

Original Article: Consequences of Changing the National Currency of Iran in the Iranian Economy

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ABSTRACT

The devaluation of the national currency leads to people's distrust in the national currency and the prevalence of foreign currencies in the country. This puts a lot of psychological and economic pressure on governments. In the event of a devaluation of the national currency, governments should pursue appropriate policies to prevent the weakening of the national currency and endeavor to preserve its value. When the value and status of the national currency is maintained by public confidence rather than gold and silver, governments have a serious responsibility to maintain the value and status of money. Given the continuing trend of inflation in the Iranian economy over the past decades and the sharp devaluation of the national currency, the implementation of the currency reform policy in Iran seems necessary. However, the authorities are still hesitant to implement the plan due to concerns about the inflationary effects of its implementation. For this purpose, in this study, according to the experiences of other countries in implementing the plan to change the national currency unit, its effects on inflation have been studied. At the same time, by estimating the demand function of banknotes and coins, the effect of the change in the demand for banknotes and coins, after changing the currency and printing banknotes with higher face value, on inflation was evaluated. Overall, the results of the studies conducted in this article confirm that the policy of changing the national currency is not inherently inflationary and governments should not be concerned about this.

Introduction

Non-monetary currency is technically a process by which a country's national currency, which has depreciated sharply due to significant inflation, is revalued and is generally done simply in the form of zero omission from the national currency. The phenomenon of reviewing the value of the national currency, which is called monetary reform or monetary revaluation in the economy, is not a new

phenomenon, but by looking at the economic history of countries, we find that many countries have implemented this policy in the face of severe inflation. The national currency not only mediates economic exchanges but also affects the national identity of the people and the political authority of governments [1]. In countries that have experienced years of inflation at high rates, large sums of money are required to exchange common economic goods due to rising general price levels. This makes

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computational and accounting operations as well as project evaluations very difficult and devalues the national currency against foreign currencies. The most important result of such conditions will be the emergence of instability and the sensitivity of inflation expectations and the beginning of distrust in the economy. Many developing countries, which have faced high inflation, have been forced to revise their currencies to handle the negative effects of the devaluation of the national currency. The change of national currency has been implemented as a reform policy in many countries. Given the inflationary trend in recent decades in Iran and the sharp decline in the value of the national currency, the reform of the national currency is necessary to reduce costs; however, due to concerns about the effects of inflation resulting from the implementation of this policy, it is still just a concept and not practiced. This study provides a general overview of currency change [2].

Problem statement

The continuous unbalanced increase in the money supply and, consequently, the continuous increase in the general level of prices has caused the purchasing power of each piece of banknotes and coins to decrease more and more day by day. As a result, the quantity of variables measured in currencies has increased in such a way that it has made it difficult to record and maintain accounts and carry out transactions. When an economy experiences high inflation rates over a long period of time and the general level of prices increases several times over, large volumes of banknotes and coins are required for routine cash transactions. In some cases, the general level of prices increases; as a result, the purchasing power of each currency decreases to the point that the currency can hardly play its role as a means of exchange and a unit of counting. It is to address the costs of such issues that governments are forced to reconsider their currency and launch new currencies to address existing problems [3].

Importance of research

The real value of the national currency in any economy is an indicator of economic strength and stability and is one of the main factors in attracting capital, both domestic and foreign capital, to participate in investment and production, which

creates new job opportunities and more production in that will eventually lead to economic prosperity, while the devaluation of the national currency will not only stop investment and production, but also the flight of capital, reducing public confidence and increasing liquidity in society. The value of a country's national currency declines when the inflation rate in that country is high for consecutive years and people are forced to pay more for banknotes and coins to use goods and services, and this is exactly what has happened over the years. Banknote per capita in Iran's economy is much higher than in that of developed countries (114 sheets vs. 14 sheets). Currency reform or the elimination of a few zeros of the country's currency has become one of the country's economic needs to facilitate trade. This is an issue that has been on the agenda of the central bank for many years. The elimination of zero from the national currency is an action aimed at increasing the nominal value of money. Therefore, we examined considering the inflation situation in Iran in recent years and the government's determination to implement the economic transformation plan, part of which is the change of currency, and the benefits stated for this policy, how the process is done and the effects of such a measure on inflation [4].

Currency change, its requirements and consequences

Money plays an important role in determining the level of economic activity, creating balance and getting rid of recession and unemployment, and therefore is of particular importance at the macroeconomic level. Given the importance of money at home and abroad, one of the most important tasks of the government is to preserve the value of the national currency. Many countries that have faced a sharp devaluation of their national currency have implemented policies to change their national currency. This study dealt with the role of money and its functions in the economies of countries, and the history of change of national currency and the requirements for the implementation of the policy of change of currency are examined. Also, according to the experience of other countries in the implementation of this policy, the situation of the Iranian Rial was studied in order to change the currency. Finally, studies on currency change were reported.

Experience of other countries in changing the currency

Normally, economic relations are disrupted in the face of severe inflation, when prices are rising at a rapidly and disproportionately rapid rate. In other words, people are not confident in the future of the economy. When it happens, policymakers are undertaking economic reforms to deal with severe inflation and its negative consequences. The elimination of zero from the national currency has been implemented as part of an economic reform program to reduce the disproportionate amount of money in many countries, some of which are reviewed in this section.

- Greece's (1944) elimination of 14 zeros

When Greece was occupied by German forces between 1941 and 1944, the country's inflation was 8.55 billion per month, in other words, the price of goods in this country doubled every 28 hours. The lives of millions of people living in this country were affected by many problems. Inflation in Greece started in 1941, but the highest inflation rates were in 1943 and 1944. In 1943, the country printed 25,000 drachma banknotes to meet the people's financial needs, but these banknotes could not be used by the people for long. For this reason, in 1944, the printing of new banknotes began in this country, on which there were 14 zeros. However, this trend continued until the end of 1944. At this time, after the end of increasing inflation, the Central Bank of Greece eliminated the zeros of the national currency with the introduction of a new currency [5].

