



STRIDES - A STUDENTS' JOURNAL OF SHRI RAM COLLEGE OF COMMERCE

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January-June 2019

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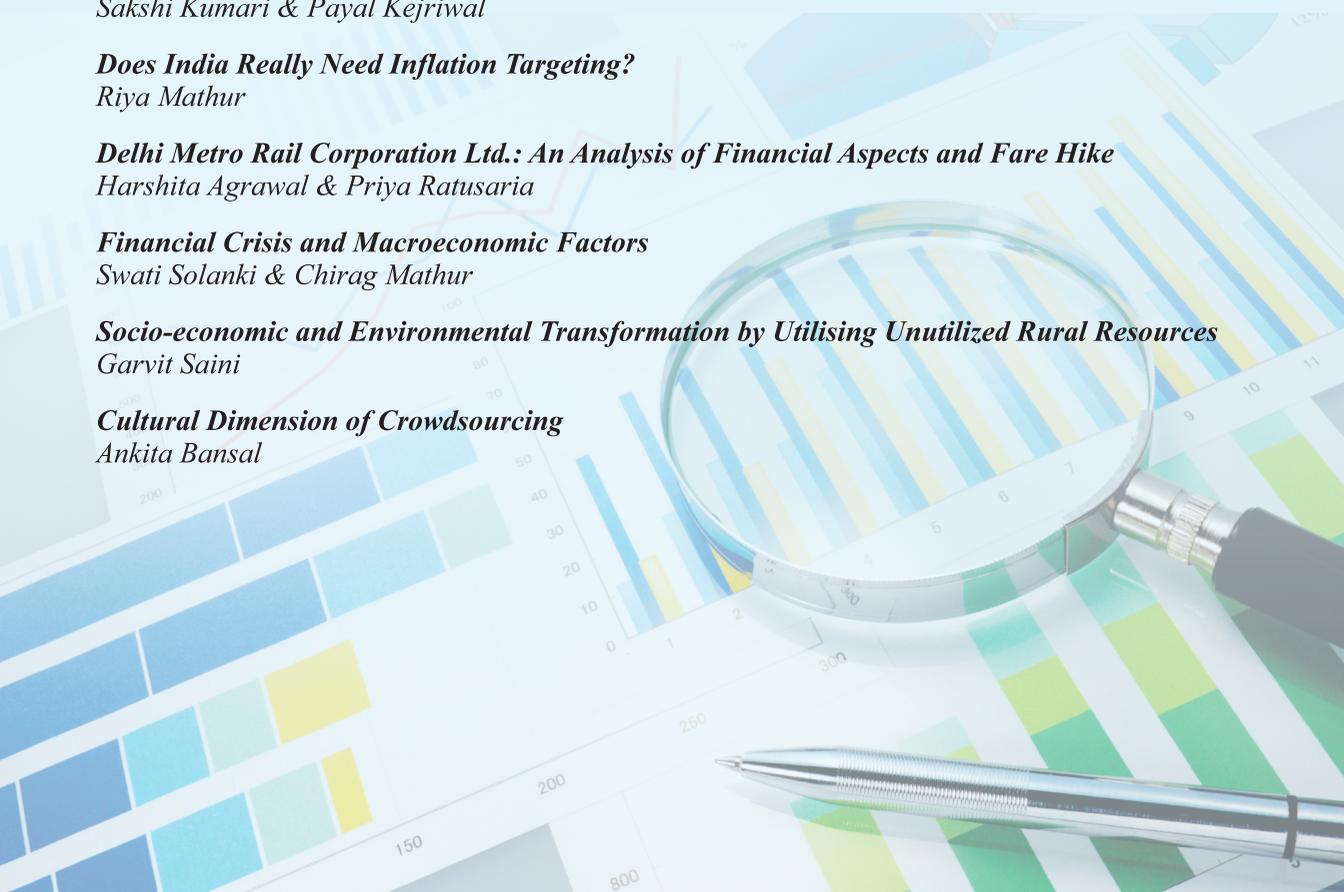
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It is a double blind reviewed bi-annual Journal launched exclusively to encourage students to pursue research on the contemporary topics and issues in the area of commerce, economics, management, governance, polices etc. The journal provides an opportunity to the students and faculty of Shri Ram College of Commerce to publish their academic research work.

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The research paper is to be typed on A-4 size paper with single line spacing. The complete length of the paper should not exceed 5000 words including endnotes and references. The font size should be 12 and font style should be Times New Roman.

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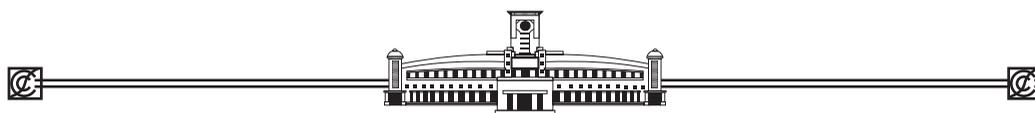
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The authors of best three papers from every Issue are awarded – First Prize, Second Prize and Third Prize on the SRCC Annual Day.



Principal's Message



The mission statement of the college signifying the existence and its road map to the achievement of its vision, reads as:

“To achieve and sustain excellence in teaching and research, enrich local, national and international communities through our research, improve skills of alumni, and to publish academic and educational resources”

To achieve and promote excellence in publications and applied research, the college has taken the initiative to launch a new journal exclusively to publish students' research papers and articles. It will be an add-on to the enriched catalogue of college publications and academic literature.

The Journal has provided an opportunity to the students of our college to focus on research. Since the students were not opened to the research methodologies at the undergraduate level, they were mentored by experienced faculty of our college. Simultaneously, their articles were also reviewed by the referees and tested for plagiarism before publication. After reporting all the suggestions recommended by the referees, the articles were revised and then finally published. The college had successfully released the foundation issue of the Journal **“Strides - A Students' Journal of Shri Ram College of Commerce, Volume 1, Issue 1, 2016-17”** on the occasion of 91st Annual Day of the College held on 13th April, 2017. The Journal was released by **Shri Prakash Javadekar, Honb'le Union Minister of Human Resource Development, Government of India.**

I would like to congratulate the students whose papers are published in this issue of the journal and simultaneously encourage all the students to contribute their research papers and articles for the successive issues of the Journal.

Best wishes for their future endeavors.

Prof. Simrit Kaur
Principal



Editor's Message

v

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In order to maintain the high standards of publication, COPE (Committee On Publication Ethics) has been constituted. The COPE shall be the apex authority to take all the decisions related to the publication of research papers and articles in Strides. The decision of COPE shall be final and binding.

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for publication. The research work published in Strides is original and not published or presented at any other public forum.

The foundation issue of the Journal **"Strides - A Students' Journal of Shri Ram College of Commerce, Volume 1, Issue 1, 2016-17"** was successfully released on 91st Annual Day of SRCC held on 13th April, 2017 by **Shri Prakash Javadekar, Hon'ble Union Minister of Human Resource Development, Government of India.**

The successive Issues of 'Strides - A Students' Journal of Shri Ram College of Commerce' shall be bi-annually released.

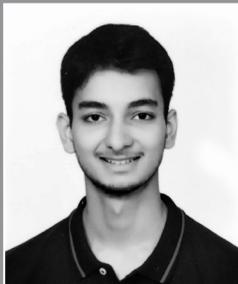
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Dr. Santosh Kumari
Editor



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Delving into the Norwegian Economy

Abstract

Norway has consistently held a good position, both in terms of economic strength and social welfare, for many years. It also boasts as one of the largest exporters of oil and holds the world's largest sovereign wealth fund. This paper aims to understand the sustainability of Norway's economy in view of its major income source being oil, and also understand the framework of the largest sovereign wealth fund and how Norway is preparing itself for a post-oil future. Additionally, this paper utilises future data estimations to critically examine the road ahead for Norway.

INTRODUCTION

“When the fund was set up, nobody thought it would pass 10,000 billion Kroner. We were lucky to discover oil. The return on the investments in global financial markets has been so high that it can be compared to having discovered oil again.”¹

-Yngve Slyngstad
(Fund's Chief Executive)

¹Solsvik, T., Adomaitis, N. and Klesty, V. (2019) Norway wealth fund grows to record 10 trillion crowns. Reuters. 25th October [online]. Available at <https://www.reuters.com/article/us-norway-swf-record/norway-wealth-fund-grows-to-record-10-trillion-crowns-idUSKBN1X41AO> [Accessed 04 February 2020]

Preceding the industrial revolution, Norway's economy was, to a great extent, dependent on primary activities such as fishing, timber, and agriculture. The citizens normally survived adverse conditions such as considerable scarcity of food, even though famine was uncommon. All around the coast, the primary method of subsistence for households, especially in numerous regions in the north and west, was fishing and it was an important supplement to farming. This sea-activity typically supplemented land-activities such as livestock breeding on small farms, crop-growing, and cattle farming.

Natural resources were found in the area of the North Sea surrounding Norway, over which the nation asserted its sovereign rights in May, 1963. The Norwegian Ministry of Industry acted swiftly to set up a national energy policy, all this against the backdrop of the country's referendum to not merge with the European Union. Norway decided to set its own energy prices in accordance with the shifts in the global market, requiring it to avoid joining the OPEC and allowing it to spend its income wisely. To facilitate the production and drilling of oil and petroleum, the government established its own company 'Statoil' (presently Equinor).

ECONOMIC POLICIES

The general public and the representative politicians, both, came to terms with the fact that taking benefit of Norway's comparative advantage was the way forward for the nation's economic advancement, by specializing in specific areas for export and importing the rest. This thinking has significantly affected Norway's agricultural policy, which has been reshaped not to promote self-sufficiency but to address the changes in the population patterns. Various issues have been raised for the Norwegian economic policy in regards to the image of Norway being developed as an oil-exporting nation. If Norway were to somehow support its flourishing economy when the oil reserves run out, the returns from oil-revenue would not be able to solely fuel public or private consumption. The concentration of human capital investment in the petroleum and ancillary sector has been a cause of a great deal of concern. Dependency of Norway's economic structure on natural resources that do not demand skilled labour has been called out by critics arguing that it makes economic growth profoundly vulnerable to fluctuations in the demand and pricing of these natural resources. Present oil-revenue is estimated to be at its peak period and will decline in the coming decades. Various endeavours have been undertaken to fence against the reliance on oil revenue. One such major endeavour is the Government Pension Fund Global.

GOVERNMENT PENSION FUND GLOBAL

The Government Pension Fund Global is made up of a structure that denies the government from accessing the revenues generated from the petroleum sector for any public spending and the only income that can be utilized is generated by the fund's capital.

The fund's valuation of \$1+ trillion is estimated to value every Norwegian citizen's worth to about \$200,000. As of 2019, the sovereign wealth fund boasts to be the largest globally. The sea-based oil drilling income is invested and the gains from the investments are paid out as dividends to the population or for impetuses, such as electric vehicle purchases.

OBJECTIVE OF STUDY

The study is primarily undertaken to accomplish the following objectives:

- To identify and gauge the parameters of sustainability of Norway's economy
- To understand the framework of the largest Sovereign Wealth Fund and its value addition for the country

RESEARCH METHODOLOGY

For any research paper, the research methodology forms the base to translate the data into a relevant conclusion. The nature of research in this paper is analytical. For the study, we have primarily used the relevant data that was provided by international organizations such as OECD, World Bank, and IMF. Some data has also been used from the websites of Norges Bank, Statistics Norway, and Norwegian Petroleum. The data has helped us understand the economic framework of Norway and the working of its main Sovereign Wealth Fund. It has also served as an instrument to assess the future course of action for the sustainability of the Norwegian economy. The techniques used in this study are confined to primary statistical concepts, such as average growth rates, basic charts, and historical data forecasting to predict the growth of the progress indicators and create a brief picture about the economic future of the country. An in-depth analysis of the Norwegian Financial Budget has also been made to gain an insight into the functioning and steps taken by the Norwegian Government to regulate their economy. The economy of Norway has been gauged by progress indicators relevant to the Norwegian economy such as Interest Rates, Household

Debt, GDP Growth Rate, Oil and Gas Reserves, and Market Competitiveness². The indicators are supplemented by graphs with trend analysis covering the timeline from factual past to predicted future to aid our understanding.

OVERVIEW OF DATA

NORWEGIAN ECONOMY AND THE ROAD AHEAD

In the financial budget for the year 2020, reduction in oil revenue expenditure has been proposed by the government administration by up to 0.2 percent of the GDP of the mainland (non-oil economy). The next few decades are expected to witness oil investments continuing to hover at significant levels, even amidst speculations of its gradual weakening beginning in the year 2020.

Of late, new advancements have been made in the fiscal policy and the period of enormous increments, brought about by the inception of the fiscal rule in 2001, in the oil revenue expenditure is declining. The last couple of years have seen some stability in the oil revenue expenditure as a portion of the non-oil economy GDP, and in about a decade, the oil revenue will gradually decline resulting in the downward movement of the Government Pension Fund Global's (GPFG) revenue generation. On proceeding forward, the GPFG's growth is forecasted to slow down. Consequently, the room for future increase of oil revenue expenditure is seriously constrained. Currently, taxation at a marginal rate of 78% has been imposed on oil exports - composing of a special petroleum tax of 56% and standard corporate tax of 22%.

The present scenario has pegged the uncertainty regarding the market value of the fund as more important compared to the uncertainty regarding the petroleum costs, which have become less significant for the advancements in the fund as oil reserves are converted into financial wealth. The fiscal rule dictates the amount to be transferred over a period to the financial budget from the fund. Funding from such transfers have taken a respectable place as valuation of the fund is currently around thrice the size of the non-oil economy. Recommendations to reduce the oil revenue expenditure would seem imperative if a substantial decrease in the fund capital is studied in isolation. The oil revenue expenditure guidelines are adaptable and versatile precisely in order to ensure that the economy experiences sustainable developments. Significant changes, both

² Norway's Economic Outlook in Seven Charts (2019) The International Monetary Fund. 12 June [online]. Available at: <https://www.imf.org/en/News/Articles/2019/06/11/na061019-norways-strong-momentum-the-ideal-time-to-address-long-term-challenges> [Accessed 02 February 2020]

positive as well as negative, to the structural deficit or the fund capital should be dealt with gradual adjustments in the oil revenue expenditure.

A 3 percent average return has been predicted for the fund in the long term. According to the government's proposition for the year 2020, 2.6 percent of the fund capital is being burnt through, which sums up to \$4.28+ billion (40 billion NOK) in expenditures from the projected long-term average return of 3 percent. Even when confronted with the 2014 oil price decline, the oil revenue expenditure had been kept under the fiscal policy rule by the existing government.

Even with a hypothetical 25 percent diminish in the valuation of the Fund's equities the oil income use stays unaltered at the level proposed in the fiscal budget. The withdrawal from the fund (spending rate) would shift to 3.1 percent of the capital of the fund as opposed to the current estimate of 2.6 percent. The estimated withdrawal rate for 2020, hence, relies upon economic policies which are prudent, given that the utilization of petroleum revenues hover around the 3 percent mark, even with some critical decline in the fund value. The administration is better suited in case of some possible future decrease in estimations of value of the GPFG or some economic mishap in the country by ensuring the spending rate remains below 3 percent. At the point when the growth of the Fund is stabilizing, restrictions during good periods is essential for the support of the fiscal policy adaptability to counter economic adversities.

Oil revenue expenditure for 2020 is implied to be of NOK 243.6 billion according to the budget proposal, as estimated by the structural non-oil fiscal deficit. 7.6 percent of non-oil economy is the value for oil revenue expenditure, which is NOK 45,000 per capita in excess. The withdrawals from the GPFG finance roughly one-eighth of the total budgeted expenditure. 0.8 percent reflects the fiscal spending growth, which is below the estimated growth in the non-oil economy.

Norway's economy and competitiveness are not solely dependent upon by the amount of oil revenue expenditure, but also the manner in which these are spent. Measures improving productivity, and in turn the economy's growth limit, should have increases in oil revenue expenditure centered around them, as was accentuated by a white paper report. "The Parliament emphasized, in 2001, that oil revenues must not turn into a reason for maintaining a distance from fundamental structural reforms" as was unanimously noted by a government committee for economic affairs in their report on long-term perspectives on the Norwegian Economy in 2017. The Committee also supported the key needs

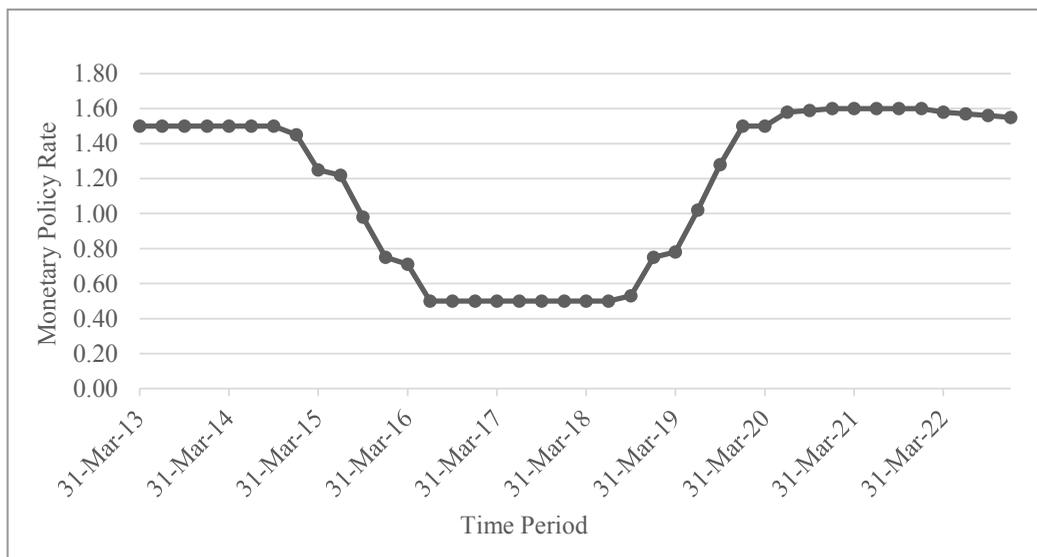
sketched out in 2001, with great emphasis on growth-oriented tax reductions, government spending focus on education, research, and infrastructure. These areas continue to be prioritized by the administration in its budget for the year 2020.

ECONOMIC OUTLOOK FROM DIFFERENT PERSPECTIVES

a. Interest Rate Outlook

Norges Bank, Norway's central bank was prompted to hike interest rates periodically to off-set the soaring inflation rates caused by the country's low unemployment and mounting wage rates. Hiking the rates aggressively could expose the households to interest rates with sharp increments, while raising the rates too progressively could prompt high inflation. As seen in Graph-1, initially, Norges Bank increases the interest rate steadily to offset the inflation in the economy. Later, levelling at a rate of 1.5 percent and decreasing thereon. The upward trend begins again to offset the growing inflation in recent years and is predicted to remain at higher levels. Although, the economic outlook seems positive during the initial years beginning 2013, the global trade tensions could prove to be a challenge in maintaining the right balance by the bank in the coming years.

Figure 1: Interest Rate Outlook

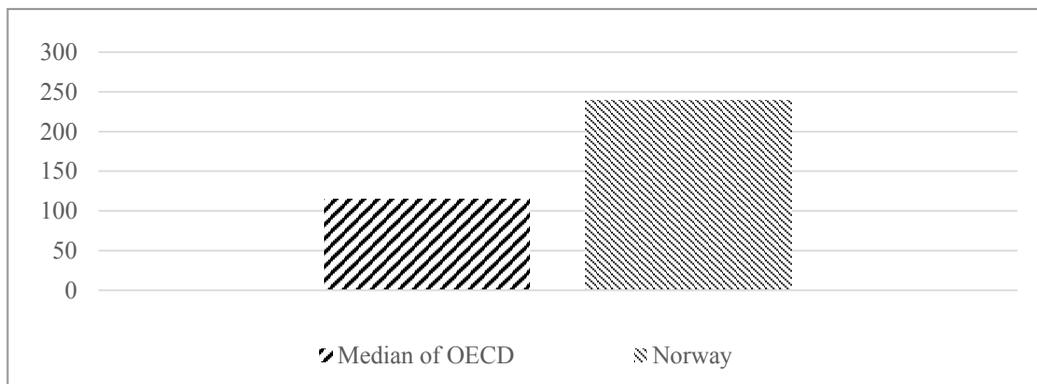


Source: International Monetary Fund

b. Household Indebtedness

A major portion of the disposable income of the population is expended by the mortgage payments of the household making real estate a costly situation for the citizens. Due to the high rise in prices the housing sector may face a crisis in the near future as Norway is challenged by shortage of real estate land space. Developments in commercial real estate should also be monitored, as valuations appear strained, most notably in the country's capital Oslo. As seen in Graph-2, Norway has a considerably higher household debt compared to other OECD nations. House prices had been growing rapidly until last year, raising concerns about disruptive price falls. Since then, house price gains have slowed, and valuations now appear less stretched. Norwegian households still have one of the highest debt levels globally, and indebtedness keeps rising and, hence, mortgage regulations should not be eased.

Figure 2: Household Indebtedness(percent of net disposable income)



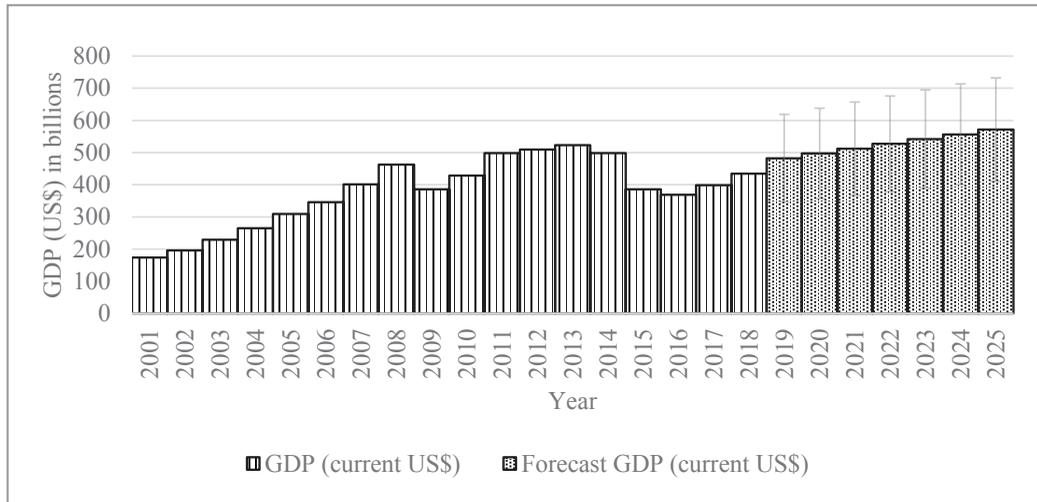
Source: International Monetary Fund

c. Growth Momentum

The country's economy has remained healthy for a couple of years and continues to be among the richest and most well-performing economies in the world. The growth has been focused around oil and gas revenues which have spurred the economy multi-fold. The investments from such revenue are a crucial pivot for the Norwegian government as this will lay the foundation for future revenue flows. The downside of relying on a major income source is the exhaustibility of the resource, as is the case with Norway's oil and gas reserves. As seen in Graph-3, the GDP numbers took a serious hit after 2014 due to a significant fall in crude prices and thus also resulting in a weaker

Krone. The forecast for the years beginning 2019 has been calculated using Historical Data for forecasting keeping in account deviation of 2.5 percent throughout. The forecast shows a stable growth for the Norwegian economy for the next six years. Though the growth has been quiet for the past few years, Norway's economic outlook remains positive so far.

Figure 3: GDP Growth Momentum



Source: The World Bank (2018)

d. Oil and Gas Reserves

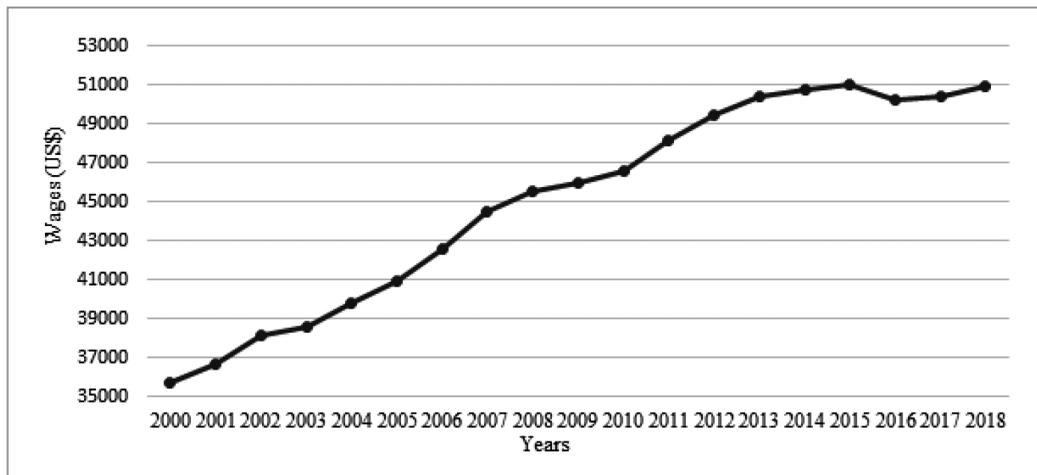
In the future, oil and gas revenues are expected to slump. Simultaneously, pensions and medical costs will continue to soar because of the aging population. The oil rate has been kept above break-even point by the government. Future spending is accommodated by the annual returns on the GPF. Norway has heavily relied upon oil and gas reserves but depleting reserves have started to pose a serious problem. As seen in Graph-4, Norway petroleum has projected that these reserves will remain stagnant for a while and then take a serious hit after 2024 unless new resources are discovered. This will imply that over time Norway's budget will face increasingly hard choices, which will require exploring new sources of revenue or savings to accommodate new spending. Renewable sources such as nuclear and solar are being explored and a self-sufficient environment is being created for the industrialists and citizens.

Figure 4: Oil and Gas Reserves Projections

Source: Norwegian Petroleum

e. Market Competitiveness

To facilitate a smooth transition of the economy away from oil and gas, an increased sense of competitiveness needs to be inculcated in other sectors. The weak Krone won't be able to sustain the competitiveness for a continued period of time on its own. Feelings of shared trust, sense of mutual responsibility, and moderations in wages would be essential. As seen in Graph-5, the wage growth slumped after 2015, which happened due to a weakening Krone as a result of plummeting crude oil prices, but it was neutralized by a downward trend in inflation. This meant that there is no real impact on the real wages. The average monthly earnings have increased by 3.7 percent in 2019 from 2018. A flood of foreign workers has also been noticed in sectors like fishery, tourism and oil related services.

Figure 5: Wages in USD PPP at Constant Prices

Source: OECD Statistics (2018)

GOVERNMENT PENSION FUND GLOBAL

The Norwegians are well aware of the oil wealth's terrible ability to transform riches into rags. In 1990 they set up a sovereign wealth fund (GPF) to prepare the nation for a post-oil future and to forestall deindustrialisation. 'Oil Fund', as it is commonly known, is managed by Norges Bank Investment Management, a unit of the central bank. 70 percent of funds are invested in global equities, a portfolio of fixed-income assets is given some 28 percent and the rest is made up of unlisted real estate holdings. The fund is invested in 9,158 companies across 73 countries – holding an average of 1.4 percent of all the world's listed companies. The 3 investment areas of the fund are equities, bonds and real estate. The fund is invested in international markets to reduce dependency on the Norwegian economy and so that it remains undisturbed by domestic fluctuations. The fund's current market value is 10,531 billion NOK³ or \$1128.49 billion as of February 2020.

As discussed earlier, the structure of the fund is such that it prevents the government from utilising the fund capital and only the returns from the fund are accessible for usage. With the implementation of the fiscal rule, 4 percent was set as the expected real rate of return of the GPF, which was further reduced to 3 percent in the spring of 2017. Preservation of the real value of the

³ Norges Bank Investment Management (2020) Market Value of the Fund [online]. Available at: <https://www.nbim.no/en/the-fund/market-value/> [Accessed 25 February 2020]

fund is ensured by the framework of the fiscal policy which would result in the benefit of future generations. Space is left to counteract economic downturns with the fiscal policy. Simultaneously, the financial budget is insulated against short-term fluctuations in petroleum revenues by the fiscal policy and the fund. An event of large shifts in the fund value or factors affecting the structural non-oil fiscal deficit would call for a smoothening change in the utilization of petroleum revenue over several years, the basis of which would be an assessment of the real rate of return of the fund a few years ahead.

The fund returned 19.9 percent in 2019, which equates to approximately \$180 billion (1.7 trillion kroner), creating history for being the highest net return of the fund. This was fuelled by positive equity gains, and depreciation of the kroner against other major currencies. The government also injected \$1.9 billion (18 billion kroner), following a \$3.6 billion (34 billion kroner) inflow in 2018. The fund not only acts as a tool to stabilize the economy from over-heating and dangerously high levels of inflation, but also holds the ability to stimulate the economy when there are warning signs of high unemployment, low growth and a fiscal stimulus is required. Withdrawals from the fund are guided by the following rules since 2001:

- Economic fluctuations would garner significant emphasis for being evened out so that contributions towards low employment and sound capacity utilization can be made.
- Over time, the transfers to the central government budget from the fund would follow the expected real return on the fund.

**Table-1: Returns from the Government Pension Fund Global
(Figures in percent)**

	2018	2017	2016	2015	2014
Returns measured in the fund's					
Equity Investments	-9.49	19.44	8.72	3.83	7.90
Unlisted real estate investments	7.53	7.52	0.78	9.99	10.42
Fixed-income investments	0.56	3.31	4.32	0.33	6.88
Return on Fund	-6.12	13.66	6.92	2.74	7.58
Relative return on fund (percentage points)	-0.30	0.70	0.15	0.45	-0.77

Management costs	0.05	0.06	0.05	0.06	0.06
return on fund after management costs	-6.71	13.60	6.87	2.68	7.52
Returns in kroner					
Equity investments	-6.56	19.74	3.67	16.77	24.60
Unlisted real estate investments	11.02	7.80	-3.91	23.77	27.51
Fixed-income investments	3.82	3.57	-0.53	12.83	23.43
Return on fund	-3.07	13.95	1.95	15.54	24.23

Source: Norges Bank Investment Management

In table-1, the returns were measured by calculating a weighted combination of 35 international currencies at the end of 2018 which formed the currency basket.

CONCLUSION

Until now, proceeds from petroleum activities have served as a backbone to the Norwegian economy. The revenue from these activities has allowed the budget to be consistently in surplus and facilitated contributions to the Government Pension Fund Global. But, since revenue from the petroleum activities is set to decline in the future, there are serious apprehensions about whether the country would be able to maintain budget surplus and continue making contributions to the fund. Norway has also invested heavily in renewable resources. Their electricity sector is primarily powered by hydropower resources, making it close to 98% renewable. But its economy is primarily dependent upon oil given 52% of their exports relate to oil and gas. Amid the likelihood of a decline in oil revenues, there is a dire need for more investment in renewable sources of energy.

Since the value of the fund is more than 2 times the GDP, the fund insures the economy of any downturns that it may face in the future. But for that, the fund also needs to ensure that constant returns are yielded from its investments. In 2018, the Government Pension Fund Global investments yielded a figure of -6.1 percent, which performed less by 0.3 percentage point than the benchmark index for returns which it is measured against. In stark contrast, the fund posted a return of 19.9 percent in 2019, the peak net return in the history of the fund. Although 2018 was marked by weak performance, the benchmark index for long-term returns has been surpassed with higher figures. The year 2018 also marked the second-lowest return by the fund since 1998, and the return in 2019 was second highest since 2008, in percent. The dip in the fund's 2018 return

is not a cause for concern as it was affected by global trade tensions and the investment strategy adopted by the management. But plummeting oil revenues would result in budget deficits that would have been funded in the form of transfers from the fund. The government's transfer to the fund in 2018 and 2019 are such transactions which could be affected in the future. This would hamper the sustainability of the fund. With continuing disparity in oil prices, the task of establishing economic stability through a cautious operation of economic policies will remain a challenge. Growth in sectors other than oil is paramount for the economy to be sustainable in the long run, and to shift from its dependence on one major income source.

REFERENCES

Baker, S. (2020). Norway's Government Pension Fund Global posts 19.9% return. Pensions & Investments [online]. Available at:

<https://www.pionline.com/sovereign-wealth-funds/norways-government-pension-fund-global-posts-199-return> [Accessed 28 February 2020]

Christiane, H. (1998). The economic effects of North Sea oil on the manufacturing sector. *Scottish Journal of Political Economy* [online]. Retrieved from: http://home.bi.no/a0310125/Bjornland_SJPE_1998.pdf [Accessed 05 February 2020]

Norges Bank Investment Management. (2020). The Fund [online]. Available at: <https://www.nbim.no/> [Accessed 03 February 2020]

Norwegian Petroleum. (2020). The government's revenues [online]. Available at: <https://www.norskpetroleum.no/en/economy/governments-revenues/> [Accessed 04 February 2020]

Norges Bank Investment Management. (2018). Annual Report 2018 [online]. Available at: <https://www.nbim.no/contentassets/02bfbef416f4014b043e74b8405fa97/annual-report-2018-government-pension-fund-global.pdf> [Accessed on 06 February 2020]

Royal Ministry of Finance. (2019). National Budget 2020. Norway.

Statistics Norway. (2020). Turnover in oil and gas, manufacturing, mining and electricity supply [online]. Available at:

<https://www.ssb.no/en/energi-og-industri/statistikker/ogibkoms> [Accessed 10 February 2020]

Scope Ratings. (2019). Scope reaffirms Norway's sovereign credit rating at AAA with a stable outlook. 08 Feb [online]. Available at: <https://www.scooperatings.com/#search/research/detail/158825EN> [Accessed 09 February 2020]

The International Monetary Fund. (2019). Norway's economic outlook in seven charts. 12 June [online]. Available at:

<https://www.imf.org/en/News/Articles/2019/06/11/na061019-norways-strong-momentum-the-ideal-time-to-address-long-term-challenges> [Accessed 02 February 2020]

The World Bank (2018) Norway's GDP [online]. Retrieved from: <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=NO&view=chart> [Accessed 02 February 2020]

The Economist. (2013). The Rich Cousin [online]. Retrieved from: <https://www.economist.com/special-report/2013/01/31/the-rich-cousin> [Accessed 03 February 2020]

Twin, A. (2019). Sovereign Wealth Fund [online]. Available at: https://www.investopedia.com/terms/s/sovereign_wealth_fund.asp [Accessed 03 February 2020]

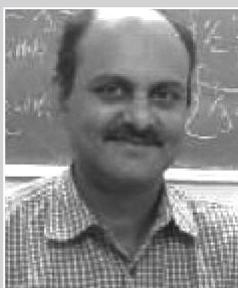
Wikipedia. (2020). Economy of Norway [online]. Available at: https://en.wikipedia.org/wiki/Economy_of_Norway [Accessed 02 February 2020]



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US – China Trade War and SAARC Nations

Abstract

The paper analyses the impact of the tariff war between US and China on India's trade with SAARC nations by using the vector auto regression (VAR) model and the Granger Causality Test, using time series data from 2009 to 2018. The results indicate that the economic impact of tariff war is insignificant on India's trade with all SAARC nations other than Bhutan. We observe that however insignificant impact might be, there exists a positive impact on all bilateral trades of India with SAARC economies.

Keywords – SAARC Nations, Vector auto regression, Granger Causality, Time series data, positive impact

INTRODUCTION

With the introduction of 1978 economic reforms, China's economy had picked up at a faster rate than a lot of developing countries and emerged as the world's largest manufacturer and major trading power. China's joining in WTO in 2001, enabled it to have free trade with all the countries and the historical savings¹ glut of China enhanced financial outflows to the US. China's potential to produce low-cost products surged the demand

¹ Savings Glut is a scenario in which desired savings exceeds desired investment. It doesn't mean that there is an increase in savings.

from foreign countries including the USA and the European Union. Economic reforms, low-cost labour and depreciation of Yuan (loosening monetary policy) had contributed to increase in trade imbalance of USA with China.

US President Donald Trump criticized his country's huge deficit with China and attributed it to Country's "unfair" trade practices, such as protectionist measures and infringement of intellectual property rights and patents. Therefore, an investigation was opened by the US Trade Representative (Office of United States Trade Representative, 2018) and it was found China's trade practices were unreasonable and discriminatory². The structural trade imbalance is the direct reason for provoking trade war by Trump's administration.

According to (Office of USTR, n.d.) US' trade deficit with China is of \$419.2 billion in 2018. To counter this trade imbalance, On March 23, 2018, President Trump signed an MOU and slapped tariffs of \$60 billion on Chinese imports and then engaged in a tit-for-tat tariff battle (Breuninger & Tausche, 2019). Since, China and USA are two world's largest economies contributing 12.8% and 8.5% of global exports and 10.8% and 13.2% of global imports respectively (WTO) and hence the repercussions of this have attracted the attention all through the globe.

The US-China trade war, beginning from March 2018 and extending to present-day is an issue of global concern. It certainly leads to an impact not only on those two countries but also on those which are directly or indirectly involved in trade with them.

With the imposition of tariffs on Chinese electronics, there was an inflation in the US (Kopf, 2019). Similarly, since soya bean was taxed too, the prices went up in China. Clearly, since both these nations have a part to play in payment of the tariffs, there is a direct impact. But, in a world where international trade is an integral part of the global economy, there must certainly be indirect effects on countries involved in trade with these nations. For example, there is an impact of the trade war on bilateral trades between India and SAARC nations. This is because India and SAARC are major trading partners. India occupies almost 70% of the geographical area in SAARC and hence is a key trade partner with almost all these nations. We can clearly see that in the niche segment of machinery including electronics, Indian exports have gone up by 15.3% from 2017 to 2019. And, countries like Bhutan and Bangladesh have been rapidly importing these commodities in order to keep up with their expanding economies. In a similar way,

² China has followed unfair practices like dumping, discriminatory non-tariff barriers, forced technology transfer, and excessive industrial subsidies.

the exports of Refined petroleum products have increased by almost 34.2% in the mentioned time period and there have been extensive imports in Bangladesh, Sri Lanka and Nepal. This was due to the SAARC Preferential Trade Agreement (SAPTA), giving special preference to certain commodities including refined oil and petroleum products and electronics, by reducing the tariffs. As Chinese electronics were slapped with tariffs, they became less competitive in the USA and also in all the SAARC nations including India. With about 30% share exports to USA, India is likely to have an impact because of the trade war (EximGuru). This leads us to the question, whether there is an identifiable impact on the South Asian Association for Regional Cooperation (SAARC) block nations.

The research paper econometrically analyses the impact using a VAR model and is organized in the following format. Part I includes the review of literature which discusses the research done so far and the lapses. Part II of the paper highlights the research methodology. Part III includes the static and dynamic analyses done to find the impact of the trade war on bilateral trades between India and each of the SAARC nations.

I. REVIEW OF LITERATURE

Since 2018, there have been a number of studies highlighting the impact of US China trade on both major economies and also over the global economy. Itakura (2019) analysed the impact of US-China trade war within the framework of the dynamic computable equilibrium model (CGE) and found that escalation of trade war reduced GDP in China and the USA by -1.41% and -1.35% , respectively and also GVCs³ played a significant role in determining trade responses. Using deadweight loss and Harberger's triangle, Evans (2019) had shown that the trade war is devastating not just for the US and China, but for the entire global economy.

Apart from all these, there are some pieces of literature figuring the impact of tariff war on EU, BRICS, and ASEAN and soon. By using a vector auto regression model Nidhiprabha (2019) examined the impact on ASEAN countries, especially on the Thai economy and concluded that, with nearly a year of the trade dispute, Thailand's outputs and exports are adversely affected. Also, there is an indirect impact of Trump's tariffs on the global slowdown particularly in Thailand's major trading partners. Misra and Choudhry (2020) evaluated the potential economic effects of the substantial tariff hike by these two major economies on BRICS and ASEAN, particularly on India using vector error correction model found and that

³ GVCs refer to the Global Value Chains. They describe the activities involves in the production, supply, distribution and post- sales activities of a good or a service when they have to be coordinated across countries.

the tussle may provide opportunities for India to gain through trade deflection in the short-run or medium run. But, in the long run, further escalation of tariffs will have a negative impact.

