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End of Central Bank's Independence: From Central Bank to National Monetary Authority

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Abstract

In a new monetary reality of the 21st century dominated by economy pricing with low inflation, low interest rate and low unemployment, it is recommended to have a more transparent and limited process controlled by administrative orders between treasury departments and central banks. This should reduce or abolish the concept of the central bank as being the 'lender of last resort' and eliminate central banks' ties to large financial corporations. The new process of administrative orders between treasury department and central banks would empower voters to exercise greater control over the political fortunes of such a process by allowing the central banks to collaborate with governments and other stakeholders under the control of a democratic process. Here, it is suggested that the new transformed central bank should be called the 'National Monetary Authority' (NMA) with shared administrative orders with treasury department under government supervision and being transparent to public regarding monetary policies. The creation of NMA will have a new monetary such as NIR and a new fiscal tool to fight high rising inflation.

Keywords: Central Bank, National Monetary Authority, Real interest rate, Natural Interest Rate, Investment, Inflation, Monetary policy, Economy Pricing System

Introduction

The idea of central bank independence has been above all independence from direction by the short-term concerns and interference of politicians. Instead, central bankers would be allowed to

set an independent monetary policy, on bringing down inflation and installing a regime of confidence in monetary stability of what is called "anchoring price expectations". The central bank was given independence from executive and legislative branches. With money's value changing value quickly because of the collapse of the Bretton Woods system and the withdrawal of convertibility of gold into US dollars in the early 1970s, independent central banks became the guardians of the public good of price stability. The ending role of gold as a liquid dollar claim, and the end of the unified fixed exchange rate regime from 1968 through 1973 emphasized even further the independence of the central banks.

The dawn of the 21st century brought other challenges to the monetary system and central banks. Many central banks in the industrialized world, in the aftermath of 2008 financial crisis, have had a hard time reaching their inflation targets. It was not the low policy interest rates promoted by central banks which caused low inflation but rather the fragile equilibrium of real interest rate. The economy's real interest rate under full employment and stable prices, in combination with the zero-lower bound on nominal interest rates, has restricted the effectiveness of monetary policy and has had no effect on inflation keeping it low or unchanged.

The scope of this paper is to explore new perspectives on the management of central bank and monetary policies as the global economy evolves into the 21st century. This process leads to the development of a new type of central bank more transparent and efficient called National Monetary Authority (NMA) that has a more wide-ranging mission of stabilizing the economy using both monetary and fiscal policy tools, based on the new theory of Economy Pricing System. The evolving global economy of the 21st century needs new monetary and fiscal tools that belong to 21st century. We cannot adjust the economy of the 21st century using the monetary and fiscal tools of the last century.

The paper is divided into seven parts. The first segment considers the advantages and disadvantages of an independent central bank. The second one talks about the central bank rules and the solvency rule curve. The third part discuss about the interrelation between the Treasury and Central Bank. The fourth segment talks about the transition from Central Bank to National Monetary Authority (NMA). The fifth part is about the jointly operations between National Monetary Authority and Treasury Department. The sixth segment will discuss a new government fiscal program to fight inflation in an economy pricing system. The seventh part will talk about the role of Neutral Interest Rate (NIR) under the new National Monetary Authority.

Advantages and Disadvantages of having an Independent Central Bank

There are advantages and disadvantages of having an independent central bank. By having an independent central bank clearly has many advantages. Some of the advantages can be been listed below:

- **Deficit spending**: a considerable large number of Governments (if not all) are affectionate of undertaking big projects even though such projects may not be completely supported by economic fundamentals. These occurrences and future commitment to invest more in large projects would become more common if the government had full control of the monetary

policy. Governments have the capability to issue bonds to match their deficit, which can be bought by its Central Banks through open market operations. Bonds issued by a government can increase the level of public debt and debt service (interest payments on the debt issuance). However, deficit spending can be consistent with public debt remaining stable as a proportion of GDP (Gross Domestic Product) as along as the level of GDP steadily grows.

- **Inflation**: Controlling inflation is the primary objective of any central bank. One way to control it is the need to control the money spent by the government. If decisions regarding public spending in the economy can be taken by the governments, they will tend to spend more money than they would be able to cover from taxes. For example, governments may increase public spending by providing free health care, childcare benefits and retirement benefits despite they don't have the financial resources to implement such decisions. This makes us think that governments will lead to use the popular option of money printing to finance deficit spending, which will ultimately lead to higher inflation than expected and eventually economic recession. Therefore, in industrialized countries to prevent this, central banks have been made independent of government authority.
- **Business cycle and political cycle**: business cycle operates in a completely different way from political cycle which is based on election every 4-5 years. The business, normally, operates based on business cycles. The periods of boom and recession in economy do not coincide with the political cycles and elections. Politicians may be easily influenced during election years and try to have popular decisions. For example, if in one election year there is much more inflation than in a normal year, politicians might be tempted to skip the necessary decision to raise the interest rates to fight the inflation as a central bank would do in similar conditions. Therefore, it is possible that politicians will not act properly or delay the decisions regarding monetary policy in improving the economy during elections years if the monetary decisions are unpopular. Usually, central banks can take tough and unpopular decisions regardless of the election cycle. The monetary policy and elections are not naturally correlated. Therefore, it is better that the decisions regarding the economy be taken independently.

Separating the central bank and monetary policy from the government has many advantages that have been listed above. However, there are some disadvantages as well that are listed below:

- **Secretive**: The biggest criticism against the independence of central bank is that their operations are very reserved and reticent. There is no opening to the public regarding the central banks' meetings. Quite often their actions and decisions are completely unexpected and hard to predict by financial analysists and business operators. It is believed that some financial crises in some countries have taken place because the central bank took unexpected actions. To prevent this from happening, central banks need to ensure that their decisions are transparent and based on economic logic. Their policies should not be secretive but rather open to government and professional experts in finance.
- **In Favor of big banks and big corporations**: There is reason to believe that all the policies and actions taken by central banks are in favor of large corporations and big banks and not in favor of the small businesses and public. For example, the main central bank's goal is to reduce inflation. However, after the 2008 financial crash, the central banks used

the policy of quantitative easing to save mostly the big banks and big corporations from bankrupting, with high risk of creating inflation.

- **Concerns over independence of Central Banks.** A well-known central bank like the European Central Bank (ECB) has been continuously criticized for projecting too rigidly the target of low inflation when the biggest problem in Europe was unemployment which has a higher rate than the USA and low economic growth. There are concerns about the wider impact of monetary policy at central banks which could impact low-interest rates on the distribution of income between savers and borrowers. The main concern of the central bank, 'inflation' was no longer a major issue after the financial crisis of 2008, at least until the global pandemic of 2020 and the war in Europe in 2022-23. Instead, a major issue in recent decades has been stagnation and prolonged liquidity trap.
- **The Impact of rapid increase of interest rates.** The Central Bank of Canada announced its key policy decision, the setting of interest rates, by increasing it ten times a year between March 2022 and July 2023 from 0.5% to 5.0% due to rising inflation. Federal Reserve in the U.S. increased eleven times the interest rate from 0.5% in March 2022 to around 5.5% in July 2023. This rapid increase did hurt public and a lot of business due to large increase of interest payments for mortgages and loans in a short amount of time. We should consider the human impact of rapid rate hikes, which central banks normally use as a monetary tool to fight inflation. As a matter of fact, this is so true that the premier of the province of British Columbia in Canada, David Eby, on August 2023 sent a letter to the governor of the Central Bank of Canada, Tiff Macklem, asking him that for the scheduled September 2023 meeting, Bank of Canada should not any further raise interest rate, given the inflation rate in Canada stabilised around 3% (2.8%-3.3%) in July-August 2023. He states that,

"…unnecessary further interest rate increases pose a danger not just to homeowners looking to renew mortgages but to renters, students, seniors, families and small businesses looking to pay bills, just as they start to recover from the COVID-19 pandemic."

Source: www.cbc.ca>news >canada>british-columbia. Dirk Meissner. The Canadian Press, Posted: Aug 31, 2023.

The premier of British Columbia province was joined by the premier of the Ontario province in Canada, Doug Ford, asking Bank of Canada to halt the interest rate hikes in 2023 (Canadian Press, September 2023). This explains why politicians in some countries are desperately asking and questioning the credibility of central banks independence regarding interest rate hikes used as a desperate monetary instrument to fight inflation.

There is a widespread general opinion that the advantages could be outnumbering the disadvantages. The independence of central bank has been widely regarded as better than the alternative and therefore many central banks across the world have witnessed increased autonomy. Some independent central bank theories have become recently obsolete due to new monetary reality. In fact, in the last two-three decades the inflation and unemployment rate in the industrialized countries have been stable, except during the pandemic and war in Europe (2020-23). The low-inflation and low unemployment rate came because of remarkable efficiency gains

achieved through globalization, technological progress and supply chain management at the beginning of the 21st century.

Central Bank and the Solvency Rule Curve

The central banks normally conduct monetary policies by adjusting the short-term nominal interest rates in response to varies shocks, using the monetary stock as the main indicator. In fact, Taylor (1993) proposed a simple interest-rule based on two variables. The first variable is the nominal interest rate which can rise more than one-for-one with inflation so that real rate increases when inflation rises, and the second variable is the interest rate to fall when output is below normal and rise when output is above normal. Taylor's rule was designed to be linear in inflation and in the percentage departure of output from its natural rate. A simple presentation of Taylor's rule is written as,

$$It - \pi t = r^* + a(\pi t - \pi t^*) + b(\ln Yt - \ln Yt^*) \quad (1.1)$$

where It is the target short-term nominal interest rate, πt is the inflation, πt* is the desired rate of inflation, r* is the assumed equilibrium rate of interest, and Yt is the real output, Yt* is the logarithm of the potential output, a is the coefficient on inflation and b is the coefficient related to output. The Taylor rule says that central bank should raise interest rate above its long-run equilibrium level in response to inflation exceeding its target and to output exceeding its natural rate. The Taylor rule was based on the principle that an increase in inflation by one percentage point would push the central bank to raise the nominal interest rate by more than one percentage point.

During the financial crisis of 2008, other alternative rules to Taylor equation have been created. One of them is called the Solvency rule, which was based on the insolvency of the system. The new perspective on the solvency rule presented by Brancaccio and Fontana (2011) after the financial crises of 2008 states that a central banker follows a new 'rule' which is aimed to control the solvency conditions in the economic system, rather than altering interest rates due to the changes and shocks in economy [1]. Because of this rule, the inflation target and eventually the output gap are neglected. Regarding the interest rate it is assumed that interest rate is kept low and is conditioned by the solvency of workers and firms that represent financial stability in the system. Differently from the Taylor rule the solvency rule represents more a benchmark than a mechanical formula.

The central bank can support the market liquidity by using the QE tool and by following the new solvency 'rule' which is aimed to control the solvency conditions in the economic system, till the commercial banks increase their lending to public and firms are able to borrow again after repairing their balance sheets and aim to have positive expectations on their investment returns. Therefore, the solvency rule or the new representation of the central bank's rule is presented as follows:

$$Bqe' = r' + a(\pi t - \pi t^*) + b(\ln Yt - \ln Yt^*) + c(Lt - Lt^*) \quad (1.2)$$

where Bqe is the quantitative easing" (QE) to boost the economy by buying bonds, mortgages-backed securities and other assets to inject money into the financial system, Yt is the real level of output, Yt* is the desired level of output, Lt is the real bank lending to public, Lt* is the desired bank lending to public, r' is the interest rate, πt is the real inflation, and πt* is the desired inflation target.

The central bank's new solvency rule during and after the financial crisis has its intention to control the solvency condition of commercial banks and big corporations rather than interest rates. Interest rates will automatically be set low as soon as a downturn or a financial crisis hit the economy to protect the solvency of workers, families and firms and stabilize the system. With the new central bank's solvency rule, interest rate, inflation and output gap are all ignored to give room to money injection in the system through QE to stabilize it.

The QE will continue until the financial stability has been reached, commercial banks and large and medium corporations have repaired their balance sheets, and private firms and public have reached confidence to start borrowing again. The QE will be gradually reduced or stopped when the desired bank lending to public, Lt*, is reached despite the inflation might have not hit yet the inflation target. The relationship between the central bank's rule of QE and the commercial bank-lending-to-public, Lt, is illustrated in figure 1.1, in the form of L shape curve.

