



Socio-Economic And Social Security Expenditure In India

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ABSTRACT :

The purpose of the study is to investigate the impact of change in socio-economic variables due to ageing pattern on social security in India. The study uses the Auto Regressive Distributed Lag (ARDL) model to decipher the linear relationship between tax revenue, expense, life expectancy, and social security in the Indian economy. The empirical findings of the study revealed that expenses and life expectancy positively affect social security contributions, but there's a negative relationship between social security contributions and tax receipts. To close the social security coverage gap and align with Sustainable Development Goal (SDG 1) on ending poverty and (SDG 10) on reducing inequality, policymakers should focus on improving institutional efficiency, expanding legislative frameworks, and introducing tax incentives for caregivers of elderly dependents. Study suggested some policy implications on the basis of empirical findings for future researchers and policymakers. Prioritise initiatives promoting elderly self-reliance through digital literacy, financial inclusion, post-retirement employment, and community engagement to foster socio-economic development in alignment with SDG 1 and SDG 10 goals for a secure and inclusive society.

Keywords: Social security, Life expectancy, Tax revenue, Expenses, ARDL model

1. Introduction :

The world's population is both ageing and expanding. The population's age distribution is shifting as a result of the demographic shift brought about by rising life expectancy in practically every nation. In 2022, there will be 1.1 billion people over 60 in the world, or 13.9% of the 7.9 billion people on the planet. Asia is home to over 58% of the world's population that is 60 years of age or older (649 million people). In the next thirty years, the proportion of elderly people in the population (13.7%) will increase, and in Asia, their overall number will double, making up 25 per cent of the population by the year 2050. This phenomenon also exists in India. India's population has been ageing due to declining fertility and death rates (Pal & Palacios, 2011). Around 10.5% of the nation's population, or 149 million people, were 60 years of age or older as of July 1st, 2022. By 2050, the percentage of the elderly population will double to 20.8 per cent, or 347 million people (Agarwal et al., 2020).

As the number of senior citizens rises and the socio-economic background rapidly shifts, older people become more and more dependent on younger working people. This suggests that older workers must rely on the earnings and revenues produced by younger employees. That might result in poverty and related issues; financial security is a major concern for senior adults. Giving money to those deemed destitute or at risk of becoming so is one of Social Security's primary goals. The objectives of the social security system are to maintain social justice, stability, and economic prosperity (YU et al., 2021). So, the Government of India prioritising old age-related issues in the social security system comprises old-age benefits, widow's pensions, disability pensions, unemployment benefits, accident and injury at work, sickness benefits, survivors' pensions, family medical support, and other necessities of life.

Even so, a relatively small fraction of Indians is covered by the state-run social security system. According to data from the Ministry of Labour and Employment, as of 2018, only about 8.33% of workers in the formal sector were covered by EPFO schemes, while around 3.8% were covered by ESIC. Out of 400 million workers in India, only roughly 35 million receive statutory social security in the form of old-age income protection. This indicates that a sizable portion of the populace lacks access to official social security benefits supplied by the government, especially those who work for themselves or in the unorganised sector. The 2021–22 Periodic Labour Force Survey reports that 53% of salaried workers in India do not receive social security payments. Of the poorest 20%, only 1.9% have access. It would cost about Rs. 1.37 trillion, or 0.69% of GDP in FY20, to protect this group.

Countries like India, which have inadequate social security schemes and comparatively limited public support for the healthcare sector, are demographically burdened by an ageing population (Banerjee et al., 2021). 55.1% of the surveyed population, totalling 5509 out of 10000 respondents, disagreed that India has adequate provisions for financial security and that its citizens are financially secure. Social security faces a significant mismatch between the revenues. Generally, it pays more in the form of assistance than we receive from returns. Since 2010, the Social Security money program has been adverse, which is an expensive method of saying that the activity is not gathering adequate cash through levies to protect what it is compensated out. But all was not lost. There was still this considerable trust fund behind social security, so we started tapping the interest on the fund. In contrast, the growth of our country is being hampered. Because of this, in order to conduct our research on social security contributions and development in India, we followed certain reviews based on this topic. India has a wide range of social security services, although compared to many other middle-income nations worldwide, it barely spends roughly 1.5% of its GDP on social protection (not including public healthcare). Employers pay 4.75% of wages toward ESIC

contributions, while employees pay 1.75% of wages. Within the set ceiling—which is periodically revised—ESI Corporation and the State Government split the cost of medical treatment in a 7:1 ratio.

Sustainable fund allocation should be used in the enlargement to prevent service interruptions. Taxes are still a comparatively underutilized source of revenue in the region despite efforts to boost social spending, and rising fiscal deficits make it harder for the government to borrow money. The government's, employers', and employees' joint efforts to ensure the sustainability of Social Security systems are closely linked to the programs' efficacy. This collaboration also encompasses tax revenue, where the amount of money collected through taxes is negatively correlated with the need for social security payments. Governments use tax money to fund social welfare programs, which reduces the amount of money that employers and individuals must contribute to social security programs. Tax revenue plays a vital role in maintaining the sustainability and availability of social security benefits in this mutually beneficial relationship, thereby strengthening the group's commitment to the general welfare of society.

Social Security benefits and tax income are negatively correlated. About half of all tax revenues are made up of labor income taxes, which include social security contributions and individual wage taxes. These taxes make up a sizable amount of government revenue. However, heavy taxation on labour income disproportionately burdens the workforce, especially considering variations in life expectancy among different age groups influenced by socio-economic factors (Olshansky et al., 2012). In a tax system with uniform rates across demographic groups except for seniors, such demographic trends result in disparities. Conversely, government expenditure remains consistent across all citizens. While studies have extensively examined the impact of demographic shifts on government spending (European Commission, 2018; Balassone et al., 2011), the implications of changing age patterns on tax revenue have received comparatively less attention. Doring and Walder (2012) found that those with higher incomes and modest spending habits, especially in retirement, tend to have better financial situations. This relationship is linked to life expectancy, as higher income often correlates with longer life spans. Understanding this connection is crucial for shaping policies on social security and economic development, particularly in countries like India.

1.1 Historical Background at the International Level

The idea of social security is not new; it has long been in place in a number of civilisations, providing assistance to their citizens in diverse ways. This idea was first introduced in many communities as a charitable endeavour to aid local citizens. In many Muslim communities, Zakat serves as the cornerstone for providing aid to the underprivileged and disabled, much like the Christian tithe does. There was also Bismarck's sickness insurance, which came into the air in 1883 to provide case assistance and medical benefits to employees working in the industrial sector during the period of sickness with the help of employees' and employers' contributions. Eventually, Bismarck founded a pension system for every worker in trade, manufacturing, and agriculture. The main aim of Bismarck in politics is to introduce social insurance to emphasise and talk about the legitimate requirement of labour to check their expansion of socialism and prevention of revolution. As it was part of past remuneration in the form of disability due to injury, sickness, or old age, the widow should be paid by employers and employees together.

Finally, New Zealand adopted a different approach to introduce a new Social Security law in 1938. It was the first universal non-means-tested system, which was started at age 65 but was available based on the test of residence, which was funded by a proportion of Social Security tax on individuals' income. There was a key impact on the world by the British government report given under William Beveridge in the year 1942; Good argued for maintaining an optimum level of employment as their prime responsibility of government family allowance for the children's comprehensive health care for the whole population through a social insurance scheme. The main aim is to eliminate poverty. In 1948, the scheme was introduced in the United Kingdom with some amendments. It was an initiative encouraged by Pierre Baroque to merge social assurance in France after World War II.

1.2 Evolution of Social Security in India

In India, social security has been a concern for policymakers since independence. It is discussed and written in the Indian constitution's directive principle in 1949. This relates to the current idea of international organisations like ILO, WHO and the United Nations, which aim to provide the minimum level of social protection floor, especially after the financial crises of 2008-09, to prevent hunger, reduce poverty and make strong human capital in the country to increase the productivity and reduce the damage of society's cost. Thereafter, social security became more important as an instrumental key to protecting people from uncertain risks and economic uncertainty in a country like India.

A special emphasis on poverty and the high rate of widowhood among senior women must be included in programs for rehabilitating India's aging population. Gender differences exist in dependency rates, however aged people make up a sizable share of the dependent population. In 1999–2000, there were more old people begging. A customized social assistance policy is necessary, as evidenced by the disparities in household distribution of elder care obligations. A sizable portion of the elderly who live alone or solely with their spouses, as well as those without living children, are also shown to be living alone, according to recent data. While creating national social support programs for India's elderly, these aspects need to be taken into account.

The recently issued Old Age Social and economic Security Report emphasizes that in order to solve economic and social security challenges for India's elderly population, more than merely targeted poverty alleviation programs are required. For instance, the government would have to spend a lot of money if it were to provide a Rs 100 monthly old age pension to the 175 million seniors that are predicted to exist by 2025. In the Indian context, social security refers to a comprehensive program designed to shield people from risk, guarantee a bare minimum income, and avoid deprivation. The development of suitable systems for worker safety and aid is essentially the job of the government; many programs rely on beneficiary contributions, while others are supported or subsidised by the Union or State Governments.

2. Literature review :

In this section, study analysed various worldwide popular studies to summaries findings relevant to research in two parts. The first is related to the association of social security contribution with tax revenue, and the second is the association of social security contribution with life expectancy and expenditure.

2.2 Empirical review

Association of social security with tax revenue:

Social security and tax rates go opposite each other; as the tax rate increases, social security contribution is reduced (Avenue, 1983). Especially for those whose earnings are below the ceiling. (Hubbard & Judd, 1987) stated that social security increases lifetime welfare and reduces national savings if people don't borrow it. Individual welfare is reduced when borrowing is taken into account. (Feldstein & Samwick, 1992) Explained that social security tax is negative for many employees. (Kotlikoff, 1996) examined that the size of efficiency gains depends on the existing structure of the association between social security benefits and taxes. Arthur & Annika (1997) examined an inverse relationship between social security benefit plan coverage and its effect on non-pension saving. (Schneider & Jelínek, 2005) examined the influence of the tax hypothesis on the fall of poor's income significantly over time. Which results in less contribution towards social security.

Mateos-Planas (2008) analysed that social security contributed to the deterioration in the population progress rate because of its additional rate and tax rate. (Olovsson, 2010) stated that the social security structure is the proper guide to pay and rates of interest. The efficient policy involves the net income tax over the life. (Torres et al., 2012) their study showed that employees' social security contributions and income tax were reduced. This implies that there is a negative association between tax and social assistance contributions. (Pestieu & Racionero, 2016) found that longevity is related to occupation. Social security is maximally utilised for short-lived workers but least for old and those who retire the earliest. It can be achieved by taxing their saving and earnings from long activity.

Association of social security with life expectancy and expenditure:

Echevarría & Iza (2006) found that high life expectancy reduces the per capita growth rate in social safety assistance due to reeducation in the proportion of the active population. The higher social security involvement rate reduces the per capita GDP growth rate. Glomm & Kaganovich (2008) found that increase in the social security contribution as government education expenditure resulting from the public budget's overall size is defined in the same manner in non-monotonic growth-inequality relationships. (Ito & Tabata, 2008) revealed that there is an association between their life expectancy and their per capita output growth hump-shaped. Bruce & Turnovsky (2013) found that there is a positive association between life expectancy, consumption, and social security. Compensation benefits have a direct impact on life expectancy. (Jaba et al., 2013) highlighted that the health system and health care directly impact life expectancy. Yurdakul & Binay (2015) suggested that increasing the premium rate can increase insurance premium revenue contribution. (Isaacs & Choudhury, 2017) proposed that rising life expectancy and social security change involve increasing the retirement age.

A decrease in social security insurance during life would be considerably larger than for the high earners. Sánchez-Romero & Prskawetz (2017) showed an increasing gap in life expectancy due to socio-economic variables, making the US pension scenario increasingly deteriorating and increasing the per capita income gap among ability groups. (Bennett et al., 2018) examined that universalism of health and social care can postpone death into older ages and decrease life expectancy inequality. (Reynolds & Avendano, 2018) explained that life longevity could be considerably slighter if the expense incurred on education and incapacity programs were compared to other high-income countries. (Bilal et al., 2019) examined that social security and life expectancy are positively associated with each other. A low level of social security leads to less life expectancy. (Margitic & Ravallion, 2019) found that social insurance does the heavy lifting for poor people and social assistance lifts.

On average, there is only 1.5 % per day, which is somewhere less than 10% of the mean spending on social security. (Prammer, 2019) found that life expectancy increases because of these things. The first is growing remuneration and pension assistance, and the second is population progress that responds negatively to the per capita effect of life expectancy on overall revenue. (June 2020) The study evaluated that older persons' working life expectancy significantly increases due to social security due to their extra livelihood rather than financial gains from a large amount of pension wealth. (Gu et al., 2020) found that a small regional gap in life expectancy leads to an increase in the housing facilities in the backward regions. (Heer et al., 2020) examined the effects of initial and welfare policies frequently supported to progress the acceptable of pension systems. (Yu & Li, 2021) showed a negative relationship between rural poverty incidence and social security expense, which means social support expense assistance to diminish absolute rural poverty. (Li et al., 2021) examined that food expense was positively associated with the increases in county-level life expectancy and nutritional measures against early disease and stationery of increases in life expectancy. (Bravo et al., 2021) explained that the life expectancy gap is direct and significant for many countries and years.

It will keep it the same, and the size of grant rates between the age groups can be large, demanding that initial social insurance be reduced and consistently reducing the annual rates of social insurance to correct it. Alfano & Capasso (2021) revealed that social security contribution escapes shrinkages as our life expectancy increases, but it increases when the revenue on the other long-run prosperity collected increases. (Schernberg & Bommier, 2021) explained that the demand of people for social security incomes gradually learns about their life expectancy. Social security offers an evading policy that pairs a short life with a high level of consumption.

Limited empirical research has been conducted on social security within the Indian context, with the majority of existing literature focusing on social, institutional, and legal aspects of the subject. The predominant research methodologies employed in this field involve primary data collection. However, this study aims to address this gap by utilizing secondary data sources and employing the ARDL model, a technique that has been underutilized in Indian social security studies. Notably, there is a lack of investigation into the relationship between socio-economic variables and social security in India. Through the introduction of new variables such as life expectancy, tax revenue, expenses, and social security contributions, this research seeks to explore the impact of these factors on social security contributions within the Indian context. To check the difference between the minimum amount needed to

meet the social security needs of qualified candidates and the existing contributions made by employers, employees, and the government. How favorable retirement benefit maintained even in the absence of obligation by the tax-paying working-age.

3. Data Source and Methodology :

The linear relationship between India's tax income, spending, life expectancy, and social security was examined in this study. We employed the ARDL (Auto Regressive Distributed Lag) model to examine this relationship while focusing on social security. As a result of missing data for certain aspects, we have chosen to concentrate on the years 1990–2020. The choice of this particular time period was inspired by the significant transformations that took place in India's social security system throughout that period. These shifts were brought about by lasting challenges, economic reforms, demographic shifts, and technology developments.

Throughout this time, social security systems have evolved to accommodate for the dynamism and complexity of meeting social welfare demands in a socioeconomic environment that is changing quickly. Despite advancements, issues remain with providing comprehensive and efficient social security coverage. Funding concerns prevented social programs from being implemented successfully. The benefits' sufficiency was also questioned, particularly in view of the fact that underprivileged groups experienced social marginalization, poverty, and health hazards. Government taxes are the main source of income for India's social security system, which is essentially non-contributory in nature.

Tax revenue declines when social security benefits increase because fewer people are contributing to the program. This clarifies the severe lack of resources. India has a much smaller income tax base (about 3% of the population) and a lower overall tax-to-GDP ratio than China and Brazil. India's GDP per capita is still relatively low. Nonetheless, the severity of the resource barrier has decreased due to recent rapid growth rates; at constant prices, public revenue is now more than four times larger than it was 25 years ago (Drèze and Sen, 2013).

If this trend continues, comprehensive social security will soon seem considerably more affordable than it does now. An increase in the number of older people who were dependent on welfare or charitable programs was brought about by inadequate social security payouts. Social security programs give people financial assistance, enhancing access to healthcare and lowering senior poverty. Better health outcomes, decreased death rates, and eventually increased life expectancy are the results of this. Government interests in fostering economic growth, social welfare, and income stability are reflected in the interrelated costs associated with employee compensation, subsidies, social benefits, and social security. A pay-as-you-go social security system supported by a flat labor income tax rate is required. To balance these expenses, careful planning, prudent money management, and long-term sustainability consideration are needed. Examining possible impacts of population age fluctuations on the social security system is the second objective. Thus, the purpose of this study is to examine the relationship between life expectancy, taxes, social security, and expenses.

The table below lists the variables' specifications and the sources from which they were derived for the current investigation.

Table 1: Sources of the data used

Variables	Description	Measurement	Sources
SS	“Social contributions include social security contributions by employees, employers, and self-employed people, as well as contributions to social insurance schemes operated by governments.”	Social contributions (% of revenue)	WDI
LIEX	“Life expectancy at birth indicates the number of years a newborn infant would live.”	Life expectancy at birth, total (years)	WDI
TXR	“Tax revenue refers to compulsory transfers to the central government for public purposes.”	Tax revenue (% of GDP)	WDI
EXP	“Expense includes compensation of employees, subsidies, social benefits.”	Expense (% of GDP)	WDI

Source: Author's own calculation

3.1 Model selection

The elementary model used in the present study to evaluate the relationship between social security contribution, life expectancy, tax revenue, and expense is as follows.

$$SS_t = f(LIEX_t, TXR_t, EXP_t) \dots \dots \dots (1)$$

$$SS_t = \alpha_0 + \alpha_1 LIEX_t + \alpha_2 TXR_t + \alpha_3 EXP_t + \varepsilon_t \dots \dots (2)$$

Where, SS_t denotes the dependent variable social security contribution. LIEX_t, TXR_t and EXP_t which indicates the life expectancy, tax revenue, and expense, are independent variable and ε_t is the white noise, respectively.

3.2 Methodology

In this study, the ARDL model is used to examine the impact of life expectancy, tax revenue, and expense on Indian social security contributions. The research is carried out in two steps: first, the variables' stationarity and cointegration qualities must be determined; second, the regression model must be estimated.

3.2.1 Unit root test

The stationarity of the variables is checked using the augmented Dickey-Fuller (ADF) [DICKEY, FULLER 1979] and Phillips and Perron (PP-1988) [PHILLIPS, PERRON 1988, unit root test. In both cases, the null hypothesis states that a unit root exists if the probability value is more than 10% and/or 5% or 1%, depending on the chosen level of significance, or if the t-statistics' absolute value is less than the critical value at a different level of significance.

Three distinct versions of the Phillips and Perron (PP-1988) and enhanced Dickey-Fuller (ADF) unit root tests were conducted:

The regression for the ADF of a random walk with a drift around a deterministic time trend test is given by the following equation.

The following model is estimated to determine whether series X_t is stationary:

$$\Delta X_t = \alpha_0 + \alpha_1 X_{t-1} + \alpha_2 t + \sum_{i=1}^p \gamma_i \Delta X_{t-i} + \mu_t \dots \dots \dots (3)$$

Where $\Delta X_t = X_t - X_{t-1}$. We state the null hypothesis and alternative hypothesis as follows:

$H_0: \alpha_3 = 0$ (if it results like this, then the series comprises unit root)

$H_0: \alpha_3 < 0$ (if it results like this, then the series does not comprise root)

If there is no unit root, the data should be combined in order 0 or I (0). When a unit root occurs, the Augmented Dickey-Fuller (ADF) test proceeds to check the stationary of the changing data with the period of taken series X_t . If the data set is X_t is stationary, the initial data set is said to be of order I (1) or I(0). Time (t) varies by $t = 1, 2, 3, 4, \dots, 31$ and the μ_t component is supposed to be Gaussian white noise random error with (p) number of observations in the sample.

3.2.2 ARDL Estimation

To study the long-run connection between social security Contributions expenses Life expectancy, and tax revenue, this study used an Autoregressive Distributed Lag Model (ARDL) developed by Pesaran and Shin (1998) and Pesaran et al. (2001). The ARDL Cointegration method was chosen over other cointegration methods, such as Engle and Granger (1987), Johansen (1988), and Johansen and Juselius (1990), due to its elasticity and efficacy for small sample size (Narayan and Smyth, 2005). There are some other benefits too to the use of the ARDL method:

- This model helps estimate the short- and long-run parameters simultaneously with a minor change.
- Pesaran et al. (2001) revealed that The ARDL model abounds with the testing procedure that is more suitable in small sample scenarios and provides consistent estimates.
- ARDL models do not cover any endogeneity problem. Rahman and Shahbaz (2013) stated that β in difference to outdated error correction approaches, the coefficients of lagged level variables are not limited to a modified error correction mechanism (ECM).

We construct the representation of the ARDL model as:

$$\Delta(SS)_t = \alpha_0 + \sum_{a=1}^p \pi_1 \Delta SS_{t-a} + \sum_{b=0}^q \pi_2 \Delta LIEX_{t-b} + \sum_{b=0}^q \pi_3 \Delta TXR_{t-b} + \sum_{b=0}^q \pi_4 \Delta EXP_{t-b} + (\delta_1 SS_{t-1} + \delta_2 LIEX_{t-1} + \delta_3 TXR_{t-1} + \delta_4 EXP_{t-1}) + u_t \dots \dots \dots (4)$$

Where,

$\pi_1, \pi_2, \pi_3,$ and π_4 are the short-run parameters.

$\delta_1, \delta_2, \delta_3,$ and δ_4 are the long-run parameters.

u_t is the Gaussian white noise error term.

$(t - i)$ shows the lagged order of the dependent variable.

$(t - j)$ shows the lagged order of the independent variable.

The occurrence of long-period linking can be studied by associating the null hypothesis with the alternative hypothesis of cointegration. The following are the null and alternative hypotheses:

Null hypothesis (no cointegration), i.e.,

Alternative hypothesis (cointegration), i.e.,

$$H_0: \pi_1 = \pi_2 = \pi_3 = \pi_4 = 0$$

$$H_1: \pi_1 \neq \pi_2 \neq \pi_3 \neq \pi_4 \neq 0$$

Designed F-statistic values are then equated to the critical values. Calculated F-statistics are less than the lower critical bound value I (0), then it means the series are not cointegrated.

In contrast, the series are cointegrated when the computed F-statistic surpasses the upper bound critical value I (1). Lastly, the cointegration choice is questionable if the F-statistic falls between the lower and upper bound critical values. When the cointegration association has been established, the short and long-run dynamics of the cointegration equations will be projected. These models' lags will be selected by severely observing the investigative checks and using suitable lag choice conditions such as the Akaike Information Criterion, Schwarz Bayesian Criterion, and the Universal to Specific modelling method.

$$\Delta(SS)_t = \delta_0 + \sum_{a=1}^p \delta_1 \Delta SS_{t-a} + \sum_{b=0}^q \delta_2 \Delta LIEX_{t-b} + \sum_{b=0}^q \delta_3 \Delta TXR_{t-b} + \sum_{b=0}^q \delta_4 \Delta EXP_{t-b} + \omega ECT_{t-1} + u_t \dots (5)$$

Where ECT denotes the error correction term, ω is the speed of adjustment. Last but not least, the superiority of the ECM and precision projected results measured with the Lagrange Multiplier test for heteroskedasticity planned by Engle (1982), the Breusch–Godfrey test for autocorrelation planned by Breusch and Godfrey (1981), and the Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUMSQ) proposed Chow (1960) and Brown et al. (1975).

4. Observed results and findings

4.1 Descriptive Statistics:

Before proceeding with regression analysis, it is essential to have the correct information about the data collected. So, we go for the descriptive statistics, which are as follows.

Table 2: Descriptive Statistics

Statistics	TXR	SS	EXP	LIEX
Mean	10.05243	0.131947	15.38325	64.40819
Maximum	12.10835	0.384681	17.22767	69.65600
Minimum	8.079454	0.028506	14.08071	57.86500
Std. Dev.	1.198127	0.088457	0.749303	3.715942
Observations	31	31	31	31

Source: Author's Own calculation

The above table's descriptive statistics, which indicate that there are 31 observations for each variable, serve as the starting point for the study's empirical inquiry. For measuring the central tendency of the variables, the mean value for tax revenue (% of GDP) is 10.05; for social security Contributions, it is 0.13; for EXP, it is 15.38. Life expectancy is 64.41. The average is the central value after the arrangement in ascending or descending order, while the mode shows the most apparent value of each variable. The maximum and minimum values tell us the highest and lowest figures in each variable.

To spread out the data the measures of dispersion have been shown; the standard deviation tells how far the observations are from the sample average for each of the variables. Here, the variables TXR (2.01) and LIEX (1.78) are less than three because a value of three implies that the distributions are normal, which is mesokurtic, but these two are platykurtic. This means that these series have lower values below the sample mean. So, in the TXR series, many matters were lower than 10.05, and in LIEX, most of the deals are more down than 64.41. So, these two are going to have a flat surface. Here, the variables TXR and LIEX are closed towards zero; hence, these two are typically distributed. Since SS and EXP have weighted a little toward one, it implies that these two distributions have a short right tail. Again, stationarity is necessary before applying the regression analysis because if the time series is non-stationary, the regression results will become false. As the above descriptive statistics indicates that all variables are normally distributed, so study elects for linear modelling using the ARDL technique.

4.2 Formal Unit Root Tests:

Before moving ahead to predict the model, check whether the variables' time series are stationary. Hence, the unit root test was applied to study the stationarity in each variable, as shown in the following table.

Table-3: Unit Root

Variables	At level	T-statistic	Prob	Decision
SS	First Difference	-1.10	0.13	I (1)
	At level	-5.63	0.00**	
EXP	First Difference	-0.84	0.64	I (1)
	At level	-7.07	0.00**	
LIEX	First Difference	-1.74	0.00**	I (0)
	At level	-4.39	0.12	
TXR	First Difference	0.44	0.80	I (1)
	At level	-5.30	0.00 **	

Notes: ** represent statistical significance at 1% level

Source: Author's Own calculation

Table 4: Lag Criteria and F-Bound Test

LAG	LOGL	LR	FPE	AIC	SC	HQ
0	-97.13	NA	0.01	6.97	7.16	7.03
1	37.50	222.86	3.56	-1.20	-0.26*	-0.91
2	59.86	30.83*	2.47*	-1.64*	0.05	-1.11*

Table 5: Cointegration Test

<i>Test Statistic</i>	<i>F-Bound Test</i>	<i>Null Hypothesis: No levels of relationship</i>		
	Value	Sign if	I (0)	I (1)
<i>F-statistic</i>	8.628146	10%	2.72	3.77
<i>K</i>	3	5%	3.23	4.35
		1%	4.29	5.61

Source: Author's own calculation

The lag selection criterion with the highest number of star signs in the second lag is displayed in Table 4. Because of this, the second latency that the criteria chosen for the bound test recommend is that we cannot rule out the null hypothesis of no cointegration once the F value is smaller than the I (0) bound. Nevertheless, the I (1) bound values reject the null if the F value is larger.

The F statistic value in Table 5 of this study is 8.628146, which is greater than the top and lower boundaries. The upper bound is 4.35 and the lower bound is 3.23 for a five percent level. At the 5 percent significance level (4.35), 8.628146 are more significant than both lower (3.23) and higher wrapped values. As such, it implies that the independent and dependent variables have a long-term equilibrium connection. Moreover, it has been determined that there is no levels relationship, rejecting the null hypothesis. It suggests a relationship between the variables. It is advised that series form long-term partnerships and cointegrate. The string can thus be integrated into a linear function since convergence will eventually occur even in the case of brief shocks that alter the movements of individual series. As a result, we run both short-run and long-run models in this case. The ARDL and VECM models are two examples of this. Furthermore, since there isn't a combination of variables with I (0) and I (1) integration, we can apply VAR in this case.

Table 6: Short-run elasticities

<i>Variable</i>	<i>Coefficient</i>	<i>T-Statistic</i>	<i>Prob.</i>
C	-1.20882	-3.848959	0.0007
SS (-1) *	-0.803993	-5.392617	0.0000
D(TXR)**	-0.035846	-2.57702	0.0163
D(EXP)**	0.070088	3.925352	0.0006
D(LIEX)**	0.009265	1.840772	0.0776

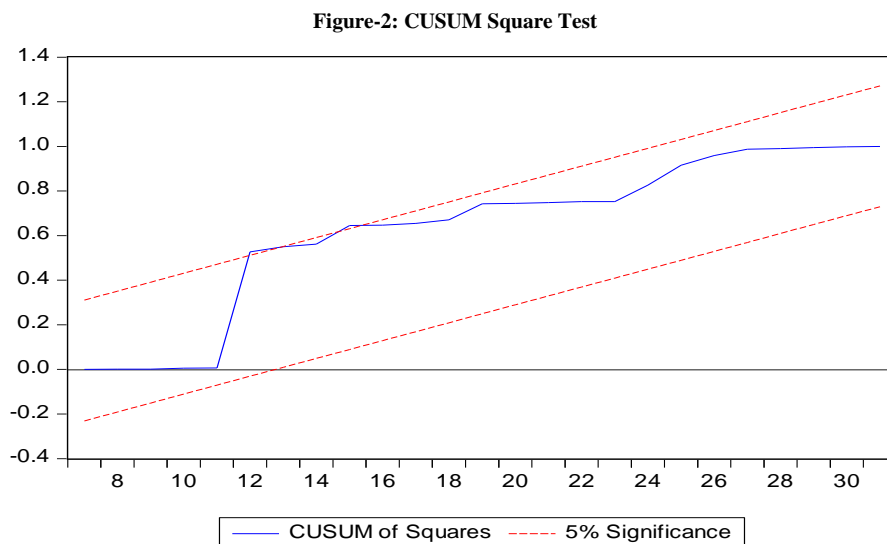