Also, there has been substantial research on US-China trade war impact on most of the economies in Latin America (Canuto, 2019), Africa (Kohnert, 2018), EU (Goulard S., 2020), ASEAN, BRICS. Hence, this paper aims to find out the effect of the tariff war between the US and China on India's trade with SAARC countries, using economic intuition and econometric models (VAR model and Granger causality). An in-depth analysis on SAARC countries and not all of the third world representatives has been performed as there has been a lot of research on Sub Saharan Africa, Latin American countries and ASEAN countries. After the South Asian Free Trade Area (SAFTA) agreement among the SAARC countries in 2006, the amount of bilateral trade between India and each of these countries have gone up substantially. Having about \$25 billion worth of trade with India, SAARC seemed like a set of countries which would have notable impact of this trade war.

II. RESEARCH METHODOLOGY

In order to analyse the impact of the US China trade war on the SAARC countries, we have taken the data of the Bilateral trade between each of the SAARC countries and India from 2009 to 2018 (Source: UNCOMTRADE)⁴. We did not consider the values before 2009 because the year 2008 was a major crisis⁵ for all of the countries involved and would cause a structural break⁶ in the time series.

Making India the node, we have seen if the foreign trade is positively or negatively affected in these countries, if at all there is an affect. We have performed analysis at three levels in the paper. The first level includes analysis of the impact on the two nations USA and China. This has been done using the import and export trends between the countries from 2009 to 2019, and also by performing a regression between the volume of imports from China and the inflation rate in the electronic goods market in the USA.

⁴ UNCOMTRADE is the pseudonym for United Nations International Trade Statistics Database. Over 170 reporter countries/ areas provide the United Nations Statistics Division (UNSD) with their annual international trade statistics data detailed by commodities/service categories and partner countries. More can be found at: <https://unstats.un.org/unsd/tradekb/Knowledgebase/50075/What-is-UN-Comtrade>

⁵ 2008 crisis is considered as the worst global financial crisis after the great depression of 1920s. This crisis led to a great recession where the house prices plunged lower than they did anytime else.

⁶ A structural break is an unexpected change over time in the parameters of regression models, which can lead to huge forecasting errors and unreliability of the model in general. Hence, either corrections are made to normalize the effects of the break or the data from the period is dropped. The proof for same is attached in the appendix A.

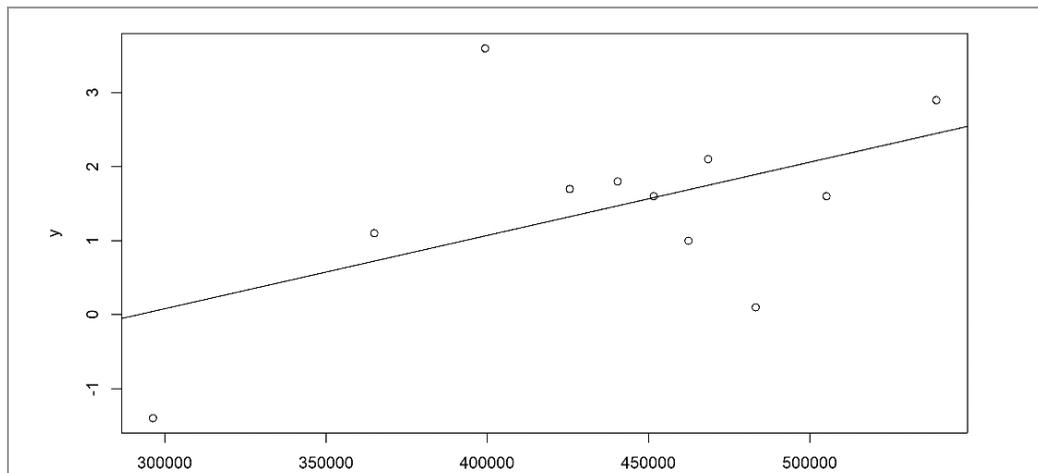
The second one includes the static analysis where in, the volumes of bilateral trades between India and SAARC nations, as well as USA and China, before and after the implementation of tariffs at two different points in time, namely May 2018 and July 2019 have been considered. The third one includes the dynamic analysis the VAR model and Granger causality have been used to find a more detangled impact of the trade war on the mentioned bilateral trades.

III. THE ANALYSIS

A. THE IMPACT OF TRADE WAR ON USA AND CHINA

Before analyzing the impact of the trade war on the Indian trade with SAARC nations, by taking a look at the impact it has caused on the countries directly involved in the war, i.e. the USA and China, we try to find the direct impact. To do the same, a relationship between inflation in the electronic goods market in the USA and the number of imports they have from China is found. It is only natural that there will be an impact as these goods are being imposed with substantial tariffs. Since not all of the tariffs are borne by the exporters in China, and the importers, at times, even the consumers have to pay a higher price so that the traders still make profits. The following plot shows the relationship between the Inflation rate in the USA and the volume of imports from China.

Figure 1: Regression Plot between Inflation in the US and Volume of Imports from China.



X - axis: Rate of inflation

Y - axis: Value of imports from China

Graph 1 shows that there is positive relationship between the rates of inflation in the US and the value of goods imported from China.

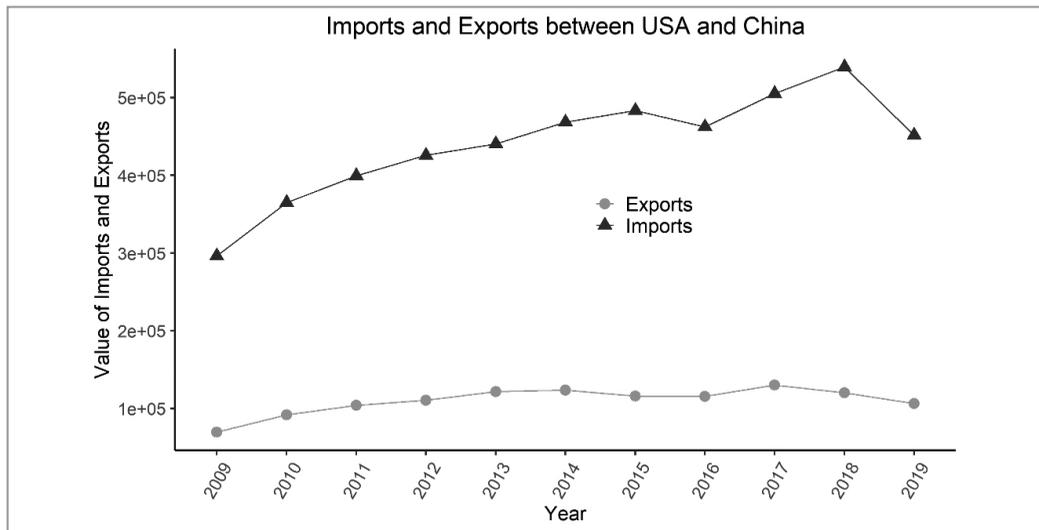
The following is the regression line:

$$Y = 1245303 + 455259X + Et$$

Value of imports: Y, Inflation rate: X

The graph indicates that as the value of imports from China increases in the USA, the prices in the USA for those goods also go up. But this does not indicate that there is a one to one causative relationship.

Figure 2: The Imports and Exports Between USA and China



Source: UNCOMTRDADE

Graph 2 shows the import and export trends between USA and China from 2009 to 2019. We can see that the trends in exports and imports, considering the graph are fairly random and hence, this is not conclusive proof that there exists a relationship between the imposition of tariffs and the change in the volume of trade between these countries..

B. STATIC ANALYSIS

Now, the volumes of all bilateral trades between India and SAARC countries, as well as with USA and China to get a cursory view of the impact caused by this war are considered.

To analyze impact on Indian trade with SAARC countries, the USA and China, the static analysis of India’s bilateral trades is done by using volumes of trade before and after tariff imposition, by the USA against China. For analyzing the same, two tariff implementation months (July 2018 and May 2019) have been taken and the trade volumes before and after the imposition of tariffs by looking at quarterly data are compared. The following table shows the changes in bilateral trades between India and SAARC nations, USA and China. The charts hereunder show the change in the export and imports captured by these nations.

Table 1: The Changes in the Bilateral Trade between India and SAARC Nations as well as USA and China

Indian Net Exports with the Countries named	Change in Exports Pre and Post tariff imposition (Pre-July 2018 and Post May 2019)	Change in Imports Pre and Post tariff imposition (Pre-July 2018 and Post May 2019)
China	-\$0.02 BN	\$0.185BN
USA	\$0.858 BN	\$1.059 BN
Bangladesh	-\$0.449BN	\$0.085 BN
Afghanistan	-\$0.051 BN	\$0.030 BN
Sri Lanka	-\$0.268 BN	-\$0.319BN
Bhutan	\$0.004 BN	-\$0.011BN
Nepal	-\$0.029 BN	\$0.083 BN
Pakistan	-\$0.267BN	-\$0.102BN
Maldives	-\$0.012BN	93,077 thousands

Figure 3: The Share of US and Chinese Exports in India’s Total Before July 2018

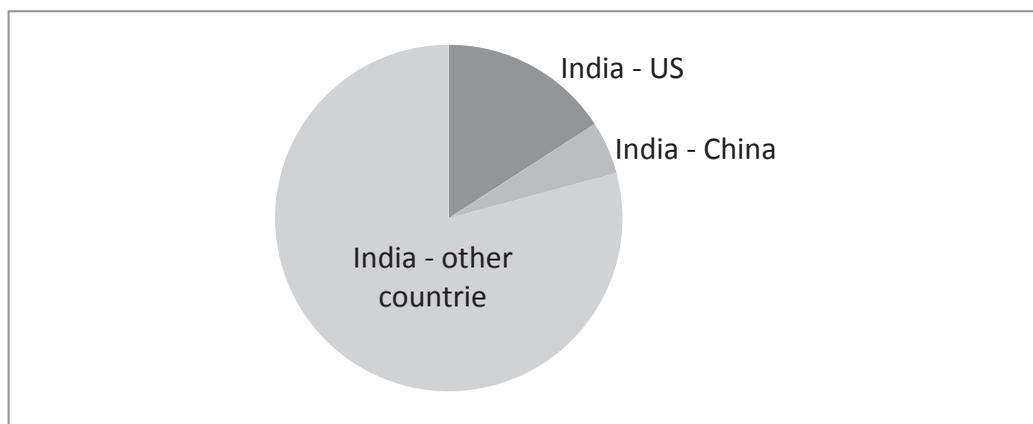


Figure 4: The Share of US and Chinese Exports in India's Total After May 2019

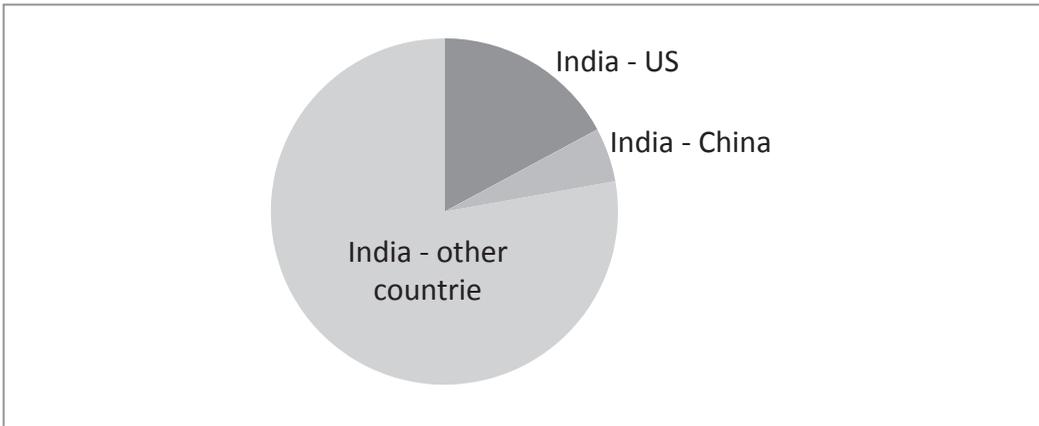


Figure 5: The Share of US and China Imports in India's Total Before July 2018

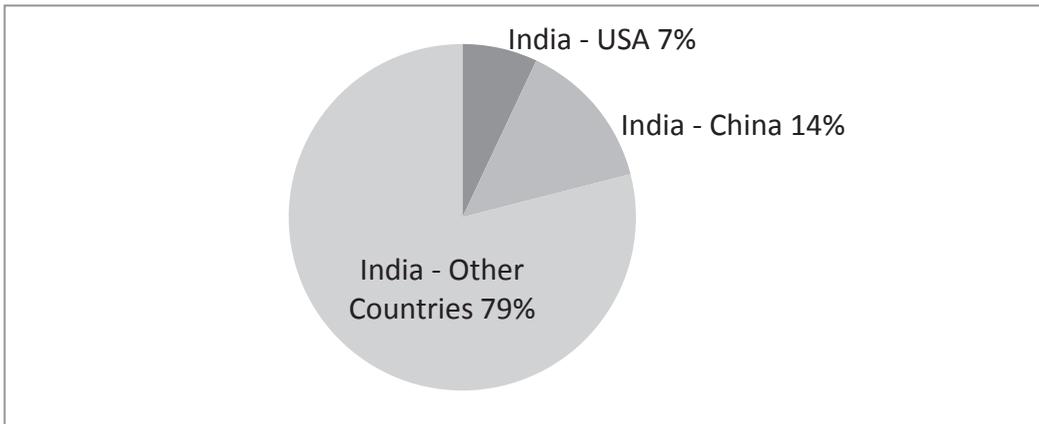
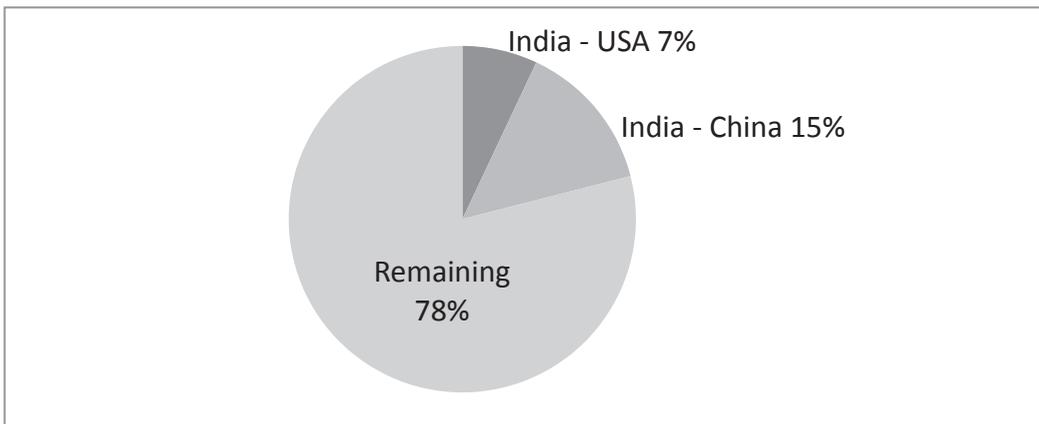


Figure 6: The Share of US and China Imports in India's Total After May 2019



The graphs 3 and 4 show that, the share to China in India's total exports has increased from 16% (pre-July 2018) to 17% (post-May 2019) and the share to the USA has remained almost the same i.e. 5%. The graphs 5 and 6 show the share of imports from China has remained virtually the same. (7%) and that from the USA has risen slightly. (14% pre-July 2018 to 15% post-May 2019).

From the table 1, graphs 3 to 6, it can be inferred that for no country there is size able impact. Since increase or decrease can also be attributed to factors such as the size of the country's GDP, cordiality between few countries, and importantly volatile exchange rate⁷ among others, we cannot be specific that the respective change is due to tariff war. There hasn't been any drastic change in the trend of imports and exports of India with SAARC, USA and China. In order to get a more detangled impact of the trade war on SAARC, we move forward to analyzing time series and dynamic trends.

C. DYNAMIC ANALYSIS

In order to find whether there exists an impact of the US-China trade war on SAARC countries or not, and if it does, how prominent it is, just assessing the trade flows is insufficient. Hence, a dynamic analysis using VAR model considering all the SAARC countries apart from Nepal was done. Nepal was excluded as the variable, 'net exports to Nepal from India', has a co-linearity with one of the other variables and hence did not add any significance to the dataset. A trend Vector Auto Regression (VAR) Model has been used to do the analysis. This model rests on the fact that the value of a given variable in time period t, depends not only on its value in the erstwhile time periods or lagged time periods, but also on the other variables which are in the model. Here, the value of net exports to one country depends on the value of net exports in the same country in the previous years and also on that of the value of net exports to other countries it is involved in trade with. The Akaike Information Criterion (AIC) has been used to choose the time lag as 1 period. (1 year in this case).

The above method was used as it estimates the errors for both the risks of over fitting and under fitting values. The estimated coefficients from the model, are found using the natural logarithms of the trends, as the Granger causality can be used only for stationary values and not dynamic trends. Vector Auto Regression (VAR) model is used in order to find if the variables we have chosen

⁷ Exchange rate volatility refers to the ever changing value of currencies of all countries, over time against one another. The test to rule out the possibility of the trade volumes being impacted by the exchange rate volatility is attached in appendix B.

are correlated or not, taking a relationship between the bilateral trade in the past between India and the country and that with other countries too. This model was chosen because it not only helps us analyze the impact of the values of time series based on itself but also on other related time series. It often provides superior forecasts to those from uni-variate time series models and elaborates simultaneous equations models. The coefficients indicated both positive and negative relationships between these trades. But correlation wouldn't imply a causative relationship. Granger causality proves causative relationship. Hence, we found the p - values and conducted the t- test for each of the variables, to find out if the results are significant or not at 1 percent level of significance. The following is the general regression equation we obtain through the VAR model.

$$y_i = y_1 \cdot A_1 + y_2 \cdot A_2 + y_3 \cdot A_3 + y_4 \cdot A_4 + y_5 \cdot A_5 + y_6 \cdot A_6 + y_7 \cdot A_7 + y_8 \cdot A_8 + y_9 \cdot A_9 + E_i \quad (i=1,2...9)$$

Table 2: The List of Explanatory and Explained variables in the Regression Model

Eq	Explained variable	Explanatory variable
1	The total trade between India and SAARC nations as well as USA and China	The total trade in the time periods before the current one (t-1)
2	Bilateral trade between India and China	Bilateral trades between India and all other countries mentioned below including past trends in India
3	Bilateral trade between India and USA	Bilateral trades between India and all other countries mentioned below including past trends in India
4	Bilateral trade between India and Bangladesh	Bilateral trades between India and all other countries mentioned below including past trends in India
5	Bilateral trade between India and Maldives	Bilateral trades between India and all other countries mentioned below including past trends in India
6	Bilateral trade between India and Afghanistan	Bilateral trades between India and all other countries mentioned below including past trends in India

7	Bilateral trade between India and Pakistan	Bilateral trades between India and all other countries mentioned below including past trends in India
8	Bilateral trade between India and Bhutan	Bilateral trades between India and all other countries mentioned below including past trends in India
9	Bilateral trade between India and Sri Lanka	Bilateral trades between India and all other countries mentioned below including past trends in India

The countries: China, USA, Bangladesh, Maldives, Afghanistan, Pakistan, Bhutan, Sri Lanka.

The table below comprises of all the regression coefficients obtained by using a VAR model on the data of the bilateral trades between India and SAARC nations as well as USA and China. The time series is taken from the year 2009 to the year 2018.

Table 3: The Estimated Coefficients using the VAR Model with 1% LOS and max lag 1

Eq	Past lags with India	China	USA	Bangladesh	Maldives	Afghanistan	Pakistan	Bhutan	Sri Lanka
eq 1	5.14053	-5.2518	-4.722	2.1288	-1548	-107.989	27.08402	- 51.2604	-23.2984
eq 2	-10.4571	10.17	4.189	-2.7515	3020	141.641	-61.22	95.686	52.89542
eq 3	5.14053	-5.2518	-4.722	2.1288	-1548	-107.989	27.08	-51.26	-23.2984
eq 4	-0.92314	0.7868	-0.544	1.1078	258.3	11.9288	-5.439	16.285	4.26444
eq 5	-0.24277	0.2656	-0.482	0.6466	77.18	3.87234	-1.55	13.768	1.946633
eq 6	0.06211	-0.063	-0.005	-0.0123	-18.78	-1.1354	0.412	-0.8977	-0.31758
eq 7	0.190733	-0.1857	-0.022	-0.014	-57.86	-2.75371	1.215	-3.2235	-0.94885
eq 8	0.150651	-0.198	0.2034	-0.2726	-60.24	-1.1452	1.029722	- 0.78278	-0.49164
eq 9	0.049453	-0.0448	0.03	-0.0468	-11.58	-1.0657	0.268303	- 1.09103	-0.26206

To interpret the results of the estimation using our VAR model, the Granger Causality has been used. Granger Causality rests on the foundation that regression simply focuses on the correlation between the variables but doesn't necessarily imply a causative relationship. In order to test if the values of a time series help in predicting the values of another time series, this comes into the picture. It is assumed that the post hoc fallacy (If event X has occurred before event Y, X might have caused Y) holds true. The above table represents the values obtained from the VAR estimation. Considering the Granger Causality, we have first the values which are significant according to the T-test. (We have used 1% LOS). The following are the p- values for each y_i for all $i = 1,2,3,4,5,6,7,8$.

Table 4: The P-values with 1% LOS

Y	p value
1	0.0453
2	0.01947
3	0.03714
4	0.2109
5	0.0548
6	0.0343
7	0.00007673
8	0.0744

From Table 4, it can be noted that only for the variable y_7 , Bhutan, there is a statistically significant Granger causality, as the p-value < 1%. Their top import commodities are oil and fuels, machinery and electrical appliances, vehicles and the same from China are electronic equipment, machinery, nuclear reactors etc. (Trading economics, n.d.). The rise in Indian exports to Bhutan can be attributed to the imposition of 25% tariffs on machinery and electronic goods by the USA. (Factbox: Next rounds of Trump's tariffs on Chinese goods to hit consumers, 2019) Justifying the same, according to the annual report of the department of commerce, 2018-19, there had been 38.29% and 18.09% growth in Indian exports of electronic items and machinery respectively (Annual report 2018-19). This shows that commodities of one country when imposed with tariffs, (China) enable countries like Bhutan to shift to other countries like India to meet their increasing demand. This may have also occurred due to the decrease in the production of the electronic goods in China due to reduced demand for exports, as these goods now render more expensive relatively, in the USA.

Supplementing the reasons, the BJP led government in its tenure from 2014 announced the neighbourhood first policy trying to keep cordial ties with Bhutan and almost around 80% of the imports in Bhutan are from India. Hence, the slightly positive effect of the US-China trade war on India caused a rise in exports to Bhutan i.e., from about 80% in 2013 to 84% in 2018 (Embassy of India, n.d.)

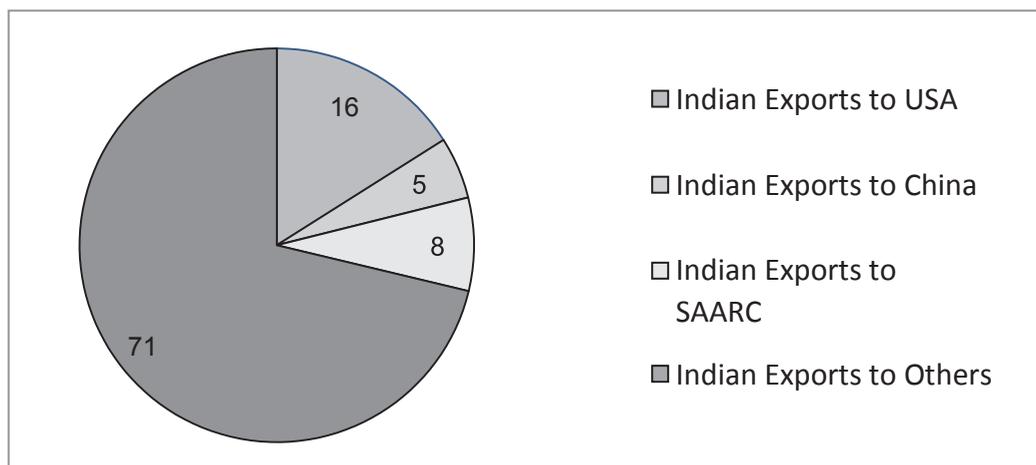
We can see that the next sizeable impact is on the bilateral trade between India and USA. From the volumes of trade, we can see that India has an increase of over 3 million dollars in the net exports. (Foreign trade, n.d.) The probable reason for this is that imports from China are more expensive than before for the traders in USA as the tariffs are borne partially even by them. This gives India an opportunity to capture the market in USA. India's top ten exports include electronics and machinery at about 6.3% and the volume of exports of electronics and machinery has gone up. It only seems natural that the exports to USA must have increased as China fell short in the area and India, partially captured that market in the USA. The Indo-US trade agreement and seemingly cordial relations between India and USA also add on this.

With the other countries, there hasn't been significant impact in the trade volumes over the years and hence we can safely conclude the trade war did not create a notable advantages or disadvantages. Binding all these SAARC countries along with the countries in the trade war, we can see that the overall impact has also not been very significant as p-value turned out to be 0.04378. Leaving aside US and China and considering the SAARC countries, we can see that the p-value is 0.07685 which is also insignificant.

CONCLUSION

This study discusses the impact of the US-China trade war on the directly involved countries and its spillover effect on the third world countries, precisely focusing on Indian bilateral trade with the SAARC nations. To encapsulate, though US-China trade war may provide some opportunities for countries like India, through the supply side, appropriating the same can depend on various factors such as the size of the economy with which India is trading, share of Indian trade with the countries and also the commodities that India export or import from them.

In 2018, out of total world exports, Indian exports contributed 1.67% collectively. From graph 7 we can see that only 8% of Indian total exports are to SAARC nations (0.13% of world exports). Hence, there isn't a sizeable impact on Indian exports to these countries, unless commodities subjected to imposition of tariffs are a major part of the bilateral trade, as in the case of Bhutan.

Figure 7: Share of Concerned Countries in India's Total Exports (2018)

As we come down to the United States, India is slowly trying to capture the market gap created due to lesser imports from China after the trade war.

About 61% of India's exports were from mineral fuels, precious metals, organic chemicals, machinery, iron, steel, cotton, and clothing. Hence the goods directly impacted by trade war didn't contribute much to bilateral trades with the SAARC countries, rendering the impact of this trade war almost negligent.

APPENDIX

(A) The F-test was conducted considering the data from the year 2001 to the year 2018. (At 1% LOS)

H0: There is no structural change in the bilateral trade

H1: There is a structural change in the date

From the test, p value is $< 2.2e-16$, meaning that the null hypothesis is false. Hence, there is a structural change. We find that the breaks are at the 3rd and 8th observations in the data, referring to the years 2003 and 2008.

(B) The following is the equation: $\log(\text{India}) = A + B_i \log X_i + E_i$

where B_i represents the estimates for each country and X_i represents the countries.

Names of the countries have been used instead of the "change in the value of the currency of the country named".

Eg: India, here means, the change in the value of Indian Rupee.

	Estimate	Std. Error	Pr(> t)
Intercept	-2.3367	0.5511	0.0514
USA	3.297	6.788	0.08322
China	0.2049	0.2221	0.4536
Sri Lanka	0.1036	0.4047	0.8219
Pakistan	0.0434	0.2259	0.8654
Afghanistan	0.4426	0.3192	0.2999
Bangladesh	0.4583	0.1541	0.0948
Maldives	1.1089	0.3378	0.0816

None of these have a p value less than 0.01. Residual standard error: 0.124

Adjusted R-squared: 0.1405

p-value: 0.2679

This means that the impact of the volatile exchange is statistically insignificant on the trade.

Table 5: Indian Net Exports to China, USA, Nepal from 2009 to 2018

Year	China*	USA	Nepal
2018	(\$57,229,380,334)	\$18,945,673,937	\$6,904,364,371
2017	(\$59,427,517,358)	\$21,931,920,008	\$5,104,487,217
2016	(\$51,567,030,333)	\$21,597,233,165	\$4,140,909,174
2015	(\$52,027,847,949)	\$19,849,051,925	\$2,705,569,204
2014	(\$44,796,295,788)	\$22,245,012,609	\$3,632,674,095
2013	(\$35,218,618,309)	\$19,356,391,356	\$2,799,511,002
2012	(\$39,411,138,813)	\$13,065,244,614	\$2,279,721,413
2011	(\$38,765,239,103)	\$10,345,160,060	\$2,051,695,643
2010	(\$23,809,124,508)	\$4,491,154,710	\$1,399,215,264
2009	(\$20,243,318,196)	\$3,129,776,770	\$911,024,768

*The red numbers, in the brackets, show negative trade balance.

Table 6: Indian Net Exports to Bangladesh, Maldives, Afghanistan from 2009 to 2018

Year	Bangladesh	Maldives	Afghanistan
2018	\$7,850,561,513	\$199,234,116	\$18,401,205
2017	\$6,618,523,784	\$205,769,112	\$120,890,423
2016	\$4,991,694,791	\$173,900,515	\$190,699,582
2015	\$4,881,619,075	\$161,765,133	\$216,538,706
2014	\$5,737,955,823	\$135,137,090	\$199,155,030
2013	\$5,463,198,419	\$120,158,833	\$300,333,409
2012	\$4,369,365,119	\$114,230,173	\$395,876,600
2011	\$2,826,390,089	\$100,317,312	\$384,455,051
2010	\$2,658,678,437	\$68,117,928	\$248,900,130
2009	\$1,942,953,557	\$105,952,747	\$351,077,597

Table7: Indian Net Exports to Pakistan, Bhutan and Sri Lanka from 2009 to 2018

Year	Pakistan	Bhutan*	Sri Lanka
2018	\$1,798,898,195	\$399,797,164	\$3,343,497,295
2017	\$1,320,006,572	\$194,685,945	\$3,749,762,085
2016	\$1,131,502,002	\$246,882,547	\$3,485,980,901
2015	\$1,507,127,958	\$180,200,410	\$4,652,233,768
2014	\$1,640,092,751	\$56,019,927	\$5,842,961,149
2013	\$1,797,251,246	\$24,602,676	\$4,238,672,043
2012	\$1,133,019,614	\$1,485,886	\$3,147,667,233
2011	\$1,326,020,320	\$13,398,696	\$3,734,059,355
2010	\$1,915,061,708	(\$26,475,673)	\$2,787,001,211
2009	\$1,183,652,675	(\$32,414,639)	\$1,395,833,435

* The red numbers, in the brackets, show negative trade balance.

Table 8: The exchange rates of currencies of the considered nations against the rupee taken on 31 May every year

Year	China	USA	Bangladesh	Maldives	Afghanistan	Pakistan	Bhutan	Sri Lanka	India
2011	0.13	0.022	1.65	0.28	0.96	1.89	1	2.44	1
2012	0.11	0.017	1.43	0.26	0.86	1.69	1	2.34	1
2013	0.09	0.016	1.31	0.25	0.98	1.62	1	2.15	1
2014	0.1	0.0157	1.27	0.256	0.95	1.69	1	2.14	1
2015	0.09	0.015	1.65	0.227	0.91	1.59	1	2.1	1
2016	0.1	0.0146	1.16	0.236	1.02	1.54	1	2.17	1
2017	0.09	0.0152	1.29	0.24	1.055	1.66	1	2.38	1
2018	0.08	0.013	1.16	0.21	1.07	1.86	1	2.31	1
2019	0.1	0.014	1.17	0.214	1.14	2.36	1	2.53	1

REFERENCES

- (n.d.). *Annual report 2018-19*. New Delhi: Ministry of commerce & industry.
Retrieved from https://commerce.gov.in/writereaddata/uploadedfile/MOC_637036322182074251_Annual%20Report%202018-19%20English.pdf
- Breuninger, k., & Tausche, K. (2019, March 22). Trump slaps China with tariffs on up to \$60 billion in imports: ‘This is the first of many. CNBC. Retrieved from <https://www.cnbc.com/2018/03/22/trump-moves-to-slap-china-with-50-billion-in-tariffs-over-intellectual-property-theft.html>
- Canuto, O. (2019). Latin America Is Not Benefiting from the US-China Trade War. Retrieved from https://www.researchgate.net/publication/335973353_Latin_America_Is_Not_Benefiting_from_the_US-China_Trade_War
- D. k. (2019, August 15). These products are probably more expensive because of Trump’s trade war.
- Embassy of India*. (n.d.). Retrieved from Embassy of India website: <https://www.indembthimphu.gov.in/pages.php?id=42>
- Evans, O. (2019). The effects of the US-China trade war and Trumponomics. doi:10.23762/fso_vol7_no1_3
- EximGuru*. (n.d.). Retrieved from EximGuru website: http://www.eximguru.com/exim/guides/how-to-export/ch_20_export_to_saarc.aspx
- Factbox: Next rounds of Trump’s tariffs on Chinese goods to hit consumers. (2019, August 31).
- Foreign trade*. (n.d.). Retrieved from United states census bureau: <https://www.census.gov/foreign-trade/balance/c5330.html>
- Goulard, S. (2020). The Impact of the US–China Trade War on the European Union. doi:10.1177/0974910119896642
- Itakura, K. (2019). Evaluating the Impact of the US–China Trade War. *Asian Economic Policy Review*. doi: 10.1111/aepr.12286
- Kohnert, D. (2018). Trump’s Protective Tariffs and Their Impact on Africa. *SSRN Electronic Journal*, 1-8. doi:10.2139/ssrn.3157328

Kopf, D. (2019, August 15). These products are probably more expensive because of Trump's trade war.

Retrieved from <https://qz.com/1687095/the-products-getting-more-expensive-under-trumps-trade-war/> Misra, R., & Choudhry, S. (2020). Trade War: Likely Impact on India. doi:10.1177/0015732519886793

Nidhiprabha, B. (2019). Impacts of the U.S.–China Trade War on ASEAN: Case of Thailand. *Asian Economic Papers*, 166-188. doi:10.1162/asep_a_00737

Office of United states trade representative. (2018, June). Retrieved from USTR: <https://ustr.gov/about-us/policy-offices/press-office/fact-sheets/2018/june/section-301-investigation-fact-sheet>

Office of USTR. (n.d.). Retrieved from USTR website: <https://ustr.gov/countries-regions/china-mongolia-taiwan/peoples-republic-china>

Trading economics. (n.d.). Retrieved from Trading economics website: <https://tradingeconomics.com/bhutan/imports/china>

WTO. (2019, April 2). Retrieved from WTO website: https://www.wto.org/english/news_e/pres19_e/pr837_e.htm



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Exploring the Role of Savings in Economic Growth

Abstract

This paper econometrically analysis the relationship between savings and gross domestic product (GDP)¹ of the Indian economy. Theories on the relationship between savings and GDP that are discussed in this paper are the classical model, Keynesian model, Solow, and Harrod-Domar model. Using a single equation regression model it is deduced that the variation in GDP can be explained by the variation in savings and investment. By finding the statistical correlation coefficient, a positive correlation between savings and investment is also portrayed. This paper aims to analyze how the pattern exhibited by India's saving rate is related to GDP over the years and draw consensus on the results. Analyzing the trend of savings and investment in India from 1975 to 2016, the paper discusses the reasons behind the slowdown in that specific period and suggests some steps that the policymakers should keep in mind to maintain the virtuous relationship between savings and GDP.

Keywords – Savings, Investment, Gross Domestic Product, Time Series Data, Single Equation Regression Model



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¹ Gross Domestic Product (GDP)-It is the monetary measures of the market value of all the final goods and services produced in an economy in a specific time period.

INTRODUCTION

A country's worth and progress these days are measured in terms of the goods they produce, net exports that they have, foreign currency reserves that they possess, consumer price index, birth rate, unemployment rate, etc. Being a predominant measure for a nation's growth GDP is given great importance and factors affecting the GDP of a country are therefore vital subjects to analyze. One of the determinants of the estimate is the amount of money the citizens save. Saving rates are the money value or percentage of the income people save after carrying out consumption expenditure. Since savings play a key role in determining the GDP of a country it is essential to analyze how the change in savings and the GDP of a nation are correlated. Harrod (1939), Domer (1946) and Solow (1956) suggested that there was a positive relationship between savings and GDP because savings leads to a capital increase, which results in economic growth. However, Keynes (1936) concluded that savings are a function of income and that they are advantageous for individuals but not for the economy as a whole.

According to various researches conducted in the past, we conclude that savings play a determining role in the GDP of a nation. Hence, it is essential to scrutinize the cause and effect relationship of savings and economic growth, examine the trend of fluctuations of both the variables over a certain time frame and device policies accordingly for achieving the stipulated development goals. This paper aims to empirically examine the trend in India by finding out the relationship between GDP and savings using WDI²'s time-series data from 1975-2016. This study contains a single equation regression model performed on the above-mentioned data to statistically examine the behavior of the GDP of India based on the fluctuations in savings and investment.

It is essential for India, being a developing nation, to comprehensively analyze and understand the movement of economic growth with the fluctuations in savings and investment of the country to device policies and reforms that maintain a virtuous relationship between them and leads to an increase in the economic development of the country.

LITERATURE REVIEW

Across the globe, there have been several studies scrutinizing the impact of savings on the economic growth of a country. Some studies conclude that saving

² World Development Indicators (WDI) - It is the World Bank's premier compilation of international statistics on global development.

has a positive correlation with the GDP of a nation which is used to estimate its growth rate. The early Harrod (1939), Domer (1946) and Solow (1956) were the first ones to state the positive relationship of savings with the GDP of a country. They argued that a rise in income leads to an increase in savings which results in a boost in investment. Researching about the theory of these were Bacha (1990), Barro (1990), and DeGregorio (1992), who also came to the same conclusion that savings have a positive impact on the economic growth. Later Jappelli and Pagano (1994), and Lucas (1988) verified that as savings increase, GDP increases.

Sinha, (1998) tested the long-run relationship between per capita GDP and total saving in Thailand using time series data for 1950-96 by causality test but the test didn't run in any direction. Although it was found that gross domestic saving and gross domestic private savings are integrated with GDP. He has conducted extensive research to examine the relationship between savings and GDP in various countries like Pakistan, Mexico, and the Philippines, Sri Lanka. Haque and Sharma (1999), examined the extent to which cross country studies of private spendings are sturdy to allow for the heterogeneity of saving behavior across countries. Their results indicated that the general government surplus as the proportion of GDP to the ratio of government consumption of GDP is one of the key determinants of the private saving rates in various countries. Yuansheng J.(2015), provided empirical evidence that domestic savings played an important role in the economic growth of Pakistan over the period 1977-2013 by using the Autoregressive Distributed Lag (ARDL) approach to co-integration.

Samantaraya and Patra (2014), using the ARDL approach, empirically studied the role of various components of household savings in India with time-series data. The result indicated that GDP and interest rates have an influence on household savings in the short-run as well as the long run. Hashmi and Sedai (2016), confirmed that there exists a bi-directional Granger causality between the domestic savings rate and GDP growth of India. There are only a few researches conducted that target the total savings rate of India and provide empirical results to support the claim that savings and rate of growth of the Indian economy is positively correlated. There have been similar studies conducted about the causal relation of savings and GDP of various countries but the results have varied because of the specification of the data and variable as well as the different methodologies and approaches used.

