

Does Deficit Financing Affect the Money Supply in a Country? Evidence from Bangladesh

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Abstract

The main purpose of the study was to examine whether deficit financing and various components of financing affect the money supply in a country. A total of 20 years (from 2000 to 2020) time-series data has been utilized to examine whether there exists a significant relationship between deficit financing in national budget and money supply. It showed that there is a significant relationship between deficit financing and money supply. Moreover, foreign financing, financing through "National Savings Scheme" (NSS) and other non-bank financing are significantly related to money supply but there is no significant relationship between short-term and long-term borrowing and money supply.

Keywords: Deficit financing • Government budget • Money supply • National Savings Scheme (NSS)

Introduction

When the total of a government's planned expenditures for a particular fiscal year exceeds the total of its expected public earnings for that same fiscal year, it is considered to be a deficit budget. All developing countries face the problem of a budget deficit (DEF), sometimes called a fiscal gap, although the deficit is much worse in those countries that are in the process of making the transition to being developed. Because of their lack of domestic resources, developing countries must rely on external funding, most notably in the form of development aid from international organizations and more prosperous countries [1]. Scholars and legislators have been motivated to act by the potential macroeconomic effects of DEFs, prompting a variety of studies to determine what, if any, correlations exist between DEFs and other relevant macroeconomic variables [2].

However, when it comes to explaining the economies of having a DEF, there has not been any anonymity. Some research has argued in favor of DEFs and related them to economic development, particularly in emerging nations. Such a perspective is consistent with the Keynesian inspired export led growth hypothesis from 1970, which cited DEF as a necessary condition for economic expansion [3]. This theory proposed that in favor for the economy to expand, the government should prioritize energizing aggregate demand via massive public investment programs. Thus, governments that adopted this growth theory were eager to propose huge spending budgets despite having inadequate income to fund such demands for public investment.

On the other hand, there is evidence that DEF could have harmful effects on the economy as a whole. For instance, traditional economics hypotheses argue against deficit budget nations by claiming that a growing imbalance between government spending and income increases the incentive to increase the money supply, which might lead to an increase in the inflation rate at home. Monetary policy instruments are sometimes mentioned as being useless in preventing internal INF. Increases in DEF are also associated with higher levels of the budget deficit, which in turn puts additional pressure on governments to repay their debts.

The INF, DEF, and MS phenomena have each been the subject of many studies by a considerable number of economists because of their obvious importance as macroeconomic variables. Government DEF and the calculation of government debt have been a constant source of worry for nations of all economic standings. The link between DEF and other macroeconomic factors is the subject of much empirical and theoretical research on a wide range of countries throughout the globe. Recession related reductions in tax income are a potential root cause of DEF. Another factor that could also contribute to the growth of DEF in emerging nations is the rising cost of servicing the public debt incurred by these countries' governments.

Government deficits, increasing debt, and declining income have all been persistent problems for Bangladesh throughout the years. Although the economy is expanding, it is slowing as a result of rising government spending in comparison to tax increases. Since the rate at which revenues are collected is lower than total expenditures, a greater amount of borrowing and external credit is needed to finance the budget deficit [4].

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Deficits in government spending may arise for several reasons. The most obvious one is when real revenue is lower than expected. The government's ability to collect sufficient funds may have been hampered by weak economic growth. Some of the possible explanations are: Alterations in the weather forecast, which reduce economic output. Also, the uncertainty, which slows the travel industry. It also includes external factors like the global emergency, which dampens private and public speculation. Lastly, catastrophic events like dry spells, floods, and tropical storms, destroy resources and impede economic functions. The Bangladesh economic review (2018) estimated a gross budget deficit (not including grants) of BDT 1.120.41 billion for FY 2017-18 or almost five percent of GDP. The government relies on both domestic and foreign financing to cover its budgetary imbalance. The share of funding from domestic sources for this gap is expanding. In recent years, the government's NSC sales have resulted in a dramatic increase in tax revenue. Nonetheless, there has been a significant declining trend in the use of bank loans. In FY18, the NSD proportion of GDP (2.1% of GDP) was higher than bank borrowing (0.9%). A reduction in government borrowing from banking sectors may have the additional benefit of encouraging private sector investment, mitigating the crowding-out impact [5].

Meanwhile, the money raised through the sale of NSCs will encourage savers by providing them with good real returns and guaranteeing the social security of net marginal households. It's undeniable that a deficit budget is necessary for Bangladesh's economic progress, but the issue remains as to whether or not it's appropriate to keep the deficit at 5 percent of GDP, or almost 30 percent of the overall budget. Remember that a budget deficit will lead to a rise in the national debt, which will need a rise in interest payments [6].

According to the fiscal responsibility legislation and the route of deficit spending, deficits must be kept below 3 percent of gross domestic product. If the national deficit is around 3% of gross domestic product, as Nguyen claims it should be, then we will have met these requirements.

Literature Review

Hypotheses development

Implementation of the budget typically depended on the appropriate mobilization of locally available resources, such as the collection of tax income from the sources of direct, and indirect taxes, as indicated by Ahmed, who analyzed the reasons and remedies for the budget deficit in Bangladesh. However, Bangladesh's tax income collection fell short of projections. If the government is genuine about reducing the deficit, it must implement effective and suitable measures to increase domestic revenue. Concurrently, lawmakers should adopt measures to reduce public expenditure in order to balance the budget.

Finland's budget deficit was analyzed by Lamichhane. This research showed that economic development had a crucial role in helping the state to cover its budget gap. A beneficial factor in reviving economic growth would be steps taken to jobs, investments, exports as well as spending on education, empowerment, and health sector development. As was the case with Finland's economy, the aggregate duty will be a black mark. According to the study's findings, economic expansion is the most effective means of plugging the "manageability hole."

The study of the surrounding environment revealed that the effects of a budget deficit were many, including a rise in unemployment, a reduction in living standards, an increase in charges, a rise in private savings, a fall in public savings, an increase in owed debt and last but not least, a rise in financing costs.

Tung used the error correction model to investigate the fiscal deficit's effect on Vietnam's GDP growth. Vietnam's budget deficit and GDP growth cointegrated as a consequence of the experiments. In both the short and long term, the research found that a budget imbalance stifles economic expansion.

Nepal's budget deficit was studied by Sutihar, who looked at its causes and potential solutions. To help fund public expenditures, the government devised a crucial tool called shortfall financing. Deficit funding can come from a variety of sources, including loans from the government, borrowing from private lenders, or a negative cash flow.

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Kenya's macroeconomic performance and budget deficits were the subjects of an experimental study by Kosimbei. For instance, systemic issues and rising public spending both contributed to Kenya's fiscal deficit gap. The purpose of the review was to investigate possible methods for filling budget holes. It seems from the inquiry that the administration did not borrow much from abroad.

Since Pakistan is stuck in a never ending cycle of underdevelopment, Haq's investigation of the causes and effects of budget deficit financing in the country established the extraordinary brilliance of deficit financing for boosting economic growth in the opposite economy. He saw that these countries had utilized their assets for speculation when their resources weren't enough to spark off their growth cycles, requiring additional funding.

According to Emmanuel, there are three main ways in which governments cover their budget shortfalls: *via* the creation of money, refinancing debt, and by making use of long-term foreign currency reserves.

A study on crowding out in Bangladesh was undertaken by Majumder. From that study, he discovered that crowding occurred in Bangladesh rather than crowding out because of the excessive liquidity controlling of the banking sector.

The Keynesian school of thought held that a positive relationship existed between the two arrangements whereas the neo-classical school of thought held that there was no such relationship, and lastly the Ricardian perspective found that there was an unbiased interconnection between a country's budget deficit and economic growth. The presence of a budget deficit is influenced by several variables, one of the most prominent being the magnitude and makeup of governmental expenditures. In order to manage the economy and spur faster development, as well as to pay for publicly delivered goods and services, governments use fiscal instruments including taxing, spending, and borrowing. However, these methods are becoming more contentious in practically all emerging nations [7].

This portion of the research details the evolution of government income and expenditures, as well as the origins and development of

the budget deficit. It also discusses the many ways in which the Bangladeshi government has been able to cover its budget shortfalls.

The following hypothesis has been developed:

- H₁: Total deficit financing positively affects money supply.
- H₂: Domestic financing significantly affects money supply.
- H₃: Foreign financing significantly affects money supply.
- H₄: Bank financing significantly affects money supply.
- H₅: Non-bank financing significantly affects money supply.

Budget analysis of Bangladesh

Revenue composition: Non-NBR revenue collection includes stamp and vehicle taxes, land taxes, and taxes on narcotics and liquor, whereas NBR revenue collection includes direct tax and indirect tax (Figure 1). On the other hand, the components of non-tax revenue include dividends and profits; post office and railway revenue; interest, fees, and tolls; and other sources [8].

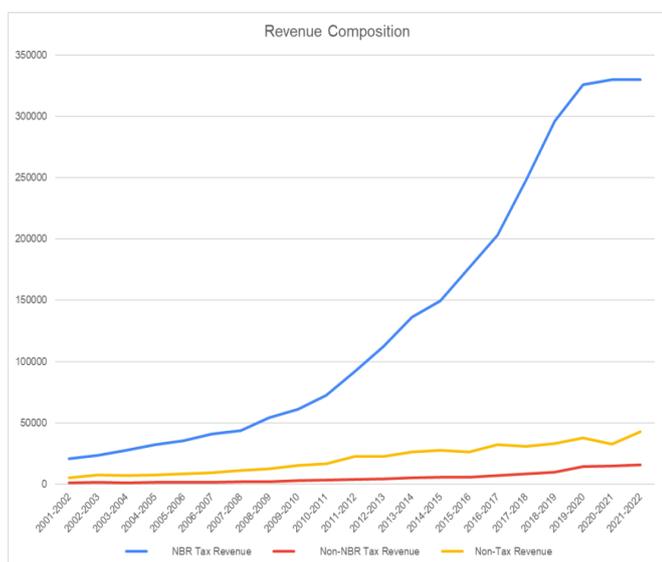


Figure 1. Revenue composition from 2001-2002 to 2021-2022 (in BDT Crore).

The composition of Bangladesh's revenue can be seen in the illustration that is located above, which covers the fiscal years ranging from 2001-2002 to 2021-2022. Before going into further depth about the trend pattern, it is vital to determine which component dominates the other in terms of the revenue composition. In comparison to the non-NBR tax revenue and the non-tax revenue source, which both have exhibited a fairly stable growth rate throughout the years, it has been observed that NBR tax revenue displays exponentially rapid growth year to year. The first implication that we can draw from this piece of information is that, much like the governments of other developing countries, the Bangladeshi government relies heavily on taxation as a means of generating money.

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Tax income collected by the NBR rose from a total of 18,000 BDT crore in the fiscal year of 2001-2002 to 20,730 BDT crore in the fiscal

year 2002-2003, representing an increase of nearly 15 percent. On the other hand, this rate does not apply to non-tax revenue or non-NBR revenue. In the instance of non-NBR, it increased to 1293 crore BDT from 1278 crore BDT during the course of the same fiscal year. The revenue from sources other than taxes rose from \$4,921 the previous year to \$5,216 the following year. In other words, neither non-tax nor non-NBR had a significant boost in terms of growth (1% and 5%, respectively). It is interesting to note that this pattern will continue until the fiscal year 2020-21, as it can be observed that the amount of tax revenue is 3,25,600 crore BDT, whereas the amounts for non-NBR revenue and non-tax revenue were, respectively, 45,000 and 33,000 crore BDT [9].

Due to the exponential growth of tax income, it may be deduced that Bangladesh is working toward transitioning from a developing nation to a developed nation. Because the literature has taught us that in a modern system of governance for a developed nation, a high revenue generating tax system is important because it provides governments with reliable and sustainable means of revenue collection; it reduces dependency on foreign aid; it increases economic independence; it empowers the government to provide regular cash support to citizens who deserve it, and it encourages positive governance.

Revenue breakdown of FY 2021-22: The revenue target for FY2021-22, including foreign grants, is Tk. 392,490 crore, which are 10.4% higher than the revised budget for FY2020-21, which was Tk. 355,517 crore and 8.7% higher than the previous year. The budget for FY2021-22, however, sets the revenue target at Tk. 389,000 billion, which is 10.7% higher than the revised budget for FY2020-21, which was Tk. 351,532 billion, which was 8.6% higher than the previous year. Even though the target for foreign grants is lower (Tk. 3,490 crore in FY2021-22 compared to Tk. 3,985 crore in the revised budget of FY2020-21, an increase of 16.2%), the percentage growth of total revenue with and without foreign grants is nearly identical: 10.4% with foreign grants and 10.7% without. 88.9% of the total revenue target of Tk 389 thousand (excluding foreign grants) consists of tax revenue, while 11.1% consists of non-tax revenue (Figure 2) [10].

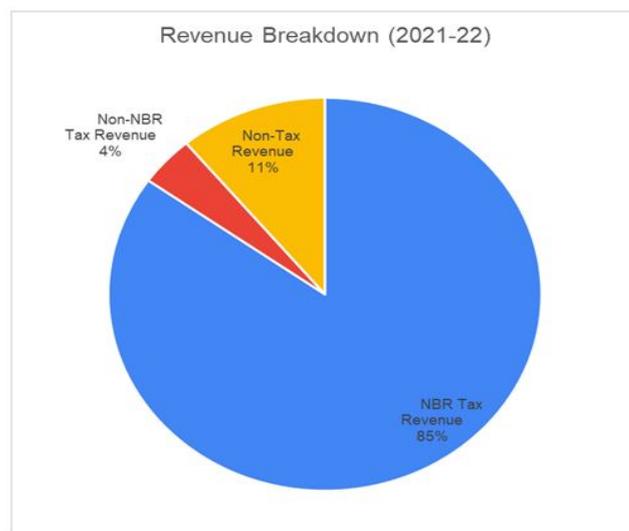


Figure 2. Revenue breakdown of financial year 2021-2022.

VAT will generate the greatest revenue out of the entire tax revenue objective of Tk. 346,000 crores, which is 9.5% more than the amended aim of Tk. Then, 30.3% of the entire tax objective will consist of income tax, which is the second highest proportion. The National Board of Revenue (NBR) is responsible for collecting the remaining taxes and duties. Supplementary Duty (SD) will account for 15.7%, customs duty (import duty and export duty) for 11.0%, excise duty for 1.1%, and miscellaneous taxes and levies for 0.3%. Even with the surcharges for health development, environmental safety, and information technology development, non-NBR taxes will only account for 4.6% of the total tax objective. The total income tax revenue forecast for FY 2021-22 is Taka 104,952 crore, which is an increase of 9.38 percent over the amended budget for FY 2020-21 but a fall of 7.69 percent from the original budget for FY 2020-21. 30.33 percent of the entire tax target of Tk. 346,000 crore, 31.80 percent of the national board of revenue's tax goal of Tk. 330,000 crore, and 26.98 percent of the total revenue goal of Tk. In FY2021-22, income tax will fund 17.39 percent of all spending, or Tk 603,681 crore. In the revised budget for fiscal year 2020-21, the income tax-to-GDP ratio was 3.11 percent, and 3.04 percent is anticipated for fiscal year 2021-22.

In FY2021-22, the overall tax to GDP ratio is projected to decrease to 10.01 percent from 10.24 percent in the revised budget for FY2020-21. If compared to the original budgets (this year's Taka 104,952 crore to last year's Taka 103,345 crore), income tax is expected to grow by 0.97 percent, but if it is compared year's budget to last year's revised budget, there is a significant increase (9.38 percent).

Expenditure composition: The term revenue expenditure of Bangladesh refers to the costs incurred by the government of Bangladesh for the day to day operations of its many departments and services, the payment of interest on debts accumulated by the government, subsidies, and other similar costs. As a general rule, expenditures that do not result in the generation of new assets are categorized as revenue expenditures. The Annual Development Programme (ADP) is an organized selection of projects in different sectors and allotment for them for a year out of a five-year plan period for the execution of the Bangladesh government's development policies, programs, and investments the plan. Other expenditures are those that do not fall into any of these two categories and thus are considered to be other expenses (Figure 3).

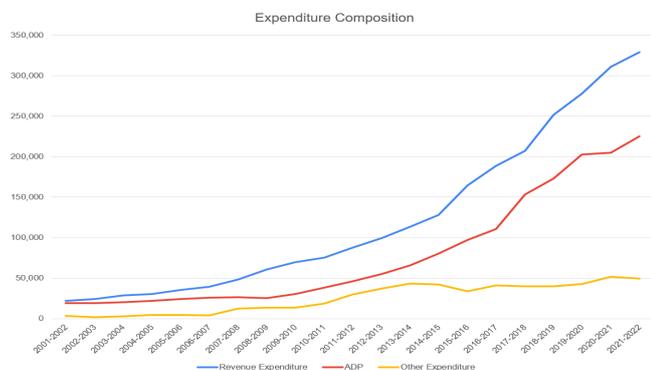


Figure 3. Expenditure composition from 2001-2002 to 2021-2022 (BDT crore).

It can be seen from the graph that is displayed above that the growth of revenue expenditures increased at a rate that was increasing while this was also true for ADP. Nevertheless, the growth of other expenses has been relatively constant over the years, beginning with the fiscal year 2001-2002 and continuing through the fiscal year 2021-2022. From absolute value comparison, revenue spending dominates ADP and ADP surpasses other expenses every year. For example, the amount spent on revenue during the 2015–2016 fiscal year was 1,64,571, whereas the amount spent on ADP and other expenses was, respectively, 97,000 and 33,529. The pattern continues until the most recent fiscal year, 2021-22, in which the ADP is 2,25,324 and the other expense is 49,517. The revenue expenditure during that year was 3,28,840. In a more general sense, this suggests that the government's investment policy has remained unchanged over the course of all these years. The trend indicates that the government of Bangladesh is largely dependent on both domestic and international loans, which requires them to account for interest payments on the debt as a component of their annual revenue expenditures. However, research suggests that the more funds a country allocates to its Annual Development Programme (ADP), the more quickly it will be able to achieve its sustainable development goals. Even if the rate of growth of Bangladesh's ADP has been rising over the course of recent years, there is still a sizeable disparity between the country's revenue expenditures and its ADP.

Expenditure breakdown of the FY 2021-22: The financial year 2021-2022 marks the fiftieth anniversary of Bangladesh's independence. The budget for the Fiscal year 2021–2022, or FY 21–2022, has generated considerable discussion. Government expenditure can be divided into current expenditure and capital expenditure. Salaries and allowances for government employees, purchase of products and services, compensation for relocation, and interest payment for foreign and domestic loans these fall under the current expenditure. Capital expenditure is spending that leads to new productive assets and inclusion. The government funded Annual Development Project (ADP) and non-ADP project are the two major categories of the capital expenditure project (Figure 4).

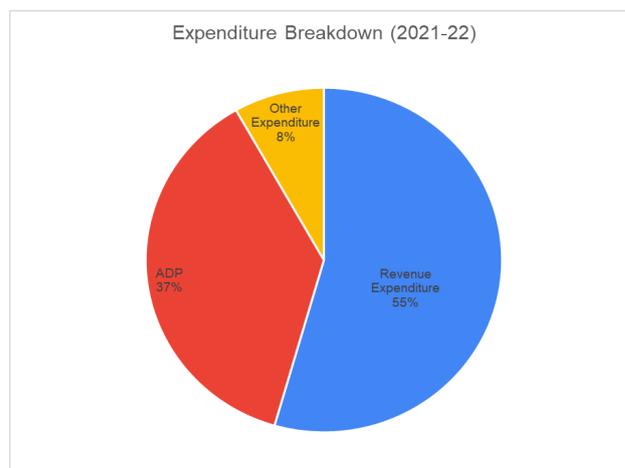


Figure 4. Expenditure breakdown of FY-2021-2022.

It is essential to examine the Budget's allocation to several sectors, such as health, agriculture, SMEs, tax reform, and education. This year's budget was BDT 6,03,681 crore BDT, 19% of

which was allocated to public administration, 16% to education and technology, and 12% to transportation and communications. Health (5%) and agriculture (5%) also receive funding from the budget, as do industrial and economic services (1%) (Figure 5).

The share of the total budget allocated to the education and technology sector and the health sector has increased, but by less than 1% for each sector (Table 1).

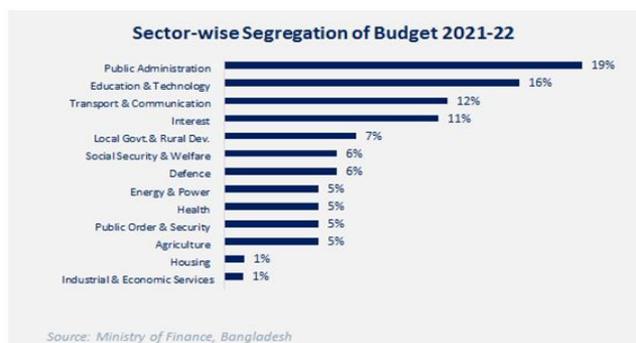


Figure 5. Sector wise segregation of the budget of 2021-22.

Sector	FY 2021-22	FY 2020-21	Change
Agriculture	5.30%	5.30%	0.00%
Defense	6.20%	6.10%	0.10%
Education and technology	15.70%	15.10%	0.60%
Health	5.40%	5.10%	0.30%
Industrial and economic services	0.70%	0.70%	0.00%
Power and energy	4.50%	4.70%	-0.20%
Public administration	18.70%	19.90%	-1.20%
Social security and welfare	5.70%	5.60%	0.10%
Transport and communication	11.90%	11.40%	0.50%

Table 1. Changes in the major sectors in budget expenditure from FY 2020-21 to FY 2021-22.

The amount allocated to the energy and power sector and the public administration sector has decreased.

A third of these costs will be incurred through the annual development plan. This concentration is desirable if it does not lower necessary present spending and if resources are utilized effectively. There are concerns regarding both areas. We spend roughly twice as much on interest as we do on high-priority sectors such as agriculture, energy, and health. Therefore, unless we limit our primary deficits (deficit fewer interest payments, the budget should be 4% of GDP), our debt will increase. Therefore, Bangladesh's debt level is not a concern.

Major sectors of the budget expenditure (health, agriculture, education, and SMEs) this year, the health sector's contribution to the Gross Domestic Product (GDP) is 0.95 percent, down from 0.84 percent in 2020. The majority of individuals believed that the budget for the health sector would be larger. Based on historical data, it appears that Bangladesh's public health sector receives little or no budgetary attention. There are 79,000,000 SME businesses in Bangladesh, and COVID-19 has made this sector one of the most vulnerable and hardest hit. As persistent lockdowns were put in place to stop the spread of the virus, it was hard for many SMEs to stay in business. Tax reformation has been put in place to help deal with this low demand. In addition to this, a few fiscal incentives, such as corporate tax cuts, have been suggested to encourage investment

and lower operational costs. This would help people find jobs. Most of these incentives are for businesses, which will help cut costs by lowering taxes on capital and core raw materials that are brought in. Approximately 38.3% of Bangladesh's workforce is working in agriculture. This sector also accounts for 12.7% of the country's GDP and ensures that there is sufficient food. Since this nation possesses alluvial land, this portion of the GDP can increase further. However, soil degradation and a lack of technology hinder the expansion of this industry. The agriculture budget for FY 2021-22 is BDT 31,900 crore BDT, which is 7.4% greater than the agriculture budget for FY 2020-21. Education will play a crucial role in Bangladesh's long-term economic prosperity, which is a goal of the nation. The budget for education increased by 7% this year, from BDT 66,200 crore to BDT 71,900 crore BDT, in recognition of the long-term benefits of education. This budget is allocated as follows: Ministry of primary and mass education: BDT 26,300 billion BDT; secondary and higher.

Education division: BDT 36,400 billion BDT.

Madrasa and technical education division: BDT 91,000 billion BDT. The amount allocated this year, 2.09% of GDP, is smaller than the amount given the previous year, which was 2.14% of GDP. This may not be good for the education sector, given that Bangladesh devotes the lowest proportion of its GDP to education among South Asian nations. To promote the excitement and engagement of

students, particularly those from disadvantaged and rural communities, a primary kit allowance of BDT 1,000 has been allocated, with a total budget of BDT 12 billion for this purpose. This package will enable children to acquire new school uniforms, footwear, and bags.

Domestic financing: It's common to think of domestic resources as the government's main source of funding for deficits. The banking sector and the non-banking market are the two domestic sources from which the government borrows. The government of Bangladesh has recently relied on local resources, particularly banks, to pay for the majority of its budget deficit. The actual situation, however, is different since the government raises more money than expected through issuing savings certificates, which lessens the need for bank borrowing. The government is borrowing more money domestically. The low demand for private sector investment money is reflected in the NSD certificates. Government borrowing from banks in substantial amounts will cause the private sector's revenue to be deflected, enabling the government to gain reserves from a variety of sources, including infrastructure funds, bonds, and other financial instruments.

Domestic borrowing has steadily increased from 7,099 crores during the fiscal year 2004-2005 to 113,453 crores in the fiscal year 2021-2022. It spiked in 2006-2008 with a rise of 10,442 crores. 2,278 crores were repaid in the following year and ever since then; domestic borrowing can be seen to have a steady growth. This trend continued and in 2020-2021, the govt. had the largest borrowing of 32,620 crores (Figure 6).

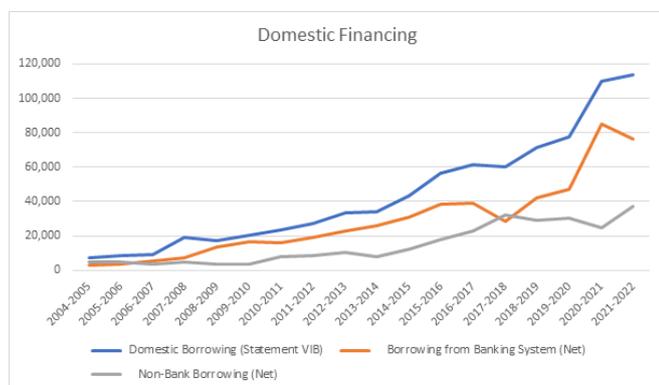


Figure 6. Domestic financing from 2001-2002 to 2021-2022 (BDT crore).

Domestic borrowing has two components: Borrowing from the banking system and non-bank borrowing. Both graphs show the net amount of borrowing. Starting in 2004-2005, non-bank borrowing was 4,500 crores, which was higher than borrowing from the banking system, which were 2,599 crores. From 2004-2005 to 2007-2008, non-bank borrowing fell, and borrowing from the banking system rose. From 2007-2008, both types of borrowing kept rising steadily. It can be observed from 2015-2016 to 2016-2017, the government only borrowed 415 crores from the banking system. In 2017-2018, the government repaid 10,735 crores of the borrowing from the banking system and increased non-bank borrowing by 9,989 crores. The borrowing from the banking system was once again lower than the non-bank borrowing this year, but from here onwards, non-bank borrowing dipped to 25,003 crores in 2020-2021 then rose to 37,001 crores in 2021-2022. From 2017-2018, borrowing from the banking

system rose till 2020-2021, with a huge increase of 37,616 crores in that year, then 8528 crores were paid off in the next year. The combined graphs of borrowing from the banking system and non-bank borrowing are represented by the domestic borrowing graph in the figure.

Foreign financing: When it comes to Bangladesh's economic growth, external financing has been crucial in bridging the internal (savings-investment gap) and external (export-import gap) divides. The pattern of budget deficit in recent years indicates a continuous decrease in reliance on outside help. However, Bangladesh is gradually paying back more of the loans it received in terms of principal and interest.

As a result, the rate of increase of the net flow of outside resources slows down and occasionally even stops. Budgetary resources are being expended at a higher rate, which reduces Bangladesh's net inflow of foreign funding.

The Figure 7 shows a graph of foreign borrowing compared to the graph of domestic borrowing. Both of them show a rising trend, where domestic borrowing started at 941 crores during 2000-2001 and rose to 113,453 crores in 2021-2022. Foreign borrowings, on the other hand, started at 6,238 crores during 2000-2001 and rose to 112,188 crores in 2021-2022. This shows that the government has increased its borrowings so that the composition consists of roughly 50% domestic borrowing and 50% foreign borrowing. Foreign borrowing had been greater than domestic borrowing from 2000-2001 till 2006-2007. During this period, it can be seen that from 2002-2003 to 2003-2004, foreign borrowing had a small but significant rise of 3,666 crores, while at the same time, domestic borrowing had a small but significant fall of 342 crores. Domestic borrowing kept rising till 2006-2007 while foreign borrowing did the opposite. The fiscal year 2006-2007 was the turning point, as from there on; the domestic borrowings had always been greater than the foreign borrowings.

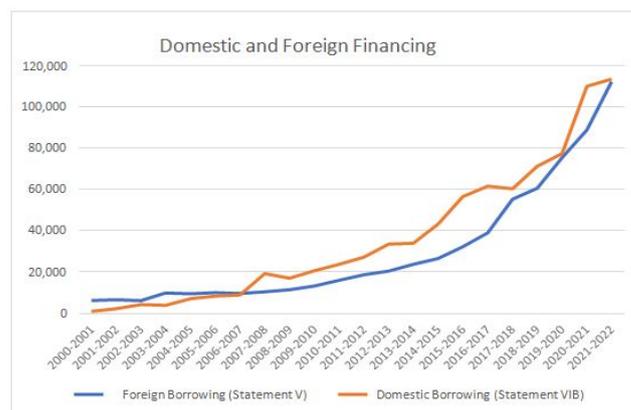


Figure 7. Domestic and foreign financing from 2001-2002 to 2021-2022 (BDT crore).

The period from 2006-2007 to 2014-2015 showed a steady and consistent increase in foreign borrowings, and the period from 2014-2015 to 2021-2022 showed that foreign borrowings increased by significantly large quantities.

Analysis of a developing country versus a developed country

There are various hurdles to budget and other parameter examination for peer comparison of two countries. Peer to peer comparisons are hampered by the dissimilar economic systems of the two countries, the absence of relevant data, and the disparate sizes of their economies. This section compares the budgets of Bangladesh with the United States using various parameters. The focus is not on the size of the economy, but rather on identifying and evaluating the trends in the budgets of the two countries.

Revenue comparison: Tax money is the main source of money for the government of Bangladesh. The majority of public revenue comes from direct and indirect taxes, which make up more than 80% of all government revenue. The rest of the income comes from different sources that are not taxes, such as expenses, fees, tolls, and other relevant streams. Beginning in 1980 and continuing until 1991, the government's revenue increased at a moderate rate. Beginning in 2000 and continuing through 2020, the trend of government revenue grew dramatically at a faster rate. The effort to mobilize the economy, structural reforms, and the introduction of the VAT policy boosted the government revenue of Bangladesh since the 1990's and it has been always rising since then. As Bangladesh grew more integrated into the global economy in the 1990's, the external factors influencing its tax performance have altered significantly. In recent years, the government of Bangladesh has altered how taxes are administered and how policies are formulated. The ratio of taxes to GDP has increased slightly in recent years as a result of improved tax administration and pragmatic policy adjustments. However, relative to other nations at the same stage of economic development, the performance is still inadequate. This can be seen as the US revenue has always been ahead of Bangladesh in the time under consideration. However, there is a breakout when the Bangladesh revenue crossed the USA revenue 2020-2021, this is because the USA was a highly affected country in the world due to COVID, but the severity of the pandemic was much less than the USA. Hence, there was a breakout or even the revenue of the two countries was at the same level comparatively (Figure 8).

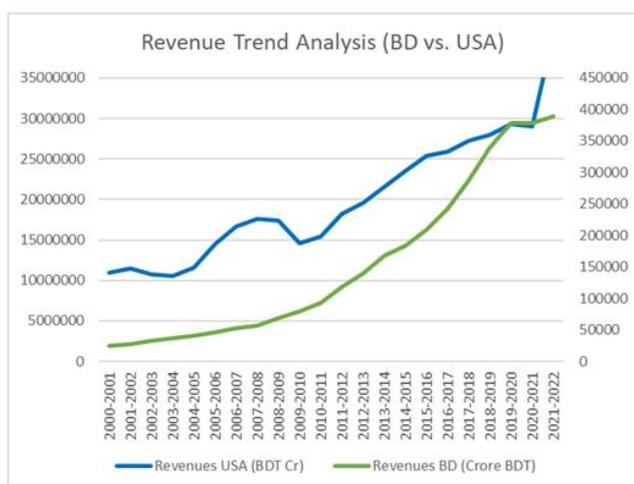


Figure 8. Revenue trend analysis of Bangladesh and USA from 2000-2001 to 2021-2022 (BDT crore).

In the middle of the 2000's, federal income grew quickly from \$2.1 trillion to \$2.6 trillion in 2007. But during the great recession,

the government's income dropped sharply, and in 2009, it was just a little over \$2 trillion. From 2010 to 2012, the federal government's income grew slowly, but since 2013, it has grown faster and is now stable at \$3.2 trillion for 2015 and 2016. The government made \$4.05 trillion in 2021. From the point of view of GDP, federal revenue steadily went up from 2005 to 2007, when it reached 18% of GDP. During the great recession, the federal government's income dropped to 14.6 percent of GDP in 2009 and stayed at about 15 percent of GDP until 2012. In 2015, however, it rose to 17.8 percent of GDP. In 2021, the government's income was 17.6% of GDP. Due to the recession of 2008, the revenue of the USA came closer to the revenue line of Bangladesh, however, the revenue of Bangladesh was not as severely impacted as the developed nations in the great recession of 2008.

In contrast to Bangladesh, the US federal government has significant income from the personal tax, while the income from the personal tax for the government revenue in Bangladesh is one of the lowest. In Bangladesh, only 25 lakh people are taxpayers. On the other hand, about 50 percent of federal revenue comes from individual income taxes, 7 percent from corporate income taxes, and another 36 percent from payroll taxes that fund social insurance programs. The rest comes from a mix of sources.

Bangladesh has a low tax to GDP ratio compared to neighboring or comparable nations because the tax base is small, there are a large number of exemptions, and the government is inefficient. This also explains why Bangladesh's tax efficiency and productivity have not changed significantly over the past two decades, despite numerous tax adjustments. The greatest issue has been the overall weakness of the policy structure. Due to the numerous exclusions, incentives, and special regimes, this is the case. These range from making VAT simpler to providing tax officials and political elites a great deal of freedom in granting advantages. This has a clear negative impact on tax collection, but it also complicates administration, makes the system less fair, and allows officials a great deal of discretion over policy and administration. So, it can be concluded that the reason for the lower revenue of Bangladesh is the inefficiency of the government compared to developed countries like the US.

Revenue differential: Due to the United States' financial crisis, the revenue gap between Bangladesh and the United States widened around the 2008 fiscal year. While Bangladesh did not experience a recession, the United States experienced a protracted recession, which resulted in a decline in government revenue for the United States but no change for Bangladesh. As the U.S. economy began to recover from the recession, the revenue disparity began to progressively increase, while Bangladesh's income collection remained constant. The United States government received record breaking revenue in 2022 as a result of a severe labour shortage caused by the epidemic. As a result, businesses are offering greater wages and salaries to employees. As incomes and salaries are higher than in the past, the United States government collects more income tax, which is its primary source of revenue. In Bangladesh, however, inflation, fuel prices, and load shedding have affected the income of both individuals and businesses, thus the government is likely to collect less revenue than before (Figure 9).

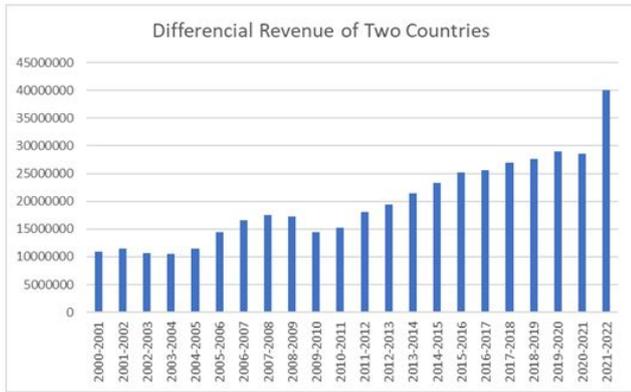


Figure 9. Differential revenue of two countries from 2000-2001 to 2021-2022.

Expenditure comparison: Since 2008, the public expenditures of Bangladesh have been on the rise. Bangladesh is a country with a perpetual budget deficit, yet budget spending has increased dramatically since 2008 for specific reasons. The majority of the Bangladesh budget is allocated to salaries, allowances, and pensions for government personnel. As the graph demonstrates, when government employee salaries and benefits were boosted, Bangladesh's public spending increased. In addition to acquiring Padma Bridge, Rooppur nuclear power plant, and other large infrastructure projects using loans, Bangladesh financed other significant infrastructure initiatives, such as Rooppur nuclear power plant and Rooppur since 2010, these large infrastructure projects financed with foreign loans have increased Bangladesh's expenditures, and these expenditures are projected to climb further as Bangladesh must repay the loans used to finance the infrastructure projects. However, due to the sheer size of the economy, Bangladesh's public expenditures will never equal those of the United States. The United States' expenditures reached a new high after 2008, as the government attempted to stimulate the economy following the financial crisis. In contrast to Bangladesh, the United States spends the most money on the military, social security, unemployment and labor, and education. However, funding for health and education continues to decrease (Figure 10).

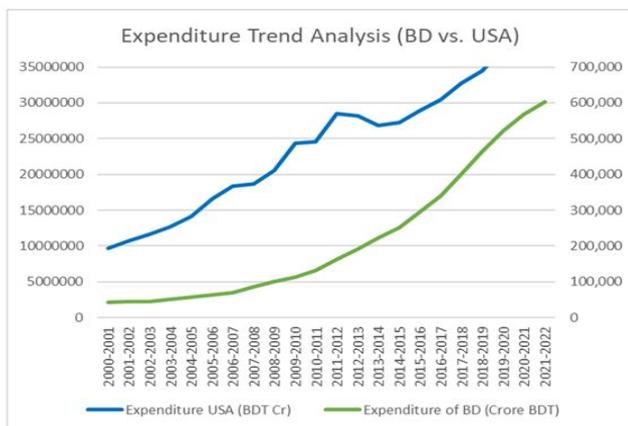


Figure 10. Expenditure trend of Bangladesh and USA from 2000-2001 to 2021-2022.

Expenditure differential: Except for 2011, the United States has always had a deficit budget, while Bangladesh has never had a surplus budget. Thus, both the United States and Bangladesh have substantial public spending (Figure 11).

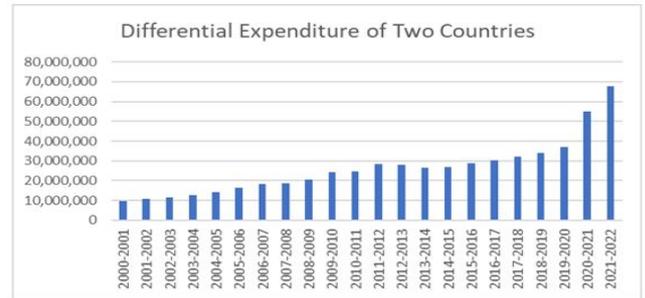


Figure 11. Expenditure differentials of Bangladesh and USA from 2000-2001 to 2021-2022.

The expenditure differentials increased in 2012 because, in response to the economic recession, the Obama administration increased public spending to create jobs, but Bangladesh did not make a comparable commitment to the economy at the time. The expenditure disparities between Bangladesh and the United States hit an all-time high because the United States government had to deal with the pandemic more aggressively than any other nation.

Budget deficit comparison: Since independence, Bangladesh has always experienced a budget deficit. In recent years, the budget deficit reached as high as 14% of GDP. In 2004, the United States budget deficit was largely due to the Iraq war campaign. The military budget is a substantial contributor to the United States' budget deficit. For Bangladesh, the budget imbalance happens as Bangladesh is inefficient to collect taxes. The United States is efficient at collecting revenue to meet expenditures. Bangladesh's revenue is low due to a restricted tax base, a small number of taxpayers, ineffective tax policy, tax exemptions, and lastly corruption, which is the primary cause of Bangladesh's budget deficit. As a result of the sluggish economy, the inability to collect income taxes from unemployed citizens and the need to invest in various projects to stimulate the economy, the budget deficit in the United States is quite high. However, the United States budget deficit again reached its high after 2022. After 2020, the budget deficit is due to the United States government's stimulus program, covid lockdown, tax cuts, and healthcare spending. However, Bangladesh's budget deficit has continuously widened, and the situation will not improve unless Bangladesh enhances its revenue collection mechanism (Figure 12).

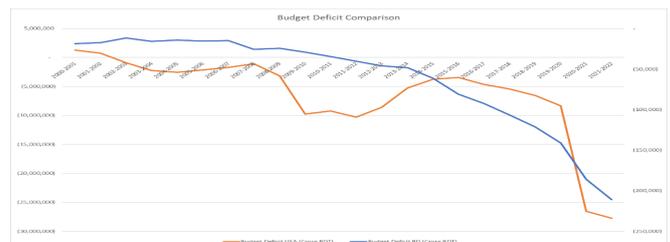


Figure 12. Comparison of budget deficit between Bangladesh and USA.

Research methodology

Data and sample: The data used in this research have been collected from secondary sources. Data has been collected budget disclosures from the ministry of finance and Bangladesh bank monetary dataset. The study is created by using 20 years of time-series data from 2000 to 2020. There is a total of N=20 observations in our sample.

Variables: This paper uses yearly data in the regression analysis which would be the primary focus of this research. In the model, the dependent variable will be the money supply (M2) of Bangladesh.

The independent variables will be Deficit Financing (DEFIN), Domestic Financing (DBOR), Foreign Financing (FBOR), Long-Term Financing (LTDFIN), Short-Term Financing (STDFIN), financing through National Savings Scheme (NSS), and Other Methods of Financing (OTHFIN).

Methodology: This paper evaluates the impact of budget deficit financing on the money supply of a country which is in line with previous literature. The estimates equation provides the following conventional regression model:

$$Y_{it} = \alpha + \beta_1 X_{1, it} + \beta_2 X_{2, it} + \epsilon$$

Here,

Y_{it} = Dependent variable of firm i at time t. For the sake of this report, the money supply (M2) will be held as the dependent variable.

α = Interception

β_i = Coefficients of each variable

X_{it} = Independent variables such as DEFIN, DBOR, FBOR, LTDFIN, STDFIN, NSS, OTHFIN.

t = Time

ϵ = Determined errors

Therefore, the final model(s) will be as follows:

$$MS_{it} = \alpha + \beta_1(DEFIN) + \epsilon$$

$$MS_{it} = \alpha + \beta_1(DBOR) + \beta_2(FBOR) + \epsilon$$

$$MS_{it} = \alpha + \beta_1(LTDFIN) + \beta_2(STDFIN) + \beta_3(NSS) + \beta_4(OTHFIN) + \epsilon$$

Where,

DEFIN=Deficit financing.

DBOR=Domestic financing.

FBOR=Foreign financing.

LTDFIN=Long-term financing.

STDFIN=Short-term financing.

NSS=National Savings Scheme financing.

OTHFIN=Other methods of financing.

Augmented dickey-fuller test for stationary

Data of the deficit financing variable was tested for a unit-root problem to check the stationarity of the variables considered in this study. We used Augmented Dickey-Fuller (ADF) stationarity test to detect unit roots problem. Testing time series data for stationarity is a pre-condition for moving forward with the regression analysis as the presence of unit roots leads spurious regression (Figure 13).

First, we see whether there is a trend in the variable Deficit Financing (DEFIN).

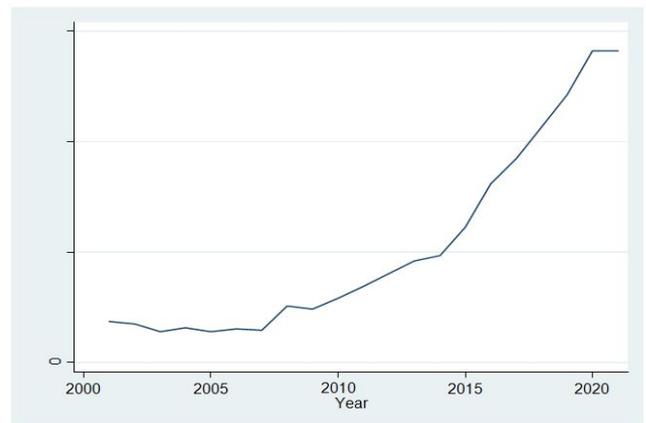


Figure 13. Trend analysis for variables.

There is trend present in the time series variable. Hence, we will conduct an Augmented Dicky Fuller test for the trend.

Now, we need to choose a lag period for augmented component. In order to find the appropriate lag, we used “Variable Selection of Order” in STATA to find the number of lag period (Table 2).

Varsoc DEFIN_w

Selection-order criteria

Sample: 2005-2021, number of obs=17

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-205.521				2.10e+09	24.2966	24.3014	24.3456
1	-172.267	66.506*	1	0	4.7e+07*	20.5021*	20.5118*	20.6001*
2	-172.192	0.15117	1	0.697	5.30e+07	20.6108	20.6254	20.7579
3	-171.9	0.58452	1	0.445	5.70e+07	20.6941	20.7136	20.8901
4	-171.765	0.2691	1	0.604	6.40e+07	20.7959	20.8203	21.041

Table 2. Lag₁ order statistic calculation for ADF test.

Results and Discussion

Here, the results show various selection criteria such as AIC (Akaike Information Criterion). Lower AIC scores are comparatively better as AIC criteria penalize models that use more parameters. So if there are two models that explain the same amount of variation, the one with fewer parameters will have a lower AIC score and will be the better-fit model. Hence, we choose lag number 1, as it has the lowest value (20.5021) as shown in the figure above.

Now, we run the Augmented Dickey Fuller test as shown below. The ADF uses a tau test. If the calculated tau statistics is greater than the critical value, we reject the null hypothesis. The calculated tau statistics is -0.825 is less than the critical value of -4.380. So, we cannot reject the null hypothesis. Hence, there is a unit-root problem in the deficit financing variable (DEFIN). In other words, the variable DEFIN is a non-stationary variable (Table 3).

Dfuller DEFIN_w, trend lag (1) reg

Augmented Dickey-Fuller test for unit root

Number of obs=19

Interpolated Dickey-Fuller						
Z(t)	Test statistic	1% critical	5% critical value		10% critical value	
MacKinnon approximate p-value for Z (t) = 0.9635						
D.DEFIN_w	Coef.	Std. err.	t	P> t	(95% conf. interval)	
L1.	-0.07204	0.087301	-0.83	0.422	-0.25812	0.114036
LD.	-0.34072	0.364748	-0.93	0.365	-1.11816	0.436725
_trend	1731.874	594.1276	2.91	0.011	465.5215	2998.227
_cons	-6765.81	3556.544	-1.9	0.077	-14346.4	814.7864

Table 3. Augmented dicky fuller test.

In order to make the variable stationery, we need to make the difference of our variable by using “gen D_DEFIN=D.DEFIN_w” We created a new variable name D_DEFIN in STATA. Afterward we calculate the lag variables and run the ADF test as done before using the new variable D_DEFIN. The smallest AIC is 20.6047; hence the number of lag is 0 (Tables 4 and 5).

Varsoc D_DEFIN

Selection-order criteria

Sample: 2006–2021, number of obs=16

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-163.837				5.2e+07*	20.6047*	20.6071*	20.6529*
1	-162.923	1.8279	1	0.176	5.30e+07	20.6154	20.6204	20.712
2	-162.118	1.6112	1	0.204	5.40e+07	20.6397	20.6471	20.7846
3	-161.894	0.44739	1	0.504	6.00e+07	20.7367	20.7466	20.9299
4	-160.685	2.4181	1	0.12	5.90e+07	20.7106	20.723	20.9521

Table 4. Lag order statistic calculation for ADF test iteration.

Endogenous: D_DEFIN

Exogenous: _cons

Dfuller D_DEFIN, trend lag (0) reg

Dickey-Fuller test for unit root, number of obs=19

Interpolated Dickey-Fuller					
Z(t)	Test statistic	1% critical value	5% critical value	10% critical value	
Z(t)	-4.431	-4.38	-3.6	-3.24	
MacKinnon approximate p-value for Z(t)=0.0020					
D.D_DEFIN	Coef.	Std. err.	t	P> t	(95% conf. interval)
L1.	-1.46269	0.330116	-4.43	0	-2.16251 -0.76288
_trend	1398.669	431.4656	3.24	0.005	484.0027 2313.335

_cons	-4492.51	2992.743	-1.5	0.153	-10836.8	1851.818
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Table 5. Augmented dicky fuller test iteration.

The calculated tau statistics is -4.431 is now greater than the critical value of -4.380. So, we reject the null hypothesis. Hence, the unit-root problem in the Deficit Financing variable (DEFIN) is not present anymore. In other words, the variable DEFIN is now a stationary variable which can be seen visually below (Figure 14):

Regression analysis

First, we want to see the relationship of deficit financing and money supply (Table 6). Before winsorizing, we get the following descriptive statistics:



Figure 14. Trend analysis for variables.

Variable	Obs	Mean	Std. dev.	Min	Max
DEFIN	21	54563.48	48988.4	11770	185987
MS	21	5771.864	4621.652	871.74	15599.5

Table 6. Descriptive statistics.

After winsorizing (95%), we get the following descriptive statistics (Table 7).

Variable	Obs	Mean	Std. dev.	Min	Max
DEFIN_w	21	52540.33	43564.02	14059	141212
MS_w	21	5688.341	4431.172	986.16	13731.1

Table 7. Descriptive statistics (after winsorizing).

Hence, we see that the maximum and minimum observations are adjusted to their nearest observation (Table 8). Now we run the OLS regression analysis.

Source	SS	df	MS
Model	379419358	1	379419358
Residual	13286276.1	19	699277.69
Total	392705634	20	19635281.7

MS_w	Coef.	Std. err.	t	P> t	(95% Conf. interval)
DEFIN_w	0.099981	0.004292	23.29	0	0.090997 0.108965
_cons	435.3136	290.0962	1.5	0.15	-171.865 1042.492

Table 8. Regression output table.

Number of obs=21

F (1,19)=542.59

Prob>F=0.0000

R-squared=0.9662 Adj

R-squared=0.9644

Root MSE=836.23

The output of the regression suggests that the coefficient of DEFIN_w and MS_w is 0.0999809, which implies that they are positively correlated. If DEFIN_w rises, MS_w will rise. The p-value of 0.000 is less than 5%, meaning that it does support the significance level. Hence, the null hypothesis is rejected, and there is a significant relationship between deficit financing and money supply.

Multiple regression analysis (foreign and domestic financing)

First, we want to see the relationship of foreign financing, domestic financing, and money supply (Table 9). Before winsorizing, we get the following descriptive statistics:

Variable	Obs	Mean	Std. dev.	Min	Max
DBOR	21	32905.95	29840.98	941	109983
FBOR	21	26167.48	24165.16	6139	88824
MS	21	5771.864	4621.652	871.74	15599.5

Table 9. Descriptive statistics.

After 95% winsorizing, we get the following descriptive statistics (Table 10).

Variable	Obs	Mean	Std. dev.	Min	Max
DBOR_w	21	31414.33	26189.06	2237	77363
FBOR_w	21	25532.48	22542.95	6238	75390
MS_w	21	5688.341	4431.172	986.16	13731.1

Table 10. Descriptive statistics (after windsorizing).

Hence, we see that the maximum and minimum observations are adjusted to their nearest observation (Table 11).

Now we run the multiple regression analysis:

Number of obs=21

F (2,18)=1216.90
 Prob>F=0.0000
 R-squared=0.9927 Adj
 R-squared=0.9918
 Root MSE=400.21

Source	SS	df	MS
Model	389822561	2	194911281
Residual	2883072.81	18	160170.711
Total	392705634	20	19635281.7

MS_w	Coef.	Std. Err.	t	P> t	(95% conf. interval)
DBOR_w	0.141018	0.010905	12.93	0	0.118108 0.163928
FBOR_w	0.03342	0.012669	2.64	0.017	0.006804 0.060035
_cons	405.0722	138.3969	2.93	0.009	114.3111 695.8334

Table 11. Regression output table.

The output of the regression suggests that the first coefficient of DBOR_w and MS_w is 0.1410179, which implies that they are positively correlated. If DBOR_w rises, MS_w will rise. The p-value of 0.000 is less than 5%, meaning that it does support the significance level. Hence, the null hypothesis is rejected, and there is a significant relationship between domestic financing and money supply.

The second coefficient of FBOR_w and MS_w is 0.0334196, which implies that they are positively correlated. If FBOR_w rises, MS_w will rise. The p-value of 0.017 is less than 5%, meaning that it does support the significance level. Hence, the null hypothesis is rejected,

and there is a significant relationship between foreign financing and money supply.

Multiple regression analysis (bank, non-bank financing)

Now, we want to see the relationship of the money supply with bank financing (long-term and short-term), non-bank financing (national saving schemes and others) (Table 12). Before winsorizing, we get the following descriptive statistics:

Variable	Obs	Mean	Std. dev.	Min	Max
MS	21	5771.864	4621.652	871.74	15599.5
LTDFIN	18	14653.22	14601.87	-1800	53654
STDFIN	17	10527.82	8189.632	1079	31326
NSS	17	11328.35	9590.542	2600	30150
OTHFIN	17	2090.588	1307.867	523	5003

Table 12. Descriptive statistics.

After 95% winsorizing, we get the following descriptive statistics (Table 13).

Variable	Obs	Mean	Std. dev.	Min	Max
MS_w	21	5688.341	4431.172	986.16	13731.1
LTDFIN_w	18	14653.22	14601.87	-1800	53654
STDFIN_w	17	10527.82	8189.632	1079	31326
NSS_w	17	11328.35	9590.542	2600	30150
OTHFIN_w	17	2090.588	1307.867	523	5003

Table 13. Descriptive statistics (after windsorizing).

Now we run the multiple regression analysis (Table 14).

Number of obs=17
F (4,12)=114.42

Prob>F=0.0000
R-squared=0.9745 Adj
R-squared=0.9659
Root MSE=784.03

Source	SS	df	MS
Model	281349450	4	70337362.5
Residual	7376524.61	12	614710.384
Total	288725975	16	18045373.4

MS_w	Coef.	Std. err.	t	P> t	(95% Conf. interval)
LTDFIN_w	0.033618	0.028801	1.17	0.266	-0.02913 0.096371
STDFIN_w	0.072014	0.035158	2.05	0.063	-0.00459 0.148617
NSS_w	0.26013	0.029491	8.82	0	0.195874 0.324385
OTHFIN_w	0.929958	0.300456	3.1	0.009	0.27532 1.584596
_cons	597.0852	402.5945	1.48	0.164	-280.093 1474.263

Table 14. Regression output table.

The output of the regression suggests that the first coefficient of LTDFIN_w and MS_w is 0.336184, which implies that they are positively correlated. If LTDFIN_w rises, MS_w will rise. The p-value of 0.266 is greater than 5%, meaning that it does not support the significance level. Hence, the null hypothesis is not rejected, and there is no significant relationship between long-term borrowing and money supply.

The second coefficient of STDFIN_w and MS_w is 0.0720142, which implies that they are positively correlated. If STDFIN_w rises,

MS_w will rise. The p-value of 0.063 is greater than 5%, meaning that it does not support the significance level. Hence, the null hypothesis is not rejected, and there is no significant relationship between short-term borrowing and money supply.

The third coefficient of NSS_w and MS_w is 0.22601296, which implies that they are positively correlated. If NSS_w rises, MS_w will rise. The p-value of 0.000 is less than 5%, meaning that it does support the significance level. Hence, the null hypothesis is rejected, and there is a significant relationship between the national savings scheme and money supply.

The final coefficient of OTHFIN_w and MS_w is 0.3004563, which implies that they are positively correlated. If OTHFIN_w rises, MS_w will rise. The p-value of 0.009 is less than 5%, meaning that it does support the significance level. Hence, the null hypothesis is rejected, and there is a significant relationship between other non-bank financing and money supply.

Conclusion

Both money supply and deficit financing are significantly related and hold important implications for fiscal and monetary policies. The paper showed that there is a significant positive relationship between deficit financing and money supply. Hence, inflationary conditions may arise as such financing would increase the money supply of the country. Moreover, foreign financing, financing through NSS and other non-bank financing are significantly related to money supply but there is no significant relationship between short-term and long-term borrowing and money supply.

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