Hungary's (1946) elimination of 21 zeros

Between 1945 and 1946, Hungary experienced an increasing rate of inflation. At that time, the prices of goods in the market of this country doubled every 15 hours. This happened after the end of World War II in this country. Before the rise of inflation, the largest banknote printed in the country was the 1000 penguin banknote. But in late 1945, the country's central bank printed banknotes worth 10 million penguins to meet the needs of the people. But this was not the end of the matter. Less than six months later, these banknotes did not meet the needs of the people, and larger banknotes were printed with 20 zeros. At this time, printed banknotes were equal to

10 to the power of 20. In the second half of 1946, even larger banknotes with 21 zeros were printed in this country. But at the end of this year, the problem of the Hungarians was solved by removing 21 zeros from the national currency [6].

Germany's (1948) elimination of 14 zeros

Germany saw inflation rise to 3.25 billion per month in the early 1920s. In other words, at this time, the price of consumer goods doubled every 49 hours. Under such circumstances, the German central bank printed large-denomination banknotes, because low-denomination banknotes had no use in the economy. The German central bank in the first step printed 50 million-mark banknotes. Over time; 100 million-mark banknotes were printed to meet the needs of the people and broke the world banknote printing record. Erhard and Rupke, members of the German school of Freiburg, proposed a currency reform to alleviate the terrible post-war situation so that the amount of money could be commensurate with the quantity of goods, as well as the abolition of price controls in Germany.

On June 20, 1948, he reformed the currency. According to this fundamental idea, a much smaller number of German marks, the new legal tender, was to replace the Reich mark. In this way, the money supply was significantly reduced. Currency reform was very complex, and the net worth of many people was significantly reduced. The net result of these measures was a 93 percent reduction in the money supply. The situation after these changes and the impact that these changes had on the German economy was very significant. On June 21, people realized that the money they earned from selling their goods was much more valuable than the old money. Absence from work decreased significantly and industrial per capita production increased many times over [7].

Poland (1950)

Because in the former Soviet Union, the mechanism of eliminating zeros from the national currency was frequent and generally resulted in the confiscation of people's assets in favor of the government and the devaluation of people's cash, this background gave the people of the former communist countries a positive view of a single change. They did not have national money. For example, the

implementation of this policy in Poland made people think that the government had confiscated part of their assets in their favor. Of course, recent studies show that with economic stability and reduced inflation, the people of this country will benefit from the implementation of this policy in the long run. Poland implemented its zero-sum policy in the middle of its economic stabilization period.

Poland had implemented a policy of zero elimination at a time when the positive effects of reform policies had not yet been felt. In fact, this policy was no longer used in Poland to signal the end of a difficult economic period to the people, but the way the government implemented this policy sought to inform people that it was very serious about pursuing different economic policies than in the past. Romania's positive achievements were not repeated in Poland. On the contrary, after the implementation of the de-zeroing policy, the value of the country's currency continued to depreciate against major international currencies, and Poland's economic growth rate continued to decline until 1996. However, since the economic stabilization package of Poland was successfully implemented and Poland became one of the most successful countries in transition, the policy of zeroing this country has never been considered a failed policy.

Czechoslovakia (1953)

In order to implement the monetary reform policy, Czechoslovakia converted the cash assets of individuals up to SEK 300 per person in a ratio of 5 to 1 and higher amounts in a ratio of 50 to 1 into new currency. Savings deposits of up to SEK 5,000 were converted at a ratio of 5 to 1 and larger amounts at a rate that gradually became more unfavorable. Wages decreased by 5 to 1 and prices decreased by 5 to 1 after an increase of 15% [8].

Bolivia's (1985) Removal of 6 zeros

Bolivia adopted policies to combat hyperinflation and its negative effects, one of which was the change of the national currency in 1985. In doing so, the country removed 6 zeros from its national currency and replaced it with a new currency [9].

Israel's (1986) elimination of 3 zeros

The Israeli government changed its currency in 1986 by eliminating zero zeros. The main purpose

of this was to simplify monetary calculations, and facilitate cash payments and registration of financial items. The need for a new currency arose from rising inflation in the early 1980s [10].

Brazil's (1967 to 1993) six-stage eliminations of 18 zeros

Brazil is a prime example of an economy with acute inflation that has eliminated 18 zeros from its national currency for many years to escape this inflation. It lost 30 to 40 percent of its monthly value in the 1960s and 1970s. In 1967, for the first time, they eliminated 3 zeros from his national currency. However, Brazil failed to control inflation, and by 1981 inflation had risen again to 151 percent. In the meantime, once again, three zeros were removed from the Brazilian national currency. In 1989, inflation rose further to 1,431 percent. At this time, Brazil once again removed the returned zeros with a change in the national currency. In 1993, when the country's inflation was close to 2,000 percent, it again removed three zeros from its currency. This time, the government succeeded in curbing inflation. However, Brazil is one of the most expensive countries in Latin America [1].

Serbia's (1994) elimination of 12 zeros

Serbia experienced extreme inflation in 1993 due to heavy international sanctions, with heavy losses. In January 1994, inflation in the Serbian economy was so rampant that the government, after printing a string of banknotes in increasing numbers, eventually issued 500 billion-dinar banknotes. From January 1 to January 24 alone, inflation in Serbia was recorded at two to three percent per hour or seventy percent per day. On January 24, 1994, the Serbian government, which intended to print a 1,000-dinar banknote, removed 12 zeros from the figure, declaring the value of a new Serbian dinar equal to one German mark. Serbia was able to control the tremendous inflation that existed in the country by controlling the printing of banknotes and the regular economic program [3].

Bulgaria's (1999) elimination of 3 zeros

Bulgaria changed its currency by eliminating 3 zeros in 1999 to facilitate accounting processes and cash payments and join the European single

currency. An examination of the statistics on the inflation rate in this country in the years 1986-2001 shows permanent inflation and in some year's inflation of several hundred percent, before the change of the currency. The only country in Eastern and Central Europe where the experience of the policy of zeroing the national currency has not been successful has been Bulgaria [10].