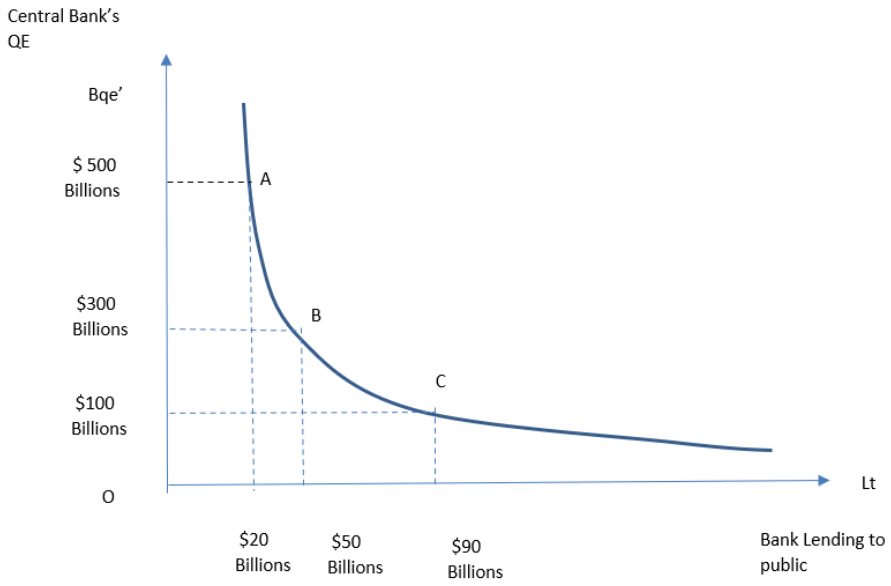


Figure 1.1 Central bank's new solvency rule curve

Figure 1.1 illustrates that at the peak of financial crisis at point A, the central bank has purchased about $500 billion dollars per quarter of private security assets and bonds. The bank-lending-to-public is at minimum, at around $20 billion dollars, as the public and private firms are not ready to borrow money from banks, despite interest rate are kept close to zero (benchmark interest rate at 0.25 per cent) and inflation is very low. As financial crisis gradually winds down, the QE moves from point A to point B, with purchases at about $300 billion per quarter (from $500 billion) and

again the QE moves from point B to C with purchases at about $100 billion per quarter and the confidence in public start increasing as firm's balance sheets are repaired. Thus, bank-lending-to-public increases from $20 billion at appoint A to $50 billion at point B and reaches $90 billion at point C.

The central bank could slow the pace of QE to a pace that keeps the desired level of stimulus, rather than trying to use extra downward pressure on interest rates. This could easily be done by reinvesting the proceeds of maturing assets, rather than creating yet more money to buy security assets.

In addition to the QE, the central banks also control the commercial banks' reserve requirement, which consist on how much of their funds they're required to keep as monetary reserve compared to what they lend out to public. By lowering the reserve help the commercial banks lend out more of their money, which increases the supply of money, and in return allows interest rates to fall. Lower interest rates are an incentive for people to borrow and spend - in addition to market confidence, build-up savings and increase balance sheet repairs - which stimulates the economy.

Interrelations between Treasury and Central Bank

There are significant differences between the role of central bank and treasury. The main role of a central bank is to provide banking services for commercial banks and lend money to banks, taking assets as collateral. Many developed countries have implemented specific reforms designed to grant their monetary authorities greater independence from their government and direct political influence. In fact, the Central bank independence is normally guaranteed by legislation and the institutional framework that govern the bank's affiliation with elected officials, in most cases with the minister of finance. Central bank legislation consists of specific procedures for selecting and appointing the head of the central bank. Usually, the minister of finance will appoint the new governor in consultation with the central bank's board and existing governor. The central bank legislation specifies the banks governor's term of appointment.

The institution or department of Treasury is considered a government body that manages the government's money where the government has its bank account into which the government deposits its receipts (tax revenues primarily) and the account from which it pays its obligations such as disbursing money for different government project (like building schools, hospitals, roads, bridges, etc.), paying employee salaries, buying goods and services from private sector, etc. The Department of Treasury in many countries is part of the Ministry of Finance under total control of the central government.

The Department of Treasury usually manages government spending. It collects the government's tax revenues, distributes its budget, issues its bonds, bills, and notes, and basically in some countries it authorizes to print the money. In general, the Treasury Department is led by a Cabinet-level appointee who advises the president or the head-of-the-state on monetary and economic policy. In advanced countries, the Treasury does not have the authority to create money, as that's the responsibility of the central bank. However, the treasury takes revenues such as taxes, borrows additional money as necessary, and pays out the government's obligations.

There's no explicit relationship between Central Bank and Treasury. Treasury department, being part of a government body, regularly supervises either directly or indirectly the actions of the central bank. Often the central bank will serve as a "deposit banker" for the Treasury, that is, the government's bank account will be kept at the central bank [2]. This means that the central bank is responsible for accepting and making payments on behalf of the Treasury

The central bank usually serves as the government's banker, processing transactions for the treasury. These transactions include accepting electronic payments for taxes, issuing payroll checks to government employees, and clearing checks for tax payments and other government receivables. The central bank, in most of the advanced nations, by legislation is not allowed to buy directly the treasury securities but rather indirectly in the secondary market. This makes the central bank typically one of the largest if not the largest buyer of the Treasury's debt (treasury securities). The central bank is also responsible for managing the nation's currency and in many cases (but not always) is the issuer of the currency that Treasury accepts for tax receivable and pays its own obligations to other entities. Therefore, the central bank can affect the value of that currency – by devaluating or valuating it - and therefore affect the value of Treasury debt relative to other assets.

Central Bank - Balance Sheet	
Liabilities	**Assets**
Banknotes (monetary base)-L1	Government balances and government Treasurie
Commercial Bank Reserves- L2	Foreign Assets (net)-A2
Liabilities held by Treasury -L3	Central Bank Operations (net)-A3
Capital and Reserve – L4	Other assets -A4

Figure. 1.2 Stylised Central Bank Balance Sheet

A stylised central bank balance sheet is illustrated in figure 1.2 where each component of the central bank's balance sheet made of liabilities and assets has an important role in the operation of the central bank, treasury, and the wider economy. The banknotes-L1 (named also as liability L1) are the liabilities issued by the central bank that are in the circulation held by public and by commercial banks.

Commercial bank reserves (L2) are overnight balances that banks hold in an account at the central bank, which are considered a claim on the central bank. Banknotes and commercial bank reserves are considered the most liquid, risk-free assets in the economy (Gray S, 2011). Liabilities held by treasury (L3) are the outstanding amount of the central bank notes (Fed notes in the US) and the central bank accounts held by Treasury department. Like private corporations the central banks are required to have capital and reserves as well.

Putting into an accounting perspective, operations that provide reserves to commercial banks will show as assets of the central bank, meanwhile operations that reduce the total of reserves held by the commercial banks will show as liabilities. The balance sheet of the central bank must balance all the time and based on the assets and liabilities illustrated in fig.1.2, we have that:

$$L1 = A1+A2+A3+A4-L2-L3-L4 \quad (1.3)$$

In the central bank's balance sheet, the monetary base L1 is equal to the total assets A1, A2 and A3 minus the total liabilities L2, L3 and L4. The government deposit funds at the central bank housed under liabilities and are like the reserve accounts, despite been treated in a different way as they are not subject to reserve requirement and are not remunerated. There are also situations when the government spending is not financed by taxation, debt sales or borrowing, but rather by central bank which lend to government to offset the deficit in the fiscal account. By operating in this manner, the central bank credits the reserves accounts of commercial banks with reserves in lieu of funds from government. The offsetting asset in the central bank is an accounting entry which is due to the central bank from government. Central bank, in this way, has financed directly the government.

Regarding treasury's balance sheet, we have that it shows the government's assets, liabilities, and net position which is a representation of a more comprehensive understanding of the government's financial position. Government assets included on the Balance Sheets are resources of the government available to meet future needs. Some of these assets reported in the Balance Sheets are cash, loans receivable, PP&E net (plant-property and equipment), inventories, and other monetary assets.

Government - Balance Sheet	
Assets (by category)	**Liabilities (by category)**
Cash and Monetary assets	Accounts payable
Accounts and taxes receivable, net	Government debt securities held by the pul accrued interest
Loans receivable, net	Government employee benefits payable
Inventories and related property, net	Environmental and disposal liabilities
Property, plant, and equipment, net	Insurance and guarantee program liabilities
Debt and equity securities	Loan guarantee liabilities
Investments in government-sponsored ent	Other liabilities
Other assets	
Total assets	**Total liabilities**
Stewardship land and heritage assets	Contingencies and Commitments
	Net position
	Funds from Dedicated Collections
	Funds other than those from De Collections
	Total net position
	Total liabilities and net position

Figure. 1.3 Stylised Government-Treasury Condensed Balance Sheet

Figure 1.3. illustrates a stylized condensed government balance sheet with all assets and liabilities by each item and category. As reported in the government balance sheet, the government's

responsibilities, policy commitments, and contingencies are part of the total government liabilities and they include different classes of social insurance programs, fiscal long-term projections, and a wide range of other programs under which the government is supposed to provide benefits and services to public especially to the category of under-privileged people. As seen in the chart above at the end of the treasury balance sheet is the Net-Position line, which is the residual difference between assets and liabilities and represents the cumulative results of operations since beginning. The second-last line is called the Total-Net-Position and is the sum of Net-Position line and funds from dedicated and non-dedicated collections.

The government has exclusive access to financial resources, due to its sovereign power to tax and borrow, through generating tax revenues and issuing treasury debt securities in the secondary market which are purchased among others from the central bank. The central bank through the holding of Government balances and government Treasuries in its assets (A1 category) is one of the biggest sources of financing indirectly treasury and national government programs.

From Central Bank to National Monetary Authority

The 2008-2009 global financial crisis and the evolution of economy pricing system has changed how monetary policy is done and how central bank manages the money supply. The low inflation rate, low interest rates and low unemployment rate have left central banks with very few monetary policy tools and significantly reduce their independence. The standard central bank monetary policies of buying and selling government bonds on the open market to reach a desired target for the interbank interest rate have not given the expected results [3].

Technically, if the recession continues even when a central bank has lowered interest rates to nearly zero, the central bank can no longer lower interest rates, but can use an unconventional monetary tool which is the quantitative easing (QE) to buy financial assets without reference to interest rates. In fact, by using quantitative easing the central bank can buy financial assets and securities from commercial banks and other financial institutions, which help raise the price of those financial assets and lowering their yield, while simultaneously increasing the money supply. This unconventional monetary tool contrasts with conventional open-market operations, as it (QE) involves the purchase of more risky assets than government bonds at a large scale, over a pre-determined period.

The presumed amalgamation of the central bank and Treasury into one government sector or the creation of a national monetary authority inside the government sector can be done without a loss of overview for sovereign monetary policy, especially if the Treasury is required to tax the public and issue government bonds to fund itself.

What is the role of the new proposed National Monetary Authority?

The role of the new "National Monetary Authority" is to have shared administrative orders with treasury department under government supervision and being transparent to public regarding monetary policies. The "National Monetary Authority" (NMA) which for simplicity can be called as "Monetary Authority" (MA) should not be independent but moderately a separate government

entity under government supervision and have shared monetary policies and responsibilities with the treasury department. The NMA will not be allowed to increase its holding of government treasuries in the primary market, but rather in the secondary market. It will be still indirectly involved in the Treasury funding through three classic channels:

First**,** the National Monetary Authority will still be able to finance the primary dealers that participate in the treasury's auctions. Through this channel the NMA will accept treasuries as collateral for repurchase agreements (repos) or by buying treasuries outright. The commercial banks will directly buy government treasuries in the open-market operations and the NMA will guarantee that there are enough reserves and supply the commercial banks with temporary repos, which is a matched purchase of treasury security debt with the requirement to repurchase later.

The commercial banks will normally use these agreements to finance the purchase of government debt securities or other investments in the open market. The NMA will then repurchase the debt securities from commercial banks at a discount rate, called the repo rate. These repo rates like prime rates will be set by the National Monetary Authority supervised by government. The repurchase agreements are strictly short-term investments with a maturity period based on the repo rate.

Second**,** the National Monetary Authority will still be actively involved in setting the yield curve of treasuries by focusing on the short end of the curve and influencing expectation about future short-term rates or Neutral Interest Rate (NIR). The yield curve can also be set by buying and selling long-term treasuries in the secondary market.

Third**,** the NMA will still be a major player in the primary market because it buys new treasuries to replace its maturing treasuries, which helps to ensure that refinancing of the Treasury goes well as planned.

The repo rate system will still be a major tool used by National Monetary Authority in the open market operations to control the money supply within economy by increasing or decreasing available funds. Other functions of the NMA would include the issue of money, lender of last resort to commercial banks, lender of last resort to government, the set of reserves requirement for commercial banks, quantity easing, etc. Let's analysis some of them briefly below:

- **Issue of money**: the new National Monetary Authority will still have responsibility for issuing notes and coins based on the money demand that will be used by commercial banks and the whole private sector in the economy.
- **Lender of last resorts to commercial banks**: NMA will have the capability to lend enough funds to commercial banks to avoid liquidity shortages and financial crisis. This will help maintain confidence in the whole banking system and the private sector as well.
- **Set reserve requirements**: This is the amount of cash that the regulated commercial banks must have on hand each night. National Monetary Authority will continue to use this monetary tool to control how much banks can lend.
- **Custody and Management of Foreign Exchange Reserves:** Another function of the NMA should be the management of the foreign exchange reserves of the country. It should be the

official custodian of gold and foreign currencies and able to sell gold at fixed prices to the monetary authorities of other countries and buy and sell foreign currencies at international prices.

