ISSN 2321 – 9378

IMI Konnect

Volume 11, Issue 1, 2022

An IMI Kolkata Publication

Highlights

Union Budget | Cryptocurrency | Financial Reporting | ICT Products and E-waste |

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Household ICT Products and E-waste in India[1]

Pingali Gautam* and Pingali Venugopal**

Abstract

The increased use of information and communication technology (ICT) products have been contributing to the e-waste problem worldwide. United Nations terms it as the Tsunami of e-waste. E-waste could be a resource or a hazard depending on how it is disposed. This study with the objective of understanding the use and disposal of ICT products by Indian households studied two cities in India, Delhi (the second largest e-waste generating city) and Jamshedpur (an industrial city in a low e-waste generating state). While the usage of ICT products and the awareness of e-waste and its hazards varied significantly between the cities, the households in both the cities store their unused ICT products in their homes. This is a potential hazard as most of these could end up in landfills or be sold as scrap due to lack of proper recycling infrastructure. There is, therefore, an immediate need to develop good infrastructure to collect and process unused ICT products.

Keywords: e-waste, ICT usage, India

1. Introduction

53.6 million metric tonnes (MT) of e-waste was generated worldwide in 2019, a 21 per cent increase over the previous 5 years (Forti *et al.*, 2020). United Nations, terms it as a Tsunami of e-waste (Kaur, 2019). Computer equipment (70 per cent) and mobile phones (12 per cent) largely contribute to the e-waste (Bandela, 2018). European Environmental Agency (2014) states that the current production processes and consumption behaviour increased the generation of e-waste. Frequent upgradation of electronic goods leading to fast obsolescence of older technology and the increased number of nuclear families demanding the latest gadgets contributed to the increase in e-waste (Oh *et al.*, 2003). According to Greenpeace (2005), the product life cycle of computers in developed countries reduced from six years in 1997 to two years in 2005. E-waste not only contains over 1,000 valuable substances (like

[1]Earlier version of the paper was published in the proceedings of, The 6th International Conference on Sustainability, Technology and Education, 2017, Sydney.

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gold and copper), e-waste contains substances that have environmental and health effects (Widmer *et al.*, 2005; Luo *et al.*, 2009).

The report of the World Health Organisation on e-waste and children health (WHO, 2021) states:

"*Exposure to lead from e-waste recycling activities has been associated with significantly reduced neonatal behavioural neurological assessment scores, increased rates of attention deficit/hyperactivity disorder (ADHD), behavioural problems, changes in child temperament, sensory integration difficulties, and reduced cognitive and language scores*."

Kumar (2010) details the environmental and health damages caused due to the toxic components in e-waste. He highlights that improper disposal of e-waste could cause impaired memory functioning and learning due to the presence of brominated flame retardants (BFRs) which are added to consumer products to reduce fire related hazards. Pregnant women exposed to BFRs could give birth to babies with behavioural problems. He adds that improper disposal could lead to lead poisoning which could be detrimental to the neurological development of the children.

Ranganathan (2018) also lists the health hazards due to toxins released due to improper disposal of e-waste. These include damage to the nervous system, chronic beryllium disease, DNA damage amongst several others.

Geneva Environment Network (2021) states that e-waste which includes toxic and non-biodegradable components contaminate the soil, water and air. Toxins released from e-waste contaminate (a) the soil impacting the food supply, (b) the water with carcinogenic material like lead, barium, mercury and lithium and (c) the air by the release of hydrocarbons, which not only impact the quality of the air we breathe but also contribute to the greenhouse effect.

E-waste on the other hand could be a source of valuable resources if it could be recycled by authorized recyclers. Ryder and Houlin (2019) state proper recycling would not only reduce CO_2 emissions but help extract 100 times more gold from one tonne of mobile phones than from a tonne of gold ore. Lahiry (2019) reported that a recycler in China extracted more cobalt from e-waste than the country mines in a year. Lahiry (2019) also states that metals extracted from e-waste are more efficient. Lahiry (2019) goes on to report that 47,488 tonnes of e-waste would be used to extract 8 tonnes of gold, silver and bronze to make 5,000 medals for the 2020 Tokyo Olympics.

Despite the fact that 66 per cent of the world is covered by rules governing proper e-waste disposal (Bandela, 2018), 82.6 per cent of the e-waste is not recycled leading to a loss of valuable resources to the tune of US $57 billion (Forti *et al.*, 2020). Only 20 per cent of the discarded computers in the US are recycled properly (Manish and Chakraborty,

2019). Manish and Chakraborty (2019) also state that the citizens have a very important role to play in e-waste management. It is in this context that this paper studies the use and disposal behaviour of information and communication technology products (ICT) by Indian households.

2. India and E-waste

India is the fifth highest e-waste generating country (Bandela, 2018) that generated 3230 kilo tonnes of e-waste in 2019, which works out to be 2.4 kg per capita (Forti *et al.*, 2020). Figure 1 shows the growth of e-waste in India.

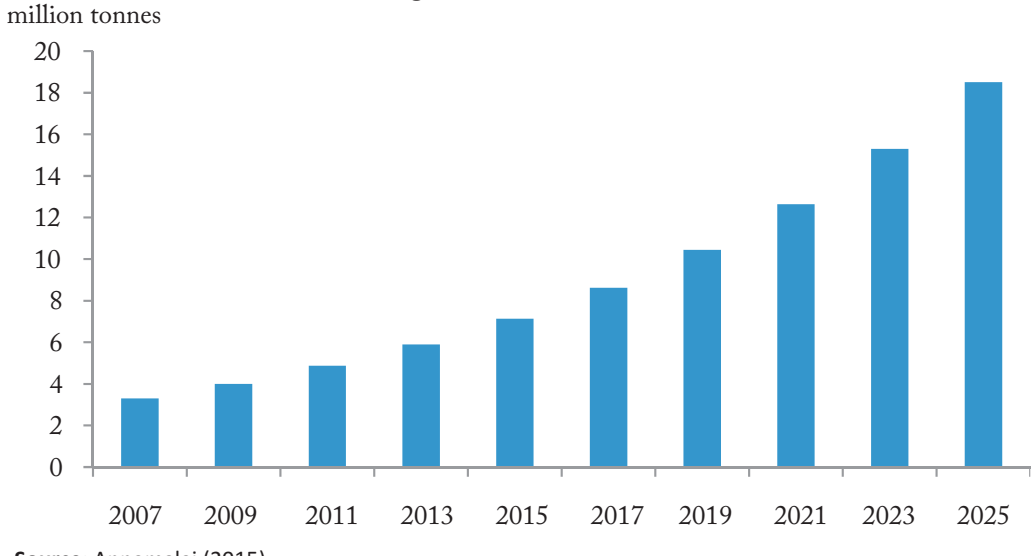
Though laws that require the manufacturer to collect and properly recycle e-waste have been present in India since 2011 (Kaur, 2019), only 1.5 per cent of India's total e-waste gets recycled by certified recyclers (Pandit, 2016). Pandit (2016) states that the improper dismantling by the unorganised sector and scrap dealers have led to e-waste concentration in Indian soil to be twice that of the global average.

Therefore, in addition to studying the use and disposal behaviour of ICT products by Indian households, the study also checks the awareness of e-waste and its consequences amongst the household sector.

3. Methodology

To get a better understanding of the behaviour of Indian households, the study selected two cities in India; Delhi, the second highest e-waste generating city, and Jamshedpur, an industrial city in a low e-waste generating

Figure 1: E-waste in India



Source: Annamalai (2015)

state (Vats and Singh, 2014). Personal computers, laptops and mobile phones being the main ICT products contributing to e-waste (Tiwari *et al.*, 2013) were chosen for this study. 100 households from each of the cities were sampled.

4. Findings

4.1 Information and Communication Technology Products in the Household

All the sampled households both in Delhi and Jamshedpur had one or more mobile phones; with Delhi having 4.03 mobile phones per household and Jamshedpur having 2.11 mobile phones per household. Family size rather than income determined the number of mobile phones per household (Fig 2).

Laptop and/ or a personal computer was present in most of the households in Delhi (97 per cent) as against only 35 per cent of the houses in Jamshedpur. While around 70 per cent households in Delhi had both a laptop and a personal computer (PC), only 5 per cent households had both a laptop and a PC in Jamshedpur.

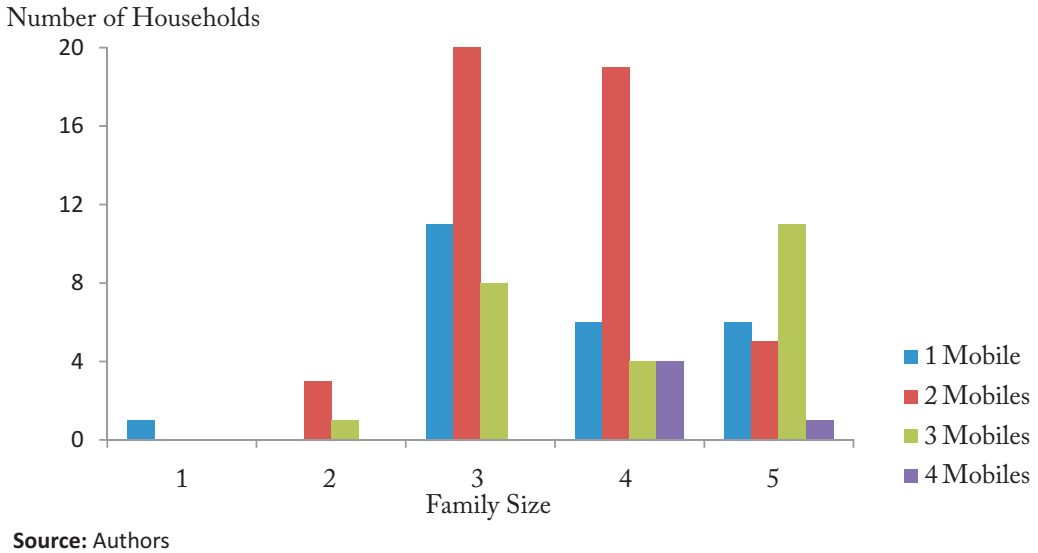
84 per cent of the respondents purchased new ICT products. While 41 per cent purchased from multi brand retail shops, 43 per cent purchased from company exclusive outlets.