Ukraine's (1996) elimination of 5 zeros

In August 1996, Ukraine reduced its currency by 5 zeros. Today, foreign analysts praise Ukraine's implementation of this policy and see it as a starting point for major economic reforms. Ukraine's experience in terms of time zeroing is now recommended by international monetary institutions to other countries of the world. The zeros of the national currency in Ukraine were eliminated when the inflation rate was 444% and the liquidity growth was 2%. As a result of the implementation of the economic stabilization program, the inflation rate in Ukraine in the first year was almost 5%. In fact, at the beginning of its economic prosperity, the Ukrainian government eliminated zeros in the national currency. The country had begun its economic boom in early 1996. The experience of Ukraine shows that the best time to de-zero is when the real variables of the country are on the verge of a significant leap and monetary variables maintain their long-term and stable trend at a reasonable rate [11].

Russia's (1993, 1998) elimination of 4 zeros

Russia's experience in de-zeroing after the break-up of the newly independent republics of the former Soviet Union is significant and instructive. Russia has twice de-zeroed since then. The change of the national currency in Russia was intended to facilitate economic exchanges, and therefore, as a result of the correct implementation of this policy, the money supply and the amount of people's savings in the economy did not change. Russia's two failed and successful experiments in year 1 and 2, respectively, have provided important lessons for other Eastern and Central European countries in implementing the zero-emission policy. The de-zeroing policy of the year 1993 was a single policy and not an executive component of a coherent and effective set of economic policies. Therefore, it can be seen that in the year 2, when inflation in Russia

had reached about 4% and the growth of liquidity to cover these price increases and to provide the cash needed to do business in this country was 150% annually, the Russian government was zeroing. The de-zeroing of the year 5 failed because it quickly led to the devaluation of the Russian currency. Conversely, with the implementation of economic stabilization policies in the mid-1990s, the second zero elimination took place in 1995 when people realized the achievements of implementing the right policies and the elimination of zeros sent a message to the people that the era of high inflation had ended.

Afghanistan's (2002) removal of 3 zeros

One of the major problems that arose before the change of currency in the exchanges of Afghanistan was the counting of the number of banknotes exchanged. Although most of the printed banknotes were worth 10,000 Afghanis, large volumes of banknotes were needed due to the very low value of the Afghanis in transactions. The inefficiency of the banking system in this country had caused most of the transactions to be done in cash and by banknotes. In October 2002, the Government of Afghanistan introduced a new Afghan currency to solve existing problems. Evidence suggests that the new currency in Afghanistan, in addition to the many facilities, has created in exchange; it has also left very positive effects psychologically [12].

Romania's (2005) elimination of 3 zeros

In Romania, policymakers removed 3 zeros from the national currency in 2005 in order to solve the problems caused by the devaluation of the currency and to join the single European currency in 2005. The first important effect of the new Romanian currency was the simplification of statistical and accounting processes. The move heralds an end to high inflation in Romania. Romanian officials believed that a change of currency would reduce expected inflation. Romania's 1995 de-zeroing policy was implemented right at the end of various economic stabilization programs. Romania's national currency zeros fell when inflation above 150 percent of the country hit single digits in 1995. Also, the economic growth of this country rose to its highest average rate during the last decade since 1995 [13].

Turkey's (2005) elimination of 6 zeros

Inflation, which began in Turkey in the 1970s, has led to the use of billions, trillions (trillion) and even quadrillion (trillion) to express economic values. In this process, the demand for money in society was met by printing larger banknotes; which has been taking place every two years since 1981. As a result of this process, Turkey acquired the world's largest banknote, 20,000,000 lire. Due to the problems of the Turkish currency and its inability to successfully perform its duties, including calculations, maintenance of accounts, recording statistics and cash payments in transactions of the Turkish government since January 1, 2005, it changed its currency and banknotes, putting the new currency into circulation. Accordingly, Turkey used both types of banknotes for a whole year and at the end of the year officially abolished the old banknotes. Today, the Turkish economy has reached relative stability and the inflation rate in this country has reached single digits [14].

South Korea's (2007) elimination of 3 zeros

After three years of research into the economic implications of removing zeros from its national currency, South Korea finally removed 3 zeros from its currency in 2007. South Korea has been experiencing single-digit inflation since 1982, but its exchange rate against the dollar has been in the four digits since late 1997. Eliminating zeros in South Korea has cost \$ 470 million. These costs include printing and issuing new banknotes, minting new coins, and replacing advanced ATMs. South Korea has used so many security measures to print and issue new banknotes that are not easily counterfeited and illegally issued.

Zimbabwe's (2009) elimination of 12 zeros

One of the signs of the collapse of Zimbabwe's economy is not only the country's high inflation rate, which is almost unprecedented in history and one of the most interesting and unfortunate models of hyperinflation, but also the country's unemployment rate. As the country's unemployment rate reached 94 percent at the end of 2008, it is as unbelievable as the country's inflation rate. Also, the country's economic growth rate has been consistently negative since 1990 and is one of the lowest economic growth rates in the world. In

line with expansionary monetary policy, Zimbabwe has removed zero zeros from its banknotes four times so far. It is clear that removing zero zeros from banknotes without correcting incorrect economic policies will not cure the pain. In 2006, each Zimbabwean dollar was worth less than one million US dollars.

In October 2005, the Central Bank of Zimbabwe announced that the currency of Zimbabwe would change in 2006. The value of each new dollar is equal to the old \$ 1,000. In February 2007, it was announced that the third dollar would be released soon. Despite four-digit inflation at the time, there was not enough money to print banknotes. In the same month, the Central Bank of Zimbabwe outlawed inflation and banned any increase in the prices of certain goods, following which a number of traders, producers and sellers were arrested. In September 2007, the Zimbabwean dollar depreciated by 92%, making every 30,000 Zimbabwean dollars equal to one US dollar, but due to a shortage of foreign currency in the country, the official rates were practically insignificant.