Several studies explaining the trend of savings have been conducted. Mohan (2008) studied the relationship between savings and economic growth of some countries by bifurcating them according to the income range, using the time

series data from 1960-2001. The results showed that economic growth has a direct effect on savings. Minsky, in the economic survey of 2017-2018, worked on the pattern of investment and saving slowdowns as well as recoveries to obtain policy lessons for India. A lot of studies have highlighted the reasons for the fluctuations of the savings rate in the Indian economy and its effect on GDP along with suggesting possible policy changes the government should consider. However, more focus is given to the role of investments in the same.

RELATIONSHIP BETWEEN GROWTH AND SAVINGS

Several studies have scrutinized the fact that savings of a country have a significant impact on its economic growth. Some theories support the positive relationship between the two whereas some advocated that a significant increase in savings leads to a decline in the growth of the economy.

CLASSICAL MODEL

In the late 18th century, before the great depression, Adam Smith and David Ricardo among few other economists provided the classical theory. The model is based on Say's law of market and wage-price flexibility. Another assumption made by classical economists is 'laissez-faire' which means no government intervention or any trade union intervention. Classical theory suggests that the economy having full employment resources will automatically achieve the natural level of output and real GDP that is the economy will self correct itself in the case of any disequilibrium (Jean-Baptiste Say,1803). Say's law states that supply creates its own demand. This meant there was no problem with the production and underutilization of resources. Assuming that the income generated by producing the total output of the country is sufficient enough to purchase them. However, people don't use all of their income on consumption, some save a part of their income. This creates a decrease in the demand for goods, resulting in a cut back in production. Since the supply decreases, employment also decreases resulting in a disequilibrium, taking away from the full employment level.

The classical claim that the savings are borrowed and returned to the economy in the form of investments. Hence savings are equal to investment which is a constituent of the real GDP. Thus in this way, the level of real GDP automatically adjusts itself. Hence, this theory believes that savings is necessary for investment, and the interest rate is the price equating them. According to classical economists, greater savings lead to greater prosperity of the nation.

KEYNESIAN MODEL

Keynes's theory emerged in the 20th century from Keynes's book 'The General Theory of Employment, Interest and Money' which defied the fundamental assumption of classicists that is the economy operates at the full employment level. The theory stated that it was rare to have a full-employment level in the economy rather the concept of underemployment seems more believable. Secondly, another reason for disagreement was the utilization of income. Classical believed that the income was either used for consumption expenditure or was saved and used as an investment. However, people saved to increase their cash balances also. Classicists think that saving depends on the rate of interest,

$$S = f(r)$$

But Keynesian theory explained that the relationship between savings and investment is determined by income rather than interest rates. He wrote that saving and investment are always and necessarily equal but only when the economy is taken as a whole. He stated that savings is a stable function of income and it varies directly with income, where income constitutes savings and consumption. (Keynes, General Theory 1936)

$$S = f(Y)$$

Where,

S is saving

Y is income

r is interest rate

According to Keynes savers and investors are two different sets of people in the economy. When an individual decides to save more and reduce his consumption, the income of the person he is buying from decreases. Since, his income decreases his savings decrease (Keynes,1936). His decision to save lead to the decline of the actual savings and national income, thus reducing the GDP of the nation. This paradox is called 'the paradox of thrift'. The basic concept is that if the economy saves more during a recession, the aggregate consumption decreases, forcing the aggregate demand to fall and thus slowing the process of economic growth (N. Gregory Mankiw, 2008). Savings are advantageous for an individual but not the whole economy.

SOLOW MODEL

Solow (1956) designed a model to show how growth in capital stock, labor force, and advancement in technology interact in the economy and affect it. He started with the assumption with a neoclassical production function with decreasing returns to capital. In the Solow model, the demand for goods comes from consumption and investment.

$$y = c + i \dots\dots\dots (1)$$

Where,

y = output per worker

I = investment per worker

c = consumption per worker

The model assumes that a fraction of income is saved and remaining fraction is spent on consumption.

$$c = (1 - s)y \dots\dots\dots(2)$$

Hence, from substituting (2) in (1) we get :

$$y = (1 - s)y + i$$

$$Sy = I$$

In the basic Solow model, two factors influence capital stock, investment, and depreciation. When the amount of investment in the economy is equal to the depreciation of the capital stock i.e, we are just investing enough to cover depreciation and aren't adding any new stock, then the economy has attained a steady state.

$$\Delta k = \text{investment} - \text{depreciation}$$

$$\Delta k = i - \delta k$$

$$\Delta k = sy - \delta k$$

$$sy = \delta k \dots\dots\dots(\Delta k = 0 \text{ at steady state})$$

Solow model shows that the savings rate is an important factor that determines steady state³ capital stock. If the savings rate is high then the economy will have large capital stock per person and a high level of output in a steady state. On the other hand, if the savings rate is low then the economy will have small capital stock per person and a low level of output at a steady state. Hence, this theory concludes that when saving rates are higher there is faster economic growth.

Although a higher savings rate leads to faster growth in the Solow model, it is only temporary because once the economy attains a new steady-state, growth eventually stops. However, with a higher savings rate, the level of output and level of capital will be higher. Therefore savings rate has only level effect⁴ and not growth effect⁵. The basic Solow model shows that capital accumulation by itself doesn't explain sustained economic growth. Higher the savings rate higher the growth but only temporary. The economy eventually attains a new steady-state capital per worker. However, population growth and technological progress can explain sustained growth and permanent rising in living standards.

HARROD-DOMAR MODEL

Roy Harrod (1939) and Evsey Domar (1946) suggested that for a capitalist economy the investment should increase at a specific rate for uniform economic growth. This model argued that a higher savings rate leads to increased investment since investment is equal to savings and this intern increases the output of the country. Harrod-Domar model was released much before the Solow model. Countries like China and India had started formulating policies that encouraged people to save and invest more. According to this model economic growth is a process of capital accumulation and it depends on two factors savings rate and capital-output ratio.

$$S = I$$

$$sy = \Delta k$$

$$sy = \zeta \Delta y \dots\dots (\zeta \text{ is capital output ratio})$$

$$s/\zeta = \Delta y/y$$

³ Steady state-It is a state in which investment is equal to depreciation. It means no new capital is being created and the investment is being used only to repair and replace the existing capital stock.

⁴ Level effect-When the variable (output, capital etc) attains a new level but doesn't experience continuous growth.

⁵ Growth effect-When the rate by which a variable (output, capital etc) is increasing continuously rises.

Hence, the growth rate of an economy is directly related to the savings rate of the economy but inversely related to the capital-output ratio. This argument has been supported by the Solow model as well. The warranted growth rate as defined by Harrod - Domer is the full capacity rate of growth of income which will fully utilize a growing stock of capital that will satisfy the producers with the amount of investment made. It is the value of $\Delta Y/Y$. Hence, the warranted growth rate is equal to s/ζ .

$$G_t = [Y_t - Y_{(t-1)}] / Y_t \quad (\text{actual growth rate})$$

$$G_r = [X_t - Y_{(t-1)}] / X_t \quad (\text{warranted growth rate})$$

Harrod-domer gave the relationship of actual growth rate and warranted growth rate as,

$$G_t = 1 - [(1 - G_r) / G_r] \cdot s/\zeta$$

Hence, according to Harrod-Domer model savings plays an important role in increasing the rate of growth of the countries economy. An increase in aggregate savings gives rise to higher investment which leads to an expansion in the accumulation of wealth and higher GDP growth. The savings rate is directly proportional to the growth rate whereas in the Solow model it is argued that the rate of savings doesn't have any impact on sustained economic growth.

METHODOLOGY

This paper uses the WDI's time-series data from 1975-76 to 2015-16 of the growth rate in gross domestic product per capita, savings and investment of India at current US dollars. According to table 1 sample size of the data available is 42.

Table 1: Time Series Data of Savings, GDP per capita and Investment in India at current US\$

Year	GDP (in millions dollars)	Savings (in millions dollars)	Investment (in millions dollars)	Year	GDP (in millions dollars)	Savings (in millions dollars)	Investment (in millions dollars)
1975	158.0	5479.8	17444.1	1996	400.0	64961.3	96357.1
1976	161.1	8656.9	18991.3	1997	415.5	71683.7	105422.6
1977	186.2	10032.5	22827.7	1998	413.3	66567.4	107270.8
1978	205.7	10266.4	26626.0	1999	442.0	72234.1	126336.6

1979	224.2	11065.3	31140.4	2000	443.3	73905.1	121884.7
1980	266.6	11429.2	36661.8	2001	451.6	75131.7	145303.7
1981	270.5	13999.0	38441.2	2002	471.0	88954.4	145894.9
1982	274.1	13577.3	42179.3	2003	546.7	119072.5	172190.5
1983	291.2	14360.5	44894.5	2004	627.8	161248.0	217766.3
1984	276.7	14213.9	44235.9	2005	714.9	195696.6	268718.7
1985	296.4	16764.2	50695.2	2006	806.8	243988.7	315785.2
1986	310.5	14989.0	57020.0	2007	1028.3	323170.4	435747.9
1987	340.4	20574.9	68205.9	2008	998.5	306410.8	416232.0
1988	354.1	25807.8	69911.8	2009	1102.0	332444.5	455592.3
1989	246.1	31204.7	72757.7	2010	1357.6	432555.4	556807.2
1990	367.6	38020.0	83718.2	2011	1458.1	448929.0	625550.7
1991	303.1	32193.7	66403.5	2012	1443.9	448760.3	611106.0
1992	317.0	38362.0	72310.0	2013	1449.6	438974.2	581076.1
1993	301.2	39042.3	66103.5	2014	1573.9	462376.0	613374.3
1994	346.1	52000.0	76447.9	2015	1605.6	460737.1	604426.9
1995	373.8	59947.7	90563.7	2016	1729.3	472088.4	646322.4

- I. To analyze the relationship between GDP, savings, and investment the Single equation regression is applied to the log-log form of these variables. To conduct this research, the natural log (ln) has been taken. The general equation can be explained by the following formula:

$$\ln Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \quad (\text{log-log regression function})$$

Where,

X_1 : Independent variable (savings at current US dollars)

X_2 : Independent variable (investment at current US dollars)

Y: Dependent variable (GDP of India at current US dollars)

To interpret the results :

- Gauss Markov Assumptions hold
- The coefficient estimate is statistically and practically significant
- All other independent variables are held constant

To conduct the research, a simple equation regression method is used taking the dependant variable to be the log transformation of GDP at current US dollars and the independent variables as the log transformation of savings at current US dollars and the log transformation investment in current US dollars. A linear relationship is hypothesised between a log-transformed outcome variable (GDP) and a group of predictor variables (Savings and Investment) is given by:

$$\ln \text{GDP} = \beta_0 + \beta_1 \ln(S) + \beta_2 \ln(I)$$

Where,

S : Savings at current US dollars

I : Investment at current US dollars

II. Correlation tests are used to find the associations between investment and savings. A positive correlation will indicate that as one variable increases the other also increases whereas a negative correlation will indicate that as one variable increases the other decreases or vice versa. If the correlation happens to be zero then it would mean that the variables don't have any effect on each other. Using the correlation formula :

$$R = \frac{\sum [(X-\text{mean}(X)).(Y-\text{mean}(Y))]}{\sqrt{[\sum(X-\text{mean}(X))^2 \sum(Y-\text{mean}(Y))^2]}}$$

Where,

R = Correlation Coefficient

X = first variable

Y = second variable

Substituting the values of mean and standard deviation from table 2, the get the values of correlation between the two respective variables taken.

Table 2 : Mean and Standard deviation

	Savings (in million dollars)	Investment (in million dollars)
Average / mean	139092.3	201589.2
Standard deviation	165255.2	212815.2

RESULT

The regression model accounts for a high value of R^2 , which implies that approximately 98.28% variation in GDP can be explained by variation in saving and investment. Thus savings and investment have a significant impact on the GDP. From the results (table 3) we observe that the coefficient of the log transformation of the savings (current US\$) is negative 23.53% and the coefficient of the log transformation of the investment (current US\$) is positive 92.04%. This observation signifies that :

- With 1% increase in savings, we can expect the GDP to decrease by 23.53%
- With 1% increase in investments, we can expect the GDP to increase by 92.04%

The log-log regression equation is observed to be the following :

$$\ln \text{GDP} = -11.4413 - 0.2352961 \ln(S) + 0.9203618 \ln(I)$$

Where,

S : Savings at current US dollars

I : Investment at current US dollars

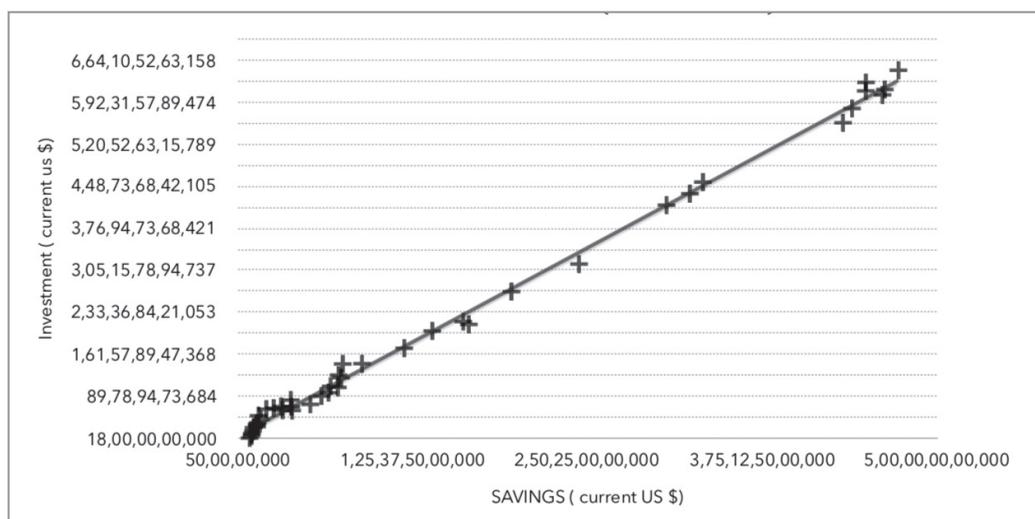
Table 3: Single Equation Regression Result table

. reg lngdp lns lni						
Source	SS	df	MS			
Model	19.081433	2	9.54071651	Number of obs =	42	
Residual	.333287274	39	.008545828	F(2, 39) =	1116.42	
Total	19.4147203	41	.473529763	Prob > F =	0.0000	
				R-squared =	0.9828	
				Adj R-squared =	0.9820	
				Root MSE =	.09244	
lngdp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lns	-.2352961	.0720447	-3.27	0.002	-.3810202	-.089572
lni	.9203618	.0916127	10.05	0.000	.7350576	1.105666
_cons	-11.4413	.62011	-18.45	0.000	-12.69559	-10.18701

However, investment is a function of savings. When savings increase the investment also increases, this in turn leads to a rise in the GDP of the country. The correlation coefficient of savings and investment calculated from Table 2 is 0.9651. From this observation it can be inferred they are positively correlated to each other. According to Figure 1, savings (current US\$) and investment (current US\$) of India are positively correlated which means that when there is an increase

in the savings rate of the country the investments in the economy will also increase. The increased investment rate of India over time leads to an increase in the savings rate of the country. As discussed in the Harrod-Domer model above, a higher savings rate leads to increased investment, and thus the rate of growth increases. Even though the empirical results show that the increase in savings decreases GDP and the increase in investment leads to an increase in GDP, but savings should still be encouraged for its desired level effects. We should take into consideration the fact that savings and investment are interdependent. They have a positive correlation. When we take both savings and investment together we notice that any variation in both savings and investment highly affects the GDP.

Figure 1: Correlation between Savings (current US\$) and Investment (current US\$)



However, using single equation regression model is not the best method to find empirical method to analyse the relationship between savings, investment and GDP. To capture the impact of savings and investment on GDP empirically better models can be used like simultaneous regression model.

IDENTIFYING INVESTMENT AND SAVING SLOWDOWNS

Although it is believed that the Indian economy witnessed stagflation till 1990, the Indian economy faced a Balance of Payments (1990-91) crisis, rising debt burden, widening budget deficit, recession in the industry, and rising inflation wrought by the unsustainable macroeconomic policies of 1990-2000. Due to the impact of the industrial slowdown and the Fifth Pay Commissions, the fiscal deficit in 1996-

97 was reduced increasing the savings of the nation. Due to the stagnation in fiscal deficits and rising public debt over the period 2002-03, and its adverse impact on public investment and growth, the emphasis was laid on ameliorating the health of public finances. The Fiscal Responsibility and Budget Management (FRBM) Act, 2003 was passed at the centre and similar fiscal responsibility legislations at the state-levels to boost the public finance sector and reduce the fiscal deficit. It brought pellucidity and answer ability in the conduct of the fiscal and monetary actions of the government. Since then significant gains were there in the fiscal consolidation process. From 2002-2007, the economy of India witnessed a rapid increase in economic growth and savings (Fig 2, Fig 3).

Figure 2 : Savings (Current US\$) of India from 1975-2016

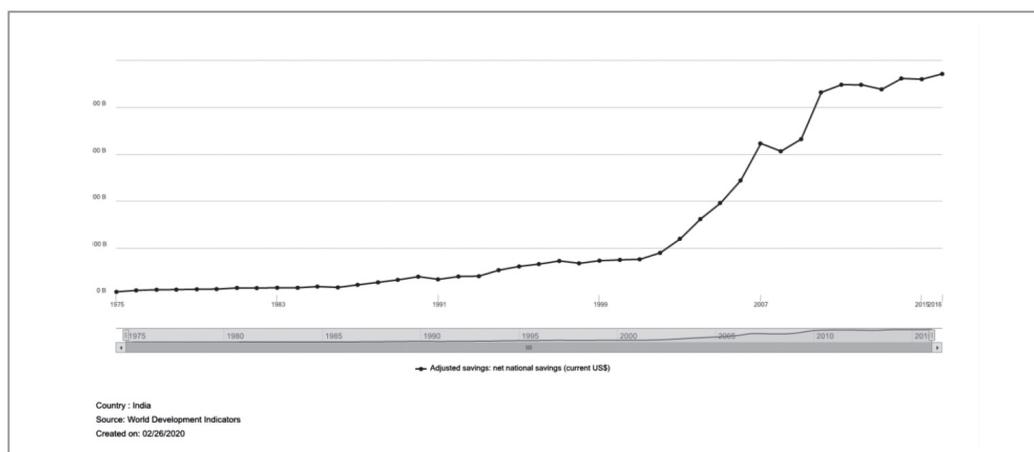
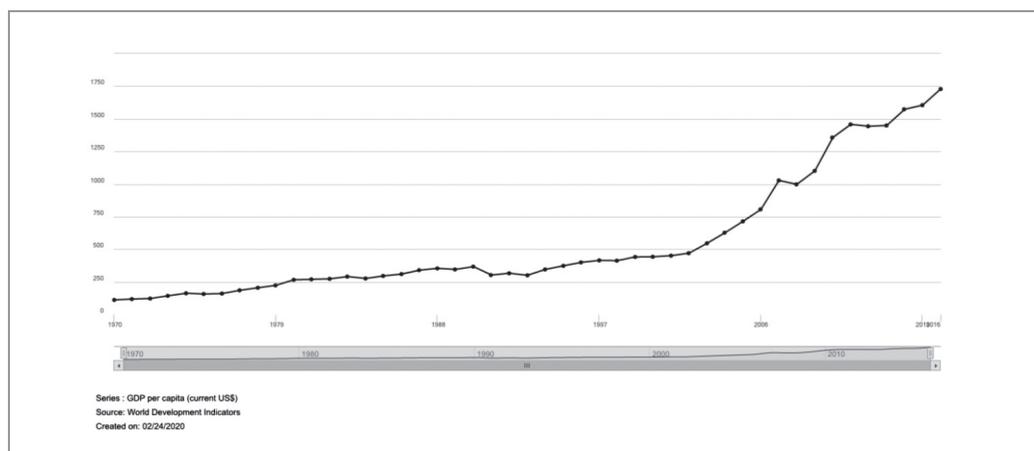
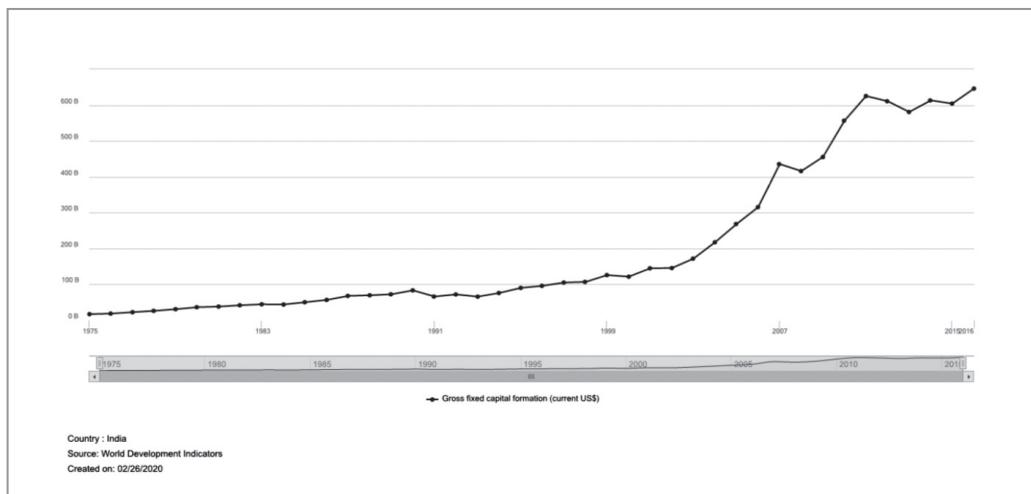


Figure 3 : GDP Per Capita (Current US\$) of India from 1975-2016



When Prime Minister P. V. Narasimha Rao came to power he worked towards bringing wide-ranging structural and economic reforms and financial liberalization in our country. By the reorganization and strengthening of measures in the domestic industrial sector, there was a decline in both real and nominal interest rates, improving the rate of growth of investments and corporate profitability (Fig 4). This led to private corporate savings being stable in the range of 2-4 percent till 2002 picked up a pace and increased subsequently up to 9 percent by 2007 (Ashish, 2018). Public sector savings were low in 2001 but gradually increased from 2003 to 2007. There was an 8.8 percent annual growth of manufacturing during the five years. The fiscal policy implication and the rising investments lead to higher GDP growth of the country. India's high savings rate has been a crucial driver of its economic boom, supplying productive capital, it helped to stimulate a virtuous cycle of higher growth, higher income, and higher savings. Since then India's domestic output grew at 8.7 percent, making it the world's second fastest growing economy after China. India witnessed an impressive investment boom complimented with a rise in the domestic savings rate. It became the highest investment rates India had noticed.

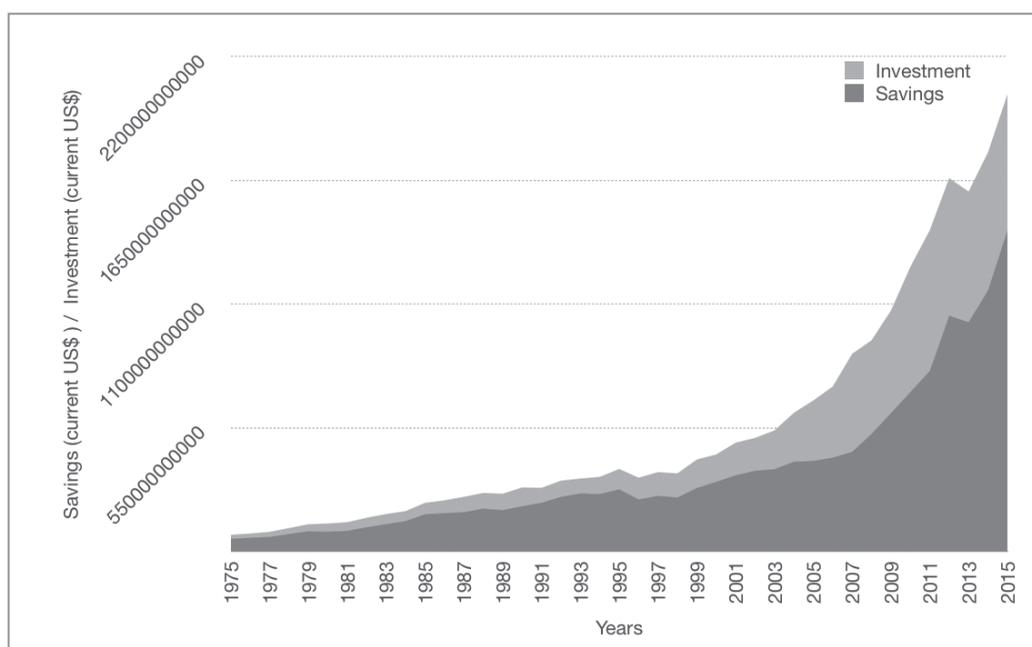
Figure 4 : Investment (Current US\$) of India From 1975-2016



Gross savings in financial assets reached its peak in 2007 and then slowed down in 2008 as illustrated in Figure 4. The global recession in 2008 led to the decline of growth rate and increased market volatility sharp which in turn resulted in the downfall in life insurance fund along with the Indian stock market. Due to the rapid corrections in the stock prices, investors suffered huge losses. A sharp decline in public sector savings was seen in 2008 largely on account of sixth pay

commission arrear and fiscal stimulus measures due to the global economic slowdown of 2008 (Mohan, 2008). Domestic savings took time to catch up to public savings. However, coordinated fiscal and monetary actions reinstate the savings rate in the economy. To better, the situation government increased its expenditure (especially on infrastructural activities) and cut indirect taxes. This decision of the government was complimented with the reserve bank of India by the change in the existing monetary policy and repo rates were decreased to increase private sector investment. Thus both savings and investments were rehabilitated in the economy (Fig 5).

Figure 5: Relation between savings (current US\$) and investment (current US\$) of India from 1975-2016



From a peak of GDP in 2010, the savings rate had fallen and remained below for the fourth consecutive year. One reason for the decline is the increase in the current account deficit due to the uncontrollable demand for gold. Growth in life insurance funds along with savings of financial assets declined between 2011 and 2013. People who saved their money moved it to a small saving scheme where the nominal rate of interest was higher than the interest on offer on fixed deposits. The government brought down interest on small savings schemes to increase the savings. In 2014, the domestic and global economy recovered because of the boost in the public sector savings which further reached above

3 percent in 2015. In 2015-16, the economy grew by 7.9 percent. India became the fastest growing economy having a five-year high growth rate of 7.6 percent.

CONCLUSION

India has shown a healthy growth rate since the past decade. This paper evaluated different theories that show whether or not the savings rate is one of the factors contributing to the growth rate of the economy. Examining the Solow and the Harrod-Domer model, two different hypotheses Solow claims that an increase in saving rate increases the output per worker but has very little to do with the sustained economic growth. Whereas Harrod-Domer says that a high savings rate leads to increased investment which results in the rapid growth rate of a nation. By applying the single equation regression model, using the WDI's time-series data from 1975-2016 of GDP per capita, savings, and investment of India to current US dollars, this paper concludes that the variation in GDP can be explained by the variation in savings and investment. Although the regression results suggest that an increase in savings leads to a decrease in GDP but the correlation results show that savings and investment are positively correlated. Hence the increase in savings leads to a rise in investments which results in the economic growth of the country.

Initially, the growth rate of the Indian economy didn't have many fluctuations. The saving rate and investment rate started ascending from 2002 majorly due to economic reforms and financial liberalization. The reduction of government fiscal deficit resulted in increased savings in 2003 onwards. In 2008 the GDP growth declined due to the global financial crisis. However, the damage was taken care of by the government in power by implementing expansionary fiscal policy and measures taken by the Reserve Bank of India. The use of fiscal stimulus can boost investments and savings in the economy. Hence the government should focus on increasing government expenditure and cut back taxes by some margin. An increase in the domestic saving rates resulted in accelerated growth in India after the 2008 crisis indicating that domestic savings along with private savings in essential to maintain and sustain a macroeconomic equilibrium. Reviving investments along with mobilizing savings would also lift the GDP numbers. Contemporary steps on the part of government should be taken to provide incentives in the form of rebates to both the formal and informal sectors. Easing the costs of doing business, and creating a clear, transparent, and stable tax and regulatory environment has to be promoted for the growth and betterment of the nation (Minsky, 2017-18).

REFERENCES

- Bacha, E.L., 1990, A Three-Gap Model of Foreign Transfers and the GDP Growth Rate in Developing Countries, *Journal of Development Economics*, Vol. 32, 279-96.
- Barro, R. J. (1990). Government spending in a simple model of endogenous growth. *Journal of Political Economy*, 98, S103-S125
- DeGregorio, J., 1992, Economic Growth in Latin America, *Journal of Development Economics*, Vol. 39: 59-84.
- Japelli, T., Pagano, M. (1994), Savings, Growth and Liquidity Constraints, *Quarterly Journal of Economics*, 109: 83-109.
- Lucas, R. E. (1988). On the mechanism of development planning. *Journal of Monetary Economics*, 22, 3-42.
- Minsky, H., Investment and Saving Slowdowns and Recoveries: Cross-Country Insights for India, *Economic Survey 2017-18 Volume 1*
- Mohan, Ramesh, (2006) "CAUSAL RELATIONSHIP BETWEEN SAVINGS AND ECONOMIC GROWTH IN COUNTRIES WITH DIFFERENT INCOME LEVELS.." *Economics Bulletin*, Vol. 5, No. 3 pp. 1-12
- Mohan, Ramesh, (2008), *The Growth Record of the Indian Economy, 1950-2008: A Story of Sustained Savings and Investment*
- Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, 98, S71-S102.
- Romer, P. M. (1986). Increasing returns and long run growth. *Journal of Political Economy*, 94, 1002-1037.
- Samantaraya, A., Patra, S.K.,(2014), *Determinants of Household Savings in India: An Empirical Analysis Using ARDL Approach*
- Sinha, D., Sinha, T., (1998) Cart before the horse? The saving–growth nexus in Mexico
- Sinha, D. (1998) *Saving and Economic Growth in Thailand*

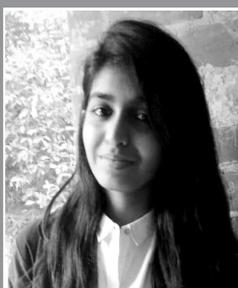
Solow, R. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics*, 70, 65-94.

SURI, A. (2018), ANALYSIS OF TRENDS IN GROSS DOMESTIC AND HOUSEHOLD SAVINGS AND ITS COMPONENTS IN INDIA

Yuansheng J, Abbas A, c., Wei, F. (2015), ROLE OF SAVINGS IN ECONOMIC GROWTH OF PAKISTAN



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The Puzzle: Impact of Elderly Population on Price Dynamics in Developed Nations

Abstract

What explains the variation in prices in a developed nation? The role of monetary and fiscal policy, interest rates, ideas and institutions have always been emphasized while leaving the role of change in the ratio of elderly population unexplored. Ageing population is an ineluctable process with major economic implications. This paper tries to explore the unexplored area that is the impact of elderly population on price dynamics. The main aim of this paper is to find out how the ageing population is linked to price dynamics, and also to find out whether it is correlated to deflation or not. This paper illustrates how ageing population influences price through various macroeconomic variables such as saving rate, consumption preferences, human capital and expectation of growth with the help of literature review. Some have inflationary effects, some deflationary and some show ambiguous results. This correlation has further been corroborated by taking five developed countries where rise in the ageing population has been observed.

Keywords – Price Dynamics, Macroeconomic Variable, Old age dependency Ratio, working age population

INTRODUCTION

According to (Harper and Leeson, 2009), most of the developed countries around the globe are approaching an era of ageing population due to fall in fertility rates and rise in longevity. The World Population Prospects 2019 (United Nations, 2019), also states that by around 2050, 1 in 6 people in the world will be around the age 65 and above, up from 1 in 11 in 2019. Similar results have been shown by World Population Ageing 2019, by the United Nations, which argues that all societies in the world are amid this ageing revolution – just the difference is in the stages where they are in. But all the countries are going to pass through this aging transition, where the chance of surviving to age 65 and above will increase from less than 50% to 90%. Thus, what we see today in the developed countries is that, the proportion of adult life spent above the age 65 has increased from less than fifth in 1960 to quarter or more.

A rise in the population ageing in a country influences its labor supply, wage levels, social dependency ratio and so on. The ongoing ageing population will influence the price dynamics of a country. Previously, various studies have tried to show a relationship between low inflation and demography. However, there is not much evidence for this hypothesis. Thus, this paper tries to assess the existence of the link between population ageing and inflation of the developed nations, and especially the correlation between ageing and low inflation rate. Therefore, if the correlation can be relatively predicted, the impact of ageing population on price dynamics may be taken into account in future monetary policy decisions. At face value, results in this article contribute to the debate concerning the observation of any link between old age population and price dynamics.

This paper illustrates how ageing population will influence the price dynamics through various macroeconomic variables such as human capital, consumption, saving preferences and expectation of economic growth. In this paper, five developed countries with rapid aging populations which are Japan, Italy, Portugal, Germany and Finland have been studied for the time span 1973-2018 to substantiate the theoretical findings. According to the World Economic Forum (2019) these five countries have the highest elderly population in the world with significantly more people over the age of 65. For a simple and clear way to measure the impact of elderly population on inflation, this paper has defined elderly people as people aged above 65 years.

LITERATURE REVIEW

In order to analyze the macroeconomic impact of elderly population, it is crucial to explore appropriate policy responses to minimize unwanted distortions. There have been various extensive studies and research which analyzes the impact of demographic transition on the economy. Many studies and research could not give any proper conclusion on the effect of elderly population on price dynamics – Inflation or deflation. Some studies also give ambiguous results. (Bloom and Canning, 2006) argues that there are many researchers and publications who try to find out a correlation between population change and macroeconomic factors, but is inconclusive, whether this correlation exists in the greyer world.

(Shirakawa 2011, 2012, 2013; Anderson et al., 2014) suggest that there is a link between the age structure of the country's population and inflation. McMillan and Baesal (1990) showed positive inflationary impact coming from dependents. Some researchers (Juselius and Takats, 2015) performed a panel data analysis of 22 advanced economies over a period of 1955- 2010 and therefore, came to the conclusion that ageing population impacts the price dynamics, thereby resulting in inflation.

Recently, there are many views that show a correlation between ageing population and deflation. This relation is opposite to what the above views present. This viewpoint focuses more on the demand side effects rather than the supply side of growing population, resulting in deflation. Thus, stating that elderly population leads to change in consumption pattern leading to fall in aggregate demand resulting in low inflation (Anderson et al., 2014; Faik, 2012; Gajewski, 2011; Bullard et. Al, 2012). The former Governor of the Bank of Japan also stated that growing population could impact the price dynamics resulting in a rise in deflationary pressure. Therefore, more research is needed in order to find out the effect of aging on various macroeconomic variables and prices.

GROWING ELDERLY POPULATION

The world is experiencing increase in the ageing population. Simultaneously four processes can be experienced as a result of greying population: demographic transition, slowing population growth, declining working age population and increasing old age dependency ratio (Macura et. Al. 2005; Kotowska and Jozwiak, 2012; Pulina Broniatowka, 2017)

DEMOGRAPHIC TRANSITION

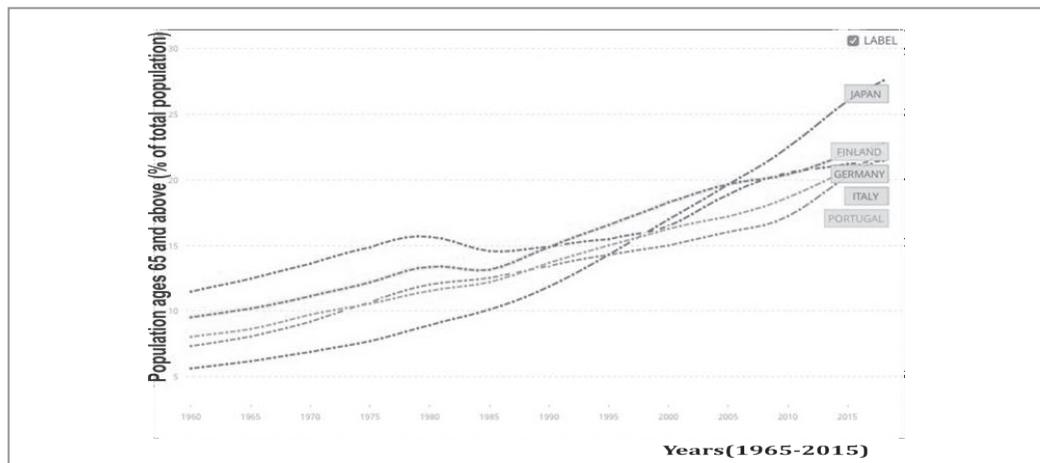
Demographic transition refers to change in population over time. It refers to the change in birth rate and death rate and consequently on the growth rate of population (Chesnais and Jean-Claude, 1992). According to the World Bank Data (2019), Japan, Italy, Portugal, Germany and Finland had experienced a baby boom long back and are currently experiencing an aging population. Factors such as better life standards, better education, better medical facilities, better nutrition intake etc. in the developed nations led to declining fertility rates combined with lower mortality rates and longevity (Oded Galor, 2011; Shyam Ranganathan, Ranjula Bali Swain and David JT Sumpter, 2015). As a result, these nations experienced a demographic transition of a rapidly growing ageing population.

Table-1: Population age 65 and above (% of total population)

Years	Japan	Germany	Finland	Portugal	Italy
1973	14.4	10.2	11.4	7.4	10.2
2018	21.46	21.721	22.752	27.576	21.954

Source: World bank group, 2019

Figure: 1



Source: World bank group, 2019

According to data above, demographic transition – rise in the population over and above the age 65, which is expressed in the form of percentage of total population can be observed in Germany, Finland, Italy, Japan and Portugal.

SLOWING POPULATION GROWTH

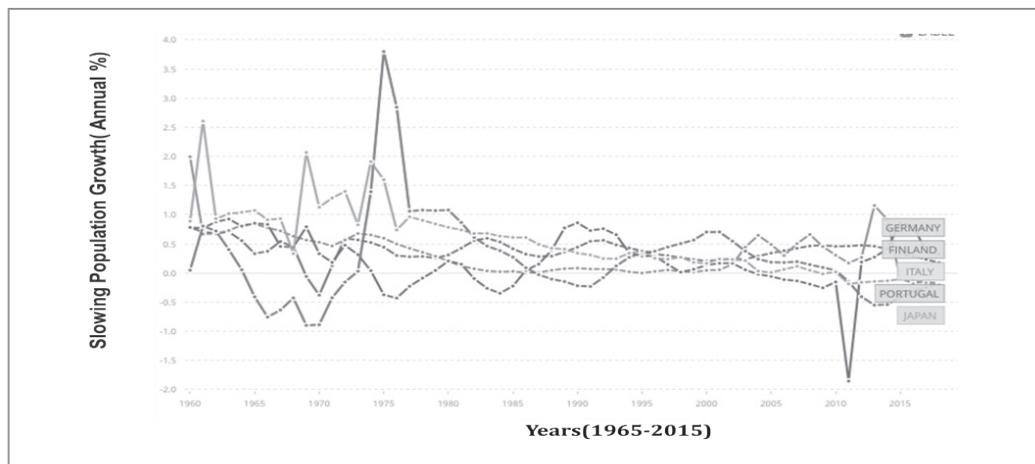
According to the World Economic Forum (2019), these nations in contrast to the developing nations will experience slowing population growth. During the 1960s and 1970s, these countries experienced rapid fall in fertility rates because of contraceptive availability, improved healthcare facilities, sanitation, increasing women workforce and changing attitudes about the status of women (Stephen Enke, 1966; Larry Neal, 1983). Immigration is also one of the factor that influences and slows down the growth of population in a country (Jakub Bijak, Dorota Kupiszewska, Marek Kupiszewski and Katarzyna Saczuk, 2012). As a result, there will be slow population growth.