- **Lender of last resort to government and fiscal agent and adviser to the government**: the new National Monetary Authority will have the ability to intervene on the open market and buy government bonds if the government fails to sell enough bonds in the open market and cause the shortfall. This function will give bond investors more confidence in buying government bonds and government to borrow at lower interest rates. The role of NMA is also to act as a banker, fiscal agent, and adviser of the central government from whom it depends. As banker to the government, the NMA will keep the deposits of the central and state governments and makes payments on behalf of governments without paying interest on governments deposits.
- **Use open market operations**: the new MA can still use the open market operations to buy and sell securities from member banks. This monetary tool helps commercial banks to change the amount of cash on hand without changing the reserve requirement. Commercial Banks and the National Monetary Authority will be able to buy and sell government bonds and mortgage-backed securities in the open market to stabilize the banking system.
- **Clearing House for Transfer and Settlement:** another important role of NMA should be to act as a clearing house for transfer and settlement of mutual claims of commercial banks. Given that NMA will hold the reserves of commercial banks, it should also be able to transfers funds from one commercial bank to another to facilitate clearing of cheques. The NMA can operates as a separate department called the "clearing house" to transfer and settle claims of one bank to others.

Jointly Operations: National Monetary Authority and Treasury Department

There are other functions or targets of the new National Monetary Authority that will be overseen jointly with Treasury under government supervision, such as inflation control, growth, low unemployment rate, and interest rate. The role of the new NMA will be to check jointly with Treasury the three main parameters of the economic stability: inflation, unemployment, and interest rates. Treasury and Monetary Authority will be jointly responsible for these objectives and targets:

- **Target low inflation**: in an economy pricing system dominated by an effective global supply chain management, technological progress and continues improvement is unlikely that the inflation will be higher than 2% (+1/-1) unless there are external shocks such as wars, pandemics, supply chain disruptions, etc. Low inflation creates greater economic stability and preserves the value of money and savings.
- **Target growth and low unemployment rate**: technological progress, effective supply chain management, fast movement of capital and financial resources are the ideal conditions of mass production of non-premium products sold at discount price. In fact, technological progress tends to increase productivity, lowers the rate of wage growth relative to productivity, and as result delays rising inflation.

- **Target favourable interest rates**: the role of National Monetary Authority and Treasury is to keep a neutral benchmark interest rate that will be charged to member banks which will guide rates for loans, mortgages, and bonds. Neutral or low interest rates will also target low inflation and maintain economic growth. The NMA and Treasury jointly will normally or ideally set the borrowing interest rates at the beginning of the year (such as the NIR) and keep unchanged for the entire year to maintain stability for all stakeholders in the borrowing market. The interest rate for the year will be decided based on a transparent process and on a widespread consultation with the public, market players, large corporations, small businesses, and different stakeholder groups. Any change of interest rates during the year, must be justified by the quick change in economic situation and look at a variety of economic statistics to get the whole picture of the economy.
- **Unconventional monetary policy**: The National Monetary Authority in accordance with Treasury may use the unconventional monetary policy such as Quantitative Easing (QE) in certain occasions especially in an economy pricing system where the liquidity trap is common due to low interest rates not being enough to boost spending and economic growth. The QE policies include creating money by NMA and use this money to do purchases of assets such as government bonds and other securities, direct lending programs, and programs designed to improve credit conditions.
- **Inflation-Fighting Tool as an unconventional fiscal policy:** the NMA jointly with the Treasury may decide to use a new unconventional fiscal policy used in an economy pricing system during periods of rising inflation. In fact, many firms operating in non-premium-product environment can choose to participate in a government program on tax corporate reduction for the portion of non-premium products that has a control price increase from one period to another. The higher the number of firms in different sectors, producing and trading non-premium products, participating to this program the lower the overall inflation in economy.

The Treasury department will continue to issue securities for other purposes than funding itself for three main reasons: i) provide a means of payment for the government of the country, ii) help the NMA in its interest-rate stabilization operations, iii) and help financial institutions meet their capital requirements posted by NMA and to provide a base upon which all other securities are valued by providing a substitution for the risk-free rate. The reasons for issuing treasuries are mostly appropriate in a monetary sovereign government with less self-imposed constraints where government administer both Treasury and NMA [3].

The low inflation rate, low interest rates (or NIR) and low unemployment rate have left central banks with very few monetary policy tools and significantly reduce their independence. Therefore, the proposed merger of the central bank and the Treasury into a government sector

and the creation of a national monetary authority inside the government with specific tasks and duties is illustrated in figure. 1.4.

Figure 1.4 reveals the joined tasks of Treasury and Monetary Authority supervised by government and overseen by Parliament in an economy pricing system when low inflation rate, low interest rates and low unemployment dominate the economic system. The newly created National Monetary Authority is focused solely on specific central banking functions and jointly with Treasury

on common targets such as inflation, unemployment rate and interest rates. Both Treasury and NMA will report quarterly to Parliament for transparency purpose how fiscal policy, monetary policy, joint responsibilities, and targets have been handled. The Treasury gets involved into monetary policy and the NMA gets involved into fiscal policy. As such, the independence of the newly proposed NMA is rather limited, but transparent, and it must ultimately support Treasury department in one way or another.

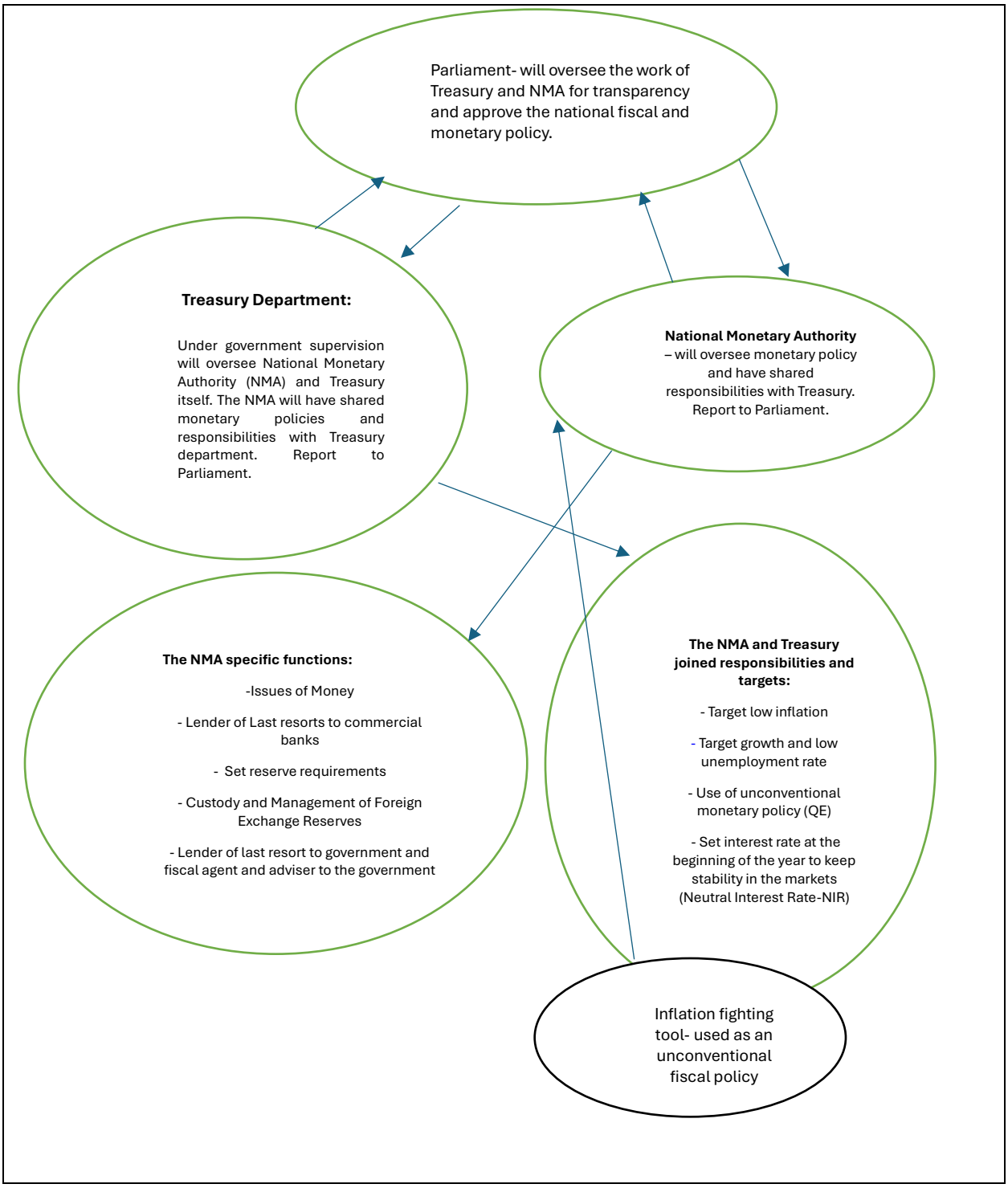


Figure. 1.4 The joined role of Treasury and National Monetary Authority (NMA)

A New Government Fiscal Program: Inflation-Fighting Tool and Economy Pricing System

Inflation is an important parameter of an economy. Low and stable inflation is good for the economy as it helps money keep its value and make it easier for consumers to plan how to spend their money. In economy pricing system most of the industrialized countries in addition to low prices, have had record low inflation, low interest rates (especially after the 2008 financial crisis), low growth rates and record low unemployment rates. However, inflation can rise quickly due to unpredicted factors and external shocks such as wars, famines, diseases, and political unrest as it happened during global pandemic years of 2020-2023 where the global supply chain was disrupted and caused a general increase of almost all prices in most of the countries worldwide. The task of national governments is to keep the inflation within a reasonable range, despite the external shocks, to help growth and reduce unemployment without comprising the purchasing power parity (PPP) of the currency.

There are several traditional methods used to control inflation with some being more effective and easier to control than others such as: Price controls to fight inflation, Contractionary monetary policy through higher interest rates, Open Market Operations, and Lower Energy, Trade, and Procurement Costs.

Price controls are normally government regulations on prices for goods and services and wages. Price control is considered by many economists as a tool of direct economic intervention to impose pricing and manage the affordability of certain goods and services, such as gasoline, food, and rent. Price control makes several basic goods and services more affordable for the consumers, however it can lead to disruptions in the market, less profit for producers and eventually lower quality for certain goods and services under price control. Price controls set by the government can impose price maximums referred to as price ceilings and minimum prices called as price floors. Although, the reasons for government pricing policy may be affordability and economics stability, the price control may have opposite effects [4]. The negative long-term effects of price controls have been known to lead to shortages, rationing, worsening of product quality and the arising of an illegal market to supply the price-controlled goods through informal channels. If the prices imposed by government are set too low, the producers may experience losses, and this can lead often to a drop in the quality of goods and services available in the market. The price-controls distort the allocation of resources. In fact, price ceilings prevent prices from exceeding a maximum, which could cause shortages and price floors prevent prices below a certain minimum that can cause surplus.

The Contractionary Monetary Policy using interest rate is another indirect method to control inflation. The main objective of the contractionary monetary policy is to reduce the money supply in an economy by increasing the interest rate. The central bank will increase interest rate to slow economic growth by making the credits and loans more expensive, which reduces consumer spending and businesses reduce their investments. Rising interest rates help rise the interest rates paid on government securities, which help investors buy government securities that have higher interest rates and are less risky than riskier equity investments with lower rates.

Open Market Operations (OMO) is another monetary tool to control inflation. OMO refers to buying and selling Treasury securities by a central bank to increase or decrease the money supply and adjust interest rates. The central bank balance sheet increases when the central bank buys securities and shrinks when it sells them. This monetary tool promotes liquidity in financial markets and put downward pressure on interest rates when central bank buys securities, while selling securities does the opposite. Central banks through Open Market Operations (OMOs) can continue to raise interest rates and decrease their balance sheet to better control demand and reduce inflationary pressures.

Lower Energy, Trade, and Procurement Costs are more direct tools to control inflation. Government policies and regulations can influence the price of many goods and services. For example, government can reduce tariffs for certain goods imported from other countries, which help companies reduce their prices and consumers get their best price for every dollar they spend. Government can end certain regulations in transportation industry that increase shipping costs and encourage the production of renewable energy to push the price of electricity down.