In July 2008, the Central Bank of Zimbabwe announced that the Zimbabwean currency was changing again, introducing a new \$ 10 billion for every \$ 10 billion, but this did not help, and in practice, due to a shortage of cash and the devaluation of the Zimbabwean dollar, foreign currencies were used. In 2008, a number of sellers were officially allowed to accept foreign currency, and on January 29, 2009, the exchange of each currency was released. This led many sellers to refuse to accept the Zimbabwean dollar. The Zimbabwean dollar was initially traded at US \$ 1.47. However, the value of the currency soon depreciated, and the unwise policy of monetary expansion caused the country's inflation rate to reach an incredible 231 million percent in 2008; that figure is much higher, according to American economist Hanke. Zimbabwe's inflation rate is estimated at 80 times 10 to the power of 21; the rate, according to Hanke, is that prices almost double every 24 hours. On February 2, 2009, the Central Bank of Zimbabwe announced that 12 zeros would be removed from the Zimbabwean dollar. Given that people turned to the US dollar in their exchanges, this did not work in practice and did not help the current situation [11].

Current situation of Rials

Rial, the national currency of Iran in 1929 was designated as the official currency of the country. Studies show that within the framework of the current laws of the country, the right to issue money belongs only to the monetary sector of Iran. And it is not possible to publish additional money in Iran. According to the Monetary and Banking Law of Iran, approved on July 9, 1972, and amendments after that date, the central bank's goal is to preserve the value of the national currency. There is no guarantee in the law for the good performance of the central bank in Iran, so there is no guarantee to achieve the goal of preserving the value of the national currency.

To maintain the value of the national currency, it is necessary to implement appropriate monetary policies. For this purpose, in order to understand the reasons for the devaluation of the Rial and adopt appropriate policies to deal with it, it is necessary to study the country's monetary policies in recent decades.

An examination of the behavior of monetary officials in Iran shows that in many cases the value of the Iranian Rial has weakened due to criteria that are not related to the monetary sector under the law, such as providing financial resources for government budgets. On the other hand, the use of adjustment policies and resorting to the undefined policy of rationalizing prices has caused the prices of basic goods in the country's economy to increase sharply. The result of these incorrect monetary policies is that today the Iranian Rial has one of the highest degrees of weakening of the national currency in the world. According to statistics, comparing the value of national currencies against the value of world currencies such as the US dollar and the European euro shows that Iran's national currency has the third lowest value of national currencies among other world currencies compared with current currencies. One of the reasons for the significant devaluation of the national currency in recent decades is the persistence of inflation in the country's economy. Inflation is a type of economic situation in which the prices of goods and services, based on the unit of value in the economy, which is the national currency, rise, while the supply of goods and services decreases with the devaluation of the national currency. In fact, inflation is a situation in which the amount of money and credit

increases relative to the supply of goods and services. The complication of inflation causes many disorders in the society's economy. The main complication of inflation is the devaluation of the national currency as a result of incorrect monetary policies, and its external symbol is the excessive increase in the money supply, the creation of incorrect credits, and the decline in the purchasing power of the national currency [14].

Looking at the trend of liquidity developments and the implicit GDP index, it seems that the country's monetary authority over the years with the supply of liquidity has caused potential inflationary pressures within the economy. The study of inflation-motivating factors in the country shows that reliance on oil revenues, lack of budgetary discipline, high production costs in the country, lack of competitiveness in the country's production sector and all kinds of government interventions in price trends without considering the competitive construction of the economy. Inflation expectations are widespread. At least in the last three decades, they have been implemented in various forms in the country, including cases that have had the effect of increasing inflationary pressures, both potential and actual [15].

The permanent and constant loss of the value of the national currency causes households to lose confidence in their monetary position and at the same time increase the intensity of their expected inflation in the future. For more than three decades, the monetary authority, relying on all justifications, has drastically devalued the national currency, and at the same time, at a time when the highest foreign exchange earnings in the country's codified economic history have been earned in a decade, the monetary authority has failed miserably. It caused the return of the lost value of the Iranian Rial. To this end, central banks must reform their policies to gain public confidence and reduce inflation expectations.

Over the past three decades, many of the country's nominal variables have risen sharply, and the general level of prices based on the consumer index has grown more than 380 times. The Rial, which was designated as the official currency of Iran in 1929, has faced serious challenges in the last 30 years. 10,000 Rials banknote was first issued in 1971 and was kept as the largest banknote in circulation until the end of 2003; due to the sharp

increase in the general level of prices in the last decade, only 20 Rials of purchasing power remains. In order to facilitate exchanges, the Central Bank, by gradually printing larger banknotes, has only increased the volume of existing banknotes and changed the composition of banknotes in circulation. Thus, in 2004, the Central Bank terminated its insistence on keeping 10,000 Rials banknotes, and after 33 years, it started printing and offering a limited supply of 20,000 Rials banknotes. Then, in 2007, it started printing 50,000 Rials banknotes and finally in 2010, it issued 100,000 Rials banknotes. However, the banknotes in the society still do not meet the exchange needs of the people. Because due to the increase in the general level of prices, we will now need banknotes with higher purchasing power to have the same purchasing power of 10,000 Rials banknotes in 1971.

In fact, it can be said that one of the main problems related to the national currency is the imbalance of banknote cutting in the country with the volume of exchanges and current values in the country. Continued inflation in the country has led to the devaluation of the national currency, economic instability, the outflow of capital legally and illegally from the country and people's distrust of the national currency. Given the negative costs of this situation, it is necessary for the government to implement a currency reform policy in Iran. For this purpose, the need to print larger banknotes and change the currency has been studied in this section.

The need to implement a policy of changing the national currency in Iran

Over the past forty years, many of the country's nominal variables have risen sharply, and the continuing inflationary trend in the country has led to the devaluation of the national currency, economic instability, legal and illegal capital outflows, and public distrust of money. Given the negative costs of this situation, it is necessary for the government to implement a currency reform policy in Iran. For this purpose, the need to print larger banknotes and change the currency has been studied in this section. These problems can be divided into three general categories:

- 1- Problem of registering information in the form of rial values, calculations and payments in cash transactions;
- 2- Huge costs of printing banknotes and checks; and
- 3- Not playing the proper role of coins in exchanges.

Proposing a model to study the inflationary effect of currency change

Inflation and its economic burden on society is perhaps one of the most important economic issues among economists around the world. Inflation is very harmful to the country's economy when it comes out of a mild and severe state and will have adverse and severe economic, psychological and social effects. High inflation causes the decrease in foreign demand for domestic goods as well as the domestic currency to decrease with the decrease in exports, and in contrast, the domestic demand for goods and foreign currency increases with the increase in imports. Therefore, the exchange rate fluctuates in favor of foreign currencies and to the detriment of domestic currencies.