4.2 Replacement Time

The replacement time for ICT products is given in Figure 3.

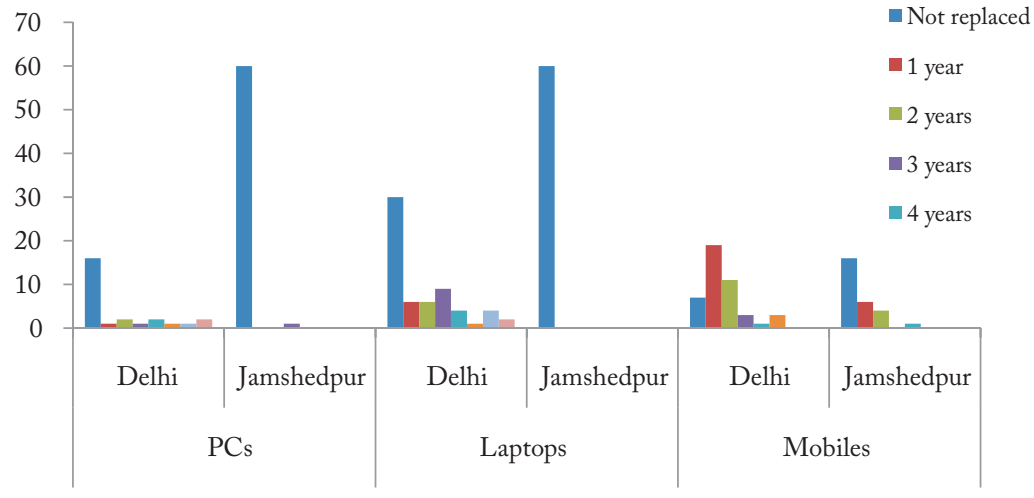
Replacement of mobile phones was more common as compared to PCs and laptops. 93 per cent households in Delhi and 84 per cent

Figure 2: Mobile Phones by Family Size



Source: Authors

Figure 3: Replacement Time for ICT Products (Per Cent Households)



Source: Authors

households in Jamshedpur replaced their mobile phones regularly. Interestingly, in both the cities the replacement cycle was less than 2 years.

While replacement of laptops and PCs was not common in Jamshedpur, in Delhi majority of households replaced their PCs and laptops with ICT products having a shorter replacement cycle (two thirds of laptops being replaced within 3 years as compared to PCs having an average life of more than 5 years).

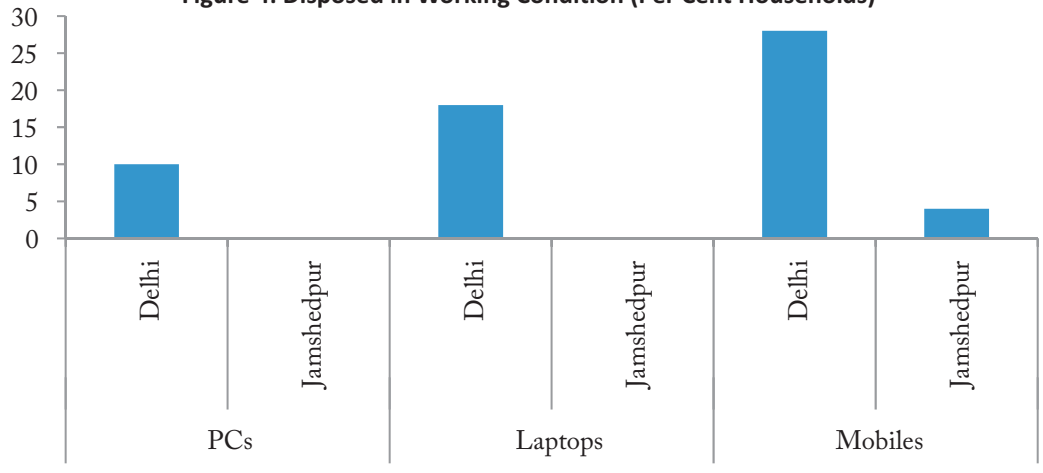
Some of the households specific to Delhi were found to replace their ICT products (PCs 10 per cent households, laptops 18 per cent households and mobile phones 28 per cent households) while they were still in working condition (Fig 4). Obsolescence was stated as the main reason for replacement.

89 per cent households in Jamshedpur tried to repair their products before replacing them. In Delhi, on the other hand, only 26 per cent tried to get it repaired (this could explain the higher replacement rate in Delhi).

4.3 ICT Products 'Not in Use'

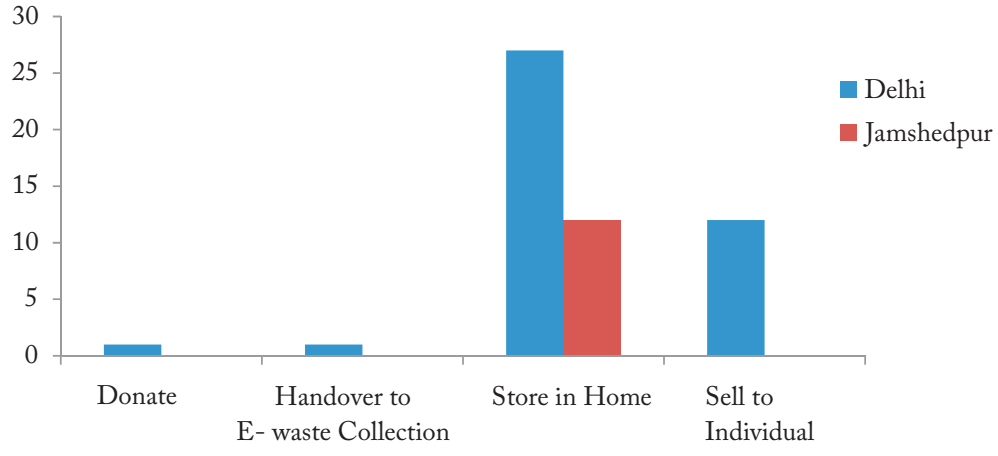
39 per cent households in Jamshedpur had atleast 1 mobile phone 'not in use' with 8 per cent households having more than 1 mobile phone 'not in use'. On the other hand, 32 per cent households in Delhi had 1 mobile phone 'not in use' and another 22 per cent households had more than 1 mobile phone 'not in use'. Overall, more than one third of the households in both the cities had mobile

Figure 4: Disposed in Working Condition (Per Cent Households)



Source: Authors

Figure 5: Disposal Behaviour of ICT products (Per Cent Households)

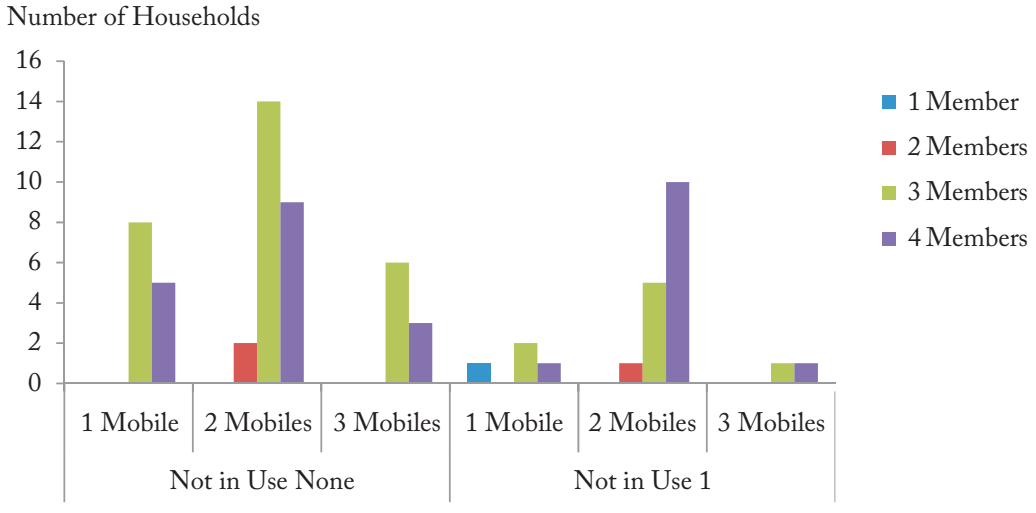


Source: Authors

phones 'not in use' in their house. Only 1 household from Delhi gave their old ICT products to authorized recyclers (Fig 5). This supports earlier studies by Tocho and Waema (2013) who found 52 per cent of the respondents stored e-waste in their houses.

The study also shows that mobile phones 'not in use' was related to family size (Fig 6).

Figure 6: Mobiles in Use and Not in Use by Family Size



Source: Authors

From the city wise data we found that, Delhi had 18 households with PCs 'not in use' and 5 households with laptops 'not in use'; with an overlap of 3 households having both a PC and laptop 'not in use'. Jamshedpur on the other hand, had only 4 households with a PC 'not in use' and another 2 houses with a laptop 'not in use' with no overlap.

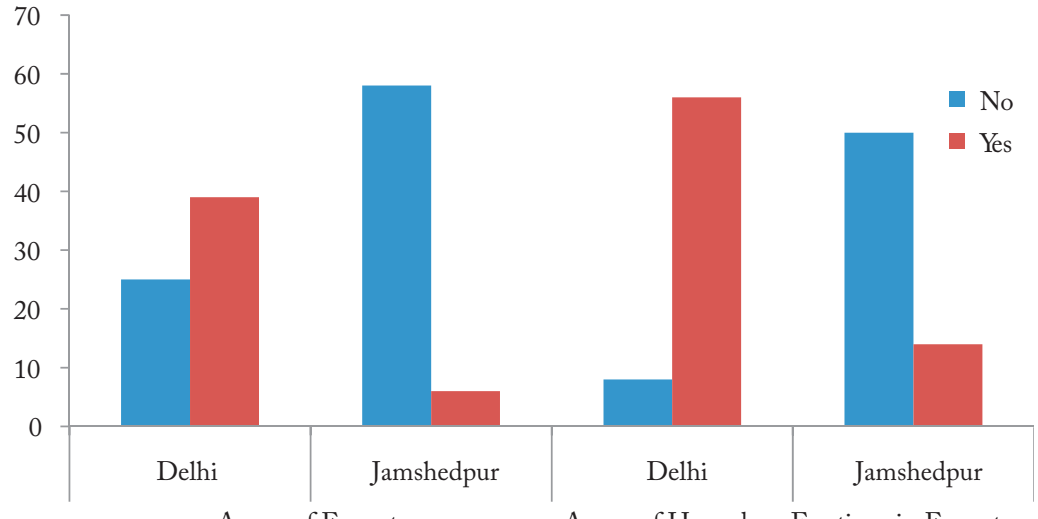
4.4 E-waste Awareness

While majority of the households in Delhi were aware of e-waste only a small number of households in Jamshedpur were aware of e-waste (Fig 7). This study found higher per cent of the households in Delhi were aware of the hazards in e-waste as against only a small per cent of households in Jamshedpur. An earlier study by Kwatra *et al.*, (2014) found 58 per cent of respondents were aware of e-waste and only 4 per cent knew the threats relating to e-waste.