The role of central bank is to maintain price stability and control inflation. However, it's not easy to bring inflation under control without triggering a recession, especially if government continue to use fiscal policy and excessive spending which could worsen inflation pressures. If central bank quickly increases interest rate to fight inflation this may cause higher cost of borrowing and eventually an undesired recession.

Promotion of non-premium products at discounted price

There is also another method that is used to control inflation, based on the theory of "Economy Pricing System" dominated by the mass production and high volumes of non-premium products which are sold at affordable price [3].

What is an Economy Pricing System?

The combination of mass-produced commodities sold at promotion prices (at high frequency during sales events) using advanced technologies, new organization management methods, innovative global supply chain and complex online shopping methods at micro level with low inflation, low-interest rates (except during economic shocks such as pandemics, wars. etc.), low growth, and low unemployment rates at the macro level has created the perfect conditions of the new economy named "Economy Pricing System". The main characteristic of the economy pricing system is that many companies are considered multi-product firms and product switching. In fact, one of the characteristics of economy pricing is to have firms producing both premium and non-premium category of products [3].

Non-premium brands are normally referred to those products that highlight different elements and characteristics, such as price discounts, affordability, and reliability, which tend to be more important for value conscious consumers offered at different low and medium price-ranges. Price and quality ratings can help consumers create their utility 'function' and influence how consumers perceive the quality of a product. For non-premium products, consumers use price to assess

product's overall quality when objective quality is difficult to assess. Affordable pricing for non-premium and basic products is what is needed during recession and rising inflation. Each firm can easily identify in revenue the affordable non-premium products sold at regular price or at discount price.

We assume that a firm has few non-premium items, n, selling at discount price, Punp, during sales events. The sales revenue of this firm indicated as Rs, operating in economy pricing that sell non-premium discounted, non-premium and premium products at regular price is given as,

$$R_s = \sum_{i=1}^{n} P_{unp} q_u + \sum_{i=1}^{n} P_{np} q_{nP} + \sum_{I=1}^{n} P_P \, q_p \qquad \text{where qu> qp and qu=ku} \qquad (1.4)$$

where, Punp and qu are respectively the discount price of units Un and quantity sold of non-premium products during sales events. Meanwhile, Pnp and qnp are respectively the regular price and quantity sold of non-premium products during non-sales events and Pp and qp are the regular price and quantity of premium products. Ku is the capacity utilization of the superstore to reach a satisfactory level of revenue to meet target profitability and the net monetary position condition (NMP>1).

The portion Punp qu in the equation (1.4) that points to the sales discounted price and quantity of non-premium products determines the inflation control tool to fight rising prices in an economy pricing system. We assume that there are many firms, Fi, operating in different sectors of economy pricing offering discount price Punp for non-premium products with a total sales revenue for all premium and non-premium products given as,

$$R_s = \sum_{i=1}^{n} F_i \left[\sum_{i=1}^{n} P_{unp} q_u + \sum_{i=1}^{n} P_{np} q_{np} + \sum_{I=1}^{n} P_P \, q_p \right] \qquad (1.5)$$

To put pressure on firms to keep the inflation low, the government can choose to reduce corporate tax for all those firms in different industries that during periods of rising inflation sell non-premium or basic products at discount price for the portion Punp qu in the equation above [3].

If the revenue for a firm operating in economy pricing for non-premium discounted, non-premium and premium products is made respectively of 45%, 30% and 25% of total sales, then government can choose to reduce corporate taxes based on the sales of non-premium discounted products that have a price increase based on the inflation target of the industry in the range of no more than 2-3% from month to month, or from quarter to quarter, to keep the inflation down. For example, if the corporate tax is 28%, and the firm at the end of the month has total sales of non-premium discounted product reaching 45% of overall sales, then the corporate tax could get reduced from 28% to 15.4% calculated as: 28% -(28% x 45%) = 28% -12.6%=15.4%. This fiscal policy will motivate the firm to manufacture and sell more non-premium products at discounted price during periods of rising inflation. This fiscal tool is important especially in those industries that produce basic needs, such as food, clothes, baby products, personal care products, basic services, etc., that could help keep the inflation low for essential products.

In some cases, the government can increase corporate taxes, for a limited time, to those oil producing corporations that reach extraordinary profits due to unreasonable and unjustified fuel

price increase that affect almost all sectors of economy and are 'responsible' somehow for rising inflation. Appendix 1.2 "Economy Pricing System and Oil Industry", demonstrate how the principles of an economy pricing system are applied in Oil Industry in North America to fight high inflation, during periods of international oil price increases.

As inflation rises, many firms operating in non-premium-product environment can choose to participate in the government program on tax corporate reduction for the portion of non-premium products that has a controlled price increase of 2-3% from one period to another. The higher the number of firms, producing and trading non-premium products, participating to this government program the lower the overall inflation in economy from one period to another. The total number of firms that operate in an economy affected by rising inflation in different sectors can be divided in those firms that produce non-premium products and participate in the price-control government programs with tax reductions and those firms that produce premium and non-premium products but do not participate in price-controlled programs and do not get tax reduction. This function can be given in the equation below as,

$$Total\ firms = \uparrow Tax_{red}[\sum_{i=1}^{n} F_{inpr}\ G_{npr}] + \downarrow No\ Tax_{red}[\sum_{i=1}^{n} F_{inp} G_{np} + \sum_{i=1}^{n} F_{ip} G_{p}] \quad (1.6)$$

where Finpr is number of firms that produce and sell non-premium products indicated as Gnpr, which are eligible for corporate tax refund, and Finp and Fip are the number of firms that produce and sell non-premium and premium products respectively indicated by Gnp and Gp, that are not eligible for tax reduction as they do not participate in price-control programs. The higher the number of firms, producing and trading non-premium products participating in Tax corporate reduction programs (TAXred), compared to other firms that do not participate in these programs, the lower the overall inflation in economy [3].

The inflation rate for an economy pricing system which consider the average price of a non-premium product during sales and non-sales events that are part of the government program to keep the inflation low, based on consumers price index (CPI), can be written as,

$$InflationRate = \frac{Avr\sum_{i=1}^{n}(CurrentCPI - BaseYearCPI)}{Avr\sum_{i=1}^{n} BaseYearCPI} * 100 = \frac{Avr\sum_{i=1}^{n}(P_{unpc} * q_u - P_{npb} * q_p)}{Avr\sum_{i=1}^{n} P_{npb} * q_p} * 100 \quad (1.7)$$

where Punpc is the price of non-premium product at the current period and Pnpb is the price of non-premium product at the beginning of the period which is referred to as base-year period. The non-premium quantities sold at current period and at the beginning period are given respectively by qu and qp. The difference in price between the current period, Punpc, and the beginning of the period, Pnpb, should be on average between 2% and 3% (average of 2.5%) to be eligible for government programs of price control, which can be written as,

$$Low - InflationRate = \frac{Avr\sum_{i=1}^{n}(P_{unpc} * q_u - P_{npb} * q_p)}{Avr\sum_{i=1}^{n} P_{npb} * q_p} * 100 \approx 2.5\% \quad (1.8)$$

The corporate tax reduction could be considered an indirect subsidy for firms participating to government price-control programs that manufacture and sell non-premium products to keep the

price stable. In fact, tax reduction funds could help these firms recover part of the rising cost of raw materials during inflation periods which is an incentive for these firms to keep the price of non-premium products at reasonable levels. This program gives time to firms selling non-premium products to streamline the supply chain during the period of high inflation to better control cost. More other firms can join these government programs, so they can keep the price of non-premium products low, despite the rising cost of raw materials, to defend market share for those non-premium products that they have competitive advantage. Once the inflation rate returns to the acceptable average of 2-3% on quarterly or annual bases, then price-control programs can be ended.

The role of Neutral Interest Rate under the National Monetary Authority

The neutral rate of interest has been a long-run concept that keeps growth at trend and inflation constant at target, when there are no shocks hitting the economy. If the growth is going to be constant and the inflation kept at target, then the neutral rate of interest is that level of interest rate to keep in balance the desired level of saving and the desired level of investment. It is the rate at which the monetary policy is neither stimulating nor restricting the investments in economy. The neutral interest rate (NIR) can be thought as a standard, where a contractionary real interest rate is referred to as "above neural" and similarly a stimulatory real interest rate is referred as "below neutral". The gap between the real interest rate and the neutral interest rate can be considered as a measure of the degree to which monetary policy is stimulating or contracting the economy. The neutral interest rate is typically believed as independent of monetary policy of the central bank and instead is driven by real phenomena such as demographics, technological progress, inequality, and preferences for safe and liquid assets [5].

There are limitations on the usage of neutral interest rate concept as the estimates of the neutral rate are imprecise and uncertain due to estimates of the natural rate of unemployment, potential inflation and growth of GDP and the difficulty in predicting future changes in the sustainable rate of productivity growth. There are different economic and financial drivers of the neutral interest rate. Some of them are considered below:

The first driver is the productivity growth. Many macroeconomic theories indicate that the interest rate is affected by the growth in aggregate productivity. Higher productivity growth increases the trend to borrow more money to invest in technology, supply chain management and organization and structural improvements. Therefore, the interest paid by borrowers must compensate lenders for giving up the 'opportunity cost' (alternative use of money) and drive up the interest rate to induce lenders to lend on different sectors of the economy.

The second driver is the fiscal policy. When government increase spending and consequently the borrowing, it can lead to higher interest rates as more savings is required for additional funds. However, despite the fiscal policy, the effect on interest rate depends also on the behaviour of the private sector to invest in government bonds [6].

The third driver is the demographics. Advanced economies have lower population growth rate due to lower birth rate compared to developing countries with much higher population growth that

puts more pressures on government resources such as healthcare and education. Slowing population growth and aging have lowered working-age population grow rates in industrialized countries. As population continue aging, will further lower potential employment growth due to older specialized workers leaving the labor force as they retire and increase the gap to replace them. The demographic changes have implications on aggregate desired saving for longer and healthier retirement, which may affect the neutral interest rate as well.

A fourth driver is the trend of capital stock. A low trend in capital stock has reduced the rate of growth in advanced economies for at least two reasons: first, the lower growth in the labor force needs less capital stock to equip workers and employees. Second, the low growth in demographics needs less investment in new housing and public infrastructure. This can put pressure on the savings and on interest rates.

A fifth driver is the excess savings over investments. This is due to several factors. One factor is that the aging population in developed western countries will tend to save more for retirement, spend less money on consumption which can put pressure on lowering interest rate and reduce the investment. A second factor is the inequality on savings among those that make a minimum wage and those that are wealthier. The minimum wage earners save less than other middle-class employees and professionals that earn higher incomes. That excess income of the wealthier people as soon as is earned is saved and is used for future investment on capital goods, such as houses, luxuries vehicles, cottages, shares, bonds, etc., putting downward pressure on the interest rates [3].

A sixth driver is the international capital flow. International capital flows from the integration of global capital markets are predominant drivers of the neutral interest rate. Emerging markets provide alternative investment opportunities resulting in capital outflows affecting the neutral rate of interest in industrialized countries. Massive investments on liquid assets such as the US government bonds have driven up their prices and put pressure on lowering their return [7].

A seventh driver is the economy pricing system. The economies of advanced countries have entered a new phase called "economy pricing", where most of the mass produced non-premium products are sold at discounted price during certain periods of the year, called sales events. The mass production of non-premium products had kept the price of non-premium goods low and guaranteed affordable prices and as result delays rising inflation. This has put downward pressure on the neutral interest rate [3].

The role of the National Monetary Authority (NMA) would be to target favorable interest rates. In fact, the NMA should keep a benchmark interest rate to charge member banks that will guide rates for loans, mortgages, and bonds. This will be the neutral interest rate (NIR). The National Monetary Authority and Treasury jointly will ideally set the borrowing interest rates at a neutral rate of interest at the beginning of the year and keep unchanged for the entire year. The neutral interest rate will be decided based on a transparent process and on a widespread consultation with the public, market players, market analysts, large corporations, small businesses, and different stakeholder groups such as representative groups from loan holders, mortgages holders and bonds holders.

The estimation of neutral interest rate under the NMA follows a different logic. The logic is based on the transparency of stakeholders regarding a hypothetical neutral interest rate where all the groups agree upon. The NMA is supposed to have an annual meeting with the participation of different stakeholders to determine the neutral interest rate for the entire year. Each stakeholder is supposed to have its own target for the neutral interest rate. There are several assumed stakeholders and advocacy groups nationwide that have their interests to influence the NMA in determining the neutral interest rate policy. Some of them are assumed as follows:

- Central Government,
- Commercial Banks (for example, the American Bankers Associations ABA in the US),
- Consumers Union,
- Associations of big corporations in different industries,
- Association of Small business in different industries,
- Association of mortgage holders in large urban cities and big cities,
- Association of mortgage holders in small cities and rural areas,
- National Farmers Union,
- Associations of unions in service, insurance and banking sector.