In fact, high inflation creates a state of uncertainty in the society's economy. Although in an inflationary economy where inflation is high, the costs of reducing production and the effects of redistribution of national income are heavy for society, the psychological effects of inflation stem from people's distrust in the real value of the national currency. This is due to the inability of the currency to perform its duties. Given the importance of the national currency as a national identity of a country and the psychological effects of devaluation, many developing countries to implement the policy of reform to deal with the negative effects of the devaluation of the national currency. They have made their own national currency.

In Iran, despite the continuation of inflation in recent decades and the significant devaluation of the national currency, the change of currency has been considered a necessity for many years; however, because there is some fear that the change of currency may contribute to inflation, its implementation is still delayed. In this chapter, in order to investigate the inflationary effects of currency change on the Iranian economy, the initial inflation and its types are discussed.

Then, the theoretical foundations of inflation are stated based on which a model for examining the inflationary effect of currency change based on the experience of some selected countries is discussed and then the results are estimated.

The effect of changing demand for banknotes and coins on inflation

Money and monetary policies can play an important role in determining the level of economic activity, balancing and overcoming economic crises. Therefore, if the government, along with other policy instruments, can effectively control the money supply and direct it to achieve these goals, the achievement of these goals will not be out of reach.

One of the factors that affects the government's control over the money supply is the number of banknotes and coins in the hands of the people. Increasing the volume of banknotes and coins in the hands of the people reduces the increasing monetary coefficient and weakens the control of monetary authorities over the volume of money.

In addition, the annual issuance of banknotes and coins creates huge costs. One of the issues that has been raised in recent years is the change of the national currency in order to reduce the volume of banknotes and coins in the hands of the people. Accordingly, by examining the experience of some countries in implementing the policy of currency change, it has been concluded that currency change is not an inflationary phenomenon, it increases the demand for banknotes and coins, and acts as an anti-inflationary policy. For this purpose, after pointing out the importance of banknotes and coins, the theoretical foundations of money demand are discussed and empirical studies on the demand for banknotes and coins are presented. Then, according to the stated theoretical foundations, the effect of changing the demand for banknotes and coins on inflation in Iran has been clarified and estimated.

The importance of banknotes and coins

There are various definitions of money, starting with banknotes and coins and covering a wide range of securities. The two most commonly used definitions are cash (M1) and liquidity (2M), of which banknotes and coins are a part. M1 is the same volume of banknotes and coins and sight

deposits and 2 M is the total of M1 and savings and time deposits. Therefore, keeping money in the form of banknotes and coins is worth considering in at least two ways. One is that the greater the share of banknotes and coins in the hands of the people than the total money, the less control the monetary authorities have over the money supply and the less effective monetary policy. Also, the higher the share of money in banknotes and coins, the higher the costs associated with replacing banknotes and coins.

Tobin Money Demand Theory

In 1958, Tobin proposed a better theory with more appropriate theoretical underpinnings for the inverse relationship between money speculation demand and interest rates. Tobin's theory is superior to Keynes's theory in two ways. One is that Tobin, unlike Keynes, believed that one does not know the future interest rate r^f with certainty, and therefore future interest rates, bond price gains and losses, and bond yields are all random variables. Second, Tobin used the theory of utility maximization to choose between holding two assets, money and bonds.

What is remarkable about Tobin's analysis is that by maximizing utility, one always maintains a combination of money and bonds, whereas in Keynesian analysis one maintains bonds or just money. So, in the analysis of Tobin speculation demand, in addition to being a continuous and descending function for the whole economy, the speculation demand curve is also a continuous and descending function for one person.

This means that as interest rates rise, so does the demand for money speculation. Another noteworthy point is that due to the shape of the indifferent curves in the figure, it is expected that with successive increases in interest rates gradually σ_{RT} and therefore B will increase less and less, and this means with successive increases in interest rates, the demand for money speculation is gradually decreasing. So, the demand curve for money speculation is convex relative to the origin. Thus, by introducing maximum utility as well as the discussion of probabilities and randomness of future interest rates and interest rates and losses on bonds, Tobin extracts the downward demand of speculation to provide a more theoretically

appropriate explanation for the demand for promissory notes.

Bamol-Tobin Trading Demand Theory

In 1952, Bamol and Tobin presented the theory of the transactional demand for money in separate papers. They tried to show that trading demand is a function of interest rates in addition to income levels, by presenting an optimization model for keeping money for transactions. Because this money demand model uses an analysis similar to the optimal maintenance and ordering of inventory or inventory, it is sometimes called the inventory model for money demand.

In this model, it can be argued that person i has a specific monthly income y_i that can be saved in a deposit account and earn interest on it or keep it in cash. If we denote the monthly interest rate by r , a person earns interest by keeping his money in the savings account equal to the percentage of interest rate r multiplied by the money deposited in the bank. If we simply imagine that y_i will be credited to his savings account at the beginning of the month, the decision is up to the individual to withdraw y_i from his account several times and use it for transactions. Although keeping a portion of the money in a savings account and withdrawing it gradually to make a transaction generates interest income for the individual, the individual spends a certain amount of money (in the form of a waste of time) for each time he visits the bank and withdraws from his account. So, the more times he goes to the bank to withdraw from his account, the more money will be incurred in this regard. Finally, we consider that the person spends his earned income during the month in a completely uniform way, which helps to simplify the extraction of results. Now we try to consider the number of visits to the bank and withdrawal from the account with the variables of income level and rate. Communication interest was obtained and from there the relationship between the amount of money held for transactions (trading demand) and the level of income and interest rates was obtained.