5. Discussion

There is a significant difference in the usage and awareness of ICT products in the two cities. The reason for higher awareness of e-waste and its hazards in Delhi could be attributed to the fact that most of the governmental, non-governmental or corporate awareness campaigns focus on the capital city. For example, Advit Foundation launched an e-waste management campaign in Delhi (TNN, 2014). Again Nokia launched its e-waste drive, 'take back' through its Priority Dealers and Nokia Care Centres in New Delhi (Sadia, 2013). However, due to the

Figure 7: E-waste Awareness (Per Cent Households)



Source: Authors

lack of formal collection mechanisms, the 'not in use' products are stored in the houses in both the cities. These 'not in use' products stored in the house could finally end up with the unorganised sector (Gautam, 2016) if the public is not educated to dispose the e-waste properly. Kwatra *et al.*, (2014) found that 74 per cent of the households sold the household e-waste to the scrap dealers. There is therefore a need to increase awareness programmes and proper collection facilities to reduce the e-waste problems.

6. Implications

Implications can be drawn at four levels: at the policy level, at the manufacturer's level, at the consumer's level and at the collection level.

Several policies have been formulated to manage the e-waste. Implementation of Hazardous Wastes (Management and Handling) Amendment Rules, 2003, Guidelines for Environmentally Sound Management of E-waste, 2008, E-waste (Management and Handling) Rules, 2011 and E-waste (Management) Rules, 2016 was enacted on October 1, 2017. While these mandated that only authorised dismantlers and recyclers should collect e-waste, implementation of these policies has been lax. There is therefore, a need to strictly implement the policies to ensure that the hazards of e-waste are minimized.

Though there is a growing need for end-of-life management of products on the manufacturers, 95 per cent of e-waste is

collected and recycled by the informal sector (Agarwal *et al.,* 2021). The manufacturers should create a reverse distribution mechanism to collect the e-waste.

From the end consumers' perspective, there is a need to: a) educate them about the 3Rs (reduce, reuse, recycle) and b) build awareness about the collection centres. In this connection, there is a need to improve the skills and provide certification for the repair labour (Gautam, 2016).

There is an urgent need to improve the infrastructure of recycling units to reduce e-waste ending up in landfills and raise awareness in the informal sector to reduce processes such as open incineration, and acid-leeching (Manish and Chakraborty, 2019).

Finally, there is a need to involve the local non-governmental organisations in e-waste collection (Central Pollution Control Board, 2011) and also a need to integrate the informal e-waste collectors with the formal e-waste processing plants (Turraga and Bhaskar, 2017).

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Cryptocurrency: Threat to Retail Banking

Dibyajyoti Guha*

Abstract

This paper describes the journey of cryptocurrency from historical perspective, how the banks are now compelled to accept what they used to oppose at the inception of cryptocurrency. This paper begins with the origin of currency and limits its discussion to the essence of central bank digital currency (CBDC). The design of CBDC and its fallout are excluded from the discussion for this part of presentation.

Keywords: Central Bank Digital Currency (CBDC), Cryptocurrency, Narrow Banking, Fiat Currency,

1. Introduction

Human civilisation has progressed through the division of labour, production and trading of the commodity through the use of value and exchange value. The empires of respective nations started issuing currency in the form of metallic coins. Later on, valuable metals whose exchange price is globally accepted such as Gold became the preferred coin for medium of exchange. However, due to high overheads of security during transport of gold, receipts which were backed by gold started gaining popularity, where the institutes/ authorities storing the gold issued these receipts and anyone in possession of a receipt could go to the issuer and demand physical gold by submitting the receipt. This was called the 'Gold Standard'.

After the World War II, delegates from 44 nations joined hands to form an international currency exchange system where a nation's currency was pegged to the US Dollar, which in turn was pegged to the gold price. This is known as the Bretton Woods system. Their aim was to create a monetary system to avoid the rigidity of the gold standard, restrictive trade policies among nations and post war reconstruction.

Internet Protocol is slowly moving away from its traditional utility of transfer of information to transfer of value by the introduction of cryptography in information exchange. Transmission Control Protocol/Internet Protocol (TCP/IP) stack originated from a research lab under the control of Department of Defence (DoD) in 1970s. This was the time when the Government was ahead in research

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and development. But when it comes to cryptographic technology like Rivest-Shamir-Adleman (RSA), Deffie-Hellman key exchange, or Kerberos architecture (came from Massachusetts Institute of Technology), Secured Socket Layer (SSL) that came from Netscape Navigator, private sector has gone ahead of the Government sector. Cryptocurrency which is working as a privately issued currency by various private research and development organizations, has its origin in a famous paper of Satoshi Nakamoto (2008) and in the concept of Decentralized Ledger Technology (DLT) of Blockchain. Along the same line, the Central Government is trying to come up with central bank digital currency (CBDC) or sovereign digital currency to counter the privately issued cryptocurrency. Bitcoin is one of the frontier technologies that has started its journey not from publicly funded university or research laboratory but from individual capacity or collaboration.

The rise of digital currencies such as Bitcoin has been made possible by the robust mechanism of Blockchain and DLT. These developments have led to the possibility of peer-to-peer lending, peer-to-peer payment. All of these are having considerable impacts on the financial system and perhaps the wider economy. As a result, central banks around the world have been monitoring developments in digital currencies for the past few years. The idea of whether the Central Banks are issuing the sovereign digital currency, has become a topic of discussion in both academia and in the policy makers' world.

In the absence of gold standard, money that is in use today is a tangible instrument issued by a state authority which doesn't have intrinsic value and is non-convertible to precious metals. This is known as fiat currency and it is standing on the political stability of the central government. Public confidence is linked to the confidence in the currency issuer in the current monetary system. Like fiat currency, digital currency represents liability on the issuer. Every financial institution has to participate in maintaining of the ledger associated with the monetary system. This is not a public ledger. The settlement relies on multi-layered centrally trusted institutions. This is more expensive than the decentralized ledger system. Blockchain technology has made it possible for the creation of decentralized secured book keeping that can be publicly shared. This leads to the design of sovereign digital currency which is a permissioned blockchain to maintain the central bank as the bank of last resort.

The rest of the paper is organized as follows: section 2 describes features of cryptocurrency, section 3 describes fiat currency, section 4 elaborates the features of fiat currency that is being aimed at by cryptocurrency. Subsequently we turn towards the Nobel Laureate James Tobin's proposal in section 5. Finally, we conclude by describing the potential consequences of CBDC in section 6.

2. What Is Cryptocurrency: Unit of Account or Medium of Exchange?

Every currency has three inherent features to be a currency: (a) Unit of account; (b) Medium of exchange and (c) Store of value.

Cryptocurrency is able to serve the latter two features but is not the unit of account. Then why it is gaining so much of importance? It's because of its settlement technology, known as "decentralized ledger technology" using cryptographic hash, non tamperable append only log of transactions, encryption, and authentication. Unlike cash, cryptocurrency is not anonymous but pseudo-nymous. The owner's cryptographic identity is attached to the currency, that helps to find the trail of currency. The cryptographic identity is not a permanent identity like Aadhaar, Permanent Account Number (PAN) number. Hence, that makes the cryptocurrency as a potential avenue to be abused by the hackers for terror financing, drug trafficking etc.

Cryptocurrency allows transfer of money to be verifiably recorded without the need for a centralized trusted third party which is the heart of Central Bank's functionalities. Hence, Central Banks are facing a huge "competitive threat" from the superior cryptographic technology of privately issued digital currency on maintaining the ledger of its particular asset, i.e., Central Bank's Money. As a result, Central Banks have taken initiative to develop CBDC. Mr. Ben Broadbent, Deputy Governor for Monetary Policy of the Bank of England (Nakamoto, 2008), expressed his view that neither the "digital" nor the classic definition of "currency" gives rise to cryptocurrency. Perhaps, a better name would be "Decentralized Virtual Clearing House and Asset Register". Since, there is no legislation that has been made to make cryptocurrency to be an unit of account, it can't be accepted as legal tender. Hence, it can perform the function of storage of value as part of the features of the currency.

Controlling the money supply and enforcing various security features are very important and essential properties for every currency. These are the prerogative duties of the central banks of every nation in the case of physical currency. Due to the robust features like one way hash function, SHA-256 based digital signature standards, linking of the hash values of the transactions and consecutive blocks, the security features of cryptocurrencies are robust. Since it is not backed by any physical metal like our physical currency, we will discuss about the pros and cons of fiat currency in the subsequent sections.

3. Need for Alternative of Fiat Currency: A Page from History

The idea of debt being represented as money goes back to the origin of Promissory Notes Act passed by the Parliament of England in 1704. What we call as deposit is the record of debt that Bank owes to its customers. In developed nations, vast amount of money is backed by mortgage (Broadbent, 2016). This is a major crisis that is contributed by the Fractional Reserve Banking system which

originated in the USA in 1791 since the creation of the Central Bank of USA. USA Constitution came into force in 1789, after 13 years of achieving independence in 1776. Alexander Hamilton became the first secretary of treasury in 1791, the Bank of US became the first central bank with 20 years of provision by US Senate, it was passed by US Congress and signed by President Washington. Hamilton was a believer of strong central government and that it could be achieved by a strong central banking.