Table-2 :Slowing population growth (Annual %)

Years	Japan	Germany	Finland	Portugal	Italy
1973	0.3	0.6	0.7	0.8	0
2018	0.327	0.178	-0.174	-0.203	-0.244

Source: World bank group, 2019

Figure: 2



Source: World bank group, 2019

According to data above, slowing population growth rate can be observed in Germany, Finland, Italy, Japan and Portugal.

DECLINING WORKING-AGE POPULATION

Ageing population in nations will lead to decline in the working age population (Mason and Lee, 2011; Walder and Doring, 2012). According to the United Nations Population Aging (2019), the working age population of Germany, Finland, Italy, Japan and Portugal has peaked and will shrink by more than 50% in the next 50 years while the share of their population above 65 will grow by 80%. For instance, by 2050 the working age population would have contracted by 28% in Japan and 23% in Germany.

RISING OLD AGE DEPENDENCY RATIOS

Change in the age structure of the population has an impactful consequence on a country's old age dependency ratio (Albuquerque and Ferreira, 2015). Old age dependency ratio is the measure of the population aged above 65 years as a share of those between 15 to 64 years (The World Bank, 2019). Demographic transition which refers to change in population structure, thereby leads to a rise in old age dependency ratio, which means that the working age population group which remains a smaller portion will be taking care of the old age group of people (Lindh, 2004; Navaneetham and Dharmalingam, 2012).

Table-3: Old age dependency ratio (65 years and above)

Years	Japan	Germany	Finland	Portugal	Italy
1973	22.9	10.8	15.1	18.4	16.5
2018	33.1	46.2	35	35.6	34

Source: World bank group, 2019

Figure: 3



Source: World bank group, 2019

From the above data, increasing old age dependency ratio can be observed in Germany, Finland, Italy, Japan and Portugal.

IMPACT ON PRICE DYNAMICS

International Monetary Fund Report (2004) states demographic transition has an impact on the economic activities of a country. Change in demographics leads to transition that alters saving and investment behaviors, consumption patterns, workforce participation rates, total output, returns to factors of production, price dynamism and other macroeconomic variables (Bloom, D.E., and Canning, D., 2004). However demographic transition is not the sole factor responsible for these changes, the magnitude of these effects depends on various other factors.

Mikael Juselius and Elod Takats (2016), “The age structure-inflation puzzle”, and Mikael Juselius and Elod Takats (2015), “Can demography affect inflation and monetary policy”, argues in their paper that increasing elderly population has an effect on the price dynamics. Price dynamics refers to the situation where prices adjust according to the supply and demand in the economy leading to inflationary and deflationary trends in the economy (George De Menil, 1974; Courchene, 1969; Bodkin, Bond, Reuber and Robinson, 1966)

Even though price dynamism is affected and influenced by monetary policy, yet the most advanced economies have not been able to achieve their target inflation rates despite their ultra-easy monetary policies. Therefore, this gives us a clue that something other than monetary policy also affects price dynamism. One of them is the rising ageing population (Mikael Juselius and Elod Takats, 2016).

Ageing population can influence price dynamics through multiple channels (Yoon, J. W., Kim, J., and J. Lee, 2014). It will alter consumption behavior, saving and investment behavior, human capital, expectations of future economic growth and overall level of output and prices in the economy (Yoon J. W., Kim, J., and J. Lee 2014; Walder and Doring, 2012). These authors say that some of these factors will have an inflationary effect, others deflationary and some might give ambiguous results. So, net effect on prices is not straightforward. Moreover, the magnitude of various effects will depend on various factors such as the relative speed with which aggregate demand and aggregate supply adjusts, labor market conditions, behavioral responses of elderly population etc. N. Renuga Nagarajan, Aurora a.c. Teixeira and Sandra T. Silva, 2006 and Mitsuru Katagiri, 2012 stress on the effect of ageing population on price dynamics through four main factors – human capital change, consumption behavior, saving and investment and economic growth. Thereby, this paper incorporates these four main factors in

studying the impact of elderly population on price dynamics – leading to inflation or deflation.

FACTORS AFFECTING PRICE DYNAMICS

1. SAVING PREFERENCE

As the population ageing rises, it will affect the saving patterns of the individual to an extent (Samuelson, 1958; Albuquerque and Lopes, 2010). The saving rate of people will decrease as they grow old because they start spending their saving in old age (Davies and Robert, 2006). This theory is also supported by Masson and Tryon, 1990; Yashiro, 1997; Peterson, 1999, where they argue that when consumption rises, savings rate will decline. As savings falls, scale of investment will fall, resulting in a change in the effective interest rate and affect economic growth.

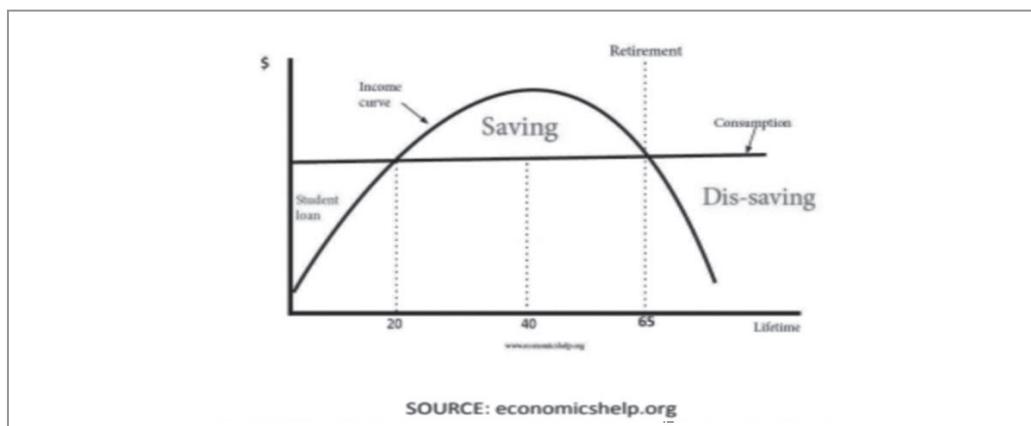
According to life cycle theory, (Modigliani and Brumberg, 1954; Ando and Modigliani, 1963), population composition has a direct impact on savings. Initially saving rises as working households increase their provision for retirement, then reaches a lifetime peak when the workers are at the middle and at the end of their careers, and ultimately falls as the workers retire and finally begin to dissave. Based on this theory Goodhart and Erfuth, 2014 have predicted that population ageing will cause saving rates to fall. Kuji's(2006), in the econometric analysis found that there is a negative relation between population aging and savings. Therefore, population ageing will lead to fall in savings. Callen et al. (2004) and External Balance Assessment (EBA) methodology by Phillips et al (2013) stress that an ageing population will result in increase in spending in areas like medical, old age pension and long-term care spending, escalating fiscal balance. Bullard et al. (2012), focusing on the interaction among demographics and the redistribution of resources in the economy through the fiscal side, asserts that ageing population will lead to deflation. Therefore, ageing population may lead to decreasing saving preferences leading to deflation.

Table-4: Gross domestic Saving (% of GDP)

Years	Japan	Germany	Finland	Portugal	Italy
1973	39.822	25.645	32.443	24.619	24.261
2018	24.669	27.96	24.576	18.221	20.66

Source: World bank group, 2019

Figure 4: Modigliani et.al, 1963



According to data above, there has been a fall in the Gross Domestic Saving (%of GDP).Japan having the highest elderly population shows a fall in Gross Domestic Saving. Similar trends have been noticed for Finland, Portugal and Italy. Contrast to the result, Germany shows a rise in Gross Domestic Saving which tells us that there might be other factors more dominant that effects saving, besides rise in elderly population.

2. EXPECTATION OF ECONOMIC GROWTH

Population ageing will influence economic growth of a country (Lisenkova, 2012; Narciso, 2010; Alders and Broer, 2004). There is a negative relationship between ageing population and economic growth (Narciso, 2010; Bloom, 2010; Lisenkova et al., 2012; Walder and Doring, 2012). Increasing old age population will reduce the country’s human capital stock, labor participation and labor productivity (Lisenkova et al., 2012; Narciso, 2010). Therefore, according to these authors, an increase in old age population will decrease the economic growth of a country. According to Phillips curve, lower economic growth will lead to lower demand resulting in lower inflation or deflation (Milton Firedman, 1967; Edmund Phelps, 1968).

Table- 5 :GDP growth (annual %)

Years	Japan	Germany	Finland	Portugal	Italy
1973	8.0	4.8	7.0	11.2	7.1
2018	0.8	1.5	1.67	2.4	0.8

Source: World bank group, 2019

Figure 5

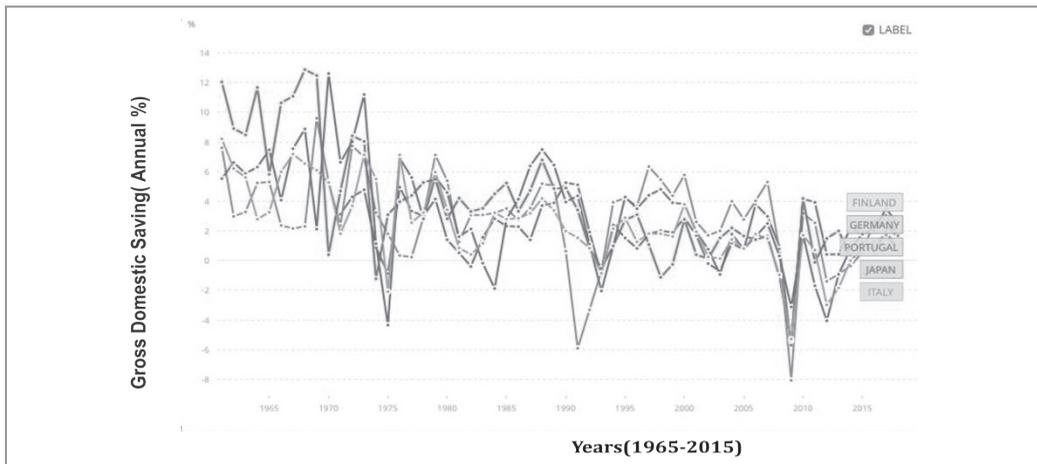
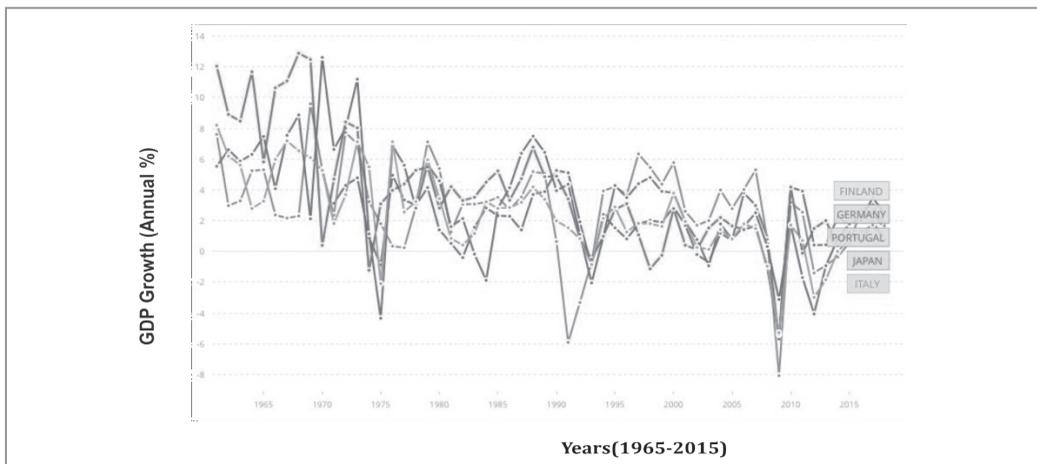


Figure 6



Source: World bank group, 2019

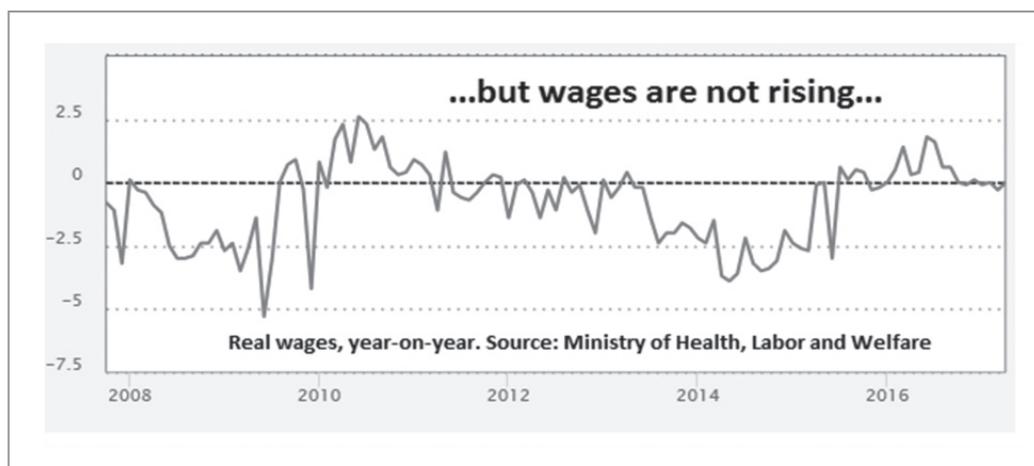
According to data above, there has been a massive fall in the expectation of economic growth in these five countries, which have the highest elderly population rate. Japan, Germany, Finland, Portugal and Italy, all these countries in support of the research show that population ageing to some extent influences expectation of economic growth of the country.

3. HUMAN CAPITAL

Population ageing will influence economic growth of a country (Lisenkova,

2012; Narciso, 2010; Alders and Broer, 2004). As the population ages, economic growth falls – thereby they are said to be negatively effecting each other (Bloom, 2010; Walder and Doring, 2012). Increasing old age population will reduce the country’s human capital stock, labor participation and labor productivity (Lisenkova et al., 2012; Narciso, 2010). Therefore, according to these authors, an increase in old age population will decrease the economic growth of a country. According to Phillips curve, lower economic growth will lead to lower demand resulting in lower inflation or deflation (Milton Firedman, 1967; Edmund Phelps, 1968).

Figure 7: (Fall in Real Wages in Japan



Source: Ministry of Health, Labor and Welfare
-Goodhart et al's (2016)

Thus, loss of human capital leading to fall in productivity and reduction in real wage may put downward pressure on inflation resulting in deflation.

4. CONSUMPTION PATTERN

The rise in ageing population will lead to change in consumption preferences to some extent (Walder and Doring, 2012; Velarde and Herman, 2014). Several authors argue that per capita income and disposable income will fall with increase in old age population which will lead to net fall in individual’s total consumption (Lee and Mason, 2007; Hock and Weil, 2012). Population ageing will influence private consumption of individuals and influence the demand for several goods (Bakshi and Chen, 1994; Walder and Doring, 2012; Merette and George, 2009). As a result of ageing, there will be a different impact on demand for different items.

A country may face reduction in demand for housing, increase in demand for stock markets and higher demand for health services (Merette and George, 2009; Bakshi and Chen, 1994). Bakshi and Chen (1994) says that old age groups will be risk takers as they are already in the later stages of life with lesser responsibilities. They will invest in risky goods. In addition to this, household consumption of non-durable goods may drop and food expenditure may drop among perishable goods (Aguilar, 2011; Aguila, 2011). Authors stress that as people age, they prefer eating home cooked rather than outside leading to fall in their food expenditure. Thus, change in consumption will impact demand for goods which will lead to price dynamics (Jong-Won Yoon, Jinill Kim, and Jungjin Lee, 2014).

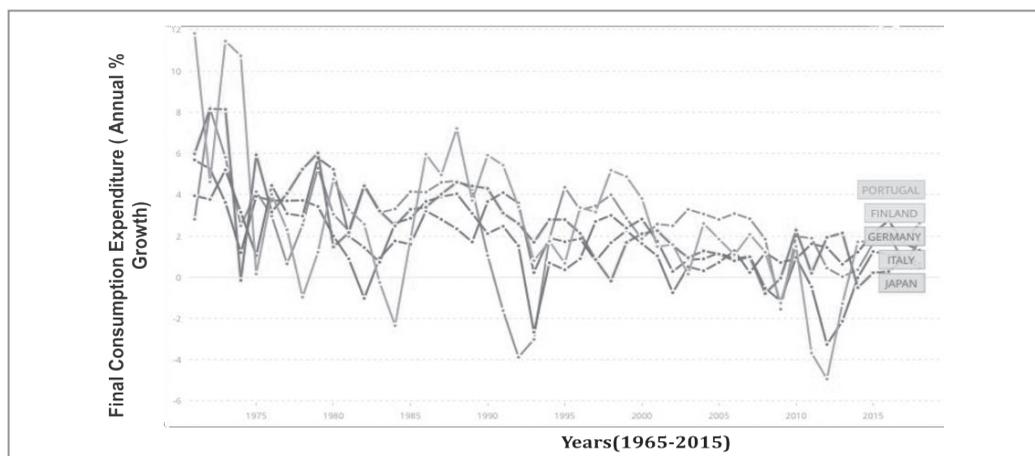
Overall there exists a negative relation between population ageing and consumption (Zhenglong Li and Hong Li, 2014). By constructing an econometrics model, Zhenglong Li and Hong Li showed population ageing will result in a negative influence on consumers and a rise in ageing population reduces consumption. Fall in consumption will lead to reduction in aggregate demand and negative inflation (Jong- Won Yoon, Jinill Kim, and Jungjin Lee, 2014; Christopher J. Waller, 2012).

Table-6: Final consumption expenditure(annual % growth)

Years	Japan	Germany	Finland	Portugal	Italy
1973	8.1	5.2	11.5	3.6	5.8
2018	0.5	0.7	2.6	1.3	1.7

Source: World bank group, 2019

Figure 8



Source: World bank group, 2019

It can be inferred from data above that Japan, Germany, Finland, Portugal and Italy having the highest rise in elderly population shows a fall in the annual consumption expenditure (% growth). According to the literature review, age structure may affect the consumption pattern of individuals resulting in fall in consumption expenditure.

PRICE DYNAMICS: DEFLATION

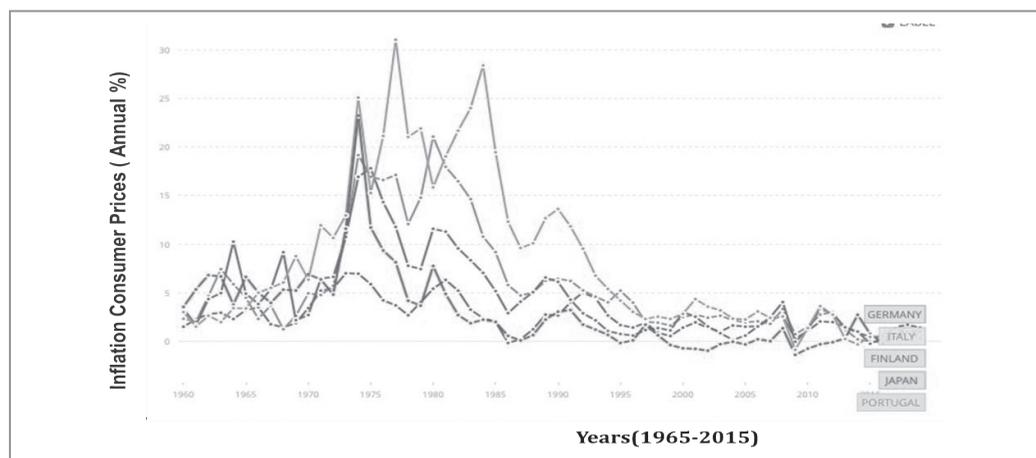
The literature review of the impact of ageing population on consumption pattern, saving preferences, human capital and economic growth shows that the net effect of ageing population may have deflationary trends in a country. It has also been concluded by various other studies. (Barry P. Bosworth, Gary Burtless, and Ralph C. Bryant, 2004; Doug Andrews, Jaideep Oberoi, Tony Wirjanto and Chenggang Zhou, 2018; Paulina Broniatowska, 2019). Therefore, it can be concluded with the help of literature review that ageing population will result in lower inflation or deflation.

Table-7: Inflation, consumer prices (annual %)

Years	Japan	Germany	Finland	Portugal	Italy
1973	11.6	10.8	13	7	10.8
2018	1	1.1	1.1	1.7	1.1

Source: World bank group, 2019

Figure 9



Source: World bank group, 2019

According to data above, there has been a massive fall in the price index in these five countries, which have the highest elderly population rate. Japan, Germany, Finland, Portugal and Italy, in support of the research show that population ageing to some extent influences price dynamics of a country resulting in deflation.

LIMITATIONS:

- This paper takes into consideration only five developed countries for the time span 1973-2018 to verify theoretical findings. The result has been true for these five developed countries, but with the large sample size, the result may vary.
- This paper talks about four main factors on which rise in elderly population have an effect. However, there may be many other factors which may be affected by elderly population.
- The effect of elderly population on price dynamics has taken only four major macroeconomic variables into account. However, there might be price dynamics because of several other factors like cause of ageing (Anderson et al., 2014) and other macroeconomic variables. This paper does not take them into account.
- This paper does not take into account the magnitude of various effects, factors such as how quickly speed aggregate demand adjusts with aggregate supply, labor market conditions, etc.

CONCLUSION

This paper has aimed at reviewing the effects of greying population on the price dynamics corroborating it with data from Japan, Germany, Italy, Finland and Portugal. Through this paper, it can be inferred that the ageing population of a country will influence demographic transition, old age dependency ratios, population growth and working age population. Ageing population will lead to a change in demography, leading to rise in old age dependency ratio, will slow the population growth and also lead to the decline in working age population. These factors will further influence macroeconomic variables such as saving preferences, consumption patterns, human capital and economic growth. As a result, they will influence a country's pricing dynamics by affecting its demand side and supply side factors. From the above explanation, it can be inferred that rate of saving falls with rise in elderly population, expectation of economic growth also falls with the ageing population, human capital declines and lastly, total consumption

expenditure also shows a declining trend with the rise in ageing people (65 years and above). Finally through this paper, it can be concluded that ageing population may be deflationary. Thus, the above sample five countries – Japan, Germany, Finland, Italy, and Portugal (according to the data above) shows the fall in the annual percentage of Inflation – thereby, resulting in deflation.

The outcome of this thesis proposes to add to the present-day research ongoing on the relationship between ageing population and price dynamics. It proposes that economies with significant increase in ageing population or expected increase may experience deflationary impact today or in future. Similar to Anderson (2014), Faik (2012), Gajewski (2011) and Bullard (2012), this paper has concluded the relationship between demography and inflation, proposing that the old-age population has a negative impact on price dynamics. This proposition has been concluded by studying the impact of ageing population price dynamics through various macroeconomic variables.

Despite the fact that several papers have studied this relationship, many gaps still prevail in this field. Many papers have proved this result, however, it still lacks string theoretical and empirical consensus. It would be recommended to test and quantify the effects concluded above in the paper in more detail through more research work and models to substantiate the outcome.

REFERENCE

Anderson et al. 2014. Health and wellness system

McMillan and Baesal (1990) the macroeconomic impact of the baby boom generation

Juselius and Takats (2015), Can demography affect inflation and monetary policy taken from <https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2019-Highlights.pdf>

Gajewski,(2011) Age-related differences in working memory performance in a 2-back task

Bullard et. Al(2012) Macura et al. 2005 The new demographic regime: population challenges and policy response

Paulina Broniatowka,2017 The demographic transition: stages, patterns, and economic implications : a longitudinal study of sixty-seven countries covering the period 1720-1984

Oded Galor, 2011 Inequality, human capital formation, and the process of development

Shyam Ranganathan, Ranjula Bali Swain and David JT Sumpter, 2015. The demographic transition and economic growth: implications for development policy

Stephen Enke, 1966 The economic aspects of slowing population growth

Larry Neal, 1983 Economic Explanation of Fertility in the Presence of Immigration: The West German Case from <https://www.bis.org/review/r120531e.pdf>

Jakub Bijak, Dorota Kupiszewska, Marek Kupiszewski and Katarzyna Saczuk, 2012 Population ageing, population decline and replacement migration in Europe

Mason and Lee, 2011 Population aging and the generational economy: A global perspective

Walder and Doring, 2012. The effects of population ageing on private consumption—A simulation for Austria based on household data up to 2050

Navaneetham and Dharmalingam, 2012. A review of age structural transition and demographic dividend in South Asia: Opportunities and challenges from

https://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2017_Highlights.pdf

Bloom, D.E., and Canning, D., 2004. Global demographic change: Dimensions and economic significance

Mikael Juselius and Elod Takats (2016), "The age structure-inflation puzzle" from <https://www.societegenerale.com/sites/default/files/documents/Econote/Aging-inflation.pdf>

Mikael Juselius and Elod Takats (2015), "Can demography affect inflation and monetary policy" George De Menil, 1974. Aggregate price dynamics

Courchene, 1969; Bodkin, Bond, Reuber and Robinson, 1966. Price stability and high unemployment Yoon, J. W., Kim, J., and J. Lee ,2014. Impact of Demographic Changes on Inflation and the Macroeconomy

N. Renuga Nagarajan, Aurora a.c. Teixeira and Sandra T. Silva, 2006. The impact of an ageing population on economic growth: an exploratory review of the main mechanisms

Mitsuru Katagiri ,2012. Managing Financial Crises: Lean or Clean?

Samuelson, 1958 An exact consumption-loan model of interest with or without the social contrivance of money <https://www.mhlw.go.jp/english/wp/wp-hw11/dl/summary.pdf>

Albuquerque and Lopes, 2010. Economic impacts of ageing: an inter-industry approach Tryon, 1990. Macroeconomic effects of projected population aging in industrial countries

Masson and Tryon, 1990. Macroeconomic effects of projected population aging in industrial countries

Modigliani and Brumberg, 1954. Utility analysis and the consumption function: An interpretation of cross-section data <https://econpapers.repec.org/paper/bisbiswps/656.htm>

Lisenkova et al., 2012. The Impact of Population Ageing on the Labour Market:: Evidence from

Overlapping Generations Computable General Equilibrium (OLG-CGE) Model of Scotland

Alders and Broer, 2004. The impact of an ageing population on economic growth: an exploratory review of the main mechanisms

Hock and Weil, 2012. On the dynamics of the age structure, dependency, and consumption Lee and Mason,2007\



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Does India Really Need Inflation Targeting?

Abstract

Inflation Targeting was adopted for the first time by New Zealand in 1990 and soon became the norm for other countries all over the world. Following the recent adoption of Inflation Targeting in India, experts have pondered how it would affect an emerging country. Another related question is if India can do better than the current set target of 4%. How should the policy be amended to suit the Indian system? Would a policy directed explicitly towards controlling inflation prove to be too tight for an economy that has been slowing down of late? With a working population of around 50 crore according to the last Census, can there be a heavy trade-off between reduced inflation and high unemployment rates? In an effort to analyse the implementation of IT in the country, setting the Indian framework side by side with that of New Zealand can help provide perspective as to how India can strive to achieve a similar success story. The aim of this paper is to provide a detailed view of the rationale behind Inflation Targeting, in the context of New Zealand's success and its subsequent learnings for India. Furthermore, this paper attempts to find out if the current rate (4%) is indeed sufficient for this country to walk in New Zealand's footsteps.



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INTRODUCTION

The unique dilemma that India faces today is a possibility of stagflation, characterised by high inflation driven by the CPI, rising prices and a simultaneously slowing growth. India adopted Inflation Targeting (IT) in August 2016 for a time period of 5 years, till March 2021. Thus, it might just be too soon to say how the policy has panned out with respect to the Indian context. Nonetheless, it becomes imperative to lay down the strengths, drawbacks and possible scope for a sustained IT model and subsequent implementation. This paper attempts to bring out such aspects of the policy, drawing parallels with peers which adopted IT on the basis of similar economic concerns and individually crafted modifications to suit the country's current objectives.

After bringing out how IT has an edge over other models that arrived before it, this paper then introduces a brief summary of how New Zealand (considered as the pioneer of the model), as an example, made a name for itself through successful implementation of the same. Given the macroeconomic differences in countries like New Zealand and India, the model, albeit beneficial, must be customised to fit the Indian context. That being said, credible national data has been used to estimate the nature of relationship between unemployment and inflation to answer if the current target of 4% is enough to achieve the desired results without impacting national growth.

OBJECTIVE

The objective of this paper is to assess IT as a successful policy for India, as compared to New Zealand in terms of methodology, comparative advantages and status of the economy. Taking a look at both the countries' policies and resulting implementation can be a key factor in guiding India's future course of action for achieving effective IT without hampering other macroeconomic indicators like unemployment.

RESEARCH METHODOLOGY

This paper uses correlation to arrive at a relationship between Unemployment rate and Inflation (CPI). The model has been used to indicate mathematically that a 4% target may not be desirable for an emerging economy. Sources include the official websites of the RBI, The World Bank, The Reserve Bank of New Zealand (RBNZ), The Federal Reserve of St. Louis (St. Louis Fed), The Federal Bank of San Francisco (FRBSF) and the IMF. The calculations presented thereafter make use of data provided by the World Bank and the Economic Survey of India for the years 2019-2020.

BACKGROUND

Given how inflation relates to the general price level of the economy, it interests the general public just as much as it intrigues policy makers and economists. For this sole purpose, the Central Banks of almost all countries all over the world (eg. Japan, England, the United States, Canada) mention ‘price stability’ explicitly in their mandates (FRBSF, 2006). Nonetheless, inflation as a factor of economic growth cannot be overlooked. Moderate inflation is characteristic of a healthy and growing economy as the rise in demand due to economic growth pushes prices higher which theoretically translates to an increase in wages. Then when these workers now go out to purchase goods and services, the prices are driven even higher and the cycle continues (Warr, 2019, WEF). Referring to the Phillips Curve introduced by A. W. Phillips in 1958, which can be extended to bring out the inverse relationship between price inflation and unemployment rate, gives us important insights as to how low inflation can have adverse impacts on a growing economy. Following serious critiques like those from Lucas (1976), the model was soon revised to include rational expectations, unemployment gap and supply shocks. According to Donald Kahn, Vice Chairman of the Board of Governors of the Federal Reserve System, “A model in the Phillips curve tradition remains at the core of how most academic researchers and policymakers—including this one—think about fluctuations in inflation; indeed, alternative frameworks seem to lack solid economic foundations and empirical support.”(FRBSF, 2008) Despite its drawbacks and criticisms, even today the Phillips curve continues to function as a crucial guide in forming public policies (Daly, 2019).

It is not difficult to see that both very high and very low inflation can ruin an economy. Thus the key lies in maintaining a reasonable rate of inflation within a certain acceptable limit which is why most Central Banks set numerical targets or intervals for the inflation rate they wish to achieve for their respective economies.

Furthermore, inflation is perhaps one of the select few topics of economics which concerns the general public such a great deal. That makes policies related to it prone to the popular “Rules vs. Discretion” debate which basically outlines the consequences of making decisions which serve the requirements of the short run but prove to be time inconsistent in the long run, causing ‘Floodgates to open’ (Buol, 2003). Kydland and Prescott (1977) introduced the importance of the framework of the policy just as much as its desirability. Then, a rule (and not discretion) based framework marked by credibility turns out to be time consistent where policy responses follow a clearly specified plan looking at the bigger picture. Needless to say, a discretionary policy allows more room for

flexibility which has its own advantages given a particular set of circumstances. Taking the argument to monetary policy, Simons (1936), Friedman (1948) and other prominent economists showed how a rule-oriented policy especially when matters of money supply and price levels are concerned can avoid the mistakes that a discretionary framework makes. Rule based foundation can greatly benefit price fluctuations in the economy while discretion, beneficial in times of uncertainty, might lead to higher than socially optimum inflation levels which can allow the Central Bank to enjoy greater revenue (Brennan and Buchanan (1981)). Barro (1984) emphasizes how rule-based structures work better than those based on discretion towards growth when monetary policy is involved under certain conditions like credibility, certainty and no sudden shocks in price levels. It is important to notice that Inflation Targeting as a model is in fact a rule based monetary policy.

LITERATURE REVIEW

Inflation Targeting has emerged as one of the most popular policies for countries all over the world. After the shortcomings of its predecessors like currency pegs and monetary targeting were realised, there was a global need for a stable nominal anchor – a standard variable for countries to make use of in order to peg their respective price levels– as defined by the IMF. While the former meant less control over the country's monetary policy and its subsequent inability to resist shocks to the

TARGETING INFLATION					
Countries across the world have adopted inflation targeting irrespective of their income level.					
COUNTRY	INFLATION TARGETING ADOPTION DATE	TARGET INFLATION RATE AT TIME OF ADOPTION	COUNTRY	INFLATION TARGETING ADOPTION DATE	TARGET INFLATION RATE AT TIME OF ADOPTION
New Zealand	1990	1 – 3	Philippines	2002	4 +/- 1
Canada	1991	2 +/- 1	Guatemala	2005	5 +/- 1
United Kingdom	1992	2 (point target)	Indonesia	2005	5 +/- 1
Australia	1993	2 – 3	Romania	2005	3 +/- 1
Sweden	1993	2 (point target)	Serbia, Republic of	2006	4 – 8
Czech Republic	1997	3 +/- 1	Turkey	2006	5.5 +/- 2
Israel	1997	2 +/- 1	Armenia	2006	4.5 +/- 1.5
Poland	1998	2.5 +/- 1	Ghana	2007	8.5 +/- 2
Brazil	1999	4.5 +/- 2	Uruguay ¹	2007	3–7
Chile	1999	3 +/- 1	Albania	2009	3 +/- 1
Colombia	1999	2 – 4	Georgia	2009	3
South Africa	2000	3 – 6	Paraguay	2011	4.5
Thailand	2000	0.5 – 3	Uganda	2011	5
Hungary	2001	3 +/- 1	Dominican Republic	2012	3–5
Mexico	2001	3 +/- 1	Japan	2013	2
Iceland	2001	2.5 +/- 1.5	Moldova	2013	3.5–6.5
Korea, Republic of	2001	3 +/- 1	India	2015	2–6
Norway	2001	2.5 +/- 1	Kazakhstan	2015	4
Peru	2002	2 +/- 1	Russia	2015	4

Sources: Hammond 2011; Roger 2010; and IMF staff calculations.
Note: Countries are classified as inflation targeters based on the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) database.
¹Adoption date is based on the starting point when the interest rate became the main monetary policy instrument.

Figure 1 Source: IMF

economy, the feats achieved by monetary targeting remained inconsistent due to regular fluctuations in money demand.

Following this, many countries like New Zealand, Canada and United Kingdom chose to go for a system which would allow central banks to target inflation and thus hold considerable control over money supply and prevailing interest rates (IMF, RBNZ, BoC, BoE). The IMF, in its F&D section, iterated the key steps to be undertaken by any country to embark on its journey to efficient inflation target setting (IMF). These include establishing clear and concise quantitative targets as well as establishing credibility regarding inflation as a priority. Consequently, setting up of a forward-looking procedure coupled with the adoption of inflation forecasting techniques further strengthened the basis for IT introduction, which also had the comparative advantages of being easily understood and directly affecting essential variables like interest rates. Furthermore, the rationale behind the shift towards IT was also a reduction of time inconsistent lags in other models (Jha, 2008). For most developed countries the model has had profound effects characterised by robust inflation targets and uncompromised growth. According to Svensson (2006), adoption of IT has aided in attaining a dynamic internal decision process; systematic, consistent, transparent and accountable. Sarwat Jahan, Chief economist at the Asia Pacific Department of the IMF further hailed the birth of IT due to its ability to call for a flexible yet robust framework which held the capability to survive even the most major of international crises (IMF).

However, according to Svensson (2006), IT, although accepted globally, may not be a robust, one-kind-fits-all model. Every country faces individualistic concerns which may range from structural inefficiencies to inept transmission systems to shaky international positions.

Kirsanova et al. (2006) showed in great detail how IT may not be optimal at all for developing countries like India until transformed into a model with terms of trade and exchange rate considerations. There is thus scope for improvement; which can go on to encompass different priorities depending on each country's own situation. In the context of developing nations, it becomes increasingly necessary to limit the unintended consequences a tight inflation target could have on the economy. As an example, advanced economies like the United Kingdom, Japan, Sweden and Czech Republic linger around 1-2% while emerging economies like South Africa witnessed rates around 5-5.5%. Taking a look at historic data for India, even though the 1990s were periods of relative price stability, the same could not be said for financial stability (Jha(2008), RBI). Subject to structural changes, even the RBI acknowledged reservations regarding the introduction of a new monetary policy which focused explicitly on price levels. (RBI 2004)

In most of what have been named 'transition economies', Jha argues, susceptibility to volatilities in unemployment, output and interest rates added to the woes of insufficient confidence and inefficient financial markets can have drastic drawbacks. Serious consequences could also come from the capital account with large-scale changes in devaluation of the national currency (Jha, 2008).

Masson et al. (1997) emphasize the importance of infrastructural resilience to absorb public and private debt without hampering the independence of the Central Bank from government interference. Countries like Kenya, Chile and Thailand that have also sought to implement models initiated by their developed counterparts require similar structural support in order to lend a strong conducive environment for IT to flourish. Going beyond the situation of structure, Svensson (2006) further argues the significance of fostering transparency on account of the Central Bank, which can be achieved by regular publications of all internal targets and projections, including the desired direction it wished to take for its instrument-rate paths. This would not only complement effective policy implementation but also provide the public with the opportunity to scrutinise the performance of the bank as well as that of its Executive Board members; and thus believes Svensson argues that detailed explanations of such optimal targets can lead many countries to achieve substantial progress through IT. James Bullard, President and CEO of the Federal Reserve Bank of St. Louis emphasised the importance of the public's role even further, elaborating how modern economic theory argues that inflation expectations are a crucial feature of the process of Inflation Targeting (St. Louis Fed). Like those followed by Germany and Norway, perhaps the biggest test for any developing country attempting to get a great deal out of IT is maintaining credibility.

THE CLASSIC CASE OF NEW ZEALAND

New Zealand is almost synonymous with the concept of IT, ever since it adopted IT as a formal model in the year 1990. Following this New Zealand succeeded in effective control of its erratic inflation patterns without compromising its growth rates or its position in the international market. Furthermore, as Damien O'Connor, Minister of State for Trade and Export Growth

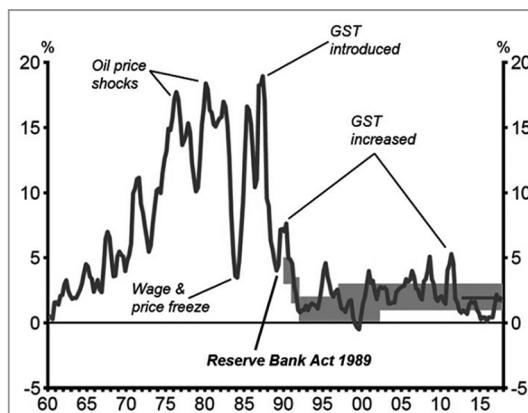


Figure 2 Source: RBNZ

put it, both these countries (India and New Zealand) face similar legal systems, comparative industry & demographic advantages and cultural backgrounds. New Zealand too, like India, began as a humble agrarian economy striving to improve its industry sector through technological progress. Setting such a precedent thus necessitates a more detailed understanding of the reasons behind the success of this model, and to lay down challenges and goals for a country like India vis-à-vis those faced by New Zealand.