As a rule, the person seeks to determine the optimal or desirable number of visits to the bank. In other words, in keeping money, a person seeks to determine the optimal amount for the number of visits to the bank for transactions and, as a result, to

determine the optimal amount for keeping money or trading demand for money. The cost of commission, waste of time, etc. for a person is multiplied by the number of visits to the bank multiplied by the cost of each visit to the bank:

$$tc \times n = \text{Fee and wasted time visiting the bank} \quad (1)$$

Also, the cost of the opportunity for the person to lose interest in holding cash is equal to the interest rate, r , multiplied by the average cash held by the person, which can be denoted by M . Therefore, the cost of the lost interest opportunity is as follows:

$$r \times M = \text{Missed interest opportunity cost} \quad (2)$$

As can be seen, in general, it can be said that the average amount of cash a person during the month is equal to a person's monthly income, y_i , divided by $2n$, so we can write in general:

$$M = \frac{y_i}{2n} \quad (3)$$

By adding the cost of commissions and wasting time, etc., and the cost of the opportunity, the total cost is lost.

A person's decision to keep money is made as follows:

$$TC = tc.n + rM = tc.n + r \frac{y_i}{2n} \quad (4)$$

It is clear that as n increases, the expression $tc.n$ increases and the expression $r \frac{y_i}{2n}$ decreases. Now n must be selected so that the total cost is minimized. For this purpose, it is sufficient to derive TC from n and set it to zero, which is as follows:

$$\frac{dTC}{dn} = tc - r \frac{y_i}{2n^2} = 0 \quad (5)$$

By solving the relation $tc - r \frac{y_i}{2n^2} = 0$ the optimal value of n (optimal number of bank visits) can be obtained, which is as follows:

$$n = \sqrt{r \frac{y_i}{2n^2}} \quad (6)$$

Now by placing n optimal, the average optimal amount of cash to be kept can be kept as follows:

$$M = \frac{y_i}{2\sqrt{\frac{ry_i}{2n^2}}} = \sqrt{\frac{tc \cdot y_i}{2r}} \quad (7)$$

Which is sometimes written as:

$$M = 2^{-\frac{1}{2}} tc^{\frac{1}{2}} r^{-\frac{1}{2}} y_i^{\frac{1}{2}} \quad (8)$$

The amount of M obtained is related to the optimal amount of cash that a person should maintain on average for trading and transactions. In other words, M is the transactional demand for money derived from the principles of optimization by Bamol and Tobin.

Friedman Money Theory

In 1959, Friedman proposed a theory for the demand for money, both to provide a more comprehensive theory of money demand than Keynesian theories, and to provide a more complete expression of the Cambridge's demand for money. A key point in Friedmann's theory of demand is that Friedmann deems it necessary to distinguish between transactional demand and speculation in the Keynesian method, and considers the maintenance of money or the demand for money to meet trading needs and the storage of wealth together. Another point is that in Keynesian speculation demand theory, it is assumed that a person compares returns and the decision to hold bonds between money and bonds, but in Friedman's method, one makes money with a wide range of compared assets and then makes decisions about keeping money. Finally, Friedman considers the demand for money to be the demand for the purchasing power of money or the real demand for money, because for a level of real income, one needs the real stock of money, which, if prices rise, equals the nominal stock of money, and increases to maintain the real stock or purchasing power of the money held. In Friedman's view, the demand for money or the maintenance of money is viewed from the consumer's point of view as a consumer good that creates utility. In other words, having money creates a benefit for the consumer that will not be created in the absence of money. This desirability is due to the feeling of peace and ease of doing business that exists for the person despite the money. Money is also considered by the producer as a type of production input that helps facilitate production. Now, in deciding to keep money, it is

not possible to say that the return on money, which is zero, compares the returns of other assets, but in keeping money, the mental utility of money is compared with the returns of other assets. Holding money, the mental utility of money is compared with the return on other assets. From Friedman's point of view, the real demand for money is thus expressed in relation to the following:

$$\frac{M^d}{P} = f\left(r_m, r_b, r_s, P^e, \frac{W_H}{W}, Y_p\right) \quad (9)$$

In the above relation, $\frac{M^d}{P}$ denotes real money demand, r_m is market interest rate (e.g. bank interest rate), r_b bond signifies yield rate (including interest income and profit and loss on bond price change), r_s shows stock rate return (including dividends and Gains and losses on stock prices), P^e is expected inflation rate (which is the return on durable goods such as cars, housing and the like), $\frac{W_H}{W}$ shows the ratio of wealth or human capital to total wealth and Y_p is permanent.

Background Research

Datsi (1988) examined the demand for banknotes and coins in the United States. Using annual statistical data (1980-1921), he found that the demand for banknotes and coins has a systematic and justifiable behavior. This study was based on the inventory theory of Bamol and Tobin warehouses. Datsi first provided a model for the relative costs incurred by banknotes and coins, and then estimated the demand function for banknotes and coins. This ratio is the ratio of goods and services purchased by banknotes and coins to the total goods and services purchased by banknotes and coins and sight deposits. Lorent method has been used to measure this ratio.

According to Laurent, the volume of exchanges in the economy has the highest correlation coefficient with GDP. For this reason, the number of times a sheet of banknotes is rotated is the product of its multiplication in the volume of destroyed banknotes as the closest figure to the volume of exchanges made by banknotes and coins and forms the exchanges in the best way.

Therefore, to find this number, the correlation coefficient between the sum of exchanges made by

checks, banknotes and coins with gross domestic product must be maximized. The pattern used by Datsy has two equations, the relative expenditure incurred by banknotes and coins, and the demand for banknotes and coins, which are expressed as a set of simultaneous equations. These equations are:

$$r = F(Y, TD, TS, TG, P, RS, RC, RG, U) \quad (10)$$

$$cr = (er, e, TS, TD, TG, P, rs, rd, rc, rg, V) \quad (11)$$

Where er is the ratio of expenses incurred by banknotes and coins, cr banknotes and coins in the hands of the people in real terms, y the actual income exchanged, Ts , Td , Tg , respectively the cost of transactions related to going to the bank, cashing checks and going to the store. p is relative cost of transactions by banknotes and coins, ey expenditures made by banknotes and coins, RS interest rate on long-term shields, RD interest rate on sight deposits, RC rate of return on banknotes and coins, RG rate of return on goods and U and V are perturbation sentences. Datsi presents the demand pattern for banknotes and coins as a logarithmic function. In this model, instead of the level of variables, he has used their first-order difference and has estimated it for the years 1980-1921 using the two-stage least squares method.