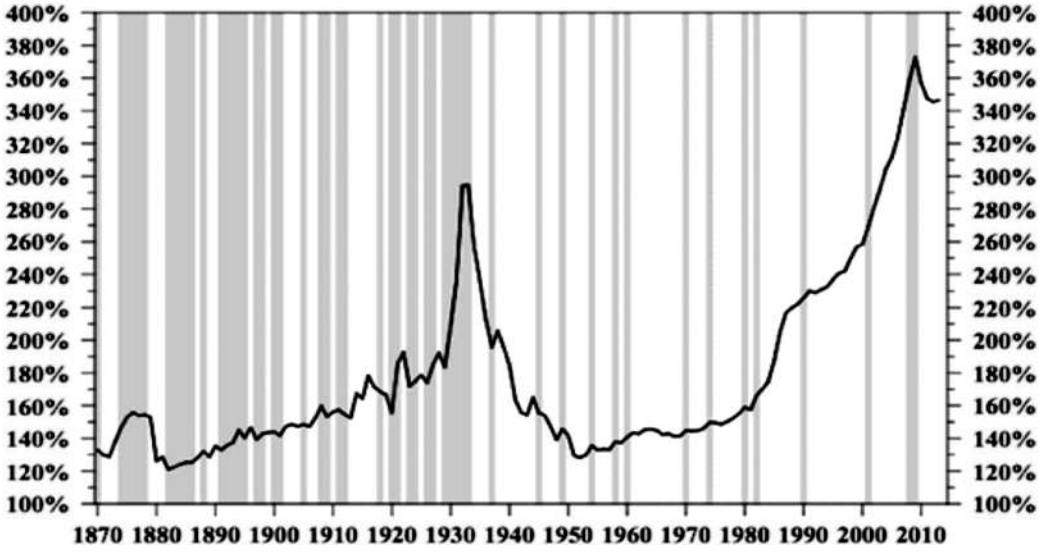
Thomas Jefferson was against a strong central government concept as he felt it was an undemocratic tool used by the North Eastern Banking establishment. In 1811 that charter ('First Bank of the United States') expired during President Madison. But USA had piled up huge debt in 1812. When the war was over, President Madison and the Congress signed the bill to establish a second Bank in 1816. The second Central bank was to be created by 1816 to control inflation. But it was opposed by President Andrew Jackson (1829-1837) as he said that it would benefit a few at the expense of many. Thomas Jefferson and Andrew Jackson said that the Central Bank was unconstitutional although the Supreme Court had ruled that Central Bank was constitutional in the famous McCulloch Vs. Maryland (1819) case.

President Jackson destroyed the creation of the 2nd Central Bank in 1836. After that there was no Federal Bank or Federal organisation in the national Banking system for the next 77 years until the Federal Reserve System was created in 1913. From 1836 to 1913, there were no central banks in the USA. Arguably, this was the period when economic growth led to social prosperity in USA. The Federal Reserve was created in 1913. Within a span of 16 years, the commercial banks started failing, that caused the Great Depression in 1929. That forced President Roosevelt to declare 4 days national shut down of banks followed by setting up of the "Chicago-Plan" that led to the Emergency Banking Act 1933 reform. Famously, during the Great Depression, a group of economists at the University of Chicago recommended the end of fractional reserve banking (the so-called "Chicago Plan"). There have been similar calls since the 2008–09 financial crisis. Prof. Richard Werner in his seminal work, established with empirical evidence that each bank creates money when it issues a new loan, resulting into currency being represented as debt (Werner, 2014).

4. What Features of Fiat Currency are Sought by Cryptocurrency?

Since, August 15, 1971, following the Presidential order of the then President Nixon, USD was no longer to be convertible into gold. The currency had lost its backing up of gold. This was the time when the USA formally adopted the fiat currency. Slowly most of the countries have moved into fiat currency. Fiat currency has social and economic consensus (Gensler, 2018a), keeping its faith on the Central Government.

Fig 1: USA Private and Public Debt as a Percentage of GDP

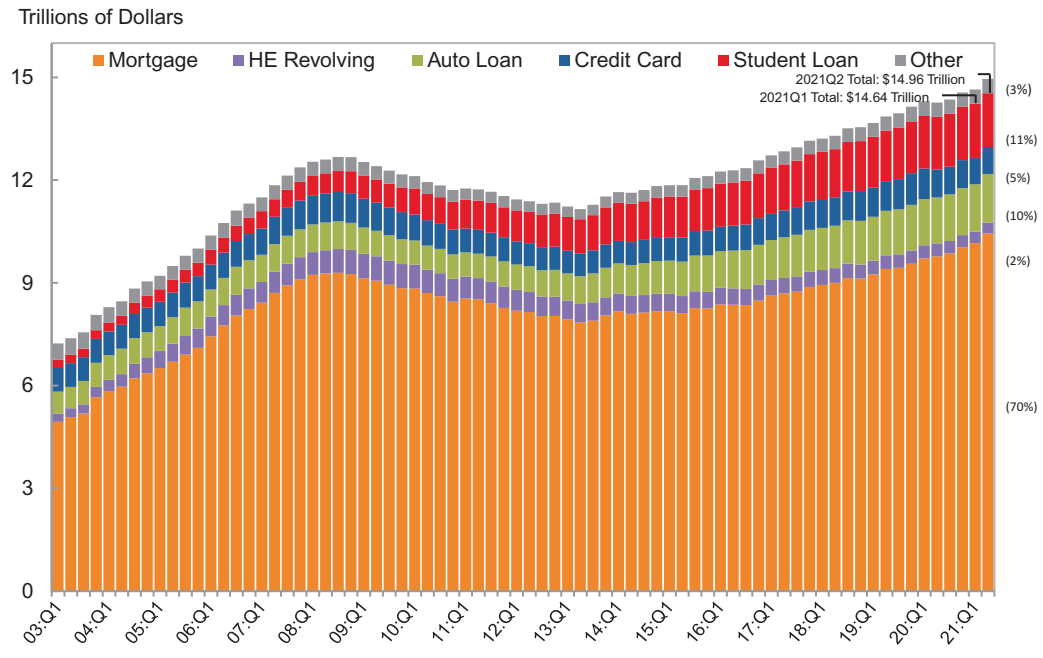


Source: Bureau of Economic Analysis, Federal Reserve, Census Bureau: Historical Statistics of the United States Colonial Times to 1970. Through Q1 2011. Last plot Q1 2011

What cryptocurrency aims at is instead of relying on Central Government's promise of promissory notes, relying on solving cryptographic hard problems to build consensus among participating nodes in the network. It doesn't aim to solve the problem of fractional reserve banking system, but paves the way for "narrow-banking" based on cryptography based distributed consensus. When Gross domestic product (GDP) of a country grows, the commodity which is getting exchanged that also grows. Commodity exchange happens through money; it implies that amount of money circulation also grows. When money is represented as debt, it becomes a humongous task to keep debt to GDP ratio under control. USA's private and public debt as percentage of GDP from colonial times to 2010 is shown in Fig 1 (U.S. Department of Commerce, 1970). This ratio is growing in an ever increasing manner from 1971, the time when fiat currency was adopted by the then President Nixon on August 15, 1971. Debt due to mortgage is the largest component in the household debt. Growth of all the components of household debt from 2003 to 2021 is shown in Fig 2.

USA's total credit market is 67 trillion USD as per Federal Reserve 2018 Q2 'Financial

Fig 2: Total Debt Balance and Its Composition



Source: New York Fed Consumer Credit Panel/Equifx

Accounts of the U.S.' (Gensler, 2018b). The Federal Reserve Bank of New York's Centre for Microeconomic Data issues its Quarterly Report on Household Debt and Credit (Press Release, 2021). The report[1] shows that total household debt increased by $333 billion (2.2 per cent) to $15.58 trillion in the fourth quarter of 2021. Mortgage balances shown on consumer credit reports increased by $258 billion during the fourth quarter of 2021 and stood at $10.93 trillion at the end of December 2021 (Federal Reserve Bank of New York, 2021). The 2.2 per cent increase in aggregate balances was the largest seen since Q4 2013.

History reminds us that the major civil wars in USA in 1811 and 1863, was preceded by the departure from the gold standard. Cryptocurrency is equivalent to digital fiat currency, both of them are not having gold back up. Cryptocurrency will enable a faster audit trail than cash economy.

Aim of CBDC: To widen access to the central banks' balance sheet, beyond commercial banks. Although, both of them might share the same technology, the aim of private and

[1] https://www.newyorkfed.org/microeconomics/hhdc

central-bank versions of a digital currency are different. The private digital currency would like to expand whereas, CBDC seeks to replace, the private digital currency. The introduction of CBDC would pave the way for negative interest rate and narrow-banking Vs. fractional reserve banking which is a long standing debate in political economy (Broadbent, 2016).

5. James Tobin's Proposal: Precursor of DLT

To avoid relying too heavily on deposit insurance to protect the payments system, noble winning economist James Tobin (1987), argued, the government should create what he called "deposited currency accounts" (DCAs) at the Central Bank. "I think the government should make available to the public a medium with the convenience of deposits and the safety of currency, essentially currency on deposit, transferable in any amount by check or other order." There are two interesting points about Tobin's proposal. One is that he made it long before anything like the "distributed ledger" was conceived (he suggested that DCA branches could be housed in post offices). Secondly he thought there should still be room for commercial banks to raise deposits of their own and that they should continue to be insured.

5.1 ***The CBDC: Enabler of Narrow Banking***

Fractional Reserve Banking system allows nationalization of deposit by commercial banks. If that is being shifted to Central Bank, then how the commercial banks would be financing their lending? Twin challenges of on-demand liabilities and illiquid assets impart an inherent fragility to commercial banks' balance sheets. By contrast, the Central Bank essentially holds nothing but liquid assets that are largely government securities. A comprehensive overview of narrow-banking is carried out by Bossone (2001).

6. Potential Consequences of Narrow Banking and CBDC

All the stock of money available to public would have to be fully backed with government paper. If narrow-banks were required to hold government paper only, the supply of such paper would depend on the government's debt management policy. Tying the monetary services with public debt management and assigning it to the government might not be a good policy.

Apart from difficulty in maintaining permanent identity of the users in cryptocurrency networks, one of the biggest impediment of cryptocurrency is enormous power consumption (Bossone, 2001). According to the Cambridge Center for Alternative Finance (CCAF), Bitcoin currently consumes around 110 Terawatt hours per year — 0.55 per cent of global electricity production (Carter, 2021). The carbon emission can be reduced if hydro power is chosen for Bitcoin network.