All these national associations have their own target on determining the neutral interest rate to present at the general meeting of NMA. The challenging question is if the inflation should be included in the estimation of the neutral interest rate under the NMA ruling. As we mentioned before the Taylor rule was based on the inflation principle where for example, an increase in inflation by one percentage point would push the central bank to raise the nominal interest rate by more than one percentage point.

Based on the new role, the NMA should consider inflation as a non- monetary issue, which does not need a monetary tool to fix but rather a fiscal one. it. In fact, the concept of inflation-control fiscal tool is based on the theory of "Economy Pricing System" dominated by the mass production and high volumes of non-premium products [3]. During periods of rising inflation, the inflation-fighting tool should be activated where many firms operating in non-premium-product environment will choose to participate in a government program on tax corporate reduction for the portion of non-premium products that has a control price increase from one period to another without putting any downward pressure or reducing the neutral interest rate. Assumed that inflation is a non-monetary issue, the role of NMA is to set up a neutral interest rate in long periods such as 1 year, 3 years or 5 years to keep stability in the markets and the national economy. Based on the Taylor equation (1.1) we can create a new equation for the Neutral Interest Rate (NIR) managed by NMA which could take the form as:

$NIR_t = r^* + \text{Target}(G_r - S_r)$ where Inflation-fighting tool is activated if ($\beta_t > \beta_t^*$) and disactivated if ($\beta_t < \beta_t^*$) (1.9)

where NIR_t is the Neutral Interest Rate, β_t is the current inflation, β_t^* is the desired rate of inflation, r^* is the assumed equilibrium rate of interest, G_t is the target neutral rate of interest indicated by the Central Government and S_r is the target neutral interest rate indicated by the

group of different stakeholders such as commercial banks, consumer unions, etc. The difference between these two targets ((Gr-Sr)), will determine the neutral interest rate in the long run. As we can see in the equation of the NIR above, the inflation βt is excluded as it is considered a non-monetary issue, nevertheless is included a fiscal tool. It is rather considered under a different aspect based on the fiscal inflation-fighting tool. The inflation can be reduced by activating an inflation-fighting fiscal tool (as mentioned in the last segment) if inflation is above the target and disactivated if inflation is below or in the target.

Central government and each stakeholder have its own NIR target based on different factors, surveys and estimations. It's interesting to notice that the Fed's average historical interest rate in the U.S.A. for a period of over thirty years from 1991 to 2023 has been around 2.91% (see tables in appendix 1.1). The interest rate in the U.S. has gone from the high of 6.75% in 1991 to the low of 0-0.25% during the financial crisis in 2008 and again at the start of pandemic in 2020 (at 0-0.25%) and then rising quickly in 2022 reaching 5.50% in July 2023, due to average yearly inflation reaching 8% in 2022 and around 5% in the first six months of 2023. The inflation rate in the U.S. has gone from an average of 3.5% in 2000 to an average of 1.5%-18% from 2008 to 2019 and then quickly rise to an average of 8% in 2022 and 5% in 2023.

The reasons of high inflation during the period 2022-2023 are caused by the global pandemic, war in Europe, supply chain issues and global economic uncertainty. Despite these global events during a thirty-year period, the average interest rate has remained at 2.91% which is close to the neutral interest rate of 2.50-2.70%. Figure 1.5. shows that each presumed stakeholder or group of interests has its own long-term NIR target indicated by Sr in equation 1.9. In the same way the Central Government has a different assumed NIR target which is indicated by Gr in equation 1.9.

Estimate methods	**Estimates of NIR**	**Average NIR estimate**
Estimates based on the histori interest rate over the period 19 (see appendix)	2.91%	2.91%
	Estimates based on tar	
Central Government target -NM – Gr	3.0 %	3.0%
Stakeholders Targets: - Sr		
Big Commercial Banks	3.0%	
Banks -Credit Unions	3.0%	
Consumer Unions	2.0%	
Associations of big corporat different industries	2.5%	
Association of Small busin different industries	2.0%	

Association of mortgage holder urban cities,	2.0%	
Association of mortgage hol small cities and rural areas,	2.0%	
National Farmers Union	2.0%	
Associations of Unions in c industries	2.0%	2.27%
Overall-Consensus average esti NIR		2.6% or rounded up to 2. rounded down to 2.5%

Figure 1.5 Estimates of NIR on the NMA annual meeting

In a similar way, figure 1.6. illustrates the National Monetary Authority (NMA) annual meeting at the beginning of the year where participants representing each stakeholder or group of interests with the voting rights proposes or 'bids' its long-term NIR target to the executive committee, to determine the final NIR during the voting session.

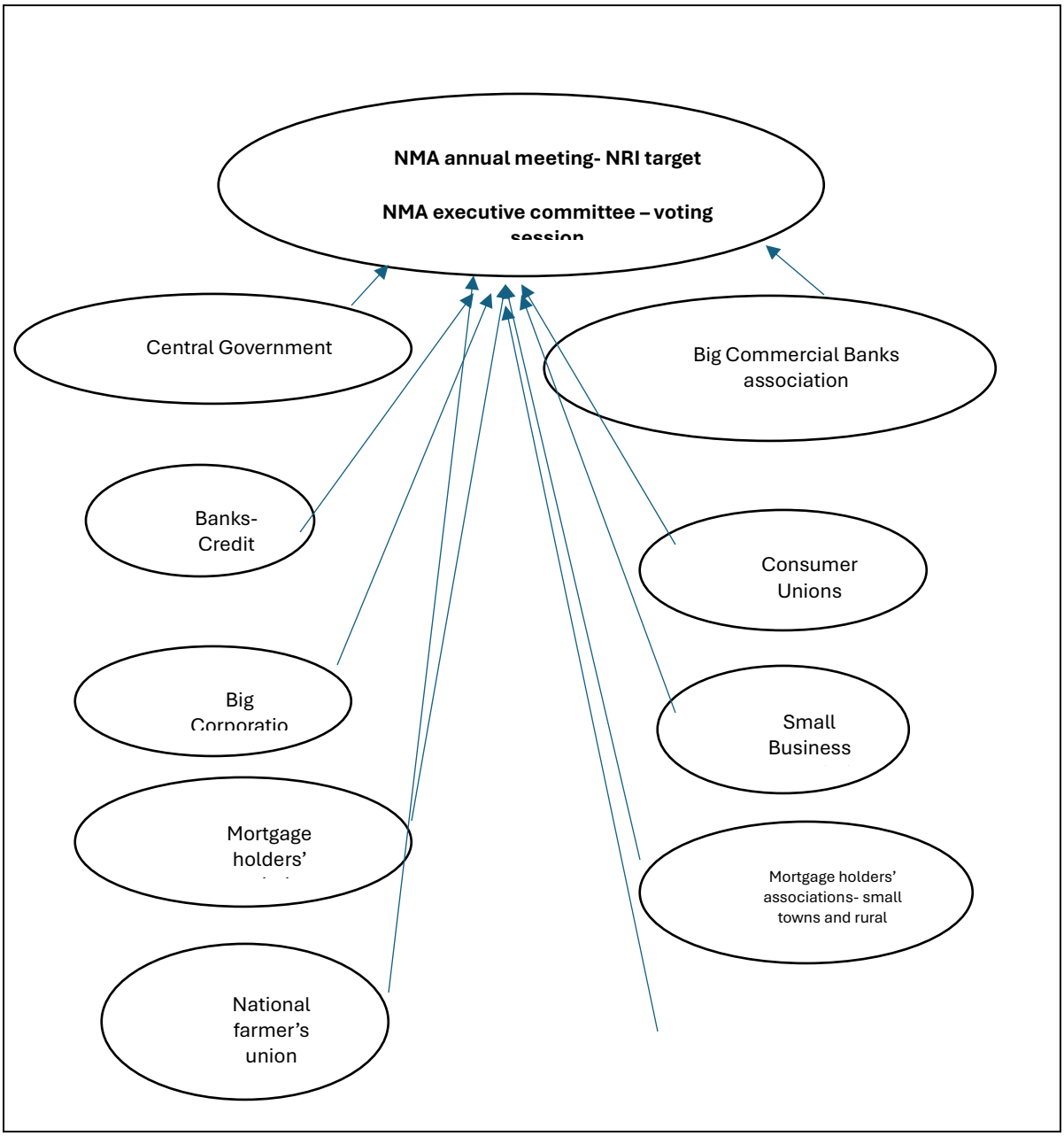


Figure 1.6 Stakeholder participants with voting rights in the NMA annual meeting

It is assumed that the Central government has the highest NIR target at 3%, which is closer to the historical NIR at 2.91%. From the group of presumed stakeholders, the group of commercial banks has the highest NIR target at 3% which is also closer to the thirty years of historical real interest rate of 2.91%. However, the rest of stakeholders such as consumers union, associations of mortgage holders in big cities and rural areas, national farmers union, etc., have a much lower NIR target of around 2%, to keep down the cost of borrowing.

Therefore, the overall average consumers and commercial banks' NIR target stands at the range of 2.5%-2.75%.

Reaching a consensus on a long-term neutral interest rate (NIR) by a pool of stakeholders with different backgrounds and interests and central government is a big achievement for the Executive Committee of the National Monetary Authority (NMA). It creates the perfect conditions for monetary and macro-economic stability, as NMA does not have to use the interest rate policy as a leverage to stabilize economy in case of external shocks. During financial crisis alternative fiscal and monetary tools can be used to fight inflation and stabilize economy.

The first tool is not the interest rate given that it has been set as NIR, but rather another monetary policy that is the unconventional monetary Quantitative Easing (QE) or the Solvency rule, as mentioned in the previous segment. This monetary policy is based on the insolvency of the system where the NMA follows the new 'rule' aimed to control the solvency conditions in the economic system, rather than altering interest rate.

The second tool is a fiscal tool aimed at fighting inflation by activating the inflation-fighting tool if inflation is above the target and disactivating it if inflation is below or in the target. In fact, if for example the inflation rises above the target of 2%-3% as it happened during 2022-2023 where the inflation reached on average 8% in 2022 and 5% in 2023 in the U.S., the fighting-inflation-tool consisting of indirect subsidies for firms participating to government price-control program to sell-non premium products at affordable price should have been activated on August-September 2021 when the inflation hit around 5% (see charts in appendix 1.1).

Should NMA keep unchanged the Neutral Interest Rate (NIR) in the long run, even during external shocks and financial crisis?

There are different reasons to keep a NIR unchanged during financial crisis or external shocks. One reason is that lowering interest near zero during a financial crisis won't help the recovery and will not help commercial banks lend a large amount of money to public. After the financial crisis of 2008, damaged banks simply didn't want to lend, and damaged businesses and households were not ready to borrow. In fact, they wanted to reduce their debts rather than increase them. This phenomenon was called the "balance sheet recession" by economist Richard Koo [8].

A second reason is that commercial banks should keep the "discipline" of scrutinizing customers and performing 'mortgage stress test' before lending money. Keeping the NIR even during financial crisis will send a message to customers that borrowed money will not be cheap.

A third reason is that a long-term NIR will not increase the value of real estate assets and other assets at accelerated rate, but rather keep them stable. We have seen this happening after the 2008 financial crisis when the value of the real estate assets in Canada and the U.S.

has increased rapidly due to cheap money with interest rate close to zero. In fact, the declining mortgage rates increased hastily the demand for housing and the housing prices after 2008, which in return increase the value of properties and assets in a scale never seen before.

A fourth reason is that the keeping of NIR for long-terms has the capability to influence asset prices and the bond market in the short term. Short-term events can temporarily affect the bond market; however, interest rates tend to follow long-term growth and inflation trends. A NIR will be considered a long-term factor and should not affect the bond market in the short-run, but rather supply and demand issues should affect yields on bonds in the broader market in the short-term.

How is the Prime Rate determined under NIR?

As per definition the prime rate is the interest rate that commercial banks charge their most trustworthy clients that have high credit ratings. The prime interest rate, is normally the prime lending rate, is largely determined by central bank funds rate. The central bank rate is the overnight rate commercial banks use to lend cash to each-other. Commercial banks will eventually use a combination of the central bank rate + ≈2% (average) to determine the prime rate or +≈1% using NIR rate under NMA ruling. The prime rate +2% is the base for interest charges on mortgages, small business loans, or personal loans. For other borrowers, where the interest charge is based on their credit scores and credit histories, is normally; Prime + ≈2% (average) plus a certain percentage. For example, if the central bank interest rate is set at 3%, then the rate for borrowers is determined as: 3% bank rate +2% rate = 5% prime rate+/-1% credit score rate = 5% or 6% (depending on credit score). Instead, under the NMA ruling the NIR will be set around 2.5% in the long-run, then the price of loans under NMA regulation represent some different scenarios as indicated in figure 1.7.