$$\begin{aligned} \ln C_t = & b_0 + b_1 \ln(C_t) + b_2 \ln(er_t) + \\ & b_3 \ln(RD_t) + b_4 \ln(RSAV_t) + b_5 \ln(INF_t) + \\ & b_6 \ln(w_t) + b_7 \ln(PDUR_t) + b_8 \ln(MTAX_t) + \\ & b_9 \ln(PFAIL_t) + V_t \end{aligned} \quad (12)$$

The results of estimating the Datsi banknote and coin demand function indicate that the coefficients of CT , $PFAIL$ and W variables in the above equation are significant and their sign is in complete agreement with the theoretical foundations of money storage demand. However, the coefficients of $MTAX$ and $PDUR$ variables are insignificant at a significant level of 10% and have no significant effect on the demand for banknotes and coins and only affect the relative costs incurred by banknotes and coins. RS is also a measure of people's use. Credit for the goods they need does not have a significant effect on the demand for banknotes and coins. Also, the rate of return on sight deposits and the rate of inflation do not have a significant effect on the demand for banknotes and coins. In this study, he found a positive relationship between inflation and the demand for banknotes and coins,

which indicates that with the increase in inflation, more banknotes and coins are maintained.

Jardin (1996), using quarterly statistical data (1988-1993), estimated the demand function of banknotes and coins in China. He used the Kagan model to estimate the demand function of banknotes and coins. The pattern used by Jardin is as follows: M is the logarithm of the volume of banknotes and coins in circulation, P is the logarithm of the retail price index, FI is the industrial production index and π is the same as the inflation rate. The results of the estimate in the short-term model for the income variable is 0.48 and the inflation rate coefficient is almost zero, but in the long-term model, the income coefficient is 1.3 and the inflation variable has no significant effect. Nofaresti and Nofaresti (2003) in the study entitled "Analytical method on the factors affecting the demand for banknotes and coins in Iran", studied the demand for banknotes and coins based on the inventory theory of Bamol and Tobin warehouse. The modeling was done in accordance with the conditions of Iran and its special features were considered. In this study, non-oil GDP is used as a variable that can indicate the volume of exchanges. The variables entered are related to opportunity cost money, inflation and time deposit rates. Other variables of this model were the ratio of urban population to total population, age structure of the population, wage level (construction workers' wage index), and purchasing power of face value of each sheet of banknotes.

$$LCC = C_0 + C_1 LGDPNO + C_1 R + C_3 INF + C_4 LW + C_5 LMNOTE + C_6 LNUN + C_7 LAS + C_8 T + u \quad (13)$$

In which the volume of banknotes and coins, GDP of non-oil, wage index of construction workers, average purchasing power of each sheet of banknotes in circulation, the ratio of urban population to total population and the ratio of population 20 to 30 years to total population with CC variables, are respectively indicated. $GDPNO$, W , $MNOTE$, and NUM have been entered logarithmically. The time trend factor and inflation rate and interest rate of time deposits are denoted by T , INF and R variables, respectively. Pattern variables have been estimated via the time series statistics of 1963-1999 using the least squares method. The results show that with increasing inflation, the demand for banknotes and coins increases.

Hashemi (2006) in his master's thesis has estimated the demand for banknotes and coins based on the theoretical demand based on the existence of warehouse with Mule and Tobin. In this study, based on cumulative methods, model variables have been estimated using time series data from 1963-2003.

$$CUL = \beta_0 + \beta_1 RL + \beta_2 WL + \beta_3 GL + \beta_4 NOTEL + \beta_5 AGEL + u_t \quad (14)$$

The model variables in this study were interest rates on long-term deposits, construction workers' wages, non-oil GDP, purchasing power of the largest working banknote, population ratio of 30 to 20 points to the total population, and free market exchange rate. The results showed that an increase in the purchasing power of banknotes increases the demand for banknotes and coins and also the exchange rate decreases the demand for banknotes and coins.

Discussion

Normally, during a long period of inflation, most countries change their national currency in order to facilitate exchanges, due to a sharp rise in the general level of prices and a sharp decline in the purchasing power of the national currency and the prevention of negative consequences. Looking at the inflation trend in Iran in recent decades, it has been observed that the Iranian Rial has depreciated sharply due to the experience of high inflation rates. One of the issues that has been raised by officials in recent years has been the change of the country's currency and the elimination of a number of zeros in the national currency. However, due to some ambiguities related to this policy, no practical action has been taken to implement it. The main concern of the country's officials about the implementation of the policy of changing the national currency is the inflationary effects of its implementation on the country's economy. For this purpose, in this study, the inflationary effects of changes in the national currency in selected countries were investigated. Then, the effect of changes in the demand for banknotes and coins on inflation in the Iranian economy was addressed. In this study, in order to investigate the effect of change in national currency on inflation, a model for selected countries based on 1980-2008-time series data using the minimum method of ordinary

squares was applied. The results of model estimation in selected countries are as follows:

Argentina

The results indicated that there was a coherence between the pattern variables and the non-false regression. Given that the quantity $R^2 = 0.99$, the model has good explanatory power. The money supply growth rate coefficient is theoretically in line with expectations and is statistically significant at 95%. The growth rate of real production is theoretically in line with expectations and is statistically significant at 95%. The estimated coefficient for the virtual variable of currency change, $DU = -2 / 85$, is statistically significant at the level of 95% and its sign is negative. This result confirms that the change in the currency did not stimulate inflation, rather it reduced inflation in this country.

Poland

The results indicated the existence of convergence between pattern variables and non-false regression. Due to the quantity of R^2 which is equal to 95%, the pattern has a high explanatory power. The money supply growth rate coefficient is theoretically in line with expectations and statistically significant at 95%. The estimated coefficient for the virtual variable of currency change $DU = -2 / 54$, is statistically significant at the level of 95% and its sign is negative. This result confirms that the change in the currency did not stimulate inflation, rather it reduced inflation in this country.