In the wet season in Sichuan and Yunnan, enormous quantities of renewable hydro energy are wasted every year. In these areas,

production capacity massively outpaces local demand, and battery technology is far from advanced to make it worthwhile to store and transport energy from these rural regions into the urban centres that need it. These regions most likely represent the single largest stranded energy resource on the planet, and as such it's no coincidence that these provinces are the heartlands of mining in China, responsible for almost 10 per cent of global Bitcoin mining in the dry season and 50 per cent in the wet season.

Most of the journalists refer to Bitcoin's "high per transaction energy cost". This is a wrong metric, as most of the energy consumed by Bitcoin network is during the mining process not during transaction and validating the transactions. A widely circulated study was cited in New York Times (Tabuchi, 2021) making the shocking claim that Bitcoin could warm the earth by 2 degree Celsius. As a result, many organizations within the mining industry have launched initiatives like the Crypto Climate Accord — inspired by the Paris Climate Agreement — to advocate for and commit to reducing Bitcoin's carbon footprint. Bitcoin mining will intensify the demand for renewable energy options.

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Major Transitions and Emerging Trends in Financial Reporting

Rajeev Kumar Verma*

Mr. Rajeev Kumar Verma has over 19 years of experience with expertise in corporate accounting and financial reporting. He is currently heading the Group Accounting and Financial Consolidation function at Tata Steel Limited. He is a Chartered Accountant. He led the implementation of Hyperion Financial Management (HFM) and Financial Data Quality Management (FDQM) in Tata Steel Limited which significantly assisted in reducing consolidation time with improved analysis of financial numbers across the Group. He has also led the implementation of the Indian Accounting Standards (Ind AS) for the Tata Steel Group. In an interview with IMI Konnect, Mr. Verma shared his views on the major transitions, developments and emerging trends in the domain of Financial Reporting.

IMI Kolkata: *As an expert in the field of financial reporting, what would you consider as the major transitions that have taken place in this domain over the past few years in the Indian context?*

RKV: The most significant transition begun back in 2007 when India embarked on a journey to align its Accounting Standards with the International Financial Reporting Standards (IFRS). The Institute of Chartered Accountants of India (ICAI) started working to develop a set of new reporting standards, now termed as the Indian Accounting Standards or Ind AS. The initial target of implementing Ind AS in 2011 got delayed to ensure a smooth and effective transition. Finally, the Ministry of Corporate Affairs (MCA) in 2015, announced implementation of the new standards in a phased manner beginning April 2016 till April 2019 for different classes and sizes of companies. Introduction of Ind AS has brought in a significant transformation in financial reporting by providing additional guidance on accounting matters and by prescribing detailed disclosure requirements.

Apart from Ind AS, over the past few years the amendments brought in by the Companies Act, 2013 which replaced the erstwhile Act of 1956 have also impacted financial reporting in India. With a view to bring consistency and comparability across companies in different sectors on adoption of Ind AS, the new Act has prescribed the detailed formats for

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presentation of financial statements including additional disclosures over and above those required by Ind AS. Other areas affected from a financial reporting perspective relate to Related Party Disclosures, Corporate Social Responsibility, Micro, Small and Medium Enterprises (MSMEs), presentation of financial information for group companies and so on.

In addition to the above, amongst the more recent trends, Integrated Reporting and Environmental, Social and Governance (ESG) disclosures have been brought in to transform the financial as well as non-financial reporting in India. These aim to ensure an improvisation to the understanding of the relationship between financial and non-financial factors that determine a company's performance and how a company creates sustainable value in the longer term.

IMI Konnect: *On a broader perspective of the global business environment, what would be some of the noteworthy transitions in the space of financial reporting that have been implemented by other prominent economies of the world?*

RKV: International accounting organizations, such as the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB), have called for more value relevant accounting standards with an aim to improve the quality of accounting information and to promote convergence towards global accounting standards.

The two leading reporting frameworks present internationally are IFRS of the IASB and US GAAP[1] of the FASB. Over the past decade countries such as India, Australia, Singapore and Philippines have moved towards converging their national GAAP with the IFRS. As a result, the differences that existed between the reporting framework of these countries have been mitigated which has helped the investors in comparing the performance of organizations located in different jurisdictions.

IASB and FASB are continuously working together to converge the new accounting standards under both the reporting frameworks i.e. IFRS and US GAAP. Recent joint efforts of the IASB and the FASB have resulted in issuance of new converged standards e.g. on revenue recognition, leases, etc. Such convergence has been made to reduce any dissimilarity that existed in these two sets of standards accepted worldwide.

Apart from standard setting and convergence, major changes have also been witnessed in the governance framework which in any jurisdiction overarches the financial reporting framework. One of such transitions was the introduction of Sarbanes Oxley Act, 2002 (SOX) in the United States of America which has revamped the federal regulations pertaining to publicly traded companies' corporate governance and reporting

[1]Generally Accepted Accounting Principles (GAAP)

obligations. The Act mandates that all publicly traded companies must establish internal controls and procedures for financial reporting and must document, test and maintain those controls and procedures to ensure their effectiveness. The purpose of SOX is to reduce the possibilities of corporate fraud by increasing the stringency of procedures and requirements for financial reporting.

Aligned to the global changes, in India too we have seen more stringent norms being introduced over the past few years e.g. the Companies Act, 2013 requirements with respect to Internal Financial Controls (IFC). In case of a listed company, the Board of Directors are required to confirm about the adequacy and operating effectiveness of Internal Financial Controls. Additional responsibilities have been thrusted upon the auditors requiring them to report whether the company has adequate IFC in place and on the operating effectiveness of such controls.

IMI Konnect: *In view of these transitions, what would be the trends in international financial reporting that one should look out for in the coming years?*

RKV: The onward path of international financial reporting is dependent on the updates and improvement projects being pursued by the IASB as a result of its post implementation reviews and to address the need for guidance sought by market regulators and companies on new emerging and complex transactions.

The objective of a post implementation review is to assess if standards or pronouncements recently implemented are working as desired by the IASB and not to reopen already discussed arguments. Review is done only after allowing sufficient time to develop a practice as concerns raised in the early days of implementation often get resolved in due course without IASB's intervention.

In addition to the post implementation review of newly implemented standards, IASB and other national as well as international regulators are also closely tracking the developments in the digital assets or cryptocurrency space to assess the need of and to provide relevant accounting and disclosure guidance in this domain.

Further, to keep pace with and address the specific accounting issues arising out of the continuous developments in the banking, financial and insurance sector, the IASB has undertaken specific projects for standard setting and maintenance which would ensure a better presentation of financial statements for the companies in this sector and provide more relevant and meaningful information to the users of financial statements.

Apart from the above, in recent years sustainability has also become a mainstream topic for every company's Board of Directors. The recent urge of investors to know about sustainability and environmental impact created by companies is leading to the development of sustainability related financial disclosures. The IASB has also set up a new

board, the International Sustainability Standards Board (ISSB) which has embarked on its journey of developing standards for such disclosures.

IMI Konnect: *Through a comparative lens, how does the regulatory framework pertaining to and governing Financial Reporting in India correspond to that in the United States?*

RKV: Transparency through better financial disclosures has been consistently demanded by stakeholders, particularly from the corporate world. Disclosure of financial as well as non-financial information is essential for reporting performance of an entity. Growing size of companies, increasing capital requirements and globalization of capital markets are giving rise to new challenges in disclosure and reporting practices. Due to separation of ownership and management in companies, managers may consider their own interest at the cost of stakeholders' interest. The Enron debacle in the U.S is one of the key examples which led to the introduction of more stringent norms for financial reporting. Regulators and policy maker's requirement for a more transparent and improved corporate governance framework has resulted in significant changes in the accounting framework and related disclosures.

In India, the Companies Act, 2013 specifies the frequency and manner of preparation of financial statements in accordance with the notified accounting standards. In case of listed companies, preparation of financial statements including the reporting frequency is additionally governed by the Securities and Exchange Board of India (SEBI) Listing Obligations and Disclosure Requirements Regulations (LODR).

In the United States of America, the US GAAP is enforceable by the FASB and Securities and Exchange Commission (SEC). The SEC has the authority under securities law to both set and enforce accounting standards, while the FASB, an independent non-governmental body tasked by the SEC, can only set standards, which it does so via the Accounting Standards Codification. The SEC keeps a close watch on the companies for compliance with the US GAAP.

IMI Konnect: *In your experience, how are the Indian firms across sectors specifically addressing the issue of Integrated Reporting at present?*

RKV: Companies in India produce multiple reports serving different needs, like Annual Reports, Corporate Social Responsibility Reports, Business Responsibility Reports (BRR), Sustainability Reports and other reports presenting compliance with emission and effluent standards. This at times makes it difficult for investors to integrate and co-relate financial and non-financial information in a holistic manner. To address this issue, India has taken steps in adopting Integrated Reporting, initiated by a 2017 circular of the SEBI which recommended that top 500 listed companies which are required to prepare BRR may adopt the Integrated Reporting framework. In 2017, India saw companies such as Tata Steel, Mahindra & Mahindra,

Wipro and Reliance Industries adopting integrated reporting and the number of such companies have been increasing ever since.

Integrated reporting has ushered in a culture of strategy-led reporting in India with 100 per cent of all Indian integrated reports publishing some form of forward-looking information. Almost all companies these days are including more and more disclosures in their integrated reports as their reporting practices evolve over the years. Companies belonging to different sectors provide different disclosures based on their nature of operation for e.g. in the Information Technology (IT) sector, companies in their Integrated Report primarily focus on Financial Capital, Intellectual Capital, Social & Relationship Capital, Natural Capital and Human Capital. Companies in the manufacturing and Fast Moving Consumer Goods (FMCG) sectors on the other hand also include additional disclosures with respect to Manufactured and Operational capital.

Using the Integrated Reporting Framework, companies are considering and reporting on the use and impact across various capitals through various quantitative metrics including qualitative narratives. Annual reports are better connected and show how strategies and business model are creating value.