Price of the loan using NIR rate ruling	**Commercial Banks**
Determination of prime rate	NIR rate = 2.5% + Commercial Bank Rate of ≈1%- 2% = 3.5%- 4.5% Prime Rate
Price of the loan based on the credi	=3.5%-4.5% prime rate +/- ≈0.5% -1% according to the bank's criteria = good credit score ≈3.0% - 4% = poor credit score ≈ 5% - 5.5%

Figure 1.7 Price of the loan under NMA using NIR

As indicated in figure 1.7 the prime rate using NIR rate under NMA ruling should be on average around (2.5%+1%) or (2.5%+2%) = 3.5% or 4.5%. From this derives that the price of loans using NIR- prime rare based on the credit score is on average about 3%-4% for good/excellent credit score and 5%-5.5% for poor credit score. It must be emphasized that there is no variable interest rate on loan and mortgages under NMA ruling due to NIR which

does not change in the short-term. The only variable factor that affects the changes of borrowing rates is the credit scoring for each client. This guarantees that loans on mortgages, small business, or personal loans are not cheap or expensive in the long run - independently of recession or rising inflation - but rather follow an unbiased neutral interest rate path.

Conclusion

The idea of central bank independence for many economists has meant above all independence from direction by the short-term concerns and interference of politicians. In a new monetary reality dominated by economy pricing system with low inflation, low interest rate and low unemployment, has been suggested of having a more transparent and limited process controlled by administrative orders between treasury department and central bank. The main idea was to reduce the independent role of the central bank and eliminate central banks' ties to large financial corporations. The new process of administrative orders between treasury department and central banks was supposed to empower voters to exercise greater control over the political monetary policy of central bank by allowing the central bank to collaborate with government ensuring a transparent and democratic process.

We have analyzed the new central bank rule called the Solvency Curve which is based on a new concept that consist of an economy fighting recession and return to normality by using the quantity easing (QE) and the capability of commercial banks to lend back to public. The relationship between the central bank's rule of QE and the commercial bank-lending-to-public, has the form of L shape curve while the interbank interest rates has been put close to zero.

This article introduces the notion of a new National Monetary Authority (NMA) intended to replace the role of central bank, which will be supervised and administered jointly by treasury and government. The newly created NMA will be focused exclusively on specific central banking functions and jointly with Treasury on common targets such as low inflation, low unemployment rate and favourable low interest rates. The independence of the proposed NMA and its monetary policy is rather limited and more transparent to public as it is required ultimately to support the Treasury on a more national comprehensive fiscal policy.

We discussed how an inflation fighting tool works under NMA ruling. It interesting to notice that during the inflation rising periods, many firms operating in non-premium-product environment could choose to participate in a government program on tax corporate reduction for the portion of non-premium products that has a control price increase from one period to another. The higher the number of firms in different sectors, producing and trading non-premium products, participating to this program the lower the overall inflation in economy from one period to another.

The last part of the paper discusses about the use of Neutral Interest Rate (NIR) under NMA ruling in the short and long run even during external shocks and financial crisis. The NIR can be reached by the consensus between different groups of stakeholders and central government. NIR creates the perfect conditions for monetary and macro-economic stability, as NMA does not have to use the interest rate policy as a leverage to stabilize economy in

case of external shocks but rather alternative fiscal and monetary tools can be used. One monetary tool is the Solvency rule, where the NMA follows this rule aiming to control the solvency conditions in the economy. The second tool is a fiscal one designed to fight inflation by activating the inflation-fighting fiscal tool if inflation is above the target and disactivating it if inflation is below or in the target based on the theory of economy pricing system [12-17].

Appendix

Appendix 1.1

Tables: U.S. Fed's Interest Rate and Inflation in the long-run

	Fed Interest Rate 1991-2000	**(Fed Chairman Alan Greenspan 1987-2000)**	
Meeting Date	**Rate Change**	**Interest Rate Target**	**Average Interest Rate Target**
January 9, 1991: Conference call	-25 basis points	6.75%	
February 1, 1991: Conference call	-50 basis points	6.25%	
March 8, 1991: Unscheduled move	-25 basis points	6%	
April 30, 1991: Conference call	-25 basis points	5.75%	
Aug. 5, 1991: Conference call	-25 basis points	5.5%	
Sept. 13, 1991: Conference call	-25 basis points	5.25%	
Oct. 30, 1991: Conference call	-25 basis points	5%	
Nov. 5, 1991	-25 basis points	4.75 %	
Dec. 6, 1991 (After a Dec. 2, 1991, conference call)	-25 basis points	4.5%	
Dec. 20, 1991 (After Dec. 17, 2001, meeting)	-50 basis points	4%	
April 9, 1992: Unscheduled move	-25 basis points	3.75 %	
June 30-July 1, 1992	-50 basis points	3.25 %	
Sept. 4, 1992: Unscheduled move	-25 basis points	3 %	
Feb. 3-4, 1994	+25 basis points	3.25 %	
March 22, 1994	+25 basis points	3.5 %	
April 18, 1994: Emergency meeting	+25 basis points	3.75%	
May 17, 1994	+50 basis points	4.25 %	
Aug. 16, 1994	+50 basis points	4.75 %	
Nov. 15, 1994	+75 basis points	5.5 %	
Jan. 31-Feb. 1, 1995	+ 50 basis points	6 %	
July 5- 6, 1995	-25 basis points	5.75 %	
Dec. 19, 1995	-25 basis points	5.5 %	

Jan. 30-31, 1996	-25 basis points	5.25%	
March 25, 1997	+25 basis points	5.5%	
Sept. 29, 1998	-25 basis points	5.25%	
Oct. 15, 1998: Emergency meeting	-25 basis points	5 %	
Nov. 17, 1998	-25 basis points	4.75%	
June 29-30, 1999	+25 basis points	5%	
Aug. 24, 1999	+25 basis points	5.25%	
Nov. 16, 1999	+25 basis points	5.5%	
Feb. 1-2, 2000	+25 basis points	5.75%	
March 21, 2000	+25 basis points	6%	
May 16.2000	+50 basis points	6.5%	
		Average Rate 1991-2000	**5.01 %**

Table 1.1: Fed's Interest Rate History in the U.S.A. 1991-1923.

Data Source: Fed's board of directors, August 2023

	Fed Interest Rate 2001-2008		
Meeting Date	**Rate Change**	**Interest Rate Target**	**Average Interest Rate Target**
Jan. 3, 2001: Emergency meeting	-50 basis points	6%	
Jan 30-31, 2001	-50 basis points	5.5%	
March 20, 2001	-50 basis points	5%	
April 18, 2001: Emergency meeting	-50 basis points	4.5%	
May 15, 2001	-50 basis points	4%	
June 26-27, 2001	-25 basis points	3.75%	
Aug. 21, 2001	-25 basis points	3.5%	
September 17, 2001: Emergency meeting	-50 basis points	3%	
Oct. 2, 2001	-50 basis points	2.5%	
Nov. 6, 2001	-50 basis points	2%	
Dec. 11, 2001	-25 basis points	1.75%	
Nov. 6, 2002	-50 basis points	1.25%	
June 24-25, 2003	-25 basis points	1%	
June 29-30, 2004	+25 basis points	1.25%	
Aug. 10, 2004	+25 basis points	1.5%	
Sept. 21, 2004	+25 basis points	1.75%	
Nov. 10, 2004	+ 25 basis points	2%	
Dec. 14, 2004	+25 basis points	2.25%	
Feb. 1-2, 2005	+25 basis points	2.5%	
March 22, 2005	+25 basis points	2.75%	
May 3, 2005	+25 basis points	3%	
June 29-30, 2005	+25 basis points	3.25%	
Aug. 9, 2005	+25 basis points	3.5%	

Sept. 20, 2005	+25 basis points	3.75%	
Nov. 1, 2005	+25 basis points	4%	
Dec. 13, 2005	+25 basis points	4.25%	
Jan. 31, 2006	+25 basis points	4.5%	
March 28, 2006	+25 basis points	4.75%	
May 10, 2006	+25 basis points	5%	
June 29, 2006	+25 basis points	5.25%	
		Average Rate 2001-2006	**3.3%**
Rate cuts 2007-2008			
Meeting Date	**Rate Change**	**Interest Rate Target**	
Sept. 18, 2007	-50 basis points	4.75%	
Oct.30-31, 2007	-25 basis points	4.5%	
Dec.11,2007	-25 basis points	4.25%	
Jan. 22, 2008: Emergency meeting	-75 basis points	3.5%	
Jan.29-30, 2008	-50 basis points	3%	
March 18, 2008	-75 basis points	2.25%	
April 29-30, 2008	-25 basis points	2%	
Oct 8, 2008: Emergency meeting	-50 basis points	1.5%	
Oct. 28-29, 2008	-50 basis points	1%	
Dec, 15-16, 2008	-100 to 75 basis points	0-0.25%	
		Average Rate 2007-2008	**2.7%**

Table 1.2. Fed. Interest Rate 2001-2008. (Data Source: Fed's board of directors, August 2023)

	Fed Interest Rate 2015-2018		
Meeting Date	**Rate Change**	**Interest Rate Target**	**Average Interest Rate Target**
Dec. 15-16, 2015	+25 basis points	0.25-0.5%	
Dec. 13-14, 2016	+25 basis points	0.5-0.75%	
Mach. 14-15, 2017	+25 basis points	0.75-1%	
June. 13-14, 2017	+ 25 basis points	1-1.25%	
Dec. 12-13, 2017	+ 25 basis points	1.25-1.5%	
March. 12-13, 2018	+ 25 basis points	1.5-1.75%	
June. 12-13, 2018	+ 25 basis points	1.75-2%	
Sept. 25-26, 2018	+ 25 basis points	2-2.25%	
Dec. 18-19, 2018	+ 25 basis points	2.25-2.5%	
		Average Rate 2015-2018	**1.5%**
	Rate cuts 2019 -2020		
July. 30-31, 2019	-25 basis points	2-2.25%	
Sept. 17-18, 2019	-25 basis points	1.75-2%	
Oct. 29-30, 2019	-25 basis points	1.5-1.75%	

March. 3, 2020 - Emergency Meeting	-50 basis points	1-1.25%	
March, 14-15, 2020 Emergency Meeting	-100 basis points	0-0.25%	
		Average Rate 2019-2020	**1.5%**
	Rate Hikes 2022-2023		
March. 15-16, 2022	+25 basis points	0.25-0.5%	
May. 3-4, 2022	+50 basis points	0.75-1%	
June 14-14, 2022	+75 basis points	1.5-1.75%	
July 26-27, 2022	+75 basis points	2.25-2.5%	
Sept. 20-21, 2022	+75 basis points	3-3.25%	
Nov. 1-2, 2022	+75 basis points	3.75-4%	
Dec. 13-14, 2022	+50 basis points	4.25-4.5%	
Jan. 31-Feb.1, 2023	+25 basis points	4.5-4.75%	
March 21-22, 2023	+25 basis points	4.75-5%	
May 2-3, 2023	+25 basis points	5-5.25%	
July 25-26, 2023	+25 basis points	5.25-5.5%	
		Average Rate 2022-2023	**3.45%**

Table.1.3: Fed. Interest Rate 2015-2018. (Data Source: Fed's board of directors, August 2023

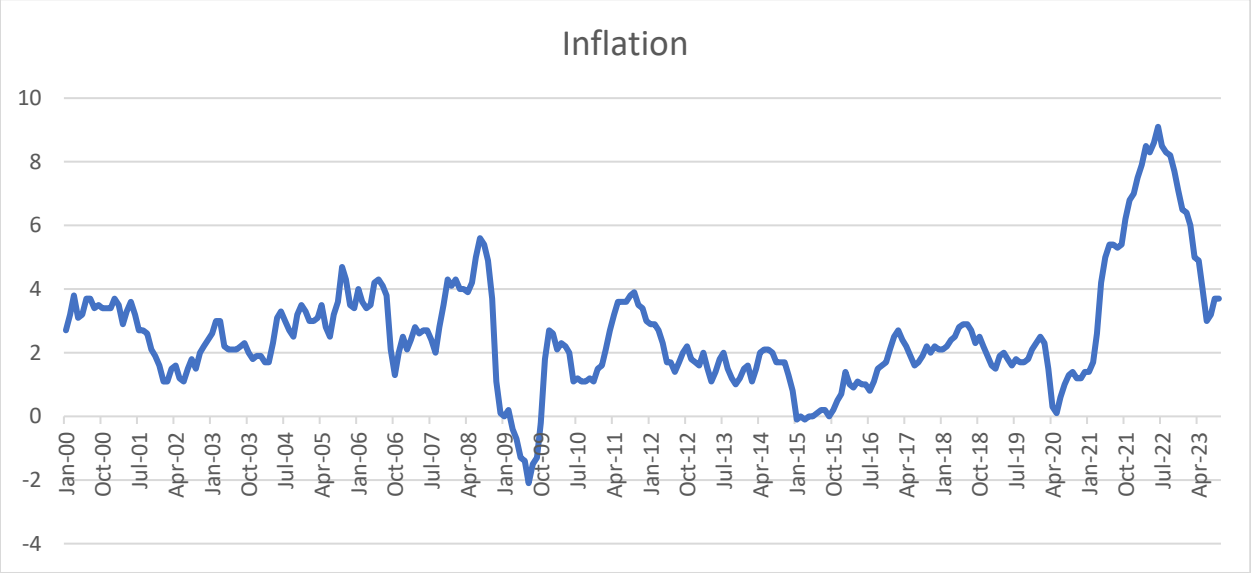
Average Rate 1991-2023	As a %	
Average Rate 1991-2000	5.01%	
Average Rate 2001-2006	3.3%	
Average Rate 2007-2008	2.7%	
Average Rate 2015-2018	1.5%	
Average Rate 2019-2020	1.5%	
Average Rate 2022-2023	3.45%	
Overall Fed's Average Rate 1991-2023	**2.91%**	