‘The organising framework provided by Inflation Targeting has the wonderful advantage of clarity-of-purpose, with a close alignment of that purpose with what monetary policy can actually be expected to achieve over the long term’ (Archer (2000), RBNZ, IMF). The 1970-90 era was a period of great price instability and tightly regulated financial sectors, following which the need for an inflation control conducive to growth was realised (Kasa 2001). Consequently, in order to present

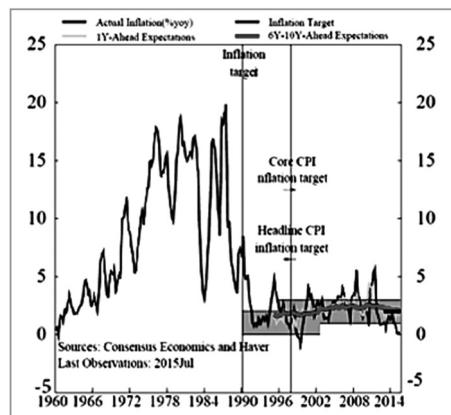


Figure 3 Source: RBNZ

such a policy shift as credible, four important factors were specified; operational independence; transparency; the single objective of price stability; and the Governor as sole decision maker, thereby making the RBNZ goal dependant but instrument independent (Kasa 2001). The need to avoid a restrictive target which hampers national growth made New Zealand focus on flexibility of the model ever since its inception, which was achieved through regular revision of the inflation target and systematic PTAs. ‘Its Reserve Bank has seen more changes to its target than most other inflation-targeting central banks, and the process of renegotiation also provides more opportunity for government direction than is the case in some other countries’ (Wadsworth, 2017). The Reserve Bank of New Zealand Act (RBNZ Act 1989) laid down a comprehensive institutional structure, outlining its top priority as price stability. Ingenious provisions such as the formation of Policy Targets Agreements (PTA) gave the Governor the power and subsequent accountability to introduce changes in monetary policy (RBNZ, 2000). Perhaps some of the biggest features which worked for the country were ‘a public sector reform had been driven from the perspective of resolving related problems’ which worked towards transparency for meeting its objectives supported by clean information and ‘persistently high interest rates’ related positively to the growth rate of potential output (RBNZ, IMF).

As seen in Figures 2 and 3, New Zealand faced immense price instability up until 1990. The fluctuations were mostly a result of supply side shock following which the authorities undertook a tighter policy, through both fiscal (introduction of a GST) and monetary (inclusion of price stability as a foremost agenda) changes. Consequently, it succeeded in toning down its price fluctuations by bringing the inflation rate down to a lower level, as desired.

The most striking feature of the RBNZ Act would be how the framework does not refer to Inflation Targeting but only agreements and measures which will be consistent with the national objective of price stability. As stated by David J. Archer, Assistant Governor of the Reserve Bank of New Zealand, 'The initial inflation target was not made on the basis of careful research. It was instead set simply as the best aiming point available' (RBNZ). The Central Bank changed its targets from 0-2% to 1-3% in order to accept wider fluctuations whilst nurturing credibility. Its flexible monetary policy was also centred on exchange rates and probable adjustments of policy instruments. Recent variations of the IT model have now been aiming at achieving transparency through more public announcements of national indicators.

THE CASE OF INDIA

The mandate of the Reserve Bank of India includes price stability citing it as a "necessary precondition for sustainable growth." (RBI) The RBI Act of 1934 was amended in May 2016 to provide a foundation for the implementation of the flexible Inflation Targeting framework.

Taking a look at Figure 4 below, India has seen considerable fluctuations in its inflation rates in its past. It was the era after 1997-98 which saw a rather increased focus on the trends of inflation in the country. Since 2000, India's trajectory can be broken down into three

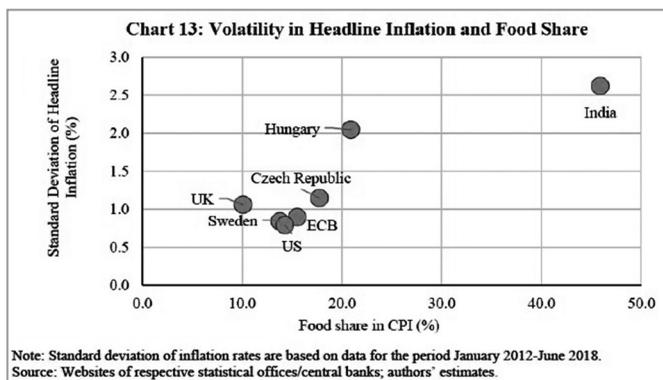


Figure 4 Source: RBI

broad phases, as per RBI analysis. Till 2008, the country saw moderate inflation and national growth which started soaring in the later part of the period. With capital inflows, administered prices and an overwhelming excess of liquidity with

banks to support an initial output gap, headline inflation remained well within its desired calculated range. The following 2008-2013 period saw a gloomy aftermath of the global financial crisis. Real agricultural wages declined, vegetables and pulses became scarce with respect to their demand and household consumption fell drastically. Government interventions, delayed monsoon, a liquidity crunch in the financial sector and highly fluctuating fuel prices affected a steep rise in annual inflation growth rates (RBI 2010). As a result, India faced far greater volatility in headline inflation as well as food share as compared to its peers, which made frequent large-scale fluctuations in inflation a problem (Figure 5).

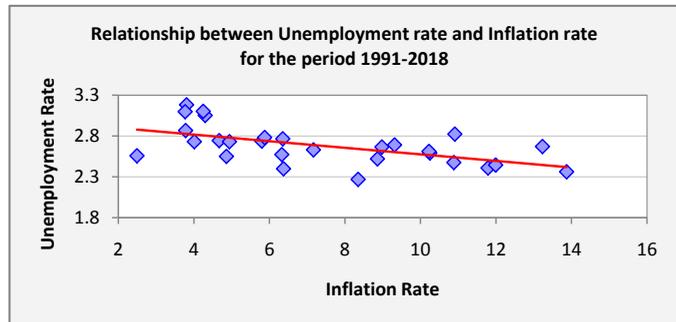


Figure 5 Source: RBI

It was during this time that the RBI set up the Expert Committee to revise and strengthen the Monetary Policy Framework, to report in 2014, realising the need to review the country's current framework and its ability to push through such crises. The submission of the report brought to national attention the urgency of a credible nominal anchor to help influence the scope of future monetary policy. One of the heroes of its policy recommendations was the adoption of a 'flexible Inflation Targeting structure' (RBI 2014). A tighter monetary policy and a stable exchange rate started creating impact nationally which could be felt through disinflationary pressures by December 2014 (RBI 2015-16). Reduction of inflation (with the CPI as the key indicator) remained a focus in the subsequent years as well, with core inflation reaching its targeted levels through constant cuts in the interest rates.

As is the norm, most developed countries set their target rates, on the basis of Personal Consumption Expenditure (PCE) as a measure of both final prices and the supply of businesses, around 2%. The target to be set becomes relatively tedious when dealing with developing countries, which are highly sensitive to destabilising consequences including but not limited to, exchange rate fluctuations, high unemployment rates and slowing output growth. The Reserve Bank of India Act (RBI Act, 1934) was amended to adopt IT as a formal model to control rising inflation rates, measured using All-India CPI-Combined published by the Central

Statistics Office (CSO). The model is in its first 5-year plan, which ends in 2021. Even in the Indian context, the RBI justified adoption of this system for a country like India as “enhancing the credibility and effectiveness of monetary policy, and particularly, the pursuit of the inflation targets that have been set.” It stated that a flexible IT (FIT) would allow the Central Bank of a foremost emerging economy to present ‘credibility in the government doing its part on the fiscal side and on supply constraints to reduce the burden on monetary policy in achieving price stability’ (RBI Monetary Report 2015). Similar to regulatory bodies created in New Zealand, Chapter IIIF introduced through the Finance Act of 2016 called for a detailed structure and role of a Monetary Policy Committee (MPC) which would act as the apex authority in national monetary policy making and undertake setting of the repo rate which is a key indicator of inflation and growth due to its effects on aggregate demand (RBI). After the repo rate is arrived at, the RBI operated now under a framework focusing on liquidity management through daily actions aimed at anchoring the Weighted Average Call Rate (WACR), its newly accepted operation target. Further, it was the RBI Notification dated 27 June 2016 which introduced a desirable bandwidth of accepted ongoing inflation rates, any values outside of which would be considered as ‘failure to achieve its target’.

Prior to this breakthrough amendment in May 2016, The Agreement on Monetary Policy Framework dealt with keeping the rates of inflation in check. Since the RBI did not follow an explicit inflation control strategy, ‘the public had no historical record from which to judge either the central bank’s commitment to the announced long-term inflation target or whether its actions to this end would prove effective’ (RBI 2015). Highly focused on open and transparent monetary policy making, the proceedings of the MPC along with the biannual Monetary Policy Report are published by the Central Bank in accordance with the provisions of Chapter IIIF of the RBI Act, 1934.

Up until 2015-16, a comprehensive monetary policy was carried out by a Technical Advisory Committee (TAC), an expert committee consisting of esteemed monetary economists, members of the RBI and senior managers in the fields of finance and commerce (RBI 2016). The years 2015-16 thus saw a major shift in RBI agenda, the birth of a core Quarterly Projection Model (QPM) for India, a designated focus on credibility and expectations, mitigating both supply and demand shocks and prompt policy responses (IMF 2018). Given the comparative advantages of IT as opposed to any other models that lived before it, there is no doubt that the model is key to the pursuit of a stronger economic future for

most countries. However, the adoption of IT in emerging economies requires caution as the Central Bank following a policy which targets inflation as the topmost priority might affect other macroeconomic factors like output growth and unemployment adversely. In that case, an important question to ask is this; Assuming India carries on with its adoption of Inflation Targeting even after its 5-year target, is a 4% target suitable or might just it need a possible revision?

CALCULATIONS:

(Data used for the period 1991-2018), $n=28$

Coefficient of Correlation: $r = \sum pu / (\sum p^2 \sum u^2)^{1/2}$

$$r = -11.6328 / 20.35276$$

$$r = -0.57156$$

Figure: India-Inflation and Inflation Expectations

Findings: Annual Inflation and unemployment rates have been sourced from The World Bank and The Economic Survey of India 2019-20 over a period of 1991-2018. In Figure 6, the units of both variables have been changed to scale in order to make the relationship between them more visible. The graph shows a predominantly negative relationship between the inflation rate (in percentage) and the annual unemployment rate (in percentage).

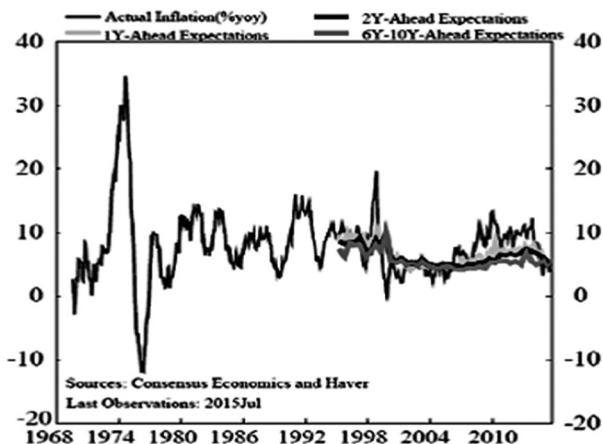


Figure 6: Author's calculations using secondary data

Observations: An inflation target rate of 4% can prove to be too low for a populous country like India with adverse impacts on its unemployment rate, which might be too tight a policy for India to consider at the moment, given its slowing economy. As backed by theory, the negative relationship proves a higher inflation rate prevailing in the economy can in fact be an effective stimulus to obtain lower unemployment.

KEY POINTS WITH RESPECT TO THE INDIAN CONTEXT

Jha (2008) argues how developing countries like India must not neglect economic growth while pushing for price stability. The country's aversion to high inflation can risk its medium-term dynamics without the achievements of high economic growth. As a consequence, only when it has achieved substantial real output growth and a simultaneous reduction in unemployment rates should it consider going for a revised monetary policy regime. Furthermore, it is important to note how developing countries like India tend to deficit finance for development spending much more than their developed counterparts and a tight inflation-oriented policy might prove to be a hurdle to growth.

India continues to be affected greatly by structural changes as well as its proclivity to fluctuate due to external variations (Raj 2019, RBI). Consequently, it has witnessed variability in CPI values over October-2017-2018. In general, the key areas of differences can be defined in terms of openness, policy credibility and financial fragility (World Bank, OECD national accounts data). Ball (1999) and Svensson (2000) showed how the direct relationship between inflation and interest rates (i.e. the Taylor Rule) must go on to include exchange rates as a measure of the openness of the IT model, keeping in mind heavy reliance of countries like India on international imports. Furthermore, time lags in monetary policy implementation (RBI, Ball (1999)) along with the Phillips curve trade-off between inflation and unemployment can result in a very tight wound IT set up which could hamper economic growth. In such cases, flexibility of the IT must take into account future shifts in 'monetary conditions' (World Bank, OECD report). After formation of the policy, ensuring its credibility requires trust in the financial and political set up of the country. As seen in stark contrast with New Zealand, India needs a robust public sector and equal emphasis on current issues like budget deficits and falling foreign reserves spiralling out of hand, coupled with an independent central monetary authority which focuses explicitly on improving transparency. Jha and Sharma (2004) further emphasised the need of sustainable public debt, controlled exchange rate volatility, addressing of supply side shocks and enhanced transmission mechanisms, if India aspired to achieve results similar to those achieved by its more advanced counterparts.

According to the official website of the RBI, 46% of the CPI basket in India consists of food, far more than most of its peers. Like India faced a 'weakness in its former policy regime: it did not provide a firm nominal anchor to prevent the pass-through of food price shocks to a generalized spiral of inflation' (RBI 2015),

volatility of food prices (through supply shock, government programmes creating distortions, structural changes) must be accounted for in all future models picked up from other countries.

As of today, India struggles with structural inadequacies. Transmission and transparency continue to be key areas of improvement (RBI). When dealing with issues like inflation which infiltrate every household, responses of the public become as essential as the formal procedure itself. Credibility then leads to the formation of rational expectations which are then incorporated into real wages and prices, that is these very expectations culminate into the target inflation rate being actually realised. 'There exists a weak link in the Indian policy transmission mechanism for any market-based monetary policy regime,' with a change of around 49 bps found for new loans even after a total change of 135 bps in interest rates recently (RBI 2015, 2019). Furthermore, the notification of the Gazette of India for June 2016 (RBI 2016) conveyed a rather fixed 4% target with a 2% tolerance level, leaving investors sceptical about the true flexibility mechanism of the policy. Adoption of a 'flexible inflation target'- with a dual mandate of securing a desired inflation target coupled with a stabilised real economy can help with accountability as well as more efficient forecast targeting (Svensson, 2006). Moreover, for developing countries it becomes important to note that a dynamic instrument rate may be more feasible and that IT in India can be broadened to arrive at a desirable instrument rate path as well (RBNZ, 2000, Svensson, 2006).

The year 2021 will present just how well IT as we know it today worked for India during its 5-year probation period. In 2018, the IMF reported that while the success of IT in the Indian context remains one of the most important policy adoptions to consider, it is a bit too early to say anything concrete as of today. Moreover, how the system holds ground in times of a supply shock (predominantly food and fuel) will prove to be a concrete test of the future scope of IT in India. Regardless, if 'IT 2.0' indeed moves towards becoming a reality, India will be ready.

CONCLUSION AND SCOPE FOR IMPROVEMENT

With the current slowdown and its related concerns (both cyclical and structural) shaping up, taking a look at India's adoption of Inflation Targeting as a model can hold the key towards sustained growth and the controlling unemployment rates in the country. It becomes necessary to note that Inflation Targeting reached India rather recently and as a consequence, there is not a wide range of data available (RBI). There is thus scope for further research into how IT adoption has worked out in the Indian context.

As a conclusion of this paper, it is sufficient to say that while arriving at a clear numerical estimate for a revised IT policy on the basis of this data is not possible, a 4% target can be a restricting and fixed Inflation Targeting policy. Furthermore, it is important to note one clear inference here, the coefficient of correlation does in no case imply causation, it merely indicates the direction for co-movement. The purpose of making use of the concept of correlation is not to offer strong recommendations given the country's recent adoption of IT. The value of r (-0.57156) indicates a significant negative relationship between inflation and unemployment rates in the Indian context for the period 1991-2018.

Going back to the New Zealand model, an economy which adopted IT in 1990 has consistently revised its desired target range over time. After more than a decade, its current estimate ranges from 0-3%. Using this figure as a benchmark, it may seem only apt that India, which followed the trend in 2016, considers probable leeway in setting its medium run inflation target above 4% or expands its interval to accommodate FIT. Going beyond the numbers as well, there is considerable evidence of the advantages of adopting IT for any country, provided it is coupled with adept infrastructure, sound efficiency and robust employment structures.

BIBLIOGRAPHY

1. Adrian et al. (2018), *Chapter 11. India: Stabilizing Inflation*, IMF
2. Albagli (2005), *"By How Much and Why Do Inflation Targeters Miss Their Targets?"* Santiago: Central Bank of Chile.
3. Amato et al. (2002), *"Communication and Monetary Policy"* Oxford Review of Economic Policy
4. Archer, D. (2004), *"Communication with the Public"*, Paper presented at the Czech National Bank conference "Practical Experience with Inflation Targeting," Prague, 13–14 May
5. Archer (2000), Assistant Governor, RBNZ, *Inflation targeting in New Zealand*, IMF publication
<https://www.rbnz.govt.nz/research-and-publications/speeches/2018/speech2018-04-12>
6. Balakrishna (1991), *"Pricing and inflation in India"*, Delhi: Oxford University Press
7. Ball (1999), *Policy Rules for Open Economies*, Monetary Policy Rules, University of Chicago Press

8. Barro, Robert J. *“Recent Developments in the Theory of Rules versus Discretion.”* Economic Journal, Supplement, (1985), pp. 23-37. <https://www.nber.org/papers/w1473.pdf>
9. Bean, C. (2003), *“Asset Prices, Financial Imbalances and Monetary Policy: Are Inflation Targets Enough?”*, BIS working paper 140, Basel, Switzerland: Bank for International Settlements.
10. Benes et al. (2016), *“Quarterly Projection Model for India: Key Elements and Properties”*, RBI Working Paper
11. Brennan and Buchanan (1981), *The American Economic Review*, Vol. 71, No.2
12. Buol, J., Vaughan, M. (2003) <https://www.stlouisfed.org/publications/regional-economist/january-2003/rules-vs-discretion-the-wrong-choice-could-open-the-floodgates#4>
13. Cabral et al. (2016), *“Inflation Targeting and Exchange Rate Volatility in Emerging Markets”*, Policy Research Working Paper; No. 7712, World Bank, Washington, DC
14. Callen, T., and D. Chang. (1999), *“Modelling and forecasting inflation in India”* IMF Working Paper WP/99/119, International Monetary Fund, Washington, D.C.
15. Cecchetti et al. (2001), *“Does Inflation Targeting Increase Output Volatility? An International Comparison of Policymakers’ Preferences and Outcomes.”* In *Monetary Policy: Rules and Transmission Mechanisms*, edited by N. Loayza and K. Schmidt-Hebbel, 247–74. Santiago: Central Bank of Chile.
16. Cecchetti et al. (2002), *“Central Bank Structure, Policy Efficiency, and Macroeconomic Performance: Exploring Empirical Relationships.”* Federal Reserve Bank of St. Louis Review
17. Christiano et al. (1999), *“Monetary policy shocks: What have we learned and to what end?”*, Handbook of macroeconomics (Vol. 1, pp.)
18. CSO (2014), Annual CPI Report
19. Daly (2019), *“Prospects for Inflation in a High Pressure Economy: Is the Phillips Curve Dead or is it just Hibernating?”*, U.S. Monetary Policy Forum, President and Chief Executive Officer, Federal Reserve Bank of San Francisco <https://www.frbsf.org/our-district/press/presidents-speeches/mary-c-daly/2019/>

february/prospects-for-inflation-in-a-high-pressure-economy-is-the-phillips-curve-dead-or-is-it-just-hibernating/

20. Evers (2018), *"Inflation, Liquidity and Innovation"*, Policy Research Working Paper; No. 8436, World Bank, Washington, DC, 29842 License: CC BY 3.0 IGO
21. FEC (2008), *Inquiry into the future monetary policy framework*, Report of the Finance and Expenditure Committee
22. Federal Reserve Bank of Saint Louis Review (2004), *"Inflation Targeting and Optimal Monetary Policy"*
23. Federal Reserve of San Francisco (2008), *"What is the relevance of the Phillips Curve to Modern Economies?"*

<https://www.frbsf.org/education/publications/doctor-econ/2008/march/phillips-curve-inflation/>
24. Fischer et al. (1994), *"Monetary Policy Credibility and Price Uncertainty: The New Zealand experience of Inflation Targeting"*, OECD Economic Studies No. 22
25. Glasner (2017) *"Rules Versus Discretion in Monetary Policy Historically Contemplated"*, Journal of Macroeconomics, Forthcoming. Available at SSRN: <https://ssrn.com/abstract=2973620>
26. Hammond (2011) *"State of the Art of Inflation Targeting."* Centre for Central Banking Studies Handbook—No. 29, London: Bank of England.
27. Hu, Y. (2004), *"Empirical investigations of inflation targeting"*, Institute of International Economics, mimeo
28. Jha (2008), *"Inflation targeting in India: issues and prospects"*, International Review of Applied Economics, 22:2, 259-270, DOI: 10.1080/02692170701880783
29. Kareem (1996), *Inflation Targeting In India*, Indian Economic Service
30. Kasa (2001), *Will Inflation Targeting work in Developing countries?*, frbsf.org, FRBSF Economic Letters
31. Kydland, F., & Prescott, E. (1977). Rules Rather than Discretion: The Inconsistency of Optimal Plans. Journal of Political Economy, 85(3), 473-491. Retrieved May 14, 2020, from www.jstor.org/stable/1830193

32. Leeper, E. M. et al. (1996), *“What does monetary policy do?”*, Brookings Papers on Economic Activity
33. Lomax, R. (2005), *“Inflation Targeting in Practice: Models, Forecasts and Hunches,”* Atlantic Economic Journal 33(3, September): 251–65
34. Meyer, L.H. (2004), *“Practical Problems and Obstacles to Inflation Targeting”* Federal Reserve Bank of Saint Louis Review 86(4): 151–60
35. Mishkin et al. (1997), *“Inflation Targeting: Lessons from Four Countries”*, Economic Policy Review 3(3): 9–110. Federal Reserve Bank of New York
36. Mishkin, F. S., and K. Schmidt-Hebbel (2002), *“One Decade of Inflation Targeting in the World: What Do We Know and What Do We Need to Know?”* In Inflation Targeting: Design, Performance, Challenges, Central Bank of Chile
37. Mishkin et al. (2007), *“Does Inflation Targeting Make A Difference”*, Working Paper 12876 National Bureau of Economic Research
38. Mishra, A., & Mishra, V. (2009), *“Preconditions for inflation targeting in an emerging economy: The case of India”*, DRU Working Paper No. DEVDP 09-08. Development, Research Unit, Monash University
39. Mohanty et al. (2004), *“Monetary policy rules in emerging economies: issues and evidence”*, Bank for International Settlements, Basel, Switzerland (BIS) Working Paper No. 149
40. Neumann (2002), *“Does Inflation Targeting Matter?”* Federal Reserve Bank of St. Louis Review
41. Rangarajan, C. (2001), *“Some critical issues in monetary policy”*, Economic and Political Weekly, 36(24), 2139–2146
42. Reserve Bank of India Act (1934)
43. RBI (2001), *Government’s Response to Monetary Policy Review*
44. RBI (2002), Reserve Bank of India Bulletin, Mumbai: RBI
45. Reserve Bank of India (2016), Monetary Policy Report
46. RBI (2019), Mint Street Memo No. 19
47. RBNZ (2007b), Supporting Paper A6: *“Supplementary Stabilisation Instruments Project and the Macroeconomic Policy Forum”*, supporting paper to the Finance and Expenditure Select Committee Inquiry into the Future Monetary

Policy Framework

48. Schaechter et al.(2000), *"Adopting Inflation Targeting: Practical Issues for Emerging Market Countries,"* IMF Occasional Paper No.202
49. Scott (2010), *"Inflation Targeting Turns 20."* Finance & Development. March: p(46–49)
50. Svensson (1997), *"Inflation targeting in an open economy: Strict or flexible inflation targeting?"*, Reserve Bank of New Zealand Discussion Paper
51. Svensson (1999), *"Inflation Targeting: Some Extensions"*, Scandinavian Journal of Economics 101(3): 337–61
52. Svensson, L.E.O. and N. Williams. (2005), *"Monetary Policy with Model Uncertainty: Distribution Forecast Targeting"*, Working paper, Princeton, N.J.: Princeton University
53. Svensson, Lars (2001), *"Independent Review of the Operation of Monetary Policy in New Zealand,"* Princeton University <http://www.princeton.edu/~svensson/NZ/RevNZMP.htm>
54. Taylor, J. B. (2017), *"Rules Versus Discretion: Assessing the Debate Over the Conduct of Monetary Policy"*, Federal Reserve Bank of Boston Conference on *"Are Rules Made to be Broken? Discretion and Monetary Policy"* https://web.stanford.edu/~johntayl/2017_pdfs/Rules_Versus_Discretion-Assessing_the_Debate-10-13-17.pdf
55. Truman, E. M. (2003), *"Inflation Targeting in the World Economy"*, Washington: Institute for International Economics.
56. Vega, M., and D. Winkelried (2005), *"Inflation Targeting and Inflation Behavior: A Successful Story?"*, Interest and Prices: Foundations of a Theory of Monetary Policy, Macroeconomics working paper 0502026, EconWPA, Princeton University Press.
57. World Economic Forum (2019), *"Inflation is healthy for the economy but too much can trigger a recession"*<https://www.weforum.org/agenda/2019/06/inflation-is-healthy-for-the-economy-but-too-much-can-trigger-a-recession-7d37501704>



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Delhi Metro Rail Corporation Ltd.: An Analysis of Financial Aspects and Fare Hike

Abstract

To understand the financial competence of the Mass Rapid Transport System, the paper analyses the past 10 years' financial statements of Delhi Metro and reviews the effectiveness of the fare hike of 2016.

Statistical methods and trend analysis have been employed to examine the profitability issues of operating the Metro Rail on PPP model and exploring different ways to increase the total revenue. The findings suggest that such infrastructure projects do not generate sufficient returns for the private players to attract their investment. Our findings indicate that the fare hike of 2016 was worthwhile in boosting the fare revenues however further raising the fares can severely affect the ridership. DMRC can expand its operations in the future through borrowings attributing to its lower debt equity ratio. Though DMRC has not been able to break even till now but it possesses the potential to augment its operating profits in the future.

Keywords: Funding Model, Fare-box and Non-fare-box revenues, Ridership, High Costs, Finance Cost, Metro Rail Policy

REVIEW OF LITERATURE

There are a number of studies that shed light on several aspects of the Mass Rapid Transport System worldwide. Analytical studies on Delhi metro evaluate its economic and environmental benefits, efficiency in operations, level of customer satisfaction, examining issues with PPP projects and management strategies for successful operation of the Metro system. Singh, N. and Ravi, R., (2018) wrote a paper titled "Riding on Debt: Financial Analysis of Delhi Metro after Phase III" focusing on the impact of debt on the financial performance of DMRC. Advani, M., & Tiwari, G. (2005) evaluated in detail the Delhi Metro Transport System in terms of its capacity, commuters perspective, travel time and accessibility.

An interesting study was conducted titled "Social Cost-Benefit analysis of Delhi Metro" by authors from the Institute of Economic growth, Delhi University Enclave that analysed the benefits and financial costs incurred by the introduction of the Mass Rapid Transport System. The paper extensively covers various aspects of the Metro system including the fare sensitivity of ridership, estimation of the daily trips by passengers, estimation of the financial flows and revenue, reduction in vehicles on road and fuel savings. Annual revenue, investment flows, operation and maintenance costs were the important parameters taken into consideration to conduct the research. The study estimated that the financial cost-benefit ratio of DMRC stands at "2.30 and 1.92 at 8 percent and 10 percent discount rates respectively" and the financial internal rate of return was estimated at 17 percent. It also concluded that "the shares of debt, equity and internal resource mobilization in investments made on Metro are 60, 30 and 10 percent, respectively"(M N Murty et al., 2006)

Murty and Goldar, (2006) conducted the evaluation of investment projects economically in a project sponsored by the Planning Commission. A study conducted by a civil servant, posted with the Planning Commission of Delhi analysed the reasons for the failure of the Public Private Partnership Model to develop the Delhi Airport Metro Express. It observed that India faces a lower rate in cancellation of infrastructure PPP projects as compared to the worldwide rate for developing countries. According to the World Bank database, "less than 10% of the 5,783 PPP projects in developing countries have been cancelled till now" whereas in India "only 6 of the 725 projects have been cancelled" which is less than 1%. This reflects the willingness of the state to continue with the service provision to escape payment liabilities on termination and to maintain public relations. (Kumar V Pratap, 2013)

A study was conducted to find out the level of satisfaction of the commuters for platform related services. The results obtained through Chi square test establish 5% level of significance, which endorses the idea of a “significant relationship between demographic variables and variables causing satisfaction of commuters for Platform services.” (Govind Nath Srivastava & Ranjan Upadhyaya, 2016)

Lather and Mohan, (2007) studied the relationship between the level of commitment and personal efficacy of associates of DMRC. Arora, S. (2019) evaluated the failing transit ridership of the Delhi Metro by examining various factors and concluded ‘Fare revision’ as the major factor. Kirti Bhandari, Hirokazu Kato & Yoshitsugu Hayashi (2011) studied the equity evaluation of Delhi Metro and concluded that Metro has led to a positive impact on mobility and accessibility.

OBJECTIVES OF STUDY

- To analyse the financial statements of DMRC and assess its financial soundness
- To calculate the yield generated by DMRC and check whether it can operate under the PPP Model
- To analyse the fare revision of 2016 and its impact on fare-box revenue and ridership
- To recommend measures to improve the operating profits of DMRC

INTRODUCTION

The Metro Rail System in India is not only a subsidised urban transportation system but also provides a host of social, environmental and economic benefits. The development of Metro Rail Transport in Delhi in the contemporary times has contributed majorly in addressing various issues, revolutionized the transport system and provided multiple benefits: controlling pollution, lessening traffic congestion, time and cost efficiency in routine travel and saving of fuel. Currently the DMRC boasts of a massive and well-connected network of around 389 Km with 285 stations, many of them equipped with roof top solar power plants (DMRC, n.d.).

The Delhi Metro Rail Corporation Limited was registered on 3rd May 1995 under the Companies Act, 1956 with equal equity contribution of the Central Government and the Government of National Capital Territory of Delhi (GNCTD).

It is an epitome of a world-class Mass Rapid Transport System (MRTS) completed before time and within budgeted cost. DMRC has been certified by the United Nations for contributing towards reducing global warming as it lessens pollution levels in the city by 6.3 lakh tons every year. It is also the first ever railway project in the world to claim carbon credits for regenerative braking (DMRC, n.d.).

The Metro Rail Policy 2017 approved by the Union Cabinet insists a shift from the current 'Financial Internal Rate of Return of 8%' to 'Economic Internal Rate of Return of 14%' "in line with global practices" (Press Information Bureau, 2017). The new policy requires the participation of private players in metro projects to be eligible to avail the central assistance and it also demands more commitment from the states to encourage public- private partnerships (PPP). This poses the question of attractiveness of such capital-intensive projects for the private investors for allocation of funds.

RESEARCH METHODOLOGY

The data used in this study has been collected from the Annual Audited Financial Statements of DMRC published by DMRC as available on the corporation's website. Other reports like the Sustainability Report and the Funding Report by DMRC have also been referred to for this academic study.

The data analysed of past ten years performance of DMRC has been worked out to produce charts and graphs. The techniques used to analyse the data and draw conclusions consist of the statistical and financial management tools such as simple average, ratio analysis, correlation, etc.

Other research methodologies employed in this research for financial analysis include the trend analysis (Time series) and regression analysis.

FINANCIAL ANALYSIS PARAMETERS

A. FUNDING MODEL

The Funding Model of DMRC is reflective of various sources of sustainable finance raised by the corporation to achieve its infrastructural goals. Understanding the funding of the corporation will enable us to know the stakeholders of the company and give an insight about its cost of capital.

Table-1: Cost and Funding Plan for Phase- I, II & III

Source of funds	Phase I	Phase II	Phase III ¹
JICA Loan	60%	54.47%	48.57%
GOI Equity	14%	16.39%	10.04%
GNCTD Equity	14%	16.39%	10.04%
Property Development	7%	5.59%	7.34%
Interest free subordinate debt towards land cost	5%	3.83%	-
Grant by HUDA	-	0.59%	-
Interest free subordinate debt for central taxes	-	2.73%	-
Land and Central tax	-	-	13.39%
Grant	-	-	10.62%
Total Completion Cost (₹ in crores)	10571	18783	41079

Source: <http://www.delhimetrorail.com/otherdocuments/funding.pdf>

The DMRC development has taken place in phases and each phase has been financed differently with contributions coming from the Government of Japan by way of a soft loan by the Japan International Cooperation Agency (JICA), the Central Government and the State Government as well as other loans and grants. The proportion of finance sources in the three phases is shown in Table 1. The Phase IV has also been initiated and the tenders have been floated for the year 2019-20.

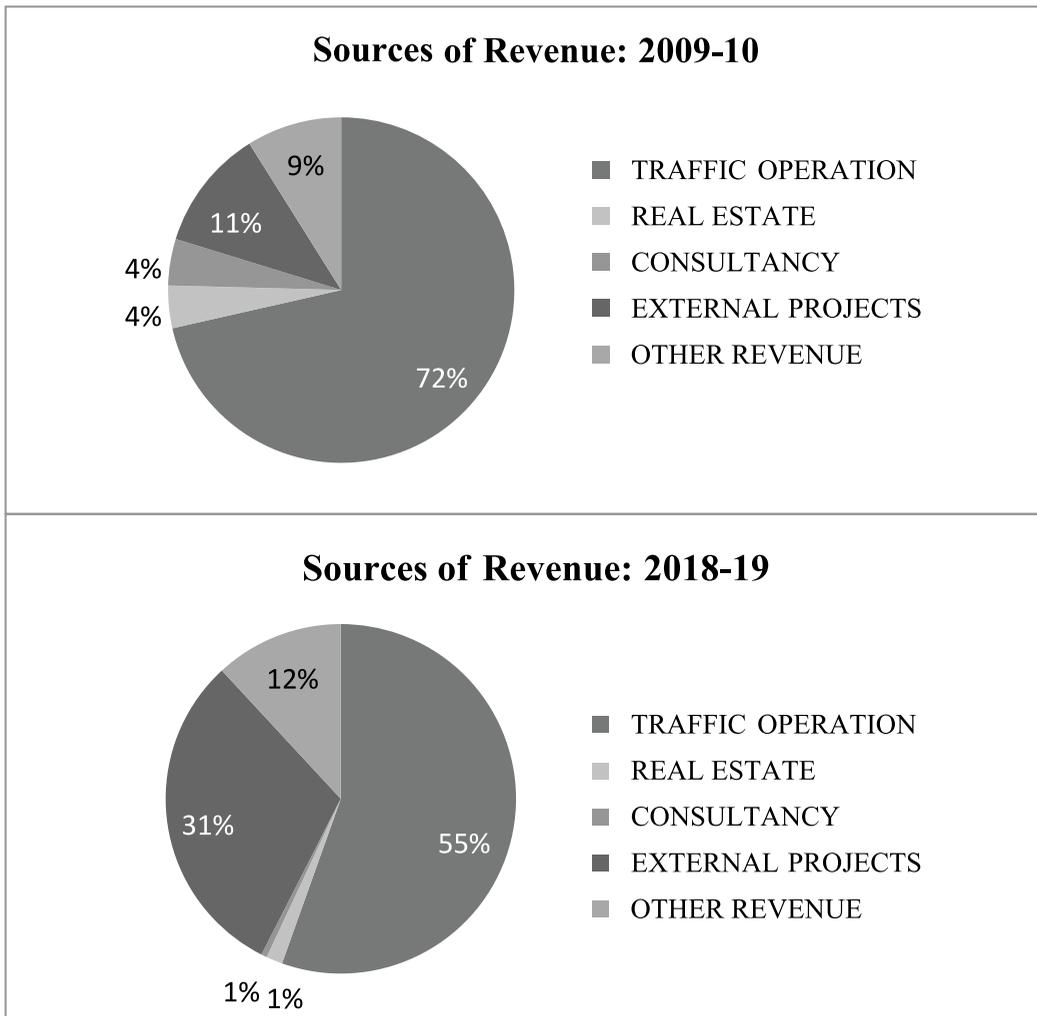
B. INCOME STATEMENT ITEMS

1. REVENUE

DMRC generates its revenue from different segments that can be classified as fare-box and non-fare box. Its principal business segments are revenue from Traffic Operations (Metro), Real Estate, Consultancy and External Projects. To increase revenue from all the sources, DMRC has taken all measures to widen its scope of operations and generate higher revenues. Since 2016, the fare has remained static and the focus is to boost ridership in augmenting fare-box revenue.

¹ Phase III figures are estimated costs taken from <http://www.delhimetrorail.com/otherdocuments/funding.pdf>

Figure-1: Sources of Revenue



Source: Data from DMRC Annual Reports, DMRC

The above two pie charts depict the share of different revenues sources in the respective years. It can be observed that the earnings from non-fare box sources particularly external projects and other revenue has increased in the past ten years. Other revenue of DMRC includes interest from bank deposits, income from sale of carbon credits, income from training and recruitment and most importantly advertisement revenues which it earns by allowing different companies to market their products on the walls of Metro Stations and Metro Coaches. Company's income from consultancy and from real estate has decreased

over the years. Hence this calls for more attention to these non-fare box sources in augmenting the total revenues.

TIME SERIES ANALYSIS

The Time series analysis is helpful to study the past behaviour of a variable under consideration. Here the two variables analysed are the Total Revenue and Total Expenditure of DMRC for the past ten years.

Table-2: Total Revenue and Total Expenditure

(in lakhs)

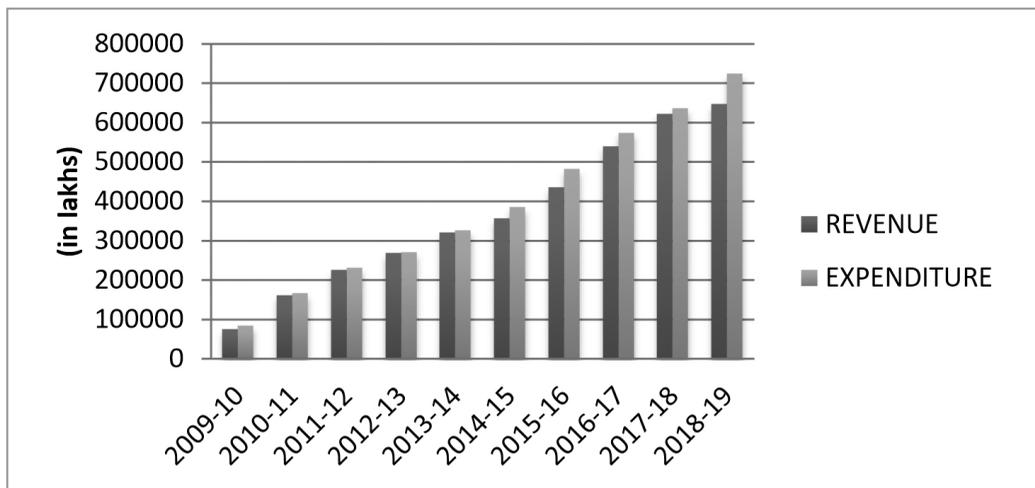
Year	TR	% Increase	TE	% Increase
2009-10	73786	1.86	82736	28.21
2010-11	160803	117.93	165489	100.02
2011-12	224777	39.78	230289	39.16
2012-13	268748	19.56	270232	17.34
2013-14	319802	19.00	325836	20.58
2014-15	356227	11.39	383783	17.78
2015-16	434425	21.95	481093	25.36
2016-17	538799	24.03	573614	19.23
2017-18	621105	15.28	635604	10.81
2018-19	646152	4.03	722584	13.68

Source: Data from DMRC Annual Reports, DMRC

As per the Table 2, DMRC has not been able to breakeven since past ten years as its total expenditures have always been greater than its revenues. The total revenue has shown an increasing trend in the past ten years and is growing at an average rate of 24.46% whereas cost is growing by 27.32%. The expenditures are on the higher side due to increasing costs like employee expenses, depreciation and finance cost. DMRC has cited rise in operating costs including more than 90% increase in electricity tariff². There was a tremendous increase in depreciation by 40.6% in the last year. As we can see from the Graph 2 the gap between total revenue and total expenditure has increased over the past years.