IMI Konnect: *What is your take on the relevance of highlighting the ESG parameters in financial reporting?*

RKV: These days, it's rare not to find some mention of Environmental, Social, and Governance matters in the news. Discussions often focus on how ESG matters affect a company's business strategy, operations, and long-term value. Such discussions are vital as it impacts or would impact the future business process and the manner in which business would be conducted. The investors want to know long term sustenance and future prospects of the business, customers are interested in the environmental and social impact of the products they procure, and regulators find information on compliance to environmental norms relevant for their use.

As companies become agile to upgrade their existing technologies and production methodology for being more energy and environment efficient, it is even in their interest to present information about how they are keeping pace with recent developments in this area. It has been observed that even though the regulations often allowed companies, to choose not to make enhanced disclosure, there is a steep increase in ESG disclosures being considered by the companies. All three types of disclosure – environmental, social and governance have increased.

IMI Konnect: *Do you think that sustainability reporting at present is taking a centre stage in investment decisions across the world?*

RKV: Sustainability reporting is a three-part reporting framework that highlights the economic, environmental and social

performance of an organization in addition to its financial performance. The concept of sustainability is based on the awareness that a company's operations should be carried out in a manner that will not have a detrimental impact on the environment and the lives of future generations.

Economic information includes several aspects of wages and benefits, job creation, expenses for research and development, investment in training, human capital and the traditional financial information. Environmental information contains activities and their impacts on air, water, soil, biodiversity and human health. Social information reveals information about workplace health, workers' rights, human rights and differences, wages and working conditions.

Through sustainability reporting, an organization conveys its non-financial performance and the consequences of its operations on the economy extensively which lets the investor know about the risks that are likely to occur as a result of the organization's non-financial performance. Investment decision depends on the usefulness of the information that is disclosed and on the requirements of the users of such information.

A well-framed sustainability information is likely to influence investor decisions and companies can therefore create more value for their shareholders in the long term.

IMI Konnect: *What is your take on the possible impact of IFRS on the concern regarding earnings management by firms or their overall accounting quality?*

RKV: It is often seen that adoption of IFRS has usually led to a better reflection of a company's underlying economics, provides more relevant information and earnings persistence. The relationship between IFRS adoption and earnings management is evident from the fact that IFRS eliminates multiple accounting alternatives for a given transaction thereby reducing managerial discretion which in turn reduces the extent of opportunistic earnings management and thereby improves quality of reporting.

By reducing international differences in reporting standards, IFRS promotes comparability among the financial statements of different companies from different countries. IFRS establishes the requirement of reporting a transaction on its substance rather than on its form and follows principle-based accounting thereby eliminating any possible opportunity for the firms to manipulate its earnings.

IMI Konnect: *What have been the key opportunities and challenges of adopting IFRS in India?*

RKV: In the given context, I would like to highlight that India adopted the convergence model with IFRS and not the adoption model. IFRS in India i.e. Ind AS contains minor differences from IFRS issued by the IASB to make the standards more relevant to the

Indian context.

Adopting Ind AS brought its own set of opportunities and challenges. By eliminating reporting differences with global peers, Ind AS implementation has increased reliability, comparability and acceptability of the financial statements of Indian firms. It has opened up opportunities for cross border investments and access to global capital markets. It helped eliminate risks perceived by providers of finance on account of financial statements not being prepared based on globally accepted financial reporting standards. Accounting professionals in the domain have been benefitted by highlighting their expertise on multiple global platforms.

On the challenges side, building technical expertise in this domain including training of both preparers and users on the new reporting changes has been a concern to be addressed since the beginning of the implementation. Finance professionals had to be adequately trained to implement the standards consistently and uniformly. In India, the MSME sector is relatively larger and the cost of implementation of the new standards may outweigh the benefits for a few firms. To address the issue, Ind AS implementation has been made in a phased manner based on size and sector of the entities. Also, fair value measurements specified under Ind AS carried its subjectivity and volatility making the financial statements difficult to understand.

IMI Konnect: *How will Blockchain impact Financial Reporting in the future? Do you see it as an opportunity to take Financial Reporting to its next level?*

RKV: Blockchain is a type of shared database that creates a permanent record of transactions. The "blocks" in the blockchain contains records of information like transactions, digital signature of buyer and seller of the transaction and a unique identifier called "hash' that enables one to distinguish each block from other ones. The fundamental difference between blockchain and traditional database systems is the fact that blockchain runs on distributed ledger technology wherein multiple participants in a network create, record and share data with multiple counterparties unlike existing database systems, where it is under the control of a single entity.

As for blockchain's impact, it is often compared to the impact the internet has had on information. When the internet first came into existence there were limited number of people using it. In contrast, today, the internet is an integral part of the fabric of all of our lives. Likewise, blockchain, when it reaches scale, could have similar kind of impact in terms of how transactions are recorded and as evidence for transfer of value.

Specific to financial reporting, blockchain will definitely impact the accuracy and validity of data. Being a distributed ledger, blockchain allows every transaction in a company's ledger to be instantaneously available to all participants in the network. When used as such, you basically have a ledger that

theoretically can never be altered and whose records can never be destroyed. A change made by a participant in this network would be validated and reflected in everyone's view of the ledger in one shared record. This not only increases the speed of transactions but also reduces human error and fraud. Also, from data analysis point of view, blockchain will open newer opportunities since huge amount of reliable and accurate data will get generated in blockchain, which coupled with advanced new analytics software available, would provide executives more power to analyse data and gain insight.

However, since blockchain is a technology based on peer-to-peer network, data privacy is one area where organizations need to have a relook before implementing this. Appropriate internal controls would be required to be put in place ranging from general IT controls to controls managed by other organizations.

IMI Konnect: *In addressing the larger vision of environmental sustainability, how is Tata Steel integrating sustainability reporting aspects in its existent financial reporting structures and processes? What would be the specific focus areas for managing long term excellence?*

RKV: Tata Steel has imbibed the vision of the Founder by integrating responsibility towards planet earth in its operations, ensuring the health and safety of people at our workplaces, balancing economic prosperity and generating social benefits for the community. Sustainability is deep rooted in the culture of the organization and this commitment is embedded in the Company's Vision which balances the aspiration of being steel industry benchmark in value creation and corporate citizenship.

Tata Steel considers sustainability reporting as a key component of its integrated report. The Company includes a detailed description of its sustainability strategy, approach and policies which are formulated to go hand in hand to achieve its vision to be an industry leader in the areas of climate change, water and waste management, biodiversity in addition to the other key performance indicators. The Company also provides information about the Committees within the organization that are working towards achieving its sustainability goals.

Tata Steel continues to focus and understand the needs of investors and other stakeholders about sustainability reporting and translate that into relevant metrics and disclosures. Continuous efforts are being made at Tata Steel to make a clear link between financial and non-financial information.

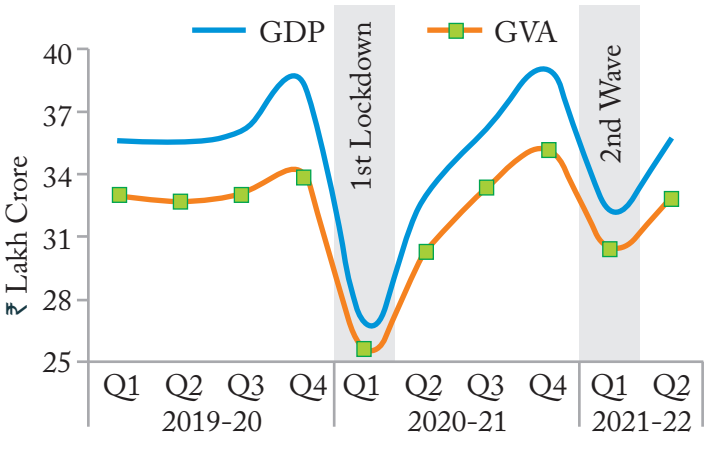
Union Budget 2022-23: A Futuristic Budget Underscoring Medium-to Longer Run Economic Growth

Sahana Roy Chowdhury*

1. Introduction

The Union Budget 2022-23[1] was presented in a very difficult timeline amidst the COVID-19 pandemic, when the Indian economy just had an upturn from two sharp double dips in the Gross Domestic Product (GDP). The first deep fall was in the first quarter Q1 of the FY 20-21 hit by the first wave, the second sharp fall was witnessed during Q1 of 2021-22 during the second wave (Fig 1), which was relatively temporary. Notably, this is the first digital and paperless budget in Indian history. Discussions and debates are ongoing worldwide on how the policymakers should intervene in terms of key policy instruments, to help revive their economies during this pandemic amid dampening demand, growth and revenue, with limited fiscal space and priorities on the health expenditure. Two distinct interventions or mixed approaches were suggested and observed in several economies as rescue packages; first, redistribution of income via boosting personal consumption expenditure such as providing tax breaks and other sops. This in turn, creates demand and thereby propels growth and recovery.

Figure 1: Growth



Source: Union Budget 2022-23, Key Features of Budget.

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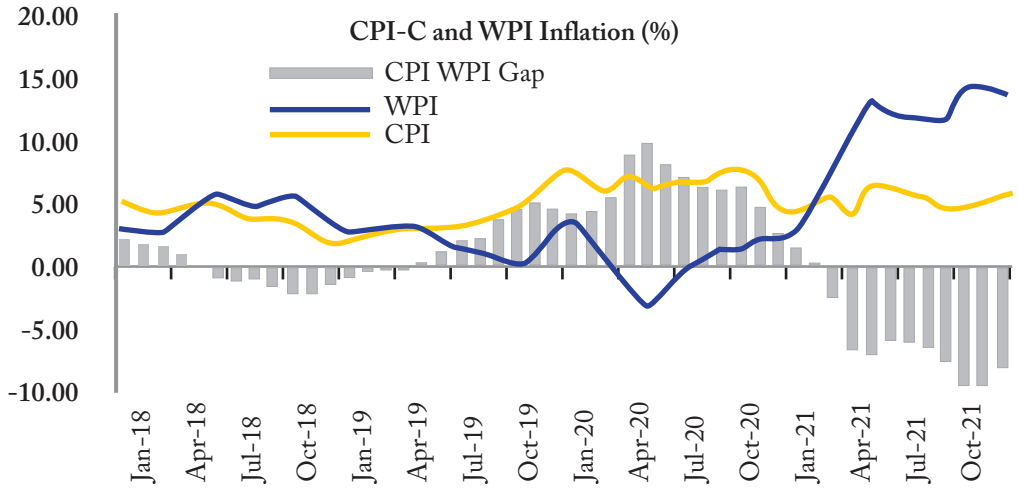
[1] Union Budget 2022-23: https://www.indiabudget.gov.in/

Second, pump-priming the economy with a boost to capital expenditure and infrastructure projects so as to trigger the multiplier process, creating jobs and demand in the process.