Table 1.4: Average Rate. 32-year period, 1991-2023.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avr
2023	6.4	6.0	5.0	4.9	4.0	3.0	3.2	3.7	3.7				
2022	7.5	7.9	8.5	8.3	8.6	9.1	8.5	8.3	8.2	7.7	7.1	6.5	8.0

2021	1.4	1.7	2.6	4.2	5.0	5.4	5.4	5.3	5.4	6.2	6.8	7.0	4.7
2020	2.5	2.3	1.5	0.3	0.1	0.6	1.0	1.3	1.4	1.2	1.2	1.4	1.2
2019	1.6	1.5	1.9	2.0	1.8	1.6	1.8	1.7	1.7	1.8	2.1	2.3	1.8
2018	2.1	2.2	2.4	2.5	2.8	2.9	2.9	2.7	2.3	2.5	2.2	1.9	2.4
2017	2.5	2.7	2.4	2.2	1.9	1.6	1.7	1.9	2.2	2.0	2.2	2.1	2.1
2016	1.4	1.0	0.9	1.1	1.0	1.0	0.8	1.1	1.5	1.6	1.7	2.1	1.3
2015	-0.1	0.0	-0.1	-.0.2	0.0	0.1	0.2	0.2	0.0	0.2	0.5	0.7	0.1
2014	1.6	1.1	1.5	2.0	2.1	2.1	2.0	1.7	1.7	1.7	1.3	0.8	1.6
2013	1.6	2.0	1.5	1.1	1.4	1.8	2.0	1.5	1.2	1.0	1.2	1.5	1.5
2012	2.9	2.9	2.7	2.3	1.7	1.7	1.4	1.7	2.0	2.2	1.8	1.7	2.1
2011	1.6	2.1	2.7	3.2	3.6	3.6	3.6	3.8	3.9	3.5	3.4	3.0	3.2
2010	2.6	2.1	2.3	2.2	2.0	1.1	1.2	1.1	1.1	1.2	1.1	1.5	1.6
2009	0	0.2	-0.4	-0.7	-1.3	-1.4	-2.1	-1.5	-1.3	-0.2	1.8	2.7	-0.4
2008	4.3	4.0	4.0	3.9	4.2	5.0	5.6	5.4	4.9	3.7	1.1	0.1	3.8
2007	2.1	2.4	2.8	2.6	2.7	2.7	2.4	2.0	2.8	3.5	4.3	4.1	2.8
2006	4.0	3.6	3.4	3.5	4.2	4.3	4.1	3.8	2.1	1.3	2.0	2.5	3.2
2005	3.0	3.0	3.1	3.5	2.8	2.5	3.2	3.6	4.7	4.3	3.5	3.4	3.4
2004	1.9	1.7	1.7	2.3	3.1	3.3	3.0	27	2.5	3.2	3.5	3.3	2.7
2003	2.6	3.0	3.0	2.2	2.1	2.1	2.1	2.2	2.3	2.0	1.8	1.9	2.3
2002	1.1	1.1	1.5	1.6	1.2	1.1	1.5	1.8	1.5	2.0	2.2	2.4	1.6
2001	3.7	3.5	2.9	3.3	3.6	3.2	2.7	2.7	2.6	2.1	1.9	1.6	2.8
2000	2.7	3.2	3.8	3.1	3.2	3.7	3.7	3.4	3.5	3.4	3.4	3.4	3.4

Table 1.5: Inflation in the U.S. 2000-2023. (Data Source: U.S. Bureau of Labor Statistics, US Inflation Rates, historical data (BLS, 2023)).



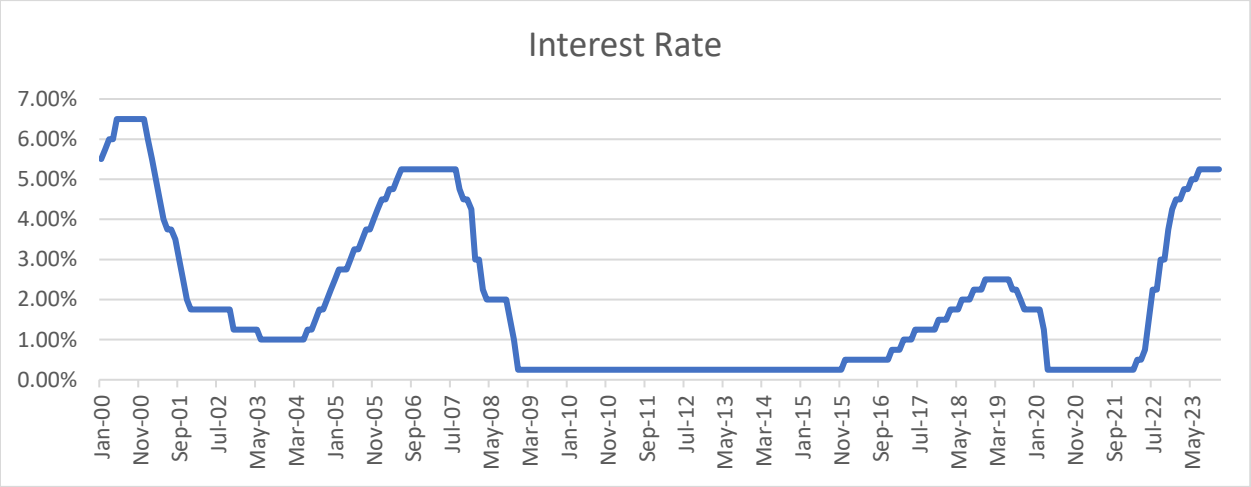


Table 1.6. The U.S. inflation and Interest rate charts for period January 2000 to July 2023, where peaked inflation is fought with increased interest rate from Fed.

Charts on Neutral Interest Rate and Inflation fighting-tool activation

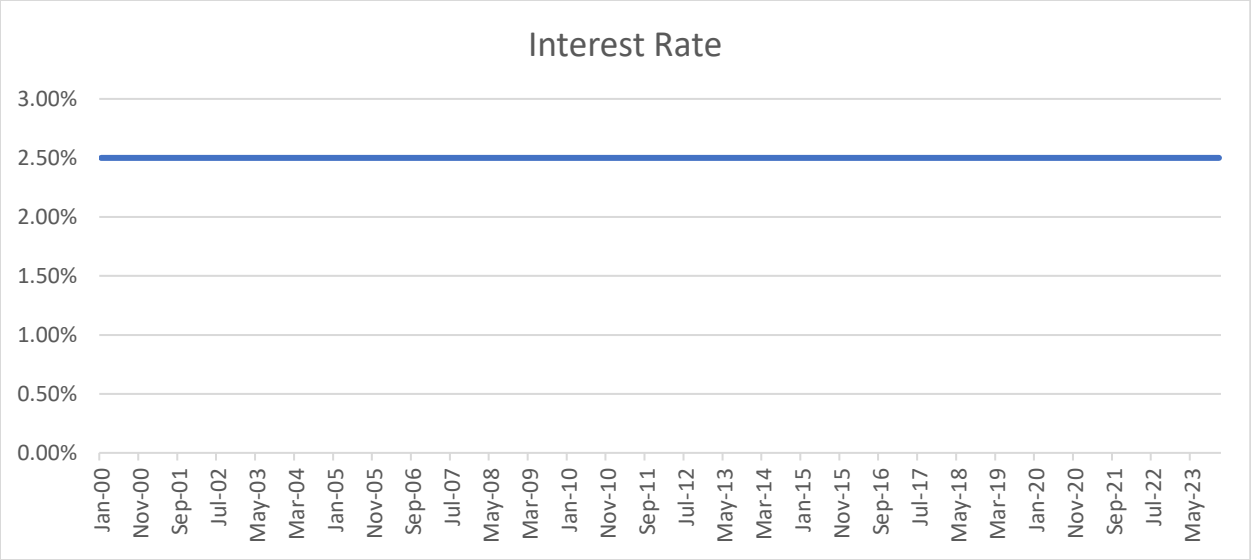


Table 1.7. Neutral Interest Rate (NIR) at 2.5% in a 20 years period used by the National Monetary Authority (NMA) based on the Theory of Economy Pricing System. NIR stays unchanged during financial crisis or external shocks. The NIR does not rise when inflation goes up as is not considered an inflation fighting-tool. The monetary policy based on NIR stays neutral.

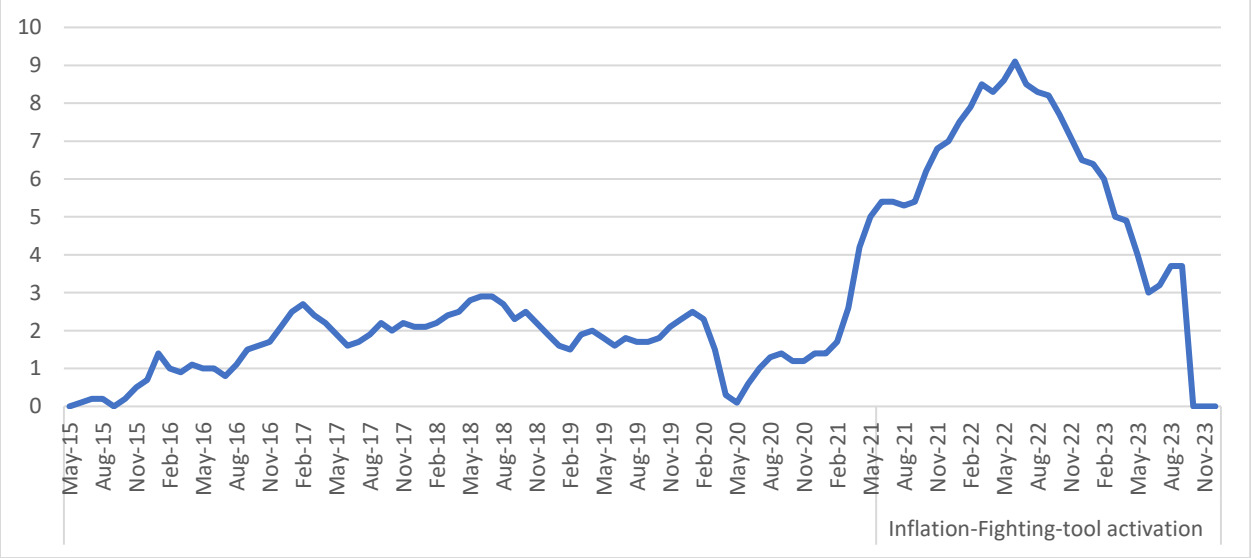


Table 1.8. The activation of the inflation-fighting tool used by the National Monetary Authority (NMA) to fight inflation when the inflation reaches 5%, consisting of indirect subsidy for firms participating to government price-control programs that manufacture and sell non-premium products to keep the price stable.

Appendix 1.2

Economy Pricing System and Oil Industry

Oil price and demand shocks tend to be the major driver of movements in global inflation in the last 7-8 decades. Energy normally counted for about 7-8% of the CPI (Consumer Price Index) in 2021. Since the end of WWII oil has been a major economic input that contributes directly to inflation. In addition to direct effect on inflation, oil industry contributes indirectly to the price of many products as the crude oil is a key ingredient in petrochemicals used in many products. CPI factors transportation costs (including fuel prices) which affects also the retail price of many products.

The war in Europe and COVID-19 supply disruptions were the main factors that crude oil prices and inflation went up so quickly in 2022. The quick rise on inflation prompted central banks around the globe to increase quickly the interest rates to fight inflation, without taking into considerations other options to fight the real cause of inflation. The rise on inflation in 2022 was unique as it was caused by supply chain disruptions due to COVID-19 restrictions and crude oil spikes due to the large-scale war in Europe and sanctions. Other more "affordable" options to fight this type of inflation, on the supply side, could be by considering the economics of Economy Pricing System (EPS).