² Moushumi Das Gupta, May 08, 2017, Hindustan Times, <https://m.hindustantimes.com/delhi/delhi-metro-fares-set-to-go-up-thisweek-minimum-ticket-price-rs-10-and-maximum-rs-50/story-IH0wh4B136dp9ex9CGUYCM.html>

Figure-2: Gap between Revenue and Expenditure



Source: Data from DMRC Annual Reports, DMRC

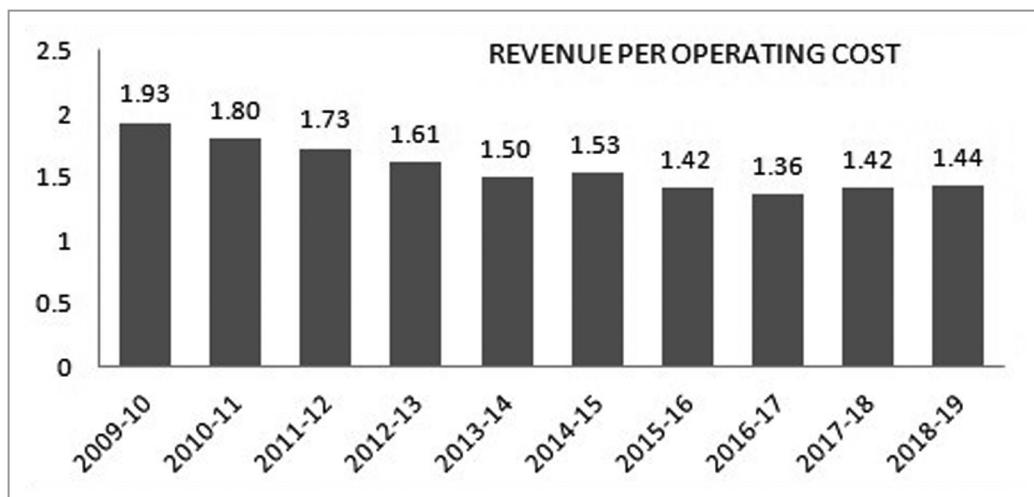
REVENUE PER OPERATING EXPENSES

The revenue per operating costs gives the value of the earnings of company by spending Rs.1. Higher the value of this ratio, the more is the efficiency of the operations.

The total commercial revenue has consistently grown over the past ten years however as seen in Graph 3, the revenue per operating cost had registered a declining trend in the initial period. The key reason for this was the static fares from the period 2009 to 2016 and the rising operating costs that were increasing at a high average rate of 28.4%. The reasons attributable to such rising operating costs relate to electricity cost, maintenance, administration, staff expenses etc.

In the recent years, revenue per operating cost is growing which indicates rise in total revenues. The reasons behind this increase are - fare revision in 2016, increase in revenues from non-fare box sources and decline in the rate of increasing operating costs which are now increasing at an average rate of 14.2%.

Figure-3: Revenue Earned per Operating Expenses³



Source: Data from DMRC Annual Reports, DMRC

2. EXPENDITURE

HIGH COSTS

The analysis of expenditures of DMRC reflects the presence of certain costs that wipe out major part of operating profits. These costs form part of high costs and have been analysed separately. High costs are those costs that form the major chunk of the total expenditures and are the major drivers for wiping out the profits of the company. In case of DMRC, operational expenses, employee benefit expenses and finance cost comprise major part of total expenditure. Hence, together they have been referred to as High Costs.

The high costs as percentage of total revenue and total expenditure have remained within the range of 55-67% in the past 10 years. This shows that with the rising revenues and expenditures over the years, the high costs have also increased proportionately. This calls for an urgent need to curb such expenditures in the pursuit of achieving the breakeven point.

³ Operating Expenses includes operational expenses, employee benefit expenses and other expenses

Table-3: Analysis of High Costs⁴

Year	High Costs	Total Revenue (TR)	Total Expenditure (TE)	HC/TR	HC/TE
2009-10	49772	73786	82735.59	67.45%	60.16%
2010-11	95814	160803	165489.37	59.58%	57.90%
2011-12	127414	224777	230288.54	56.68%	55.33%
2012-13	170296	268748	270231.94	63.37%	63.02%
2013-14	214130	319802	325835.97	66.96%	65.72%
2014-15	224409	356227	383782.85	63.00%	58.47%
2015-16	294614	434425	481093.21	67.82%	61.24%
2016-17	380242	538799	573613.98	70.57%	66.29%
2017-18	417973	621105	635603.57	67.30%	65.76%
2018-19	431275	646152	722584.49	66.75%	59.69%

Source: Data based on DMRC Annual Reports, DMRC

FINANCE COST ANALYSIS

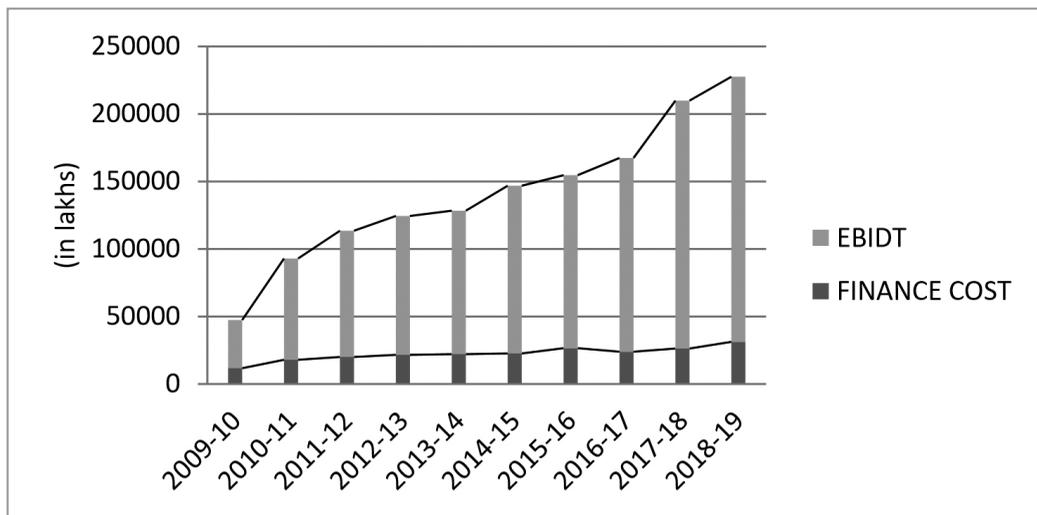
The DMRC operations have been financed in phases, majorly through external borrowings.

This led to the huge burden of repayment of principal with interests, though DMRC is charged at a nominal rate. The company has serviced the debt obligations timely and has planned to borrow more for the next phase. Such repayments have formed the part of finance cost which has remained in the same range in the recent years.

Due to rise in the operating profits, finance cost as a percentage of EBITDA has been declining since the past ten years. Finance cost includes interest payment and commitment charges to JICA, finance charges, interest on enhanced compensation on land and interest cost (Fair Value on Security Deposit /Retention Money).

⁴ High Cost includes operational expenses, employee benefit expenses and finance cost

Figure-4: Part of EBIDT Wiped Out by Finance Cost



Source: Data from DMRC Annual Reports, DMRC

C. RATIO ANALYSIS

RETURN ON INVESTMENT

Return on Investment is the ratio between operating profits and the cost of investment. A higher ROI indicates that the gains from the investment are favourable as compared to its cost and is used as a good parameter to evaluate the efficiency of the investment. Private players tend to invest their capital into projects that give higher ROI and are profitable in the long run.

Table 4 shows the Return on Investment that is miniscule and below 3% in the past ten years. The key reason for such performance is the low fares that leave a very meagre chance of recovery of capital investment. The big obstacle that the corporation faces is the ceiling on fares, which has to be maintained to keep them at a level that doesn't hamper the ridership.

The metro industry involves lot of high costs in terms of infrastructure and operations and hence the fixed capital investment is difficult to recover with low operating returns. Hence this makes DMRC not suitable to be operated under the PPP (Public- Private Partnership) Model as it would not be able to yield the required returns.

Table-4: Return on Investment**(in lakhs)**

Year	EBIDTA	Total Investment ⁵	ROI %
2009-10	35590.32	2526750.81	1.41
2010-11	75049.58	2917164.51	2.57
2011-12	93335.20	3245904.3	2.88
2012-13	102783.76	3621659.26	2.84
2013-14	106208.29	4107219.46	2.59
2014-15	123990.05	4623891.39	2.68
2015-16	128173.90	5505543.33	2.33
2016-17	143309.36	6077168.09	2.36
2017-18	183571.57	6542820.47	2.81
2018-19	196274.52	6885126.12	2.85

Source: Data from DMRC Annual Reports, DMRC

DEBT-EQUITY RATIO

The Debt to Equity⁶ (D/E) Ratio measures the relative proportion of debt and shareholder's equity used to finance the company's assets. It is the measure of degree to which a company finances its operation with debt as compared to the owner's equity.

Table-5: Debt Equity Ratio

Year	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Debt: Equity	1.36	1.27	1.23	1.15	1.18	1.16	1.15	1.32	1.43	1.5

Source: DMRC Annual Report (2018-19), DMRC

The debt equity ratio of the company has remained below the industry average over the years which indicates sound financial health of the company as well as its future fund-raising capabilities via debt financing. This also highlights that

⁵Total Investment = Net Worth of the company + Borrowings

⁶Debt to Equity (D/E) Ratio = Total Debt/ Equity

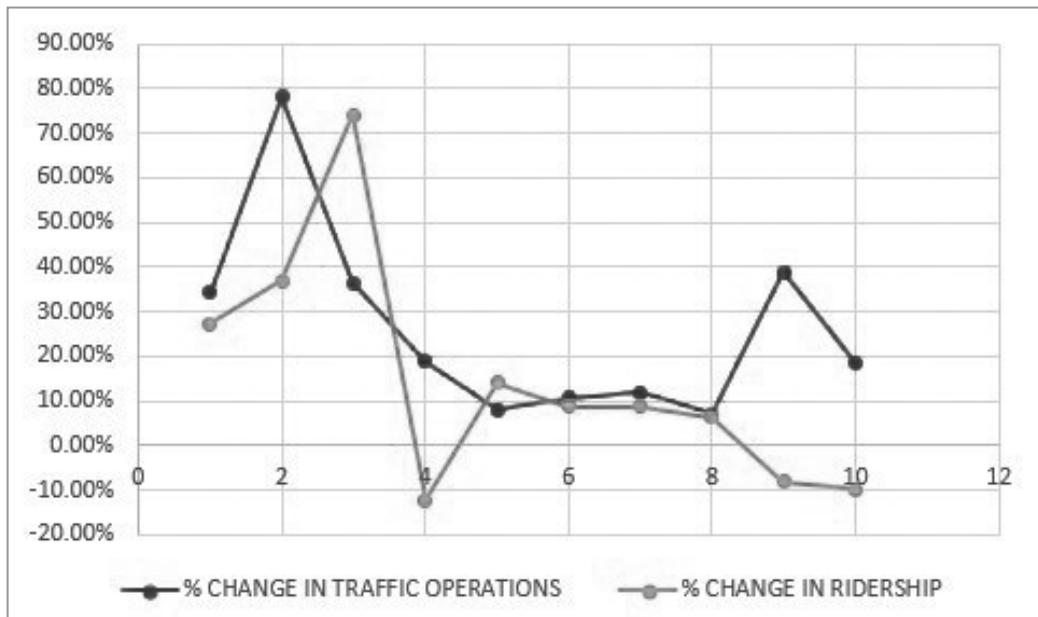
DMRC doesn't depend excessively on borrowed funds and is able to meet its financial obligations through other sources of funds as well.

CORRELATION BETWEEN RIDERSHIP & REVENUE FROM TRAFFIC OPERATIONS

The annual ridership impacts the revenue from traffic operations and hence it becomes essential to study the relationship between the two to arrive at meaningful conclusions. For the said analysis the percentage change in both the variables has been taken into consideration.

As per the Figure 5, annual ridership and revenue from traffic operations are positively correlated. Correlation worked out for the past ten years is 0.7 which reflects a strong relationship between the two variables. So a rise or fall in one variable leads to the change in the other variable in the same direction. But the analysis of recent years showcases a different trend.

Figure-5: Percentage Change in Ridership & Revenue from Traffic Operations



Source: Data from DMRC Annual Reports, DMRC and DMRC Sustainability Report, DMRC

As it can be inferred from above, since 2016 after the fare revision, though the ridership has declined but the revenues have still grown giving negative correlation of -0.988 for the last 3 years. To understand this phenomenon, the

time period between 8th and 10th year is divided into two phases: Phase I⁷ and Phase II⁸.

In Phase I, the years under study are 2016-17 and 2017-18. In this period immediately following the fare revision, the revenues witnessed an upsurge despite the percentage decline in the ridership. This can be attributable to the fact that though the ridership had fallen but the increased fares were sufficient enough to push up the total traffic revenues to a higher value.

In Phase II, the years under consideration are 2017-18 and 2018-19. In this phase after reaching the peak, DMRC witnesses a fall in the percentage of revenues with further fall in the ridership. This is due to the continued percentage decline in the ridership that severely impacted the fare box revenues at this stage.

Another reason that can be attributable for this trend is the extra discount offered to the riders. As per the notification, with a view to encourage ridership on Sundays and National Holidays (26th January, 15th August and 2nd October), DMRC approved special discounted fares⁹ in 2017. Also to avoid overcrowding during peak hours, an additional 10% discount can be availed by riders using Smart Card who exit from metro system during off peak hours.

Hence this analysis gives an insight regarding the change in fare- box revenues and ridership and their behaviour as impacted by the change in fare policy.

ANALYSING THE FARE REVISION OF 2016

What would have been the revenue from traffic operations had the fare revision not taken place?

DMRC adopted a new fare policy in 2016 which led to a fare hike and subsequently impacted the percentage increase in ridership. Had such fare revision not taken place and DMRC would have continued with the old fares, the values of fare box revenue and annual ridership would have been different. Through this analysis we aim to assess the success of this fare policy in terms of its impact on fare box revenue.

⁷ The period of 8-10 years has been divided into 2 parts to discuss the change in revenues and ridership in phases. Phase I is from the beginning to the mid period.

⁸ Phase II is from the mid to the end of the said period

⁹ Refer to the Appendix for the tables depicting fare charged by DMRC, DMRC Press Release: http://www.delhimetrorail.com/press_reldetails.aspx?id=jkOjxn1IG6Ylld

To do the comparative analysis of the impact of fare revision on the revenue from traffic operations and the ridership, the values of past years were taken in order to project the values for the year 2018-19. The actual figures from the year 2004-05 to 2014-15 have been taken under the analysis to extrapolate the figures. The projected values are computed below.

Table-6: Projected Revenue from Traffic Operations

(in lakhs)

Year	Average Ridership	Annual Ridership	Revenue from Traffic Operations	RTO/R* (₹)
2004-05	1.2	438	5350.51	12.2
2005-06	2.68	978.2	11328	11.6
2006-07	4.84	1766.6	22266.26	12.6
2007-08	6.25	2281.25	28338.32	12.4
2008-09	7.22	2635.3	39286.6	14.9
2009-10	9.19	3354.35	52720.12	15.7
2010-11	12.59	4595.35	93865.23	20.4
2011-12	16.6	6059	128157.32	21.2
2012-13	19.26	7029.9	152374.25	21.7
2013-14	21.92	8000.8	164539.74	20.6
2014-15	23.86	8708.9	182032.05	20.9
2018-19 ¹⁰	32.66	11920.27	325934.67	27.34

Source: Data from DMRC Annual Reports, DMRC and DMRC Sustainability Report, DMRC

**RTO/R stands for Revenue from Traffic Operations per Rider*

As it can be inferred from the Table 6, the extrapolated figures of daily revenue per rider for the year 2018-19 is 27.34 which is lower than the actual current value of 42.96¹¹. This is due to the higher value in the numerator and lower value in the denominator in the current case as compared to the projected values. The actual revenues are 9% higher than the projected while the ridership is 43%¹² less as compared to the projected values.

¹⁰ The figures for 2018-19 are projected values (see Appendix)

¹¹ The actual Revenue from Traffic Operations and Ridership for the year 2018-19 are ₹358279.63 and 8340.25 respectively. Hence the daily revenue per rider comes out to be 358279.63/8340.25 = ₹ 42.96

¹² Actual values have been taken as the base to arrive at this percentage

As far as the time value of money is concerned (which has not been taken into account in the analysis), the real value of old fares would have gone down and the metro would have become cheaper year by year had no revision in fare taken place. Also, this would have led to overcrowded metros necessitating for an increase in the seating capacity, adding to the total fixed costs.

Hence it can be concluded that had the fare revision of 2016 not taken place, the ridership would have been very high, but the revenues would have stayed below the current level. So, the fare revision was a good and a necessary measure to escalate the revenue base without severely impacting the ridership.

Table-7: Comparative Analysis

Data for 2018-19	Ridership (in lakh)	Revenue from Traffic Operations(₹ in lakh)	RTO/R (₹)
Actual	8340.25	358279.63	42.96
Projected	11920.27	325934.67	27.34

RECOMMENDATIONS

As per the analysis of the financial statements of DMRC and the results obtained from the various parameters, it seems very challenging for the company with the existing fare structure and high input costs to become self-sufficient. The company should focus on increasing its operating profits and pursue to breakeven. For this the following recommendations are proposed:

1. Augment revenue from non-fare box sources to push up the total revenue.

DMRC operates in four business segments namely Traffic Operations, Real Estate, Consultancy, and External Projects. The revenue from External Projects has witnessed a surge in the recent years due to new projects taken up by DMRC. It can further widen its scope by entering into contractual agreements with more organisations in different sectors as well as explore the possibilities of providing services globally and serving other underdeveloped economies. This can prove to be a major revenue generator in the future.

The Real Estate income primarily are the rentals from leasing. Not much information is available about the consultancy services offered by DMRC and it forms the least share of the total revenue. The Management should try to expand the scope of revenues from these services as they hold good potential for raising revenues.

2. Control the rising input costs and reduce the high cost component of the expenditures that wipe out profits.

As per the analysis of the total expenditures, operating expenses form the major part of expenditures and have been rising, which require to be checked. DMRC should lay emphasis on capitalising on private resources, expertise and entrepreneurship, as can be established from the Metro Rail Policy 2017 approved by the Central Government. The Policy says, "Private participation either for complete provision of metro rail or for some unbundled components (like Automatic Fare Collection, Operation & Maintenance of services etc.) will form an essential requirement for all metro rail projects seeking central financial assistance" (Press Information Bureau, 2017). Hence the management can work on outsourcing the aforementioned services and adopting suitable operating model for achieving efficiency and cost reduction.

3. Revenue by way of advertisement (Other Revenue source) holds loads of potential for revenue generation considering the popularity of metro as a means of transport and ample scope of Ad spaces to be given for this purpose. There is already a soaring demand for advertisements by private companies which can be profitably tapped by DMRC.

4. Enhancing corporate governance to achieve effectiveness in operations and reduce losses. For example, the delay in land acquisition poses problems for the expansion of metro and causes increase in operating and construction costs. Such inefficiencies can be checked to reduce such costs and bring more efficiency in operations.

CONCLUSION

The analysis and research on the financial data of DMRC brings out a bundle of observations regarding its financial position, stability and sustainability. The low Debt-Equity ratio of the company provides it the financial soundness to borrow more in the future for expanding its operations. DMRC has the scope of increasing its non-fare based revenues and by opting a suitable operating model it can lessen its operating expenses.

The analysis of the fare revision of 2016 leads to the conclusion that it was successful in augmenting the fare-box revenues and was a necessary measure to boost the operating profits. But increasing fares further is not a good option to expand the revenue from operations as that would deter people from using the metro and further lead to the reduction of the fare box revenues. Also, the fares

of DMRC cannot be kept more than double of the alternative modes of transport. Though the company has yielded very low returns in the past, but it has the potential to improve its position by pushing up its operating profits.

Studying the case of DMRC helped in understanding the Metro Rail Projects in general and what problems are being faced by them. The Metro Rail models in India lack the profitability factor to attract private investment in capital as they don't yield a return of more than 2-3%. Hence the future of Metro Rail development is through the Centre-State cooperation and soft loan funding by international organisations.

REFERENCES

Advani, M., & Tiwari, G. (2005). Evaluation of Public Transport Systems: Case study of Delhi Metro

<https://www.semanticscholar.org/paper/EVALUATION-OF-PUBLIC-TRANSPORT-SYSTEMS%3A-CASE-STUDY-Advani-Tiwari/edf85468b8be20d903251ee9b22badd9da2947b7>

Arora, S. (2019). Evaluating the failing transit ridership of the Delhi Metro.

https://www.researchgate.net/publication/334545477_Evaluating_the_failing_transit_ridership_of_the_Delhi_Metro

Delhi Metro Rail Corporation Ltd., (2009-10 to 2018-19) *Audited Annual Report*. Retrieved from: http://www.delhimetrorail.com/annual_report.aspx

Delhi Metro Rail Corporation Ltd., *Introduction*. Retrieved from:

http://www.delhimetrorail.com/about_us.aspx

Delhi Metro Rail Corporation Ltd., *Press Release*. Retrieved from: http://www.delhimetrorail.com/press_reldetails.aspx?id=jkOjxn1IG6Ylld

Delhi Metro Rail Corporation Ltd., (2015-16) *Sustainability Report*. Retrieved from: <http://www.delhimetrorail.com/otherdocuments/Sustainability-Report.pdf>

Delhi Metro Rail Corporation Ltd., *Website, Projects, Funding*. Retrieved from: <http://www.delhimetrorail.com/otherdocuments/funding.pdf>

Govind Nath Srivastava and Ranjan Upadhyaya (2016). *Measuring Platform Services of Delhi Metro: Commuter satisfaction*. <https://search.proquest.com/openview/121ede75932e13cb2b4ff15c3ca7386a/1.pdf?pq-origsite=gscholar&cbl=546310>

Kirti Bhandari, Hirokazu Kato & Yoshitsugu Hayashi (2011). *Economic and Equity Evaluation of Delhi Metro*. <https://www.tandfonline.com/doi/citedby/10.1080/12265934.2009.9693657?scroll=top&needAccess=true>

Kumar V Pratap (2013). *Delhi Airport Metro Fiasco: What Can Be Done to Redeem the Project?* *Economic and Political Weekly*, 48(49), 18-20. Retrieved from www.jstor.org/stable/24478367

Lather, A. S., & Mohan, S. (2007). A Comparative Study of Executive and Non-Executive Associates of Delhi Metro Rail Corporation for Their Level of Commitment and Personal Efficiency. *Vision*, 11(4), 13–20. <https://doi.org/10.1177/097226290701100402>

M N Murty, Kishore Kumar Dhavala, Meenakshi Ghosh and Rashmi Singh (2006) *Social Cost-Benefit Analysis of Delhi Metro*. <https://mpr.ub.uni-muenchen.de/1658/>

Murty, M. N. & B. N. Goldar (2006), *Economic Evaluation of Investment Projects*, Report of Project Sponsored by Planning Commission, Government of India.

Press Information Bureau- GOI (16-August-2017) *Metro Rail Policy 2017*.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1499815>

Singh, N., & Ravi, R. (2018). Riding on Debt: Financial Analysis of Delhi Metro after Phase III.

https://www.researchgate.net/publication/328094569_Riding_on_Debt_Financial_Analysis_of_Delhi_Metro_after_Phase_III

APPENDIX

1. Projected Revenues from Traffic Operations

- The figures of average daily ridership for the period 2004-05 to 2014-15 have been extracted from the Sustainability Report of DMRC released by DMRC. The figures of Revenue from Traffic Operations for the said period

have been taken from the audited Annual Reports of DMRC.

- The data extracted above has been used to work out the projected values of average daily ridership for the year 2018-19 using the regression model:

$$Y = mX + b$$

where, Y is the dependent variable (Average daily Ridership)

X is the independent variable (Years)

m is the slope of the line

b is the y intercept

- By multiplying the average daily ridership by 365, the annual ridership has been found out.
- The daily Revenue from Traffic Operations per Rider for the years 2004-05 to 2014-15 is found by the following calculation:

$$\frac{\text{Revenues from Traffic Operations}}{\text{Annual Ridership}} = \text{Daily Revenue per Rider}$$

The Regression model has been used again to project the revenues from traffic operations (RTO) per rider per day using

$$Y = mX + b$$

where, Y is the dependent variable (RTO/Rider/day)

X is the independent variable (Years)

- The Projected Annual Ridership is multiplied by the Projected Revenues from Traffic Operations per rider per day (RTO/Rider/day) to arrive at the projected revenue from traffic operations i.e.

$$\text{Projected RTO} = \text{Projected Annual Ridership} * \text{Projected RTO/Rider/day}$$

Revised fares of Delhi Metro (Press release by DMRC in 2017)

Existing Fares (All Days)				
Distance zones (KMs.)	Fare (Rs.)			
0-2	8.00			
2-4	10.00			
4-6	12.00			
6-9	15.00			
9-12	16.00			
12-15	18.00			
15-18	19.00			
18-21	21.00			
21-24	22.00			
24-27	23.00			
27-31	25.00			
31-35	27.00			
35-39	28.00			
39-44	29.00			
>44	30.00			

Revised Fares (Monday to Saturday)		
Distance zones (KMs.)	Phase I Fare (Rs.)	Phase II Fare (Rs.)
0-2	10.00	10.00
2-5	15.00	20.00
5-12	20.00	30.00
12-21	30.00	40.00
21-32	40.00	50.00
>32	50.00	60.00

Revised Fares for Sundays and National Holidays

Distance zone (Kms)	Phase-I Fare (Rs)	Phase-II Fare (Rs)
0-2	10	10
2-5	10	10
5-12	10	20
12-21	20	30
21-32	30	40
>32	40	50

Source: Press Release, DMRC Website

Financial Crisis and Macroeconomic Factors



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Abstract

This paper focuses on finding the relationship between the occurrence of Financial Crisis and certain macroeconomics factors like Financial Market performance, government revenue and expenditure and sector performance. The paper studies the performance of Stock Market from 2000 onwards and studies in details the Dot Com Crisis of 2001 and Financial Crisis of 2008 and compared the total debt that the US government had at the time of recessions and how it changed year by year. Comparison is done between the debt structure during 2000s and the 2018 onwards to find out the capability of the US government to handle another Economic Crisis in the same way it did during the Global Crisis of 2008 by buying the non-performing assets and how long will the Crisis last if it does happen.

The current Stock Market situation and companies' performance is analyzed to find whether there exists a bubble alongside studying the government spending, whether these expenditures are actually generating returns and whether it can sustain such increasing debt.

Keywords: Financial crisis, Macroeconomic factors, Stock market, Debt structure

OBJECTIVES OF RESEARCH STUDY

- To study the significance of the Global Financial Crisis on different sectors of the economy
- To find out whether stock market performance, bond market performance and government debt structure can help predict economic crisis
- To study the government debt structure and the ability of US Government to withstand another Financial Crisis

RESEARCH METHODOLOGY

- Collection of secondary data through online websites, stock market reviews, Dow Jones Charts, NASDAQ Charts etc.
- Used the official US Government Website for Bond market performance throughout the history.
- Analysis of Data – Compared the financial market performance with the overall economic condition prevailing in the respective year. We analyzed the bond market performance and US Expenditure simultaneously to the economy, credit and GDP growth. We studied the indexes closely and studied their behavior of these indexes in different economic situations.

INTRODUCTION

Financial crises, whether global or regional, are a recurring phenomenon. We learn from them to develop new administrative reforms and regulations for financial markets so as to reduce the chances of history being repeated. In an economic emergency, asset prices witness a lofty decline in value, corporates and households default on their financial obligations and financial institutions witness liquidity crunch. It is often witnessed that during such times investors panic and initiate a bank run during which investors convert their assets into cash or withdraw money from savings accounts because they are afraid of a steep decline in asset value if they continue in the financial institutions (Will Kenton, 2020). Financial markets have endured biggest disengagement following the real seismic importance and impact of the global financial crisis, under the influence of macroeconomic factors like Markets performance, government revenue and expenditure and sector performance.

Macroeconomic factors include factors like economic outputs, unemployment rates, inflation, etc. that impact an economy as whole, as opposed to selected

individuals or sectors. These pointers of performance are firmly and similarly checked by organizations, governments and consumers.

Recessions can be brought by monetary stuns (for example, a spike in oil prices), financial panics (which happened before the Great Recession), fast changes in financial expectations (“like the ‘animal spirits’ as described by John Maynard Keynes; the catalyst of dot-com bubble burst”), or a blend of these. Most firms suffer during a downturn, principally in light of the fact that demand and income falls and volatility and vulnerability about the future ascents.

History discloses to us that few commonly re-authorizing events and choices, as opposed to solitary impetus, will add to major financial market crises. In any case, excess levels of debt by the government are generally the core part of the issue. “The national debt level is a measurement of how much the government owes its creditors. Since the government almost always spends more than it takes in, the national debt continues to rise.” (William D. Lastrapes, 2019)

So, the financial markets and the government policies have to be studied in depth to analyze their impact on the economic performance, and establish a significant relationship between indicators of financial performance and debt structure and their impact on upcoming financial situation in an economy, basically US in this paper.

FINANCIAL MARKET REVIEW FROM YEAR 2000 ONWARDS

2000-2002

The NASDAQ stock market broke the 5,000-point barrier which was an indication of an optimistic thinking of investors. The year started with speculators filling a stock purchasing free for all, however it closes with a market that has been whipsawed and developing alerts that the nation could be very nearly a downturn. The NASDAQ index registered a 85.6 percent increment, the highest annual gain for a major market index in U.S. history. The Dow industrials witnessed a 25.2 percent gain in 1999, a record fifth year in a row that the blue-chip index registered a year-end double-digit gain. The S&P 500 had a 19.5 percent gain, a record fifth straight year that the index had a double digit year-end return (Bebar, 1999).

A record 203.9 billion shares changed hands on the New York Stock Exchange and a record 265.6 billion shares were traded on the NASDAQ.

NASDAQ composite fell by a whopping more than 50 percent from its March peak of 5,048 and established this as its worst performance since its inception in

the early 1970s as result of Dot Com crisis. The Dow Jones industrial average and the S&P 500 gave signs of a lower close, giving way to a negative region close in a decade for the three indexes because of the intensity of crisis. Microsoft, IBM and many other tech giants, grew wary of the demand of personal computers as it was not as promising as it was in the 1990s and the tech industry was existing as a bubble. When such news arrives volatility of stocks increase and investors enter the market deliberately and thus hiking stock prices and creating a bubble.

2003-2004

The index had an increment of 29.3 percent during 2003 after falls for three consecutive years in a row as the Fed was continuously decreasing interest rates to bring back the economy to the original state. After three years of tremendous and never seen before highs, both the VIX and VXN remained at a lower level in the last three-quarters of the year, at stable levels matching the consistency of late '90's bull market ("Stock Market Report- 2003 Review", 2004). Retail investors were reluctant in investing and had a pessimistic viewpoint about the materiality of the rally, a bullish indication. After a year of development and growth in the economy, only three of the ten economic sectors gave negative average annual returns over the past five years and the economy was indicating that stability might return. Even the presence of Iraq conflict did not affect the Market that much and the economy was stable with no signs of crisis.

The signs of stable economy were -

- The GDP rose to \$11.458 trillion in 2003 and \$12.214 trillion in 2004 from \$10.582 trillion in 2001 (Source: World Bank data on GDP of USA, 2018).
- The GDP growth rate was 2.861% in 2003-2004 as compared to 0.998% in 2001.
- The war in Iraq continued furiously, the Federal Reserve began raising short-term interest rates, oil prices reached a high of \$55 a barrel, the presidential election happened and the stock market went through a large portion of the year in the doldrums, yet the three main market indexes finished up for the year and achieved their pen ultimate level in the following three and a half year.

2005-2006

The index grew by 7.0 percent thought 2005. In December, the NYSE surpassed its bull market peak reached in 2000 and ended the month 1.2 percent above

the high (Stock Market Report – 2005 Review). GDP rose from \$12.214 in 2004 Trillion to \$13.037 Trillion in 2005. GDP growth rate was 3.513% (Source: World Bank data on GDP of USA, 2018).

2007-2008

The Fed was cutting interest rates and brought it down to 1.75% from 6.5% along the decade. People were taking loans and mortgaging was increasing and cheap availability of cash assisted investing and brought the Stock market back into stable zone. This situation of accessible credit and the forward movement of real estate prices made investments in higher yielding subprime mortgages mimicked the rush of gold. The Fed was continuously reducing interest rates, encouraged by the fact that inflation was at bay despite low interest rates. In June 2003, the Fed lowered interest rates to 1%, the lowest rate in 45 years. When October 2008 arrived, the Federal funds rate and the discount rate were already being reduced to 1% and 1.75%, respectively. February and March 2007 saw more than 25 filings for bankruptcy and this acted as a catalyst for forthcoming downfall.

2009-2010

“While most financial markets registered positive returns for a second straight year, investors had to go through a host of worrying news and pessimistic market expectations. Even eight months into the year, the S&P 500 Index was down 5.9%. But varied portfolio, long-term investors registered themselves with good positive market returns, as the S&P 500 ended with a 15.06% gain, with 10.76% of the gain coming in the fourth quarter (Grunden Financial Advisory, 2011). (Returns are in US dollars throughout this report.) Despite the pessimistic forecast of a double-dip recession, spiraling government debt and impending inflation, stocks performed well in USA and most other developed countries and across size and value factors. This shows the optimism investors had with regards to market and economy.

2011-2012

“The closing days of 2011 are a reminder of the sputtering U.S. economic recovery. It was also a year of market volatility, though it ended with stocks about even or up slightly. But if an investor had reinvested dividends the total return for 2011 would have been 2.11 percent” (Kim, 2012). Revenue across the S&P 500 companies showed an upward trend yet the market remained flat and uninspiring. This resulted in compression of PE ratios, valuation and other ratios in 2011. Monetary policy failed in reviving the economy and improving

the growth rate, and the testament to this is the failure of the Federal Reserve's "Quantitative Easing" measures to increase real money supply in the economy or in other words encourage borrowing. Like a light at the end of the tunnel of disruptions, 2012 finally gave investors what they were actually eager about. The year had slow and steady gains with volatility indexes low in number and the stock market made it out of years of worries and sometimes in unexpected ways. Nothing like this could have been possible If Fed had not kept the interest rates low in a bid to revive economy and stimulate investments in stocks and risky ventures. The housing rebound assisted in improving consumer confidence which again was a major reason for market strength. "Junk bonds, for example, began the year at somewhat inexpensive levels compared to their historic values, helping to explain their strong performance" (Zuckerman, 2012).

2013-2014

Turbulence: The financial markets experienced ups and downs in 2013 and a significant number of investors stuck to cash for stability and safety while others did the exact opposite and shifted their investments from the safer bonds to riskier junk bonds looking to cash in returns of a reviving economy. It was a big year for big stocks. The U.S. stock market followed an upward trend of 32% as measured by the S&P 500 Index and it came as a shock to everyone who was expecting a turning correction as the prices were rallying beyond the actual earnings. After all investors take of the economy and the companies is a deciding factor of its growth.

Opinions, valuations, forecasts regarding the overvaluation of companies (Bubble) started to come in and many reacted by sticking to cash especially the HNIs and ultra-riches. Nothing but the four crashes in the past decade were to blame for this reluctance.

The S&P 500's total return of 14% in 2014 was 40% higher than its 25-year average annual gain.

The stock market rose again in 2014. With such gains came in expensiveness in the American stocks (Russell 3000 Index) which were now valued at 143% of GDP – a year end figure only present during 1999.

The bond market, for instance, was not as optimistic like stock market because their prices tend to fall and yields rise in economic strengthening but in 2013 10-Year Treasury Yield fell from 3.03% to just 2.17%.

After 14 years, the S&P 500 finally, in late 2014, achieved new heights on an inflation-adjusted basis. Retail investors, after sitting on the sidelines after the financial crisis of 2008, entered the markets once again and benefitted from the gains of 2014. Households gained \$7 trillion of wealth in the past three years owing to the upward trend in the value of stocks. Experts and analysts were of the opinion that the market was sensibly valued, arguing that corporate earnings are actually in line with the prices of stocks which were valued at close to \$25 trillion, but this number was just over 40 percent higher than G.D.P. This same ratio was persistent throughout 1999 and maintained this level at the year end and eventually led to a market plummet.

2015-2016

After years of low rates, the Fed eventually raised the interest rates in mid-December for the first time since 2006. After years of near-zero rates to encourage corporate expenditure and economic revival, the Fed was confident enough to raise the rates in order to keep the inflation at bay. These global worries came to a head in August when the Chinese central bank shocked the world by devaluing the Yuan. By making the Chinese currency cheaper against other currencies, Chinese goods became even cheaper in the foreign market and that is exactly what the Central bankers were hoping. This devaluation was received as a distress call for a worrying Chinese economy and the market immediately reacted by a plummet. Between August 10th and August 25th, the S&P 500 dropped over 11%, and made its way to correction territory. However, markets didn't stay there; investors quickly regained optimism and the market picked up a positive momentum and S&P 500 went up by 9.5% by the end of the year. After a topsy-turvy 2016—at one point in February, the S&P 500 index fell 15%—investors relieved and rejoiced after the index's nearly 10% rebound by the end of the year. In 2016, the US market achieved new highs and stocks in a majority of developed and emerging market countries garnered the investors with positive returns. The year began with anxiety over China's stock market and economy, falling oil prices, a potential US recession, and negative interest rates in Japan. US markets started with negative returns and witness the worst start in the history of US. However, the markets rose steadily in mid-February through midyear. Investors also faced uncertainty from the Brexit vote in June and the US election in November. Even after everything US market had a good year. The S&P 500 Index brought in 11.96% total return and small cap stocks, indicated by the Russell 2000 Index, brought in 21.31%.

“Although the S&P 500 Index had a positive return in 2016, the year was not in the top half of the index’s historical annual returns. In 2016, equity market volatility, as measured by the CBOE Volatility Index (VIX), was below average. There were, however, several spikes because of the incorporation of news into prices every now and then. The high was reached in early February, and spikes occurred following the Brexit vote in June and again in November preceding the US election. Yield curves were generally upwardly sloped in many developed markets, indicating positive expected term premiums” (Ohanion, 2017).

2017-2018

S&P 500 witnessed a whopping 62 all-time highs in 2017 while 2018 had only 18 all-time highs. 2018 had in total 4 down months and they were all significant drops (-3.6%, -2.8%, -6.8% and -9.0%) while there was no such month in 2017. The annualized daily volatility of S&P 500 was 17.1% in 2018 which was significant which was almost triple the 2017 volatility, yet remained quite below the long-term historical average of roughly 19%. 2018 had a range of 580 points i.e. the difference between the high point and low point in 2018 was such. 2017 witnessed too much stability and steady gains that made 2018 equally unstable. “Things were a little too good in 2017 so when things headed south in 2018 people overreacted. 2018 - The Dow fell 5.6%. The S&P 500 was down 6.2% and the NASDAQ fell 4%. It was the worst year for stocks since 2008 and only the second year the Dow and S&P 500 fell in the past decade (Carlson, 2019).”

2018 WILL BE REMEMBERED FOR ITS EXTREME VOLATILITY.

Looking at the trends in stock market one can easily find out what is the status of economy at the time. Right now, in 2018-2019 the Technology sector is forming a bubble with companies reporting losses and a lot of companies are being overvalued to the extent of 50%. The conditions were the same as we saw in 2000-2002 when the Dot Com Industries were overvalued. It has been observed in the past that after a huge rally a downfall has been which happened in 2001, 2018. When there existed wars in Iraq, political tension rose but still the economy was in good shape as the Feds were cutting down interest rates and investors were optimistic about the market.

Due to such low interest rates, mortgage backed loans increased tremendously. But when the news of defaults started to fly in, the investors grew cautious and as a result the Index grew by 7.0 % in 2005-2006 as compared to 29.3% in the earlier year. Yield curves started to decline and signs of another recession were clearly evident as the bond market was failing. By the end of 2005 yield curve

inverted and it was reflected in the stock market as volatility increased to up to 18% in 2006 Quarter 2.

Figure 1: Difference Between 10- & 2-Year Treasury Bond (2005) (Source: US Department of Treasury)

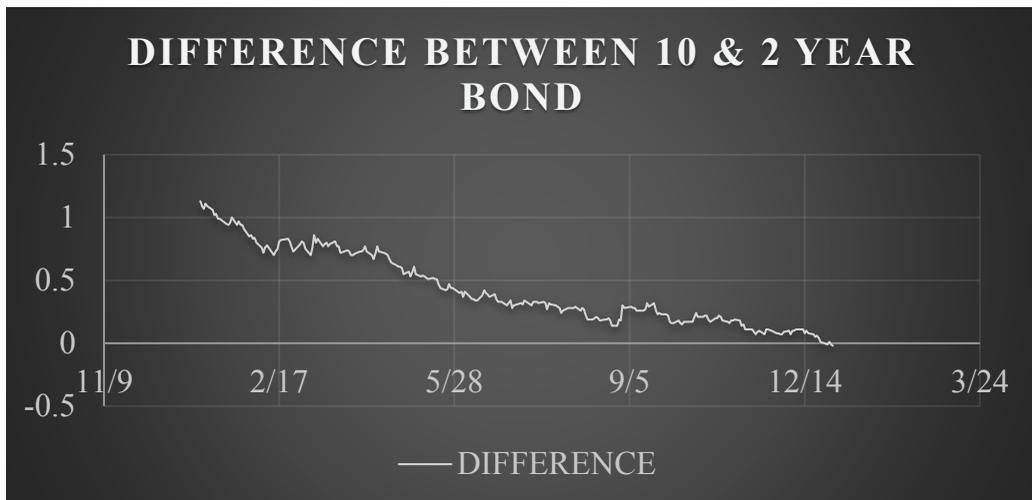


Figure 2: Difference Between 10- & 2-Year Treasury Bond (2006) (Source: US Department of Treasury)



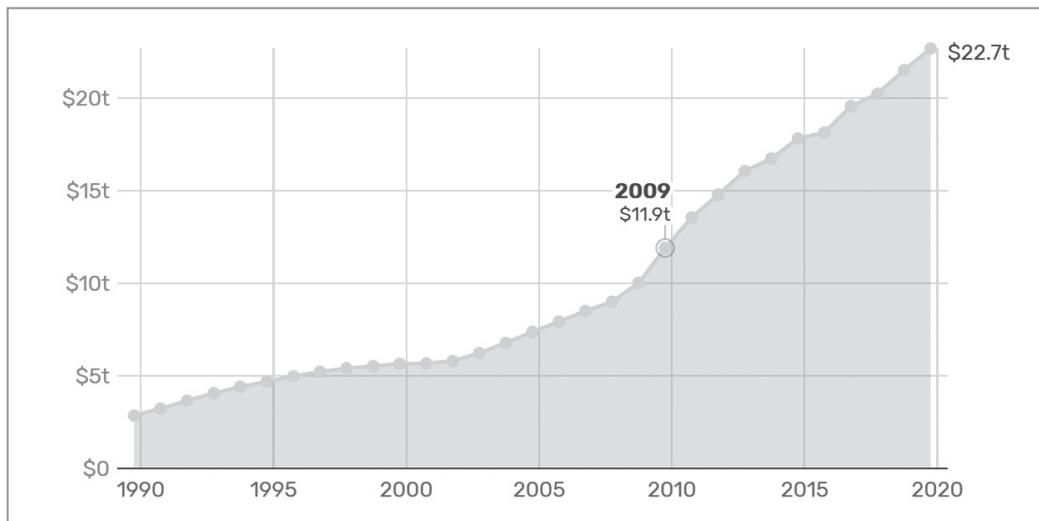
Just before the crisis hit in 2007-2008 the yield curve inverted which has in the past also predicted the crisis. After the crisis the government took up \$464

Billion worth NPAs and prevented the economy from getting worse. In the coming years the government kept the interest rates low and focused on getting the US economy out of the recession. The point to note here is that the USA Government was in a position to take up these NPAs as their debt wasn't too high and their revenues were strong in the years up to the crisis. The predictions were that the recession will go into double dips but that did not happen and investors were optimistic with regards to the Economy. Following years saw a good growth in the S&P Index with 2009-2010 recording a growth of 15% and 2011-2012 2.12%. These years saw ups and downs but ended with positive returns. 2012 was a good year. People's optimism was reflected in the performance of JUNK bonds as it was evident that they were optimistic of Fed's action of reducing the rates and reacted positively. In the following year i.e. 2013&2014 saw returns of 32% in 2013 and 14% in 2014. The prices were zooming ahead of earnings which might indicate a bubble but as this was just a beginning correction did not take place and individuals were optimistic still but were skeptical because of the past asset crashes. The Bond market saw a decline in interest rates and a rise in prices which shows that people were skeptical of another overvaluation and this could be shown from Valuation of Russell 3000 Index companies at \$25 Trillion which is 40% higher than the GDP mimicking the 1999 Stock market condition just before the crash. 2015 and 2016 were topsy-turvy and there were huge spikes and falls in the market following the increment in rates of the Fed. S&P 500 fell by 15% and then rose by 10% in the year 2015. 2016 started off at lower end but by the end of 2016 gave a return of 12%. The year saw Brexit, Chinese Economy slowdown and as a result was volatile in nature. Yield curves remained positive but Yuan depreciation came as a surprise to everyone. But then 2017 arrived and it was one of the best years for Stock markets ever. IPOs came in and were successful, tech companies were skyrocketing and their valuations were really high. I believe these valuations were over and above the actual performance of the firms as the arrival of 2018 saw occurring of huge losses to tech unicorns. 2018 was a big crash of Stock market after 2008 and the interesting part is that such same situation developed in 2001 (Overvaluation of Tech Stocks) and 2008 (Yield Curve going inverted). Tech unicorns are losing value faster than ever and are incurring huge losses. Billions of losses are piling up and investor money is being used up. Conditions right now are similar to those of 2000-2001 Dot Com Crisis and recession will happen sooner or later and Technology Sector crash would be the starting point. Alongside this, the effect of crude oil prices and Trade War is also visible on the US stock market.

SECTOR PERFORMANCE

From the findings, we can see that rising levels of government debt and changing patterns of revenue and spending are destined to impel US economy into another financial crisis and downturn. National debt obligations in the U.S. has expanded over 10%, since January 2017 as Donald Trump took Presidentship, with the obligation to GDP proportion advancing 110% in 2019. The debt passed a milestone of \$23 trillion in 2019 and as of January 2020, it exceeded \$23 trillion too. Debt levels have now increased to such an extent that US government is not in a position to take more even willingly (Source: Office of Management and Budget, 1929 to 2017).

Figure 3: US Debt Volume



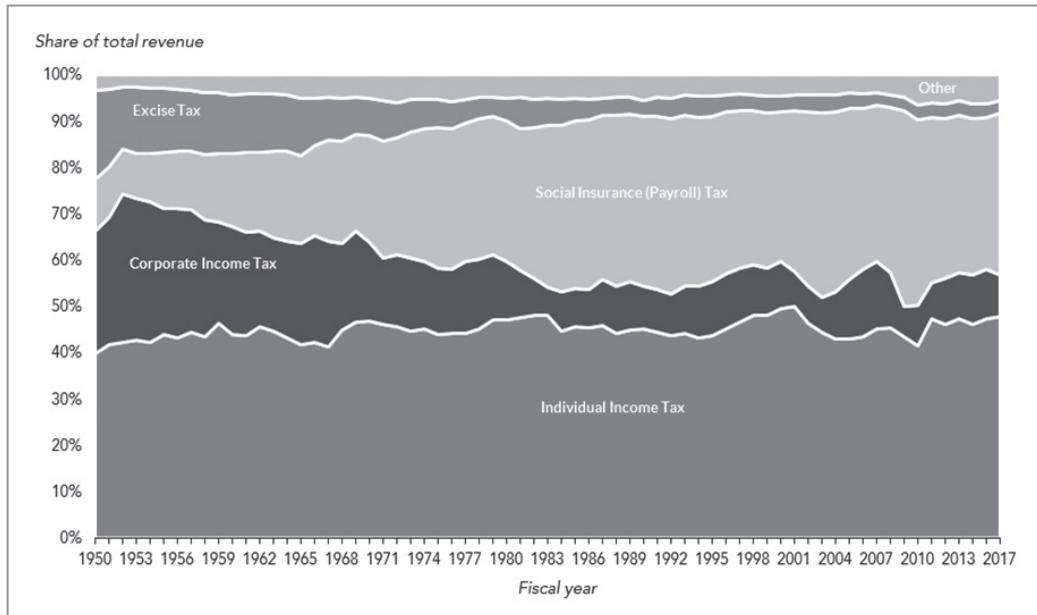
(Source: Office of Management and Budget, 1929 to 2017)

The increasing national obligation must be reduced through various mechanisms such as minimized spending, expanded tax assessment, debt restructuring, debt monetization, etc. But the administration is moving in the opposite direction, like decreased taxation and increased spending, with the debt usage losing a significant amount of support.

The US government is confronting Falling Revenues because of persisting Tax Cuts (which were introduced during George W. Bush's president ship) that keep on adding to the weight. "**Tax Cuts and Jobs Act (2017)**" as enacted by president Trump escalated the influence as it cut both individual and corporate taxes. The three fundamental sources of federal tax revenue are: income taxes, corporate

income taxes (both of which are low because of “Tax Cuts and Jobs Act, 2017”) and payroll taxes (or social insurance tax, that fund Social Security and the hospital insurance portion of Medicare).

Figure 4: Source of Federal Revenue (1950-2017)



Source: Office of Management and Budget, 1929 to 2017

Government managed “**Social Security Program** and Disability Pensions” are fundamentally giving budgetary security to the resigned and handicapped. Payments collected from workers are used for immediate benefits and thus this allocation of funds doesn’t generate any kind of revenue.

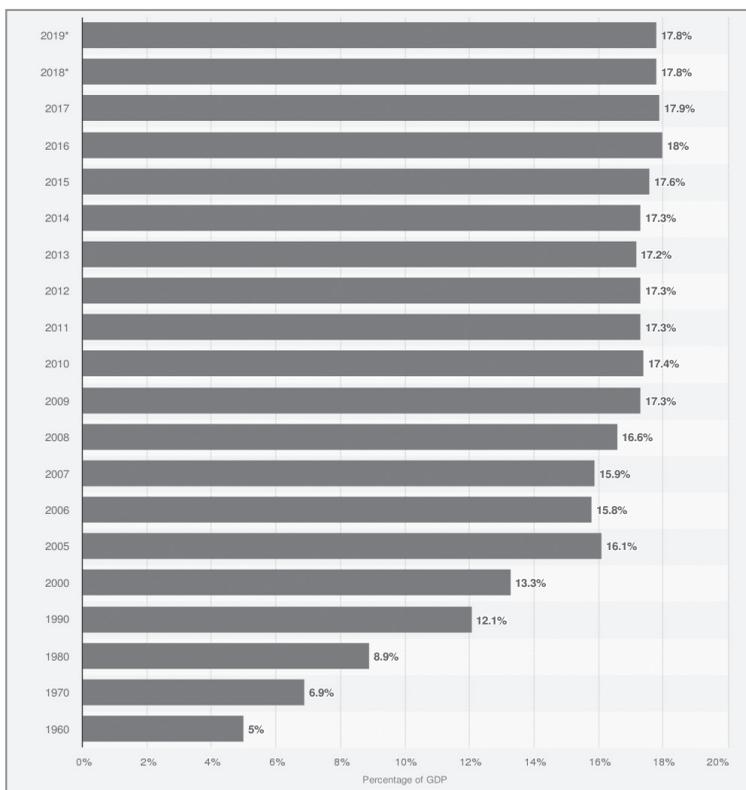
The “**Social Security Trust Fund**” took in more income than it required through Payroll charges. Instead of investing the money available into the people when they retire, the funds were credited to the administration to back its expanded spending. This premium free credit helped keep Treasury security loan costs low, permitting more obligation financing. Then amount to retirees has to be reimbursed through increased taxes.

Other than this, the expenses of the US government on **Healthcare Programs** are increasing drastically. The Health sector in US is currently booming. Increasing population, especially in high age groups, is expanding the interest for medical laborers, clinical advancements and upgrades are expanding the availability

of occupations and Federal health care insurance has expanded the scope of people looking for routine clinical consideration. Additionally, investors’ interest in healthcare and biotech stocks continues rising. But on the other hand, it has the highest health costs per capita worldwide, and is costly and inefficient. At present, its expenses and incomes are generally equivalent; however costs are developing all the more rapidly.

Funds in “Medicare Part A” (**Health Insurance**) are channelized through the “Hospital Insurance (HI) Trust Fund”, which is sourced through payroll tax (2.9%). CBO projects the Trust amount will be exhausted by 2026 and the trustees of the Medicare venture its dissolution by 2029. Inability to address expenses would mean a 10-15% benefit cut, as benefits are limited to trust fund revenue, which will further increase the government’s obligation to borrow more and contribute to the untenable rise in levels of the federal obligation (Source: Congressional Budget Office)

Figure 5: US National Health Expenditure, as % of GDP (1960- 2019)



Source: Matej Mikulic, Aug 9, 2019

After social security, **Military Expenditure** is the second biggest thing in the financial budget of the government. US spending on defense is more than that of other top nine nations combined. It's expenditure in 2018 was \$890.8 billion, \$956.5 billion in 2019 and projected to be \$989.0 billion in 2020. Thus, the US Defense Budget Expenses are increasing continuously without adding any revenue. The increasing debt and falling revenues will not enable the US government to undertake the same recovery measures that it took in 2008 Financial Crisis. The main expenditure of the government goes into the health care, social security schemes and the defense whose returns are very low as compared to the costs. Thus, it's not able to maintain its expenditure and the debt obligations because its expenditures are non-returning. Therefore, if we get another recession, that will be a more prolonged one than before and US won't be able to recover from it as it had before (Source: EResearch Fidelity).

Another important player in the US economy is the **Technology sector**. Work opportunities among Information Technology are anticipated to increase to 13% by 2026, quicker than that of all other occupations. It has a powerful history of development and constriction. The principal high-development period was the "Dot-com bubble" that lasted from 1990 to 2000. National employment in tech sector shot up by 36% and average weekly wages rose by 102%. In early 2001, the bubble busted and employment in this division fell quickly. "By the time it bottomed out in 2004, the sector's workforce had shrunk by 17.8%. From 2004 to 2008, the tech sector experienced modest job growth, in step with the rest of the private sector. But in 2009, it suffered a major contraction, which was tied to the financial crisis and subsequent recession. After the Great Recession (2007-09) ended, it experienced robust expansion in employment and moderate growth in wages. From 2010 to 2015, jobs in the sector expanded by 20.3%, compared with just 11.1% growth in employment for the private sector" (Source: EResearch Fidelity).

Stepping a bit away from the sectors' performance to the international economic issues, we see that President Trump's involvement in "**Trade war**" with China and different nations has expanded vulnerability for businesses and their decision dynamics. Spending on investments by the corporates is mellowing, regardless of the large "Tax Cut" that president Trump claimed would help it. The contention has made it problematic for firms worldwide, particularly China and other Asian economies to plan their operations, so companies do not know that for how long these tariffs will be proceeding with cost of doing business altogether. The exchange wars and shaky worldwide monetary tact cause fluctuations in

businesses. These prompt further tumbles in business sectors and occupation misfortunes, provoking American buyers to turn out to be increasingly wary. Large corporate obligations make a rush of liquidations. Furthermore, national bank strategy demonstrates feeble, along with fiscal approach that is non-existent.

CONCLUSION

After studying the financial markets and the effect of government policies on economic performance, the results indicate a significant relationship between indicators of financial performance and debt structure and their impact on upcoming financial situation in US, heading towards another financial crisis. The conclusion is that high levels of worldwide obligations by the government, trade wars, financial situation, etc. are destined to push US economy into another global recession. With the debt levels in present scenario, policy makers in advanced nations are not in a position to give sufficient fiscal or monetary policy improvement in case of another worldwide recession and financial crisis.

The lack of investment sends the sign of economic downturn and the investors showcase their sentiments through stock markets. A stock market performance over the year can help predict the coming recession. Bond market works parallel to the stock market and both when studied carefully by analyzing debt structure of US Government and Industry performance will assist in predicting the next crisis and up to some extent predict the source of recession too.

REFERENCES

Alexandra Twin (August, 2007) - *Dow makes stunning comeback* https://money.cnn.com/2007/08/16/markets/markets_1200/index.htm

Bill Chappel (February, 2019) - *U.S. National Debt Hits Record \$22 Trillion* - Retrieved from - <https://www.npr.org/2019/02/13/694199256/u-s-national-debt-hits-22-trillion-a-new-record-thats-predicted-to-fall>

Chris Isidore, CNN Business (December, 2018) – *2018 Was the worst stock in 10 Years* - Retrieved from - <https://edition.cnn.com/2018/12/31/investing/dow-stock-market-today>

Congressional Budget Office – Retrieved from - <https://www.cbo.gov/>

EReasearch Fidelity- Sectors & Industries Performance – Retrieved from - https://ereasearch.fidelity.com/ereasearch/markets_sectors/sectors/si_performance.jhtml?tab=siperformance

Gregory Zuckerman (December, 2012) - *A Really Good Year—Wins and Losses of 2012* – Retrieved from - <https://www.wsj.com/articles/SB10001424127887323984704578203593473607014>

Grunden Financial Advisory (January, 2011) - *2010 Review: Economy & Markets* – Retrieved from - <https://www.grunden.com/blog/2010-review-economy-markets>

Independent UK (December, 2007) - *Review of 2007: A year that began with euphoria and ended with the spectre of recession* – Retrieved from – <https://www.independent.co.uk/news/business/analysis-and-features/review-of-2007-a-year-that-began-with-euphoria-and-ended-with-the-spectre-of-recession-766845.html>

Jake Ulick (December, 2001) - *Wall St.: From bad to worse* – Retrieved from - https://money.cnn.com/2001/12/17/markets/markets_review/index.htm

Jim Zarroli (August, 2019). Retrieved from - *Is The U.S. Economy Strong Enough To Withstand Another Slowdown Or Recession?* : NPR

Jonathan Fuerbringer (January, 2005) - *Late Stock Market Rally Makes 2004 a Winning Year* – Retrieved from - <https://www.nytimes.com/2005/01/01/business/late-stock-market-rally-makes-2004-a-winning-year.html>

Martha Slud (December, 2000) - *Wall Street's wild year* – Retrieved from - <https://money.cnn.com/2000/12/22/markets/overview/index.htm>

Matej Mikulic (Aug 9, 2019) - *U.S. health expenditure as percent of GDP 1960-2019* – Retrieved from – <https://www.statista.com/statistics/184968/us-health-expenditure-as-percent-of-gdp-since-1960/#:~:text=U.S.%20health%20expenditure%20as%20percent%20of%20GDP%201960%2D2019&text=Recent%20figures%20tell%20us%20that,regards%20to%20GDP%20will%20stagnate.>

Micheal Schuyler (February, 2019) - *A Short History of Government Taxing and Spending in the United States* – Retrieved from - <https://taxfoundation.org/short-history-government-taxing-and-spending-united-states/>

Murse, Tom (11 February, 2020) - *History of the US Federal Budget Deficit* - Retrieved from- <https://www.thoughtco.com/history-of-us-federal-budget-deficit-3321439>

Office of Management and Budget, 1929 to 2017 – Retrieved from - <https://www.whitehouse.gov/omb/historical-tables/>

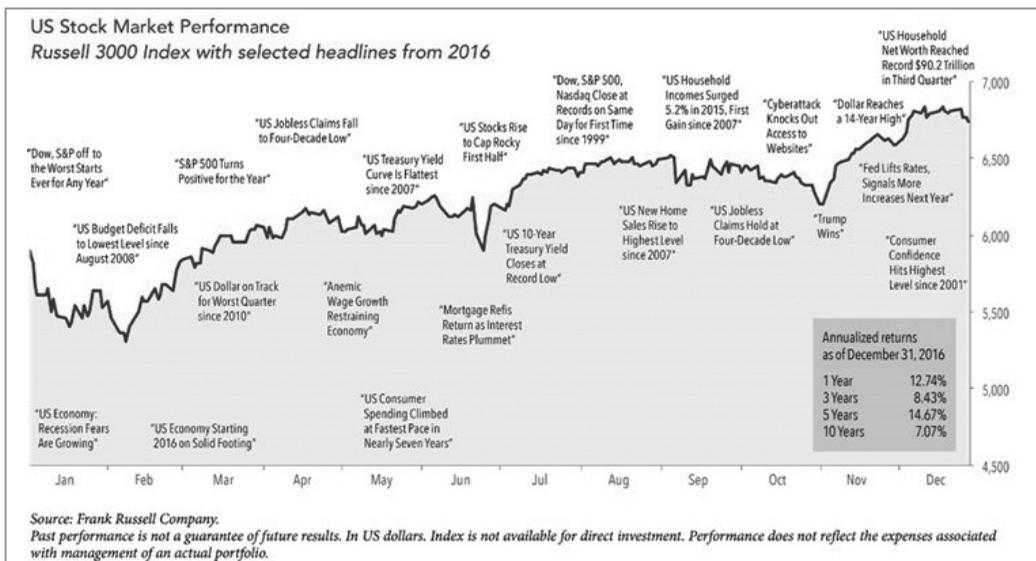
Seeking Alpha (December, 2009) - *Our December 2009 Stock Market Review* – Retrieved from - <https://seekingalpha.com/article/182899-our-december-2009-stock-market-review>

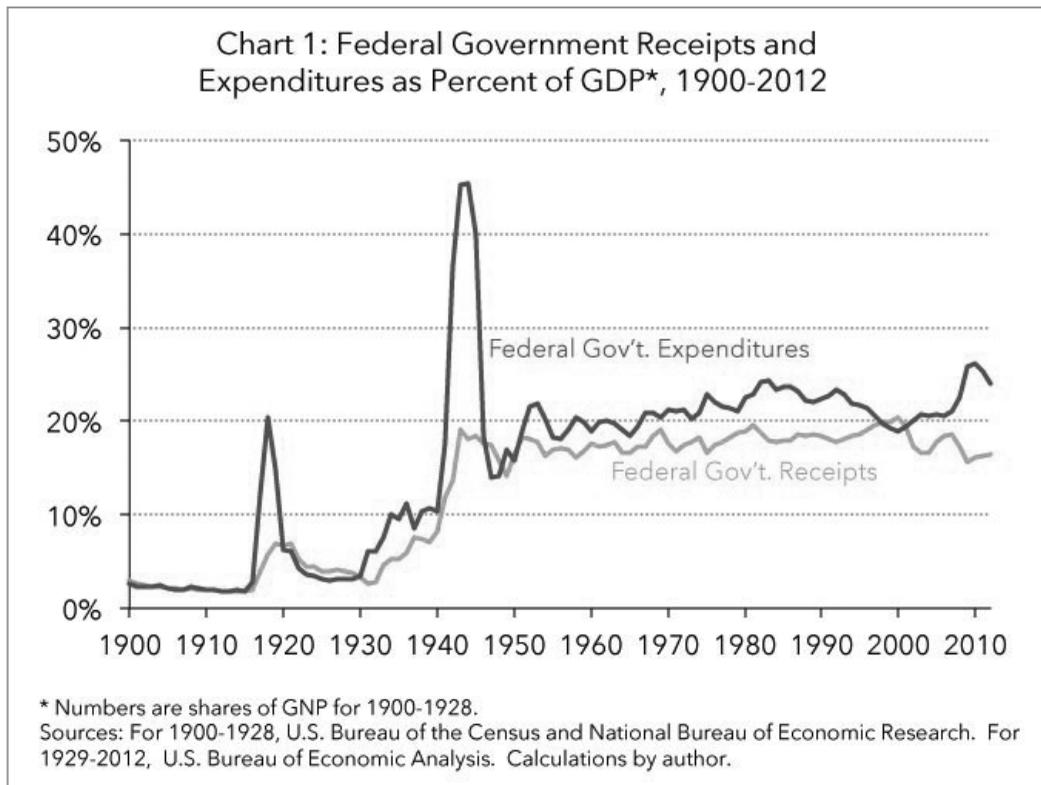
Stock Market Review of 2005 by Reserve Bank of Boston (January, 2006) - *Stock Market Report - 2005 Review* – Retrieved from- https://www.google.com/l?sa=t&rct=j&q=&esrc=s&source=web&cd=12&cad=rja&uact=8&ved=2ahUKewiZz_uDupnnAhXEWisKHaumDXsQFjALegQlAxAB&url=https%3A%2F%2Fwww.bostonfed.org%2F-%2Fmedia%2FDocuments%2Fstock-market-report%2FSMRye2005.pdf&usq=AOvVaw0qtEQHkF_Th3O-Y7SACqbu

Susanna Kim (January, 2012) - *7 Moments That Moved the Financial Markets in 2011* – Retrieved from - <https://abcnews.go.com/Business/2011-review-financial-marketes/story?id=15260533>

APPENDIX

Figure 6: Industry Contributions to Changes in Real Gross Domestic Product

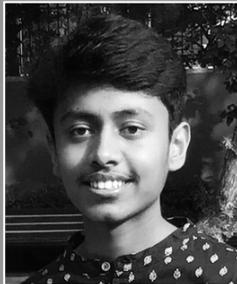


**Table 1**

Fiscal Year	Deficit (in billions)	Debt	Deficit/GDP	Events
1998	(\$69) (surplus)	\$113	(0.8%)	LTCM crisis, recession.
1999	(\$126) (surplus)	\$130	(1.3%)	Glass-Steagall repealed
2000	(\$236) (surplus)	\$18	(2.3%)	Surplus
2001	(\$128) (surplus)	\$133	(1.2%)	9/11 attacks, EGTRRA
2002	\$158	\$421	1.4%	War on Terror
2003	\$378	\$555	3.3%	JGTRRA
2004	\$413	\$596	3.4%	Iraq War
2005	\$318	\$554	2.4%	Katrina, Bankruptcy Act
2006	\$248	\$574	1.8%	Bernanke chairs Fed
2007	\$161	\$501	1.1%	Bank crisis
2008	\$459	\$1,017	3.1%	Bank bailout, QE

2009	\$1,413	\$1,632	9.8%	Stimulus Act. Bank bailout cost \$250B, ARRA added \$241.9B
2010	\$1,294	\$1,905	8.6%	Obama tax cuts, ACA, Simpson-Bowles
2011	\$1,300	\$1,229	8.3%	Debt crisis, recession and tax cuts reduced revenue
2012	\$1,087	\$1,276	6.7%	Fiscal cliff
2013	\$679	\$672	4.0%	Sequester, government shutdown
2014	\$485	\$1,086	2.7%	Debt ceiling
2015	\$438	\$327	2.4%	Defense = \$736.4B
2016	\$585	\$1,423	3.1%	Defense = \$767.6B
2017	\$665	\$672	3.4%	Defense = \$817.9B
2018	\$779	\$1,217	4.0%	Defense = \$890.8B. Trump tax cuts
2019	\$1,091	\$1,314	n/a	Defense = \$956.5B
2020(est)	\$1,101	\$1,281	n/a	Defense = \$989B
2021 (est)	\$1,068	\$1,276	n/a	n/a

Source: Murse, Tom. (11 February, 2020)



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Socio-economic and Environmental Transformation by Utilising Unutilized Rural Resources

Abstract

The paper attempts to evaluate economic, social and environmental transformations which can be brought by utilising unutilized rural resources which are being wasted or being used for non economic purposes. Qualitative approach is used to evaluate and analyse the impacts of utilising unutilized rural resources supported by relevant case study considering possible opportunities in which these resources can be used to scrutinise their reliability. Considering availability of these resources, their possible uses and opportunity cost, it was found that these resources possess strength to bring revolutionising transformations in terms of national income, women empowerment, environmental issues and rural prosperity. Utilising rural resources can increase National income by increasing net exports, status of women empowerment by providing them good working environment and creating employment opportunities, controlling pollution in Delhi by managing root cause of pollution and prospering villages leading to increase in standard of living of rural population.



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Introduction

“The soul of India lies in its villages”

-Mahatma Gandhi

This statement quoted by Mahatma Gandhi is indeed true. Not only by the fact that the authentic Indian culture is depicted by its villages but also by the part it contributes and can contribute in India's growth. Agriculture is the mainstay of rural occupation which contributes around 15% percent of GVA and feed 1.3 billion population of India. However, this huge contribution does not limit the potential villages still possesses as there are many resources in rural India which is still unutilized and need attention. Two major unutilized resources present in almost every Indian village are Agricultural residue, also known as stubble and cattle waste. Since past, these two resources are either abandoned or used ineffectively leading to loss of their values. In villages, cattle waste is conventionally burnt to be used as fuel instead of using for biogas or compost which leads to many negative out turns at micro as well as macro level resulting in tremendous economic, social and environmental loss. More apprehensive is the case with agricultural residue also known as stubble. Stubble refers to left out unwanted part of crops which is usually burnt by the farmers in open fields as waste which results in extensive impacts both on on and off farm, like losses in soil fertility, productivity and environmental pollution. Instead of wasting these two resources can be used as biogas, fertilizer or compost. Biogas can be used as a substitute for other non-renewable sources of energy as it is considered clean, more efficient and a renewable fuel. It's use may save tremendous amount of energy in rural areas especially in the developing countries like India considering number of livestock, huge biodegradable waste, huge energy consumption and dependence on other countries for fuel. In the same way, considering livestock population and deteriorating soil health in India, organic fertilizer, compost and vermi Compost can be of great economic, social and environmental significance.

METHODOLOGY

Qualitative approach is used to evaluate and analyse the impacts of utilising unutilized rural resources on economic, human and environmental well-being supported by relevant case study considering possible opportunities in which these resources can be used to scrutinise their reliability.

NATIONAL INCOME

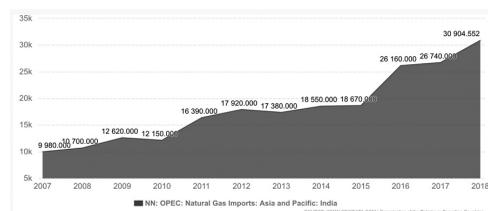
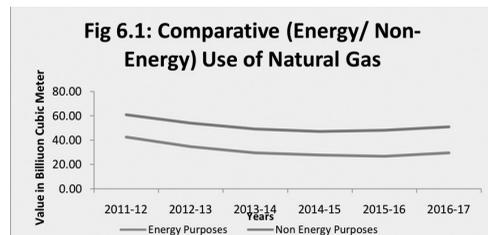
National income is very important and exclusive gauge of measuring a country's performance in economy which is calculated as the sum of consumption,

investment, government expenditure Net exports. Net exports and investment expenditure are important components of national Income and these two components can perceive positive changes with the utilization of rural wastea biogas and fertilizers.

IMPACT ON NET EXPORTS

India's energy sources are highly contingent on Gulf countries and recently this dependency has even rose substantially.

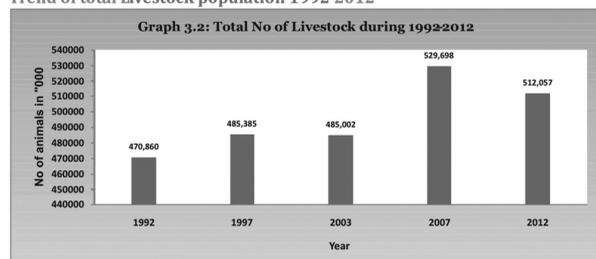
As per reports, a steady increase is seen in the estimated consumption of crude oil from approximately 156 million metric tonnes during 2007-08 to approx 245 million metric tonnes during 2016-17 with compound annual growth rate of 4.63%. In 2015-16, consumption of crude oil was 232.86 million metric tonnes but in the very next year it increased to 245.36 million metric tonnes. It's rate of growth also increased from 4.63% in 2015-16 to 5.37% in 2016-17. (*Government of India Department of fertilisers 2015*).



The fertiliser industry uses about 30.38% of natural gas which is maximum followed by Power generation (24.28%) and as domestic fuel (14.47%). To fulfil energy demand of such huge population, India imports natural gas which was reported to be 30,904.552 Cubic meter mega newton in December 2018. This records an increase from the previous number of 26,740.000 Cubic meter mega newton in Dec 2017 (*India's Natural Gas: Imports*). This shows the dependency of India on other countries for fuel which can alternatively be fulfilled within the domestic territory by making use of waste produced from livestock.

The total livestock population comprising of Cattle, Sheep, Buffalo, pig, Goat, camels, Horses & Ponies, Mules, Donkeys etc within the country is approximately 512.05 million numbers in the year 2012

Trend of total Livestock population 1992-2012



(19th Livestock Census-2012 All India Report) making India one of the countries having highest number cattle inventory which signifies India has a bright future for biofuel. By bottling livestock biogas at 150 pressure, use of natural gas and domestic fuel can be replaced by livestock biogas. Livestock biogas may also be used like CNG cylinders in the vehicles. By Storing purified livestock biogas, it may become a marketable commodity and can easily replace LPG as then, it could be used any time anywhere in the country, especially in the hotels restaurants and household sectors. If proper attention is paid to utilization of cattle waste and agricultural residue in production of biogas and effective and efficient implementation is practiced, biogas can fulfil fuel demand of every household in India which will reduce spending to other countries to import fuel.

Ukraine has demonstrated the capacity of livestock biogas where the cow dung of 4000 cows of Ukrainian Milk Co Ltd is utilised to produce energy at the Ukraine's first biogas cogeneration plant. Through its operations, Ukraine has successfully reduced CO₂ emission equivalent to 18000 metric tons according to GE. Not only this, the cow manure is also used to produce 625 kW of electricity and 686 kW of thermal output. The surplus energy produced at this plant is sold to the facility grid under Ukraine's green tariff.

Similar steps can be taken in other developing countries like India where livestock population is quite remarkable, that will help reduce the pollution as well. (Clipsham and Herro 2010)

AGRICULTURAL PRODUCTIVITY

Indian land has intensively been exploited since the green revolution and tremendous increase in use of chemical fertilizers which has resulted in soil degradation in India which is not only affecting environment but also impacting agricultural output in long run. Excessive use of chemical fertilizer impacts health of soil in a bad way affecting ecology as well as agricultural output. Also, practically, it is also not a good option to replace chemical fertilizer completely with organic manure and compost considering huge population of India to be fed and bad impacts of overuse of organic fertilizers on soil. To increase crop yield it is necessary to understand features of soil, chemical composition in soil, fertility, and nutritional requirement of crop, and most importantly the best proportion of combination of organic and chemical fertilizer. As per researches it has been shown that substituting a particular part of chemical fertilizer with organic fertilizer in a particular crop can increase crop yield by a good proportion than use of only chemical fertilizer in cultivation. The nutrients which are used by

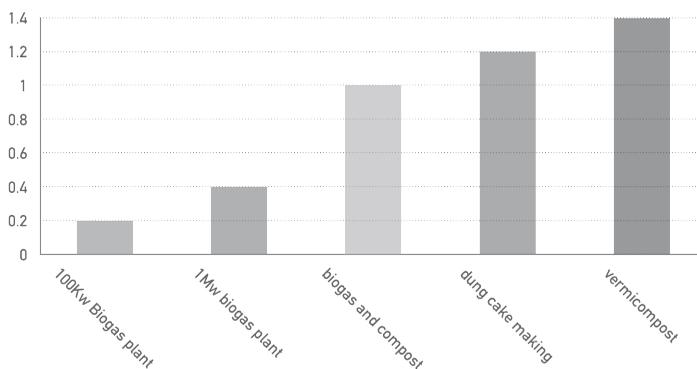
the plants in large quantities are known as macronutrients. Example – nitrogen, phosphorus and potassium. Other nutrients which are used by the plants in very small amount are known as micronutrients. Example – Boron and manganese. For maintaining a balance between crop productivity, soil fertility and protection of environmental & natural resources, it would be necessary to understand what appropriate composition of chemical and organic fertilisers should be supplied to the plants. For every crop there's a particular best manner in which high yield can be obtained.

In this field certain researches have been conducted on different crops to emphasise the importance of introduction of manure and compost in agriculture.

In a research, it was found that when an appropriate ratio of organic manure and chemical fertilisers was supplied to the crops, a remarkable change in the crop productivity, quality of crop and physio-chemical properties of soil was observed. Improvements in these parameters further increased the grain yield and nutritive quality like amylose content, gel consistency, and protein content of grain.

This shows that apart from having environmental benefits of using agricultural waste and livestock waste as compost, it also has strength to increase agricultural output which in turn help farmers in generating more revenue and economy to perform better.

RURAL PROSPERITY



As per a research in Jabalpur, employment which can be generated from per tonne of fresh dung in different dung activities was analysed. And, vermicompost was found to be the best in terms of employment generation.

Source : Harsdorff 2014

This shows that producing vermi compost from rural waste like agricultural residue (stubble) and livestock waste can be a good option to provide employment to many people in

rural areas. Vermicompost is an organic fertilizer, similar to compost and manure. To obtain this, earthworms are reared and are fed organic wastes. Excreta of the earthworms is Vermi-compost. This process of obtaining vermi-compost from earthworms is called vermi-compost. Vermi-compost is very rich in nutrients and other growth promoting substances like soil and it is therefore, popularly called as black gold by the farmers.

Vermicompost is not only sold in offline/conventional market but also online e-commerce websites like Amazon, Flipkart, Indiamart etc which provides a platform to rural population to earn. Considering demand of vermicompost in urban cities for garden, parks, nurseries and flower pots, availability of online platform and low cost inputs, it can be stated that vermi compost has a bright future in creating prosperity in rural part of India.

Krishi Vigyan Kendra, IVRI Izatnagar conducts a training programme on agricultural pursuits every year. In 2015, a young boy of about 21 years of age named Prateek Bajaj also joined this programme and got training for vermicomposting. He was surprised to learn about the utilisation of dairy waste including dung in different fields including vermicomposting. Knowing this, he planned to become an entrepreneur in agriculture. He was just a passout of BCom, but he practised various methods of composting like a Rhino Vermi-bed method, mud press method, use of neem and waste flowers in vermicomposting, Matka-method, vermiwash etc. (ICAR- Indian Veterinary Research Institute Izatnagar)

Sr. No.	Items	Quantity and price	Expenditure incurred in a season (2.5)	Total return from one season
Flooring method				
1	Dung	10 quintals @ ₹1/kg in size of 30x2 feet bed.	3000.00	Vermi-compost: 6.5quintals. Sold @ Rs. 5/kg = Rs. 3250.00
2	Earthworms	10kg in each bed @ Rs.200/kg	2000.00	Earthworm: 17kg. Sold @ Rs. 200/kg = Rs. 3400.00
3	Miscellaneous	Rs.700	700.00	Vermiwash: 15 litres. Sold @ Rs.250/litre = Rs.3750.00
Rhino Method (10x4 feet size)				
4	Dung	10 quintal	1000	Vermi-compost = 6.5quintals. Sold @ Rs.5/kg = Rs. 3250.00
5	Earthworm	7kg	1400	Earthworm=12kg. Sold @ Rs. 200/kg= Rs. 2400.00
Total expenditure and returns in a season (2.5months)			Rs. 8100	Rs. 16050
Total expenditure and return in a year			Rs. 32400	Rs. 64,200

Source: ICAR- Indian Veterinary Research Institute Izatnagar

Expenditure and return in his vermicompost enterprise is quite impressive. The table of expenditure and return table of his vermicompost enterprise shows the wider scope of utilising waste as vermicompost in prospering villages.

In addition to vermicompost being an avenue in increasing employment in rural areas, there are products which can be made out of cow dung. This includes the following-

- *Gau ark*- it is an excellent medicine for various diseases and is safe for human consumption as a medicine. Crude cow urine is filtered and distilled to produce this.
- *Gomay Bhasma* – it is the ash of cow dung mixed with neem and some other medicinal herbs like Babool. It is used as a toothpowder.
- *Dhoop batti* – Fragrance is mixed with the powdered cow dung and urine to produce these fragrance stick. It is in high demand now a days, across the whole India.
- *Mosquito repellent*– Coils are prepared with a paste of cow dung, cow urine, powder of neem and lemon grass and fragrance. When these coils are burnt, its smell repel mosquitoes. It is totally chemical free and natural.
- *Gonyle* – Cow urine has disinfectant properties. So chemical free disinfectant (phenyl) is produced by mixing fragrance and colour to the cow urine.
- *Gomay Tikiya* - Powdered cow dung is used as a base material to produce bath soap and is sold on e-Commerce websites.. (*Cow Based Rural & Self Employment* – ग्राम एवम् स्वयं रोजगार)

In addition to the above, many other products may be produced using cow dung and cow urine. It involves very less investment and are marketable which increases economic benefit to the farmers. Such products may be like Gau-Kashtha, paper, cardboard, et cetera. Today, urban markets have huge demand for organic and natural products and therefore, farmers can easily make good money by selling these products in the urban markets. It will lead to rural prosperity and will increase standard of living in the rural areas.

WOMEN EMPOWERMENT

Women empowerment need to begin with there empowerment at home first of all by involving them in the decision making of the family matters and then gradually giving them authority to decide. So the process of women empowerment will have to be carried out simultaneously inside as well as outside their homes. They should be treated with equality as men, when they are at work. They should be given proper social regard and equality, political participation in the decision making at administration as well as political levels. Their health, education, economic and financial stability will have to be taken care of. In India, women are far behind men in the field of education. Literacy is only 44% in Indian women as opposed to 76% males. In rural areas, women's most of the time is spent in kitchen inhaling a lot of smoke emitted by burning dried cattle dung and firewood. The biogas cooking systems can improve women's well-being by lowering the time spent in cooking and the workload for collecting and making firewood and cow dung cakes respectively. Use of biogas in place of burning firewood and dried dung also improve the kitchen environment as there is less smoke and less formation of soot on cooking pots, ceilings and walls of the kitchen. Such cleanliness and faster cooking capacity can also encourage men to help women with cooking chores. This enhances the sharing of roles between male and female. The reduction in cooking time and collecting firewood frees up time for women to participate in other productive and social work like contributing in more economic activities and attending community development meetings. Bioslurry is out there to be used as biofertilizer and pig feed after extraction of biogas. To enhance gender equality, there are many opportunities to build businesses to create employment for women in biogas and vermicompost sector. Such opportunities include training the as mason or constructors and to model their capacities to operate biogas plants for a fee. Women can also be involved as dealers or suppliers in the biodigester value chain. Women can also be paid as mobilizers, plant supervisors and extension service providers for a fee in rural areas. Hence, conclusively, initiation of biofuel and vermicompost related businesses can improve condition of rural women by employing them and can also help them live a better life by replacing firewood and dried cattle dung with biogas which is way more efficient and effective.

ENVIRONMENTAL TRANSFORMATION

India is the second largest economy based on agriculture. Here, crop cultivation is done round the year. It generates a large amount of agricultural waste in the form of crop residue, approximately 500,000,000 tonnes per year, as per reports

of MNRE. (*Ministry of new and renewable energy*) Majority of this crop residue is, non-scientifically used as fodder and fuel for domestic purposes about 92 MT is going every year the report says. This burn portion of agricultural waste is even more than the total production of Agro waste in Bangladesh or Indonesia or Myanmar, as is depicted in the table below. (*Bhuvaneshwari, Hettiarachchi and Meegoda. 2019*)

Country	Agricultural waste generated (Million tons/year)
India 🇮🇳	500
Bangladesh 🇬🇧	72
Indonesia 🇮🇩	55
Myanmar 🇲🇲	19

Burning of this 92 MT of Agro waste in India causes high level of air-pollution in certain areas due to excessive particulate matter emissions. If we consider Delhi, this particulate matter emission due to burning of Agro waste (stubble) is about 17 times of the total emission from all other sources including garbage burning, vehicle emissions and industries. Burning of agricultural residue had been considered to be a major cause for environmental problem in health issues in the Urban as well as rural areas. It cannot be denied that burning of agricultural residue contributes a lot to the air pollution and global warming. This agricultural residues which is presently burnt, can be used to produce biogas and fertilisers. It may prove to be a very effective technique not only for reducing air-pollution, but also for a sustainable growth and development.

In addition to addressing problem of global warming and pollution, shifting waste from being burnt in the field to using in anaerobic digester can also make sure that the nutrients present in soil is not negatively affected. Agricultural residue is usually burnt in the fields itself which decrease the organic matter and nutrients in the soil. By shifting agricultural waste from being burnt to making biogas, the fertility of soil can be maintained.

It may be relevant to consider here a long term experiment conducted at China. They grew corn (*Zea Maize L.*) continuously for 21 years by applying different combinations of nitrogen, phosphorus and potassium with composted pig manure (CPM) in the soil. They carried on analysis of the soil samples for these 21 years. Their results are presented below.

The given Table which shows that after 21 years, soil receiving chemical fertilizers alone had a significantly lower soil pH compared with the no fertilizer group (CK). The application of CPM alone and NPK with CPM increased the soil pH significantly. These results indicate that manure application plays a critical role in maintaining the soil pH. Application of manure could relieve the negative impact of N application on pH. Manure application maintained the soil pH at the initial level. (Sorathiya 2014)

The other environmental transformation which can be brought by utilising rural waste is impacting biological magnification or biological accumulation. It refers to increase in the concentration of toxicity from one organism to the next in a food chain. In agriculture, excessive use of chemical fertilizers increase the accumulation of harmful chemicals in crops which keeps transferring in the food chain. It is very serious problem leading to loss of biodiversity on earth. As discussed above, a proper proportion of chemical fertiliser can be substituted for manure and compost can help address the problem of biological magnification by decreasing use of chemical fertilizer to an extent in agriculture.

CONCLUSION

Currently, major rural resources like livestock waste and agricultural residue are being used for non economic purposes undermining their values. These resources can be utilised in variety of works like producing vermicompost, biofuel and organic & natural products like Gau Agarbatti. These resources posses a bright future in India considering availability of inputs, labour force, cost and benefits. If these resources are brought in commercial use it can bring variety of transformations. In terms of economy as whole, utilising these resources can contribute in increasing national income resulting in better economic out turns in addition to prospering villages by providing employment to rural population. Utilising these resources can also help in improving India's status in women empowerment by empowering rural women and can address major environmental issues in India like pollution, biological accumulation, land degradation etc. However, inspite of having these wonderful strengths, these resources are not getting proper attention. Factors like capital and awareness are major constraints which needs to be overcome.

BIBLIOGRAPHY

Amjad A. Ahmad, Theodore J.K. Radovich, Hue V. Nguyen, Jensen Uyeda, Alton Arakaki, Jeana Cadby, Robert Paull, Jari Sugano and Glenn Teves. (2016). Use of

Organic Fertilizers to Enhance Soil Fertility, Plant Growth, and Yield in a Tropical Environment. DOI: 10.5772/62529

Anas Iqbal, Liang He, Aziz Khan, Shangqin Wei, Kashif Akhtar, Izhar Ali, Saif Ullah, Fazal Munsif, Quan Zhao and Ligeng Jiang. (2019). Organic Manure Coupled with Inorganic Fertilizer: An Approach for the Sustainable Production of Rice by Improving Soil Properties and Nitrogen Use Efficiency. *Agronomy*

Central Statistics Office Ministry of Statistics and Programme Implementation Government of India, New Delhi. (2018). *Energy Statistics 2018 (Twenty Fifth Issue)*. Retrieved from http://mospi.nic.in/sites/default/files/publication_reports/Energy_Statistics_2018.pdf#page46

Cow Based Rural & Self Employment – ग्राम एवम् स्वयं रोजगार. Retrieved from <http://govigyan.com/training/how-to-generate-cow-based-rural-self-employment>

Economic Survey of India 2019-20. (2020). *State of Economy*. Volume 2.

Environmental Research and Public Health. Retrieved from https://res.mdpi.com/d_attachment/ijerph/ijerph-16-00832/article_deploy/ijerph-16-00832.pdf

Government of India Department of fertilizer. (2015). Import of fertilizers. Retrieved from <http://fert.nic.in/node/3808>

ICAR-Indian Veterinary Research Institute Izatnagar-243 122. VERMICOMPOSTING - A PROFESSION OF YOUTH : A SUCCESS STORY. Krishi Vigyan Kendra. Retrieved from <http://ivri.nic.in/services/kvk/Download/SuccessStory2.pdf>

India Natural Gas: Imports. Retrieved from <https://www.ceicdata.com/en/indicator/india/natural-gas-imports>

Jenn Clipsham and Alana Herro. (2010). 4,000 Ukrainian Cows Power Country's First Biogas Plant. Retrieved from <https://www.greenbiz.com/news/2010/07/14/4000-ukrainian-cows-power-countrys-first-biogas-plant>. *GreenBiz*. Retrieved from <https://www.greenbiz.com/news/2010/07/14/4000-ukrainian-cows-power-countrys-first-biogas-plant>

Jigmet Yangchan, S.A. Ganie, M.A. Wani, V. Gupta, Anil Kumar and Yogesh Kumar. (2019). A Success Story of Farmer's using Vermicomposting for Revenue and Employment Generation in Trans-Himalayas of Cold Arid. *International Journal of Current Microbiology and Applied Sciences*. ISSN: 2319-7706 Volume 8 Number 04 (2019)

Judith Libaisi and Mary Njenga. (2018). Biogas as a Smart Investment for Women's Empowerment and Livelihood Enhancement.

L.M. Sorathiya , A.B. Fulsoundar, K.K. Tyagi, M.D. Patel, R.R. Singh. (2014). Eco-friendly and modern methods of livestock waste recycling for enhancing farm profitability. DOI 10.1007/s40093-014-0050-6

Marek Harsdorff. (2014). The economics of biogas creating green jobs in the dairy industry in India. *International Labour Organisation*. Retrieved from https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_242911.pdf

Ministry of Agriculture Department of Animal Husbandry, Dairying and Fisheries Krishi Bhawan, New Delhi. *19th Livestock Census-2012 All India Report*. Retrieved from http://dahd.nic.in/sites/default/files/Livestock%20%205_0.pdf

Ranjan Bhattacharyya, Birendra Nath Ghosh, Prasanta Kumar Mishra, Biswapati Mandal, Cherukumalli Srinivasa Rao, Dibyendu Sarkar, Krishnendu Das, Kokkuvayil Sankaranarayanan Anil, Manickam Lalitha, Kuntal Mouli Hati and Alan Joseph Franzluebbbers (2015). Soil Degradation in India: Challenges and Potential Solutions. *Sustainability*. doi:10.3390/su7043528

Soil Quality Information. Retrieved from <https://extension.psu.edu/soil-quality-information>

S. Bhuvaneshwari, Hiroshan Hettiarachchi and Jay N. Meegoda. (2019). Crop Residue Burning in India: Policy Challenges and Potential Solutions. *International Journal of Environmental Research and Public Health*.

Space Applications Centre Indian Space Research Organisation Department of Space, Government of India Ahmedabad – 380 015, India. (2016). *Desertification and Land Degradation Atlas of India*. Sponsored by Ministry of Environment, Forest and Climate Change, Government of India. Retrieved from https://www.sac.gov.in/SACSITE/Desertification_Atlas_2016_SAC_ISRO.pdf

The role of women in rural development, food production and poverty eradication. Retrieved from <https://www.unwomen.org/en/news/in-focus/rural-women-day/2013>



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Cultural Dimension of Crowdsourcing

Abstract

The crowd is the greatest asset on the face of this world. It is just too valuable to ignore which is clearly witnessed by the originality of the people who have contributed their bit in solving most complex of the public issues and challenges. What if we put the successful US based Taskrabbit app in the Indian scenario to crowd source the everyday tasks for the benefit of the Indian task posters? Wouldn't it be a challenge to face the culturally reserved society rise to a pedestal to be market ready for such a company? Well, the study is first of its kind to understand the connection between the cultural aspect and crowdsourcing via the case study of Taskrabbit App and suggests the need of the development of such an app as per the Indian market.

Keywords: Crowdsourcing, Cultural Factors, Taskrabbit App & Human Resources.

INTRODUCTION

*"Great Vision without great people is irrelevant."
- Jim Collins(Collins, 2001)*

Knocking on the doors is the 21st century scenario which backs it up with the fine lights of technology combined with the human intellect. In the management jargon, also widely known as the human resource it has crossed its boundaries and explored over the real potential of the homosapien population around us.

Imagine organizing a party without this much



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required resource, the whole state of affairs will be doomed. The crowd around us makes up for an essence in our lives that life without them is unthinkable. Walking on the similar lines, the sourcing of this crowd to disentangle the knots and pulling the problems towards solutions without ensuring any wastage of this pristine resource is what majorly constitutes crowd sourcing, a term which steals its identity from the human engagement itself.

At every level, crowd sourcing lives up to its name just like the important investment to aid future wealth creation. This targeted arrangement leads to the increase in the probability of the results with the diminishing of the costs. (Deloitte, 2016)

In Indian realm, the game of crowd sourcing is much in the tasks requiring specialist skills and subjective judgments which define the very companies working for the outsourcing of these services to the Indian Market in the return of cheap labour. Some of the organizations practice it via e- crowd sourcing means in the areas of consulting, research, strategic development etc. (Deloitte, 2016)

The Indian Society has a lot of tasks to be performed on a routine basis like cleaning, furniture assembling, electrician, plumbing and a lot more. With the rising urban population and a stress in terms of less availability of time, the crowd sourcing of these micro tasks would be of a great help to the masses.

The designing of an app which has the facility of providing efficient micro services would be a great ignition start. With the jolting of the employment rates, it would certainly provide a platform for the all sections of Indian people to register as a tasker and perform the tasks as per their skill set and later on to be rewarded for the same.

A USA based firm known as TaskRabbit, founded in 2008 is already working to match the freelance labour with local demand thereby allowing the consumers to find immediate help for these petty jobs. It had also launched its new business models in 19 cities in United States and in UK. (Future Work Technologies, 2011) The new app provides the customers the facility to book the tasks and get it finished in 90 minutes. The taskers are assigned the task in just 5 minutes. (Future Work Technologies, 2011)

But what if we placed this app in the Indian landmass? Will it be accepted and received in the similar fashion by the society or not? There are a lot of questions to be answered in regard to its business model. But certainly, the discussion of its cultural outlook seems unavoidable.

The crowd sourcing access by a culturally diverse society with 1 Billion plus people looks fancy but when the real work takes on to its toes, whether or not it is productive will put it to an actual test . The research Paper thereby aims to resolve this conflict of thoughts and decodes the prospective application of the app to be developed by taking into account a multitude of variables like income, pricing, marketing, socio- religious and many more.

REVIEW OF LITERATURE

The essence of crowdsourcing lies in the mere fact that the usage of crowd to the best of their potential helps in the growth of economies across the world. The available literature in the form of various articles and reports have explored its usage in various fields but the researcher finds a gap in its relationship with cultural dimension and how it continues to impact the business settings if placed in a culturally influenced society like India.

A lot of understandings of the terminologies and its applicability have been taken from the Deloitte reports to understand the crowd's chain reaction in an enterprise ecosystem. These reports are loaded with conceptual data with the applicability explained with the examples of various working environments.

In today's Internet era the most significant form of marketing is the social media marketing as it helps business grow by tapping in the new customers. In Pamela Fasalo's research work she pinpoints this importance in the light of real estate landscape with the consideration of the tool of crowdsourcing. The advantages of using crowdsourcing in the marketing arena was assessed by an another researcher Whitla who put her thoughts very clearly with the example of Amazon's Mechanical Turk. She proposed that the boon of Crowdsourcing allows enterprises to harvest such ideas from a diverse collection of individuals with experiences which differ than the ones already employed with the firm.

A famous U.S based company called "TaskRabbit" became successful by the efficient utilization of the crowdsourcing model. This paper discusses this company with its business model, marketing channels etc. Secondary data has been collected about this company from its official website and various other websites.

Culture plays a critical role and impacts the consumption patterns of individual or institutions, considering this notion the research of the impact and influence of culture on the Indian markets is also studied. It gave useful insights on the difference of various brands and their policies when implemented in Indian markets.

Further, the detail of the various papers has been done specifically in the below summary table:

Table -1 Summary Table

Author and year	Objectives	Research Methodology	Findings
Deloitte, 2016	The report focuses on how to make the use of crowd in public sector domain so that it can act as a catalyst to promote new thinking approaches in organizational environment.	The paper has used mainly conceptual research methodology with various examples and cases.	It aims to answer the three most important questions which are about: <ol style="list-style-type: none"> 1. Value of crowd 2. Engagement of the crowd. 3. Beginning with the crowd
Deloitte, 2017	The report's main objective is to study that how the crowd deliver the value in the enterprise ecosystem	The paper has used mainly conceptual research methodology with various examples and cases.	The paper aims to look at the crowd sourcing as a way to liberate the thoughts in enterprises market and to discuss its benefits and issues for the same.

Fasolo, 2016	A study aiming towards trust in online reviews for the real estate sector and the homebuyers personal experience for a new site.	The paper has used a lot of primary data collection via the medium of questionnaires along with cases and examples.	used by home seekers to help with their home search decisions. The thesis develops a new website concept. Under this the users can submit reviews and information on home listings and provide their first-hand experiences and advices.
Whitla, 2009	This paper examines how firms are utilizing crowd sourcing for the completing marketing-related tasks:- <ol style="list-style-type: none"> 1. Product development 2. Advertising 3. Promotion 4. Marketing research 	The paper has used mainly conceptual research methodology with various examples and cases.	Findings state that some firms are locating individuals to complete menial tasks for less compensation. Aiming to seek prospective solutions from the same crowd, having different opinions. Conclusions are drawn regarding the benefits and the limitations of crowd sourcing and the exploring of the possible future of crowdsourcing in marketing.

<p>Ta, 2018</p>	<p>The importance and impacts of crowd sourcing in Supply Chain Management is investigated from multiple perspectives.</p>	<p>Three individual studies implementing a range of methodological approaches (archival data, ethnography, and field and scenario-based experiments) are conducted to examine potential impacts of crowd sourcing in different supply chain processes from the customer's, the Crowd sourcing firms and the supply chain partner's perspectives.</p>	<p>It also provides evidence that across the supply chain and across processes B2C collaboration and crowdsourcing in particular, have positive benefits for various supply chain members.</p> <p>The end-customers seem to enjoy better on-time delivery and lower delivery charges owing to the adoption of crowd sourced delivery, and thus are more Satisfied with the purchase experience and with the retailers.</p> <p>The way for companies to increase participation and quality of Crowd sourcing work is to frame the task messages in a negative way and emphasize the Connections between the crowds sourced agents and the consumer community.</p> <p>Overall, this research is a first empirical effort in understanding The "chain" effects of B2C collaboration in supply chain management.</p>
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Bao, 2017	<p>The objective of the dissertation is to</p> <p>Examine methods by which human subjects evaluate alternatives in an online setting. In particular, it explores the impact of using the widely used rating method of evaluation when another method is available that has been shown in the literature to be more accurate in predicting the winning ideas and products and to be better able to discriminate</p> <p>Between winning and losing alternatives.</p>	<p>The paper looks at the three main experiments with a lot of mathematical tools and numerous empirical researches involved.</p>	<p>Overall ,the results from the three studies suggest that crowd-based expectation voting offers a relatively cheap and effective method for finding high quality ideas and Forecasting future revenue.</p>
Future work technologies	<p>The detailed discussion about the business and revenue model of the TaskRabbit app.</p>	<p>The website shows the conceptual data.</p>	<p>The unique aspects of taskRabbit app which pulls it away from its competitors and makes it stand out.</p>
Newton, 2014	<p>It pinpoints the fact that how the taskrabbit app is blowing up the market and growing bigger and better.</p>	<p>The website shows the conceptual data.</p>	<p>It worked on its cost fixation models and also expanded its reach to other countries like united kingdom and many other cities.</p>

Jungleworks	The challenges faced by the taskrabbit and then the evolving of new business practices for the same.	The website shows the conceptual data.	The 3 step model which was founded by the taskrabbit and change in its business model to rectify an error in its operations.
Taskrabbit, 2008	The official website of the Taskrabbit app	The website shows the conceptual data.	It is the sole interface to act as a linking pin between the taskers and users.
Ghosh, Ghosh, & Ghosh, 2016	Merger and blend of cultural fiber is the today's requirement for flourishing of brands. The paper throws light on the examples of companies who rose due to the adoption of this principle.	Descriptive study using quantitative methods is conducted restricting samples size of 160.	The research work will help organizations to understand the importance of culture in brand establishment.
Krueger & Nandan, 2008	The identification of key challenges that need to be taken into account by successful global companies with respect to culture and branding.	The paper has used mainly conceptual research methodology with various examples and cases.	Cultural pitfalls can be avoided easily by the analyzing of a country's cultural framework. This brand-image alignment enables a firm to quickly and successfully build brand equity in the global-local market place.

RESEARCH METHODOLOGY

The study uses the method of case study analysis of Taskrabbit app using the secondary data to understand the connection between the Crowdsourcing and cultural dimension in Indian Society.

PROBLEM STATEMENT

Crowd sourcing is one of the aspects of modern world which is getting much required recognition through it being widely used in the corporate world. India being an emerging economy and holding a billion plus people must subscribe to the above idea in the field of microtasking. The Researcher finds a gap in the relationship of cultural impact on crowdsourcing talking specifically in terms of Indian markets. Also the aim is to develop an app in the Indian Context which shares its intentions with the TaskRabbit App already successful in the United States to put light on its business model and how it can be an employment generator in the time of high rates of unemployment.

OBJECTIVES OF STUDY

- The study aims to look at the connection between culture and crowdsourcing.
- It suggests to develop an app in Indian market.

DISCUSSION

Crowdsourcing

For centuries, the traditional enterprises have relied upon closed approaches for their success: Firstly they recruit and retain specialists, and then slowly their skills and experience are deepened over the years; they develop effective techniques to help them do business, they sell products and services in the markets where the competition is stagnant. Being closed, and keeping things 'in-house', was simply the way that businesses worked. (Deloitte, 2016)

But the earlier fixed relations of businesses needed a transformation in today's dynamic operating environment which requires a different and more agile approach from businesses and other organizations.(Deloitte, 2016)

So the concept of crowdsourcing is used to understand the value of crowd by the 3 potential benefits of crowdsourcing:

- Rapidly Generating the diverse and quality solutions
- Resource Maximization
- Increasing the Engagement of the Crowd(Deloitte, 2016)

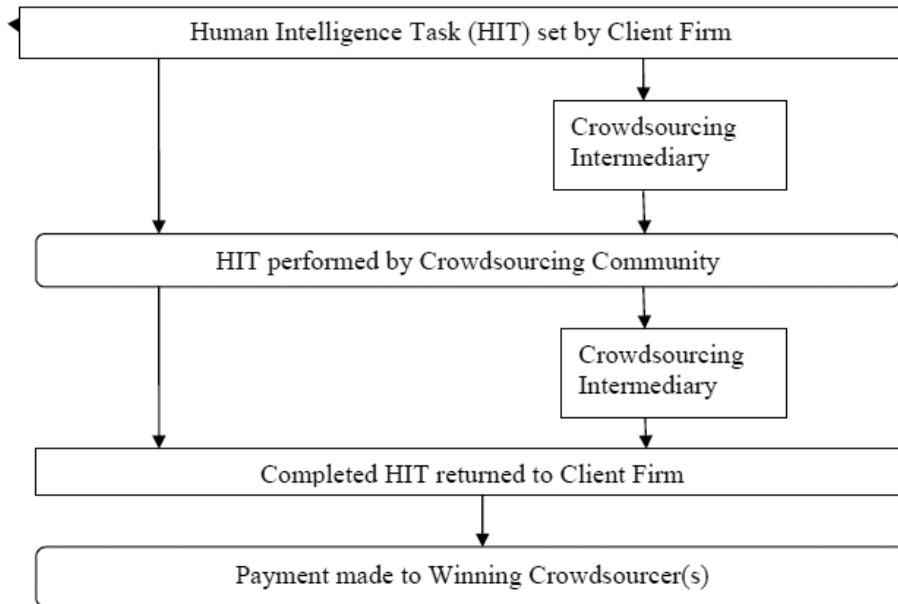
The useful crowd can act as a catalyst to solve difficult problems quicker, better and cheaper and there are four situations well suited for the engagement of the crowd.

Firstly, we have the use of crowdsourcing to solve the various issues in the society. The greatest benefit in that is getting the diverse opinions from the non-experts and also the real time observation data.(Deloitte, 2016)

Secondly, when an institution is in the need of innovative solutions to a particular hurdle, the crowd can act to inspire even more creativity. For example, in support of the first humanoid robot in space to take over dangerous tasks, National Aeronautics and Space Administration (NASA) did not have a viable way to teach the robot how to interact with the input devices used by astronauts. NASA opened the problem to the top coder crowd community and launched a \$10,000 algorithm challenge to develop an efficient way for the robot to recognize buttons on the task board. (Deloitte, 2016)

For the utilization for human resource, the public sector organizations might postpone their significant projects that call for the need of brute level of labor. Whenever a new solution is prepared for a certain market problem uncertainty tends to be the end result. So to avoid that phase of uncertainty the organizations can open the testing phase to the crowd and then receive the feedback.(Deloitte, 2016)

Online websites or crowdsourcing intermediaries can act as platforms for customers to interact with the crowds and avail their services. Some of these websites may have their own specialized crowd in the form of an online community, or they may agglomerate a more generalized crowd who will then pick and choose which tasks they wish to complete. Individuals working on tasks through these crowdsourcing intermediaries may not even become familiar with the client firm on whose behalf they are completing the task. Amazon's 'mechanical Turk' website is the best known of the crowdsourcing intermediaries which has received wide publicity in beta testing and already hosts a large number of 'Human Intelligence Tasks' (HIT's). Mostly only a small amount needs to be paid (typically less than US\$1) for each HIT completed. Anyone can sign up to assign tasks and anyone can sign up to complete the tasks that are listed. (Whitla, 2009)

Figure 1: Amazon Mechanical Turk Model(Whitla, 2009)

If we implement the model of crowd sourcing to perform the micro tasks the discussion of the famous and successful TaskRabbit app is undeniable.

Taskrabbit

TaskRabbit is a two-sided marketplace that connects 'Task Posters,' people who need help, with 'Task Rabbits,' a network of pre-approved and background checked individuals, who have the time and skills needed to complete the listed task. In a nutshell the US based company founded in 2008, works to provide users help in the run small errands and to perform other jobs at the rates they have already fixed.(Jungleworks)

Initially it was founded by Leah Busque in 2008 as 'Run My Errand' and later renamed as TaskRabbit in 2010. Initially it received a funding of \$20,000 which depicts the fact that Investors find huge potential in the business. (Jungleworks)

Table 2: Business model of Taskrabbit (Future Work Technologies, 2011)

Task Rabbit Business Model		
KEY PARTNERS <ul style="list-style-type: none"> • Task posters • Rabbits (Taskers) • Investors • Payment Processors 	KEY ACTIVITIES <ul style="list-style-type: none"> • Product development and management • Building the “task poster” network and managing them • Building the “Rabbit” network and managing them • Payment management • Customer Service 	KEY RESOURCES <ul style="list-style-type: none"> • Local Task posters • Efficient and skilled Taskrabbits • Technology
COST STRUCTURE <ul style="list-style-type: none"> • Technological setup running costs • Salaries to permanent employees • Social and community services 	VALUE PROPOSITIONS (Task Posters) <ul style="list-style-type: none"> • Saves time • Easy to get help • Taskdoers with a clean background • Insurance(every task is insured up to \$1,000,000) • Cash free payment 	CUSTOMER RELATIONS <ul style="list-style-type: none"> • Customer services • Social Media • Promotional offers and activities • Task insurance • Word of mouth advertising • Free first delivery

REVENUE STREAMS	VALUE PROPOSITIONS (Task Rabbits)	CHANNELS
<ul style="list-style-type: none"> • Commission on every transaction 	<ul style="list-style-type: none"> • Availability of local jobs • No schedule job • Instant money • Better return with increased reputation with good reviews 	<ul style="list-style-type: none"> • Website • Mobile app for IOS • Mobile app for Android

Not only the efficient business model shines but the process to recruit the taskers is totally trustworthy and aims to eliminate any hindrances. The interested taker can potentially apply online by filling an application form. The team checks the background and later comes an in- person interview. Once they are shortlisted, Taskers are required to specify their interests and skills and are then accepted by the taskrabbit team.(Future Work Technologies, 2011)

The taskrabbit app has been very successful throughout the United States of America but if we try to put the same model in a culturally and spiritually influenced society like India, what will be the consequences and whether it will be accepted by the indian Market. This question can be answered if we study the variables via the introduction of an App (Imaginary) which aims to crowd source the micro tasks.

Cultural Dimension

There is a great degree of diversity within India, which is only to be expected given its huge population and landmass. There are wide disparities in terms of religious sects, languages and dialects, food, regional customs, and wealth. Treating India as a monolithic entity will be the biggest mistake by the large corporations. Successful marketing in India requires a thorough knowledge of the social, cultural and economic characteristics of the Indian consumer, which means companies need to be careful about how they select target markets. (Krueger & Nandan, 2008)

Take the case of Mc Donalds the world's largest chain of hamburger fast food restaurants. The world's largest beef burger company was about to set its

footmark into a country which considers cow holy. The major consumers were supposed to be vegetarians, and some non-vegetarians with special exclusion to beef and pork. The company had to do a lot of homework in terms of its pricing policy to adjust to the Indian pockets. The competition aspect couldn't be ignored as the local market leaders were already having enhanced knowledge of the Indian taste buds. (Ghosh, Ghosh, & Ghosh, 2016)

Coming to the crowdsourcing of the everyday services like delivery, cleaning, minor home repairs, electrician etc the cultural aspect will definitely impact the way people will react to this app as far as its usage is considered.

Firstly, considering the income variable which in the Indian society has a huge influence as the society functions majorly on the different classes like the Upper class, Middle class and lower class. The app is definitely useful and finds its utility by the way of giving ease to a lot of people but since the people who are giving their services have the option of fixing the rates, the task posters in this case might be reluctant to pay according to the tasker. This stems out of the fact that bargaining mentality thrives in the Indian society.

The most nearby solution to this remedy will be resolving it via chat on the portal and also initially the fixing of the lower rates for the first time user in the terms of giving discounts and promotional codes on repeated uses. The strategy called Rider Zero, used by Uber also helped it rise to fame.

So potential target market will be initially the upper class and small population of middle class population might subscribe to the idea. According to CK Prahalad's theory of Fortune at the bottom of the pyramid, the lower class will be attracted to this app's market but not as a task poster but as a tasker for giving their services. (C.K.Prahalad, 2004)

The Micro tasking industry in India works in the terms of word of mouth advertising rather than adoption of other sources. The app needs to be believed by the people so that the trust can be restored. In the beginning the potential market share might be less due to less trusted sources and users but with the growing of Indian society towards the modern age the acceptance of apps and internet usage has increased over the last decade where the customers are more interested in better quality services to save their time and money as well.

While an addition to the promotional aspect of marketing can also be the wise choosing of the face of the brand with whom the people can relate and are ready to buy in.

Although for most of the crowdsourcing projects the researcher believes that the socio-religious dimension will not impact the part of the cultural dimension.

Since the business ethics and practice followed around the world are also impacted by the way society is. Talking in terms of India, the cases of unethical practices from the side of the taskers can be a possibility which can be a hindrance in its coming in the practice in rural towns and laid back cities. Business majorly thrives on its reputation which makes us question the fact that the organizational efficiency should be great for such devices which require trustworthiness.

As far as the age groups are considered, it will be in great demand from the elderly or the disabled people who require the help do run errands. The Younger generation will be making the extra money by doing the chores or vice-versa.

In a culturally reserved society, the most taskers can be the males as compared to the female counterparts who might be not so open to volunteer for the same. In a society which still struggles with the defined gender roles, the safety of the women appointed in these tasks can be an urgent issue which needs to be addressed.

Actually, understanding of the language can be a barrier so it will be better to collaborate with the state governments of the different Indian states to customize the app as per the state to suit the specific needs of the people. This can on the flip side (such collaboration) help to gain the trust of the Indian masses. This app also serves to solve the problem of structural unemployment in the society which is a pressing issue in today's times.

All in all, the first mover advantage can be enjoyed only with the proper utilization of the Human resource by crowdsourcing and obtaining the innovative ideas to improve the service from the available workforce itself.

CONCLUSION

The Crowdsourcing is the need of the modern world, with the Indian society moving towards its dream of a developed nation one day the dire requirement of a systematic functioning to manage this resource was much needed. With its multiple benefits and uses, it acts as a multiplier of human resource. The Microtasking industry in India has a huge demand and using the two tools of crowdsourcing and digital media in form of Internet can help in realizing the increased potential. The research paper proposes to develop this app based upon the successful business model by the Taskrabbbit .Culture as a whole leaves

a huge impression on Indian markets and despite all the barriers faced in terms of culture the app still seems prospective and shows an optimistic outlook to the future.

LIMITATION

The solutions backed in the study are not verified in the form of a primary data study which could have given a better conclusion with the context of Indian scenario.

REFERENCES

- Bao, J. (2017). Crowd-sourced Evaluation Methods for predicting product success. *Proquest* , 1-159.
- C.K.Prahalad. (2004). *Gareebi Hatayen, Munafha Kamaye*. Philadelphia: Wharton school Publishing.
- Collins, J. (2001). *Good to Great: Why some companies make leap...and others don't*. William Collins .
- Deloitte. (2016). *The three billion enterprise crowdsourcing and the growing fragmentation of work*. London: Deloitte.
- Deloitte. (2016). *The value of crowdsourcing: A public sector guide to harnessing the crowd*. London: Deloitte.
- Fasolo, P. J. (2016). Using Crowdsourcing to change the real estate landscape. *Proquest* , 1-103.
- Future Work Technologies. (2011). *Taskrabbit business and revenue model- How it Works: Future Work Technologies*. Retrieved from Future Work Technologies: <https://futureworktechnologies.com/taskrabbit-business-and-revenue-model-how-it-works/>
- Ghosh, D. M., Ghosh, D. A., & Ghosh, M. (2016). Impact and Influence of culture on brands in indian market . *IOSR journal of business and management* , 54-60.
- Jungleworks. (n.d.). *How Taskrabbit works: Insights into business and revenue model*. Retrieved Feb 10, 2020, from Jungleworks: <https://jungleworks.com/how-task-rabbit-works-insights-into-business-revenue-model/>

Krueger, D., & Nandan, S. (2008). Branding in the global arena: Role of culture. *Marketing Management Journal* , 30-38.

Newton, C. (2014, June 17). *Task rabbit is blowing up its business model and becoming the uber for everything*. Retrieved from The Verge: <https://www.theverge.com/2014/6/17/5816254/taskrabbit-blows-up-its-auction-house-to-offer-services-on-demand>

Ta, H. H. (2018). Assessing the Impacts of Crowdsourcing in Logistics and Supply Chain Operations . *Proquest* , 1-117.

Taskrabbit. (2008). *Taskrabbit Home page*. Retrieved from Taskrabbit: <https://www.taskrabbit.com/>

Whitla, P. (2009). Crowdsourcing and its application in marketing activities. *Contemporary Management Research* , 15-28.

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HISTORY OF THE JOURNAL

The idea to launch this Journal was discussed in December 2016 by the former Officiating Principal, **Dr. R. P. Rustagi** with **Dr. Santosh Kumari**, the Editor of the Journal. Since the idea appealed to **Dr. Santosh Kumari**, she took the initiative to contribute to SRCC by creating this new academic research Journal and took the responsibility for its Creation, Registration, License and ISSN (International Standard Serial Number) etc. along with *Editorship*. Therefore, **Dr. Santosh Kumari, Assistant Professor in the Department of Commerce, Shri Ram College of Commerce** was appointed as the Editor of the Journal vide. Office Order – SRCC/AD-158/2017 dated March 14, 2017. She meticulously worked hard in creating the concept and developing the structure of the Journal. She introduced the concept of COPE (Committee On Publication Ethics) to maintain the high academic standards of publication.

On behalf of SRCC, **Dr. Santosh Kumari** made every effort in seeking License from Deputy Commissioner of Police (Licensing), Delhi to register the Journal at “The Registrar of Newspapers for India, Ministry of Information and Broadcasting, Government of India”. The paper work for seeking license started under the former Officiating Principal, **Dr. R.P. Rustagi** on March 27, 2017. The foundation Issue of the Journal “**Strides – A Students’ Journal of Shri Ram College of Commerce, Volume 1, Issue 1, 2016-17**” was successfully released on the 91st Annual Day of SRCC held on April 13, 2017 by **Shri Prakash Javadekar, Honb’le Union Minister of Human Resource Development, Government of India**. The title of the Journal got verified and approved by the Registrar of Newspapers for India, Ministry of Information and Broadcasting, Government of India on April 21, 2017. On September 1, 2017, **Prof. Simrit Kaur** joined SRCC as Principal and signed each and every legal document required for further processing and supported **Dr. Santosh Kumari**.

On December 18, 2017, the College got the license “**License No. - DCP / LIC No. F. 2 (S / 37) Press / 2017**” to publish ‘Strides – A Students’ Journal of Shri Ram College of Commerce’. Due to change of Printing Press, the License got updated on March 09, 2018. On April 26, 2018, the SRCC Staff Council unanimously appointed **Dr. Santosh Kumari as the ‘Editor of Strides’** for the next two academic years.

On April 27, 2018 (The Foundation Day of the College), **Dr. Santosh Kumari** submitted the application for the registration of the Journal. On May 04, 2018, the SRCC received the ‘**Certificate of Registration**’ for “**Strides – A Students’ Journal of Shri Ram College of Commerce**” and got the **Registration No. DELENG/2018/75093** dated May 04, 2018. ***On behalf of Shri Ram College of Commerce, it was a moment of pride for Dr. Santosh Kumari to receive the ‘Certificate of Registration’ on May 04, 2018 at the Office of Registrar of Newspapers for India, Ministry of Information and Broadcasting, Government of India (website - www.rni.nic.in).***

On May 07, 2018, **Dr. Santosh Kumari** submitted the application for seeking ISSN (International Standard Serial Number) at “ISSN National Centre – India, National Science Library, NISCAIR (National Institute of Science Communication and Information Resources). Weblink - <http://nsl.niscair.res.in/ISSNPROCESS/issn.jsp>”. Finally, the College received the International Standard Serial Number “**ISSN 2581-4931 (Print)**” on **June 01, 2018**.

We are proud that this journal is an add-on to the enriched catalogue of SRCC’s publications and academic literature.

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RELEASE OF FOUNDATION ISSUE OF STRIDES



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