The latter is less direct and takes time to impact the economy, while the former is a direct boost to the GDP, and therefore more of a populist measure at a time when people lost jobs and uncertainty prevails with regard to income. Nonetheless, a sound recovery and its sustenance in the medium to longer run, comes through a strong multiplier effect via capital expenditure, or through building assets, and strengthening infrastructure and the supply-chain connections. This also takes care of the fact that the GDP loss has been triggered both by the demand and supply side factors- slackening demand as well as cost-push and supply-chain disruption related reasons. This is reflected from the fact that alongwith the growth fall, inflation has picked up as well (Fig 2), and with slackening demand this is more likely to happen when costs are rising (supply-side factors). Therefore, attacking the supply-side and simultaneously building assets, capital formation and investments in infrastructure is a visionary approach with foresightedness, rather than boosting consumption via redistributive or taxation policies which is a myopic approach. The outlay for capital expenditure in the Union Budget is being stepped up sharply by 35.4 per cent from ₹5.54 lakh crore in the current year to ₹7.50 lakh crore in 2022-23. This is an increase of more than 2.2 times the expenditure of 2019-20 and is 2.9 per cent of GDP.

Figure 2: Inflation



Source: Union Budget 2022-23, Key Features of Budget.

The Union Budget 2022-23 takes exactly this approach at a time when it is absolutely anticipated. Over the coming 25 years down the line (from India 75 years to 100 years of independence) it envisions a high-growth path, building an atmosphere to prop-up public investment with a crowding-in impact on private investment, and at the same time an all-inclusive welfare generation. The Atmanirbhar Bharat[2] scheme (Table 1) envisions 'creating 60 lakh new jobs, and an additional production of 30 lakh crore during next 5 years'. This budget carries this spirit.

2. Four pillars of Union Budget 2022

2.1 PM GatiShakti: This is an approach towards sustainable development via building infrastructure involving roads, railways, waterways, logistic infrastructure and mass transport. The seven engines are Roads, Railways, Airports, Ports, Mass Transport, Waterways and Logistics Infrastructure. These 7 engines in the National Infrastructure Pipeline will be aligned with PM GatiShakti framework (Union Budget, 2022-23). The national highway network to be expanded by 25,000 km in 2022-23 and ₹20,000 crore is to be mobilised for this. To build a strong local business and supply chain network One Station One Product concept was floated in the budget under Railways. Under indigenous world class technology and capacity network project Kavach it is mentioned that 2000 km railway network is to be brought under this, 400 new generation of Vande Bharat trains is budgeted to be manufactured, and 100 new cargo terminal in the coming three years, ropeways are to be developed in PPP mode.

2.2. Inclusive Development: This implies an array of developmental and welfare oriented expenditure which enables a balanced and sustainable sectoral growth with equity. Under this several sectors have been emphasised:

i) Agriculture: This sector absorbs more than 50 per cent of the unskilled workforce mostly concentrated in the rural areas. This has increased during the COVID-19 pandemic as a good proportion of the migrant labourers have returned back to the source states from their destination states for livelihood. Notably, this sector has shown consistent good performance and less volatility during the pandemic. The last budget also allocated quite a hefty amount directly and indirectly for this sector to help sustain growth in this sector. This year's budget allocates ₹2.37 lakh crore direct payment to 1.63 crore farmers for procurement of wheat and paddy. Sustainable farming has been emphasised keeping Sustainable Development Goals (SDGs) in mind, and also the harmful impacts of excessive usage of chemical fertilisers. It is well documented that too much of subsidies in certain fertilizers triggered irreversible damage in soil fertility increasing the Nitrogen Phosphorus Potassium (N-P-K)

[2]AtmaNirbharBharat webpage: https://static.pib.gov.in/WriteReadData/userfiles/highlight2022.pdf

ratio in several parts of Indian farmland. This needs policy attention and suitable incentive mechanism designing policies. The budget takes a move ahead in this direction; chemical free natural farming is to be encouraged throughout the country, initially the focus will be on lands in 5 km wide corridors along river Ganga. In agri-start up sector, National Bank for Agriculture and Rural Development (NABARD) has been assigned the key role to disburse and facilitate blended capital to these units. Technology embedded impetus on growth policy has propelled in almost all the sectors of the expanding Indian economy, agriculture can't remain an outlier. The state of the art technology usage is proposed- Kishan drones to assess crops and digitize land records. An outlay of ₹1400 crore to be implemented to help 9.08 lakh hectares of land to be irrigated by this.

ii) Micro, Small & Medium Enterprises (MSMEs): The MSMEs were hit hard during the pandemic due to several reasons- supply-chain disruptions to availability of labour related issues. To help this sector sustain and maintain the entrepreneurial spirit, the government had already taken multiple steps in the last year, including suspension of Insolvency and Bankruptcy Code and many others. This budget gives further fillip to this ailing sector. The Emergency Credit Linked Guarantee Scheme (ECLGS) which was announced now is extended for additional credit and timeline till March 2023. To incentivise and induce productivity accreditation of MSME performance has been proposed with a ₹6000 crore outlay.

iii) Skill Development: A digital eco-system is to be developed nationwide for skilling, re-skilling and upskilling, start ups are to be facilitated on drone development.

iv) Education and Health: Considering the fact that students are facing several learning challenges during the COVID-19 pandemic the 'one class one TV channel' is to be expanded. Digital university with world class education is to be built up. These are to be built in the hub-spoke model, the hub will have cutting edge Information and communications technology (ICT) and the country's public universities and institutions will collaborate as the hub-spokes network. There has been a series of interventions in various modes during the pandemic in this sector. Emphasis has been given on digitization in this budget, and a big push is provided to create a mental health provisioning network. Government is already providing integrated benefits to women and children through Mission Shakti, Mission Vatsalya, Saksham Anganwadi and Poshan 2.0. The budget proposes to upgrade 2 lakh anganwadis to Saksham Anganwadis.

v) Infrastructure Building for Equitable, Inclusive and Sustainable Development: Har Ghar Nal se Jal is the flagship scheme that is rolled out on a massive scale in mission mode to provide tap connections to all in a time bound manner. This budget allocates ₹60,000

crore to cover 3.8 crore households under the scheme in 2022-23. Under Pradhan Mantri Awas Yojana – the Housing for all scheme, ₹48,000 crore is allocated for completion of 80 lakh houses in 2022-23. A new scheme, Prime Minister's Development Initiative for North-East Region (PM-DevINE), is proposed for socio-economic development of the north-eastern region, specifically for the livelihood activities of the youth and women, an initial allocation of ₹1500 crore is allocated. The villages in the northern remote border areas where connectivity has been a major challenge will be focused upon.

One of the most promising steps in this budget under the pillar of inclusive development is the move towards digital banking and envisioning linking of all the post offices with the core banking system. This will enable smooth transfer of funds between post offices and banks thereby helping the senior citizens and farmers in particular. Promotion of user friendly and economical payment platforms will be done. These are indeed giant leaps towards the goal of financial inclusion.

2.3. Productivity Enhancement and Investment, Sunrise Opportunities, Energy Transition, and Climate Action

i) Ease of Doing Business (EODB): India has been ranked higher in EODB by several ranking organizations, done internationally by World Bank and others. This budget takes further steps on EODB 2.0 towards the commitment of 'minimum government & maximum governance'. Issuance of e-passport in 2022-23 with futuristic technology and embedded chip is another proposal that will ease travel and tourism for citizens.

ii) Climate Action: Clean technology usage and governance solutions are key to clean air and zero fossil-fuel policy. Therefore, emphasis on Electric Vehicles (EV) is given as it was provided in the last budget. To help build the EV eco-system, innovative policies such as 'battery swapping' have been introduced. Also, emphasis on solar power and renewable energy is provided to achieve the target of 280 GW of installed solar capacity by 2030. An additional allocation of ₹19,500 crore for Production Linked Incentive for manufacture of high efficiency modules is announced.

iii) Digitization: Land records are not well maintained and land is not documented in most of the part of Indian territory. The budget takes a step ahead in proposing and encouraging states to adopt Unique Land Parcel Identification Number in order to facilitate information technology enabled land recording systems. Also, One Nation One Registration Software is proposed to be promoted.

iv) Urbanization: With India@100 as target this budget took urbanization measures to be critically important since by then more than half the population will be living in urban areas. Proper planned growth and

development of tier 2 and tier 3 cities are crucially important as these urban areas are going to accommodate sustainable living in near future; a paradigm shift with policy foresightedness rather than a business-as-usual approach is required for this. Central government's financial support for developing mass transit projects and Atal Mission for Rejuvenation and Urban Transformation (AMRUT) scheme (central government's urbanization flagship scheme) for states' action plans will be leveraged. Urban planning and design centres of excellence are proposed to be developed with an endowment fund of ₹250 crores for each of them, and All India Council for Technical Education (AICTE) will lead designing their curriculum.

v) Supply Chain, IT Infrastructure, Production Facilitation Related Governance: Modernization of agri-procurement rules are proposed with faster payment facility and dispute settlement. Noting the fact that the gaming and animation industry absorbs youth and has a promising future in India, for creating congenial ambience for this emerging industry, task force is to be built with experts and the stakeholders involved. Under telecom policy spectrum auction for rolling out 5G mobile services by private players in 2022 is to be conducted this year. Under export promotion and initiatives in the external sector the most important step has been the proposal of repealing the Special Economic Zone (SEZ) act to facilitate states to further develop enterprises and service hubs, and optimally utilize the infrastructure to build competitive export. Emphasis has been given on building indigenous produce and start- ups in the defence sector. This will not only give a big push to the domestic producers and start-ups but also limit import dependency.