Based on the theory of the EPS, even the oil industry could have a differentiation between premium and non-premium products offered at different retail prices rather than a single price for what is called the regular gasoline which has an 87-octane [3]. Premium gasoline is normally considered any type of gasoline with an octane level of 91 or greater, available at gas stations in the United States and Canada. Gasoline with an octane level of 87 is considered "regular," and gasoline sold at 89-octane often is labeled as 'midgrade' by most gas stations in North America. There are more considerations to be done for the price of regular gasoline which has an 87-octane. The economy of pricing system may help us break up the law of one price for the regular gasoline (87-octane).

The rapid decline in the global price of oil after mid-2014 contributed to sharp increases in US shale oil production and around the world, impacting the oil prices. Many countries started production on oil shale reserves, such as Canada, Russia, China, Congo, Marocco, Kazakhstan, etc. This contributed in part to the decline of oil prices in the global market. For example, in the U.S. the shale oil production was used for the domestic market, and has replaced US crude oil imports, reducing the demand for oil in global markets, and increasing the US exports of refined products, eventually causing some sort of sharp drop in global oil prices (in addition to other factors such weakening of the global economy). The U.S. refining industry has been benefitting from U.S. shale oil, as it has a competitive advantage compared to diesel and gasoline producers abroad because of its access to low-cost crude oil [9]. Another benefit of the shale oil production has been the transportation sector in North America, particularly the

railroad industry, and the industries directly serving the oil sector [10]. Recently, some drilling oil companies have been working to produce even cheaper lower-emissions heavy crude oil that can be brought into production at a much lower cost compared to oilsands formations [11].

Cheaper Crude Oil in North America

Two Canadian oil produces companies, Canadian Natural Resources Ltd and Baytex Energy Corp have been searching the cheaper, lower- emissions heavy crude oil in eastern Alberta province of Canada. Oil drillers have applied for 81 drilling licenses in 2023 to drill into Waseca formation an increase of 30 licenses compared to 2022. The Waseca formation holds heavy oil about 400 meters beneath the soil near oilsands of region Cold Lake. However, this Waseca formation differently from oilsands can be tapped with conventional drilling that costs less and generate lower emissions. Compared to oilsands that require billions of dollars of investment and years to establish production, a conventional heavy-oil well type Waseca-formation can be brought into production in a few months at a fraction the cost of oilsands formations, reducing further the cost of crude oil in North America.

Source: (Tuttle Robert, Bloomberg.com>news>articles>Canada, October 23, 2023)

The shale oil production could create the conditions for differentiating the price of the regular gasoline 87-octane between premium and non-premium in North America. The premium or non-discounted regular gasoline 87-octane could be the gasoline refined from the imported oil at the global price (OPEC-oil price) and the non-premium or discounted regular gasoline 87-octane could be the gasoline refined from the domestic shale oil production, which has eventually a lower production cost.

As a simplified example, gas stations across North America could sell the regular or non-discounted price of gasoline 87-octane refined from imported oil in period of high inflation or external shock at $1.6/ liter and the non-premium or discounted price of gasoline 87-octane refined from domestic shale oil production at $1.15/liter. The pricing difference of $1.6/liter - $1.15/liter =$0.45/liter will create the deflation factor of gasoline 87-octane product which will affect different sectors of the economy, given that gasoline is still one of the main drivers of economic system in industrialized countries.

If oil production companies, choose to differentiate let say the price of gasoline 87-octane to premium and non-premium then they will not be taxed for extraordinary profits due to unreasonable and unjustified fuel price increase in the global market (due to regional wars, pandemic, etc.). They also can take part to a government program on tax corporate reduction for the portion of non-premium products (gasoline 87-octane) that has a controlled price increase of 2-3% from one period to another. Otherwise, they will be taxed on unjustified profits because of no production cost increases but rather unreasonable increase on markup profit.

Import Sources by Count	**Gross Imports**	**Gross Exports**	**Net Imports**
Persian Gulf Countries	0.98 (12%)	0.02	0.96
Top 5 countries			
Canada	4.35 (52%)	0.84	3.52
Mexico	0.81 (10%)	1.17	-0.36
Saudi Arabia	0.56 (7%)	0.01	0.55
Iraq	0.31 (4%)	0.01	0.31
Colombia	0.24 (3%)	0.15	0.09

Table 1.9 Top Sources of U.S. petroleum imports (% share of total), respective exports and net imports for 2022. (Data source: U.S. Energy Information Administration, Petroleum Supply Monthly, February 2023).

Based on the U.S. Energy Information Administration (EIA), in 2022 (see table 1.9), the U.S. imported about 8.32 million barrels per day (b/d) of petroleum (petroleum includes = crude oil, hydrocarbon gas liquids, refined oil products) from 80 countries and produced about 2.84 billion barrels (or about 7.79 million barrels per day) of crude oil directly from tight-oil resources in the United States. The U.S. crude oil imports of about 6.28 million b/d were about 75% of U.S. total gross petroleum imports, and non-crude oil petroleum made the rest for about 25% of U.S. total gross petroleum imports. This means that there is a lot of domestic

oil production (almost 50% in 2022), which has a lower cost not affected by international oil market or external shocks, that can be used as a non-premium/discounted gasoline 87-octane product during period of high inflation to deflate the economy.

The non-premium/discounted gasoline 87-octane that can be traced to domestic oil production has the same quality and standard as the regular 87-octane gasoline which can be traced back to imported oil production. The non-premium/discounted gasoline 87-octane can be sold at gas stations on certain days of the week. During the week days gas stations can sell the regular gasoline 87-octane traced back to imported oil production and on weekends they can sell non-premium/discounted gasoline 87-octane traced back to domestic oil production. In fact, on the weekends, price-sensitive customers will have more time to line up to gas stations to fill their tanks than during week days where non-price sensitive customers who have less time to spend on lineups will fill their tanks.

Let's assume that a multinational oil company (for example a vertically integrated multinational oil company active in different areas of the oil and gas industry including exploration, production, refining, transport, distribution and marketing, etc.) during periods of high inflation and external shocks (such as wars, pandemics, etc.), operates in economy pricing system by producing premium and non-premium products [3]. Let's indicate by P(D(Pp)) the price demand and C(D(Pp)) the cost related to demand D(Pp) for the regular gasoline 87-octane which can be traced back to imported oil production with higher cost as it is based on the international market oil price per barrel, and Pnp(Dnp)(Pnp) and Cnp(Dnp)P(np) let be respectively price demand and cost related to demand for non-premium/discounted gasoline 87-octane traced back to domestic oil production companies with lower cost due to lower domestic production and transportation cost. Then the multinational oil company's profit net of government taxes Tp to pay for the regular 87-octane product is given as,

$$[\mathrm{P}(\mathrm{D}(\mathrm{P_p}) - \mathrm{C}(\mathrm{D}(\mathrm{P_p})] + \left[\mathrm{P_{np}}\left(\mathrm{D_{np}}(\mathrm{P_{np}})\right) - \mathrm{C_{np}}\left(\mathrm{D_{np}}(\mathrm{P_{np}})\right)\right] = \pi_{\mathrm{p}}\left(1 - \mathrm{T_p}\right) + \pi_{\mathrm{np}}(1 - \mathrm{T_p})$$

where Tp = 28% and $\Pi_{\mathrm{p}} < \Pi_{\mathrm{np}}$ (1.10)

This multinational company generates a regular profit пp from regular gasoline 87-octane refined from imported oil at international market price and a much higher profit пnp from non-premium/discounted gasoline 87-octane refined from domestic oil production at much lower cost and pay same tax rate Tp= 28% for both profits of both products. The selling price of both products (oil purchased internationally and produced domestically) is at $1.6/liter at the pump.

If this oil company participates in a Government Fiscal Program indented to use Inflation-Fighting Tool based on Economy Pricing System, then the company's profit is given as [3],

$$[P(D(P_P) - C(D(P_p)] + \left[P_{np}\left(D_{np}(P_{np})\right) - C_{np}\left(D_{np}(P_{np})\right)\right] = \pi_p\,(1 - T_p) + \pi_{np}(1 - T_{np})$$

where Tp = 28% and Tnp =14% and $\Pi_p > \Pi_{np}$ (1.11)

where the profit is differentiated based on the distinction of the final sales price between regular/premium and discounted/non-premium 87-octane product. In fact, it is assumed that the regular sales price of gasoline 87-octane is $1.6/liter and the profit is taxed at 28% and the non-premium/discounted sales price of gasoline 87-octane is assumed to be $1.15/liter which is taxed in half at only 14%. This is a fiscal deflation policy during high and uncontrolled inflation, which is different from government subsidies, as it is based on the economy pricing system to help push the discounted products into the market to help reduce the price of fuel that is the base of many sectors in economy.

References

1. Brancaccio, E., and Fontana, G., (edited by) (2013). The Global Economic Crisis: New Perspectives on the Critique of Economic Theory and Policy, Routledge, 1st edition.
2. Lavoie, M., (2013). "The Monetary and Fiscal Nexus of Neo-Chartalism: A Friendly Critique," Journal of Economic Issues, Vol. 47 (1), pp.1-32.
3. Muzhani. M., (2023). Economics of Economy Pricing, Vernon Press- Series in Economics.
4. Taussig, F. W., (1919). "Price-Fixing as Seen by a Price-Fixer." Quarterly Journal of Economics, Vol. 33, (2), pp. 205–241.
5. Borio C., Disyatat P., and Rungcharoenkitkul P., (2019). "What Anchors for the Natural Rate of Interest", BIS working Paper 777, Bank of International Settlement, Basel.
6. Rachel L., and Summers L.H. (2019). "On Secular Stagnation in the Industrialized World", Brooking Papers on Economic Activity (Spring) 1-76.
7. Caballero R. J., Farhi E., and Gourinchas P, O., (2021). "Global Imbalances and Policy Wars at the Zero Lower Bound", Review of Economic Studies, 88 (6), 2570-621.
8. Koo, C.R., (2014). "The escape from Balance Sheet Recession and the QE Trap: A Hazardous Road for the World Economy", John Wiley & Sons Singapore Pte Ltd, 1st edition.
9. International Energy Agency (2012), World Energy Outlook 2012, Paris: OECD-IEA
10. Kilian, L., (2014). "The Impact of the Shale Oil Revolution on U.S. Oil and Gasoline Prices", CEPR Discussion Paper, 10304
11. Tuttle Robert, (2023). "Hot New Canada Oil Play Draws Drillers Seeking Greener Crude", Bloomberg.com>news>articles>Canada, October 23, 2023.
12. https://www.cbc.ca/news/canada/british-columbia/david-eby-open-letter-bank-of-canada-halt-interest-rate-1.6953609

13. Eltherington W., (2023). "Ontario Premier Doug Ford asks Bank of Canada to halt rate hikes," The Canadian Press- Toronto Star, September 4th, 2023
14. Gray S., (2011). "Central Bank Balances and Reserve Requirements", IMF, Working Paper WP/11/36, pp.1-55.
15. Taylor, J. B., (1993). "Discretion versus Policy Rules in Practice", Carnegie-Rochester Conference Series in Public Policy, vol. 39 (December 1993), pp. 195-214, Elsevier.
16. Fed's Board of Directors. (2023). "Fed's interest rate history: The Federal Funds rate from 1981 to present". www.federalreserve.gov/monetarypolicy/bst_openmarketops.htm.
17. U.S. Energy Information Administration, (2023). Petroleum Supply Monthly, February 2023.

FootNote

1. Marin Muzhani has a PhD in economics from the University of Florence. He has been a post-doctorial researcher at the University of Florence and visiting scholar in different universities in Europe and North America. His interests and research are related mostly to growth economics, macroeconomics and modern monetary theories. His most recent research is focused on the micro and macro impact of economy pricing system.
2. The standard definition of a Repurchase Agreement, which is usually called as 'repo', is a form of short-term borrowing for dealers in government securities. A repo is created when a dealer sells government securities to investors, usually on an overnight basis, and buys them back the following day at a slightly higher price. The difference in price is nothing more than the implicit overnight interest rate. Repos are basically used to raise short-term capital. The repos are also a standard tool used by central bank in open market operations.
3. There has been an ongoing debate regarding the neutral and natural rate of interest. The two terms are often used interchangeably as the two underlying concepts originate from different types of economic models. The neutral interest rate is considered for the short-run concept of economy affected by transitory economic shocks. Instead, the term of the natural interest rate is used for long-run concept of economy and is itself slow-moving determined by demographic characteristics and income inequality not impacted by temporary shocks. It is more common to think about the neutral rate as fluctuating around the natural rate.