Island

The results indicate the existence of a coherence between the pattern variables and the non-false regression. Given that the quantity $R^2 = 0.68$, the model has a relatively good explanatory power. The money supply growth rate coefficient is theoretically in line with expectations and is statistically significant at 95%. The growth rate of real production is theoretically in line with expectations and is statistically significant at 95%. The estimated coefficient for the virtual variable of currency changes $DU = -4.4$ is statistically significant at the level of 95% and its sign is negative. This result confirms that the change in the

currency did not stimulate inflation, rather it reduced inflation in this country.

Bulgaria

The results indicated that there was a coherence between the pattern variables and the non-false regression. Given that the quantity is $R^2 = 95\%$, the model has good explanatory power. The money supply growth rate coefficient is theoretically in line with expectations and is statistically significant at 95%. The growth rate of real production is theoretically in line with expectations and is statistically significant at 95%. The estimated coefficient for the virtual variable of currency change, $DU = -. / 48$, is not statistically significant at 95% level and its sign is negative. This result confirms that the change in currency has no effect on inflation.

Brazil

The results indicated the existence of synergy between pattern variables and non-false regression. Given that the quantity is $R^2 = 99$, the model has good explanatory power. The money supply growth rate coefficient is theoretically in line with expectations and is statistically significant at 95%. The growth rate of real production is theoretically in line with expectations and is statistically significant at 95%. The estimated coefficient for the virtual variable of currency change, $DU = 0.83$, was not statistically significant at the level of 95%. This result confirms that the change in currency had no effect on inflation.

Romania

The results. indicated that there was a coherence between the pattern variables and the non-false regression. Given that the quantity is $R^2 = 78\%$, the model has a relatively good explanatory power. The money supply growth rate coefficient is theoretically in line with expectations and is statistically significant at 95%. The growth rate of real production is theoretically in line with expectations and is statistically significant at 95%. The estimated coefficient for the virtual variable of currency change, $DU = 0.14$, was not statistically significant at 95% level. This result confirms that the change in currency has no effect on inflation.

The results indicate that according to the theoretical and empirical evidence obtained from the study of selected countries, the policy of changing the currency cannot be considered a policy that causes inflation. Contrary to the experience of these countries, it is confirmed that the policy of changing the currency has generally led to a reduction in inflation and in other cases has not had a significant effect on inflation. Therefore, it seems that the concern about the inflationary policy of changing the currency is baseless.

Also, in order to investigate the effect of change in the demand for coins in inflation on the Iranian economy, a model using the time series data of 1959-2007 has been estimated by the combined method. According to the results, R^2 is equal to 0.89. Therefore, the error correction model has a high explanatory power, so that 89% of the changes in the demand for banknotes and coins in the short term are justified by changes in the variables that explain the pattern. it is possible. The error correction sentence coefficient is 0.25 that shows that 25% of the imbalance error is adjusted each year in the next period. Watson's camera statistics also indicate the fact that error statements are not consistently correlated. It is concluded that as the nominal purchasing power of each sheet of banknotes and coins in circulation increases, the demand for banknotes and coins increases. Therefore, the general results of estimating research models indicate that:

First, according to the experience of selected countries in changing the national currency, the implementation of the policy of changing the currency is not inherently inflationary. Second, the change in currency, which is usually accompanied by the printing of banknotes with higher face value, will lead to an increase in demand for banknotes and coins. In fact, increasing the purchasing power of the nominal value of money by increasing the demand for banknotes and coins and reducing the increasing monetary coefficient acts as a contractionary monetary policy and reduces the amount of money available, which is an anti-inflationary effect. Based on the results of this study, it seems that the existing concerns about the inflationary effects of the change in the national currency are baseless.

Table 1. The proposed combinations of banknotes and coins in daily exchanges

| Coins | Banknotes |
|---------------|----------------------|
| 5/0 New Dinar | 1 Rial New |
| 1 new dinar | 2 Rials New |
| 2 new dinars | 5 Rials New |
| 5 new dinars | 10 Rials New |
| 10 new dinars | 20 Rials New |
| 20 new dinars | 50 Rials New |
| 50 new dinars | 100 Rials New |

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Conclusion

Based on the experience of other countries, it can be said that the success of the change of currency depends, above all, lies in the type of route design and how it is implemented. Accurate route design with the necessary predictions will play an undeniable role in achieving the desired goals, clarify issues such as the definition of the new currency, exchange rates between new and old Rials, how to round the figures, how to refer the old Rials in administrative transaction laws, judicial decisions, commercial laws, trading tools and other documents to the new Rials. Regulations and penalties for violating the rules on the use of new banknotes are among the issues that need to be carefully considered.

In addition, providing a timeline for the implementation of the currency change plan is of great importance in the implementation of this policy. In this program, the desired plan should be started along with the exact start date and length of time required for such matters as extensive and comprehensive advertising, coordination of banknote printing and printing systems, preparation of IT infrastructure and computer systems adaptation to this change, distribute money according to the new Rial and remove the old Rial, and determining the time of conversion of all digits from the old Rial to the new Rial. Here, the currency design project team must provide a comprehensive model of when new money is circulating until the end of the period of complete elimination of old money. Information is one of the most effective parts of implementing a currency change plan. It is necessary to provide accurate and reasoned information to the public through the mass media. One of the most time-consuming parts of this project is the coordination of computer systems and office machines with the new currency, and the

coordination of ATM systems in terms of hardware and software with the new system. Also, financial markets and securities should be coordinated with these changes and there should be appropriate information about the exchange rates of foreign currencies with domestic currencies.

A noteworthy point in the implementation of the policy of changing the national currency is the efficiency of this policy because although a change in currency prevents the waste of society's resources and the use of new money will cost less opportunity for people in society and lead to simplification of monetary calculations and ease in cash payments and registration of financial items, the effects are strongly dependent on the economic conditions prevailing in society and the attitude towards economic policies. When economic policies do not take a precise and purposeful policy, they change people's attitudes toward the economy, and the implementation of these reform policies will not only not work in this situation, but also increase the scope of economic problems. A comprehensive approach can pave the way for Iran's economy in the domestic and international arenas. It should be noted that the combination of currency change with anti-inflationary policies will increase the effectiveness of this measure. Although the change of currency is a need of today's society, it must be done according to its principles, and according to the experiences of other countries, in order to be successful.

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