2.4. Financing of Investments:

i) Green Bonds and Public Investment: Among some major initiatives towards financing green infrastructure and public projects that are meant for reducing carbon intensity, sovereign green bonds will be issued as part of government borrowing. To complement financing of infrastructure, propping up of private investment or encouraging Public-Private Partnerships (PPP) mode of investment are essential along with public investment. However, financial viability of such infrastructure projects remained a big concern to attract private investment. Multi-lateral agencies and proper network creation for knowledge assistance on technical aspects are proposed to be created.

ii) Digital Rupee and Cryptocurrency: It was proposed for the first time in any budget that Central Bank Digital Currency (CBDC) will introduce digital Rupee using blockchain technology. However, no further information on this is provided as of now. It remains to be observed how RBI will introduce it and whether it will actually replace all other digital payment platforms that are existing and in fact, are quite successfully performing. Several questions emerge on the introduction of this

at this juncture. International experience in countries where such currencies were introduced do typically have depleting faith in the currency in circulation, may be due to high inflation, or due to reasons such as digital payment could not take-off. Both these reasons are not quite valid for the Indian money market at present. That is why more clarification and justification are awaited from the central bank on the introduction of this digital currency. In cryptocurrency, several countries have already banned such transactions. This budget dis-incentivises and imposes a tax of 30 per cent on cryptocurrency income, which is at par with that on betting and speculation. This has two-pronged implications or justifications: Instead of directly banning this it could be the reason that the government wants to signal that the entities dealing with this highly volatile risky instrument should be well aware of its risks, and/or wealthy enough to bear this hefty tax. Secondly, it could be that the government can see revenue mobilising potential in this instrument, and that is why has sort of, legalized their transactions in the Indian economy.

iii) Cooperative Federalism: Looking into the true spirit of it, the states were provided with financial assistance for capital investment for creating productive assets and generating remunerative employment. This scheme has been a great success in boosting states' involvement. This budget enhances the allocation from ₹10,000 crore to ₹15,000 crore. Following the recommendation of the 15th finance commission, states are allowed with a fiscal deficit of 4 per cent of gross state domestic product (GSDP) of which 0.5 per cent is tied with power sector reform.

3. Towards Fiscal Prudence and Debt Management

India adopted the Fiscal Responsibility and Budget Management (FRBM) Act in 2003 and under the fiscal consolidation regime. This act originally targeted the fiscal deficit at 3 per cent and revenue deficit at 0 per cent respectively, to be met at the end of FY 2008-09. This was not met due to the unprecedented external economic shock in 2008 when the government had to extend huge stimulus rescue packages to revive the ailing economy. Then it was felt that the priority should be to boost the economic growth rather than sticking to the fiscal disciplining path, and accordingly the FRBM rule got suspended for the time being. The Indian economy started to recover in 2012 and the act was further brought back. There have been several reviews of the act to fit it well with the changing Indian economic architecture. The COVID-19 pandemic has similarly triggered unprecedented rise in government's expenditure although mostly in the health sector to start with. Later on it percolated down to the other sectors of the economy when productivity nosedived due to supply-chain disruptions, labor shortages, cost rise, and for many other reasons. The MSMEs

were hit hard in this uncertain timeline, when country-wide lockdown was imposed as precautionary policy measure, to mitigate intensifying COVID-19 fatality across most of the states. The central government extended several financial packages, including the hefty Atmanirbhar Bharat package in a gradual manner. This was quite evident in the burgeoning fiscal deficit and other fiscal indicators, that the expenses in the form of rescue packages triggered such rises. India was not an exception to take such prudent and timely interventions to revive growth at the cost of fiscal discipline for the time being, several other countries who have otherwise proven fiscal prudence have also adopted similar strategies. Quite expectedly, the FRBM regime was suspended and the targets were postponed. The Fiscal Deficit (FD) and other important fiscal indicators took very bad shape, but the revival of the economy was quite palpable. Many countries have entered debt trap or in the unsustainable debt path, but this was not the case for India where a rational mix of fiscal prudence with policy induced expenditure boost were seen. Nonetheless, the FD during the COVID-19 pandemic has increased to an uncomfortable level which needs to be brought down by rational policy choices along the gliding path, at the same time taking good care of the growth path. This was the objective under fiscal consolidation in the last two budgets, this year's budget has not been an exception. We find that the FD level is at 6.9 per cent, quite high, although the budget estimate is 6.4 per cent in 2022-23 and the revised estimate of FD is 6.9 per cent, implying a lower target on the gliding path. The broad fiscal consolidation path targets FD to be below 4.5 per cent in 2025-26 with an emphasis on nurturing stronger and sustainable growth.

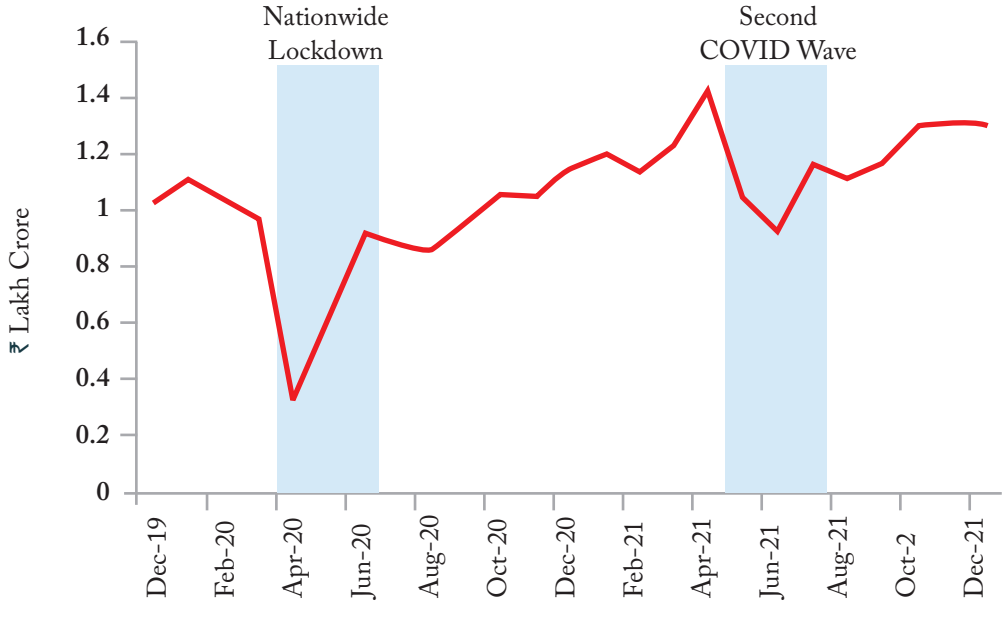
In direct and indirect taxes front expectations were that at the time when personal consumption level has shown precipitous fall during the pandemic and has not even gone back to the pre-pandemic level, tax sops and incentives will be provided to boost consumption which has more direct effect on GDP than the multiplier effect via capex boost. However, the impact is transient, while the fiscal multiplier via capex is much stronger and helps in building the basis of sustainable growth. The government perhaps, for this reason has taken recourse to this relatively not so populist measure at a time when both the interventions are not feasible given the limited fiscal space. Nonetheless, several direct tax compliance related incentives have been provided along with rationalization of surcharges. This includes providing opportunity to file updated return with payments of the additional tax, within 2 years from the end of relevant assessment year, tax relief for differently abled persons, bringing parity between state and central government employees, the tax deduction limit for state government employees is raised from 10 to 14 per cent on the employer's contribution in National Pension System (NPS). In indirect

tax, the Goods and Services Tax (GST) has been a remarkable reform since it subsumed all other taxes and replaced the regime of double taxation and cascading effect. The GST being a value added tax with several compliance incentives imputed in its information technology (IT) driven machinery is supposed to widen the tax base and widen the ambit of formal economy. Although there were hitch and glitches initially when it was rolled out in 2017, GST collection has become an extremely buoyant source of revenue for the government despite the pandemic. The GST collection in January 2022 has been the highest since its inception (Fig 3). On the trade front, in the last couple of years many customs exemptions were provided which are gradually being rolled back. Tariff rationalization in the line of World Trade Organization (WTO) compliant guidelines are being carried out as strategic policy intervention – this is quite evident from the budget announcement every year.

4. Conclusion

The Union Budget 2022-23 as we discussed completely focuses on the medium to longer run or sustainable growth perspectives. Keeping an eye on the stringent sustainable

Figure 3: Buoyant GST Collection during Pandemic



Source: Union Budget 2022-23, Key Features of Budget.

Table 1. Major Schemes and Allocations in Union Budget 2022-23: A Brief Overview

Major Allocations in Budget 2022-23 (in ₹Crore)				
Scheme wise			Ministry wise	
Scheme	*2021-22 RE*	*2022-23 BE*	*Ministry*	*2022-23 BE*
National Health Mission	34947	37800	Ministry of Communications	105406.82
Jal Jeevan Mission	45011	60000	Ministry of Chemicals and Fertilisers	107715.38
National Education Mission	30796	39553	Ministry of Agriculture and Farmers' Welfare	132513.62
Pradhan Mantri Gram Sadak Yojana	14000	19000	Ministry of Rural Development	138203.63
PM Kisan	67500	68000	Ministry of Railways	140367.13
Aatmanirbhar Bharat Rojgar Yojana	5000	6400	Ministry of Home Affairs	185776.55
Pardhan Mantri Swasthya Suraksha Yojana	7400	10000	Ministry of Road Transport and Highways	199107.71
			Ministry of Consumer Affairs, Food and Public Distribution	217684.46
			Ministry of Defence	525166.15

Source: Union Budget 2022-23

development goals (SDG) such as SDG #11 (sustainable cities), SDG#7,8,9,13 (industry, innovation and infrastructure), as set by the United Nations (UN) the budget makes climate action plans and other action oriented strategic allocations. Also, major expectations were there that given the limited fiscal space a redistributive consumption boosting mechanism will be available in the strategic allocations of the budget at a time when GDP growth revival is crucially important. However, instead of this myopic and transient measure a long-term vision of capex led - multiplier triggered sustainable growth has been envisioned, which will eventually have an equitable trickle down impact. The other reason could be that inflation is picking up, consumption led growth would have had an inflationary repercussion as well. On the other hand, supply chain disruptions and cost-push inflation is well taken care of via provision of several sops, incentives and rationalization of

surcharges mechanism. Another big observation is that no further disinvestment proposals have been provided in this budget, the reason could be that several proposals and actions have already been announced in the last couple of budgets, and there are quite a few disinvestment plans lying in the pipeline. These are being gradually taken forward, before any further announcements are made on this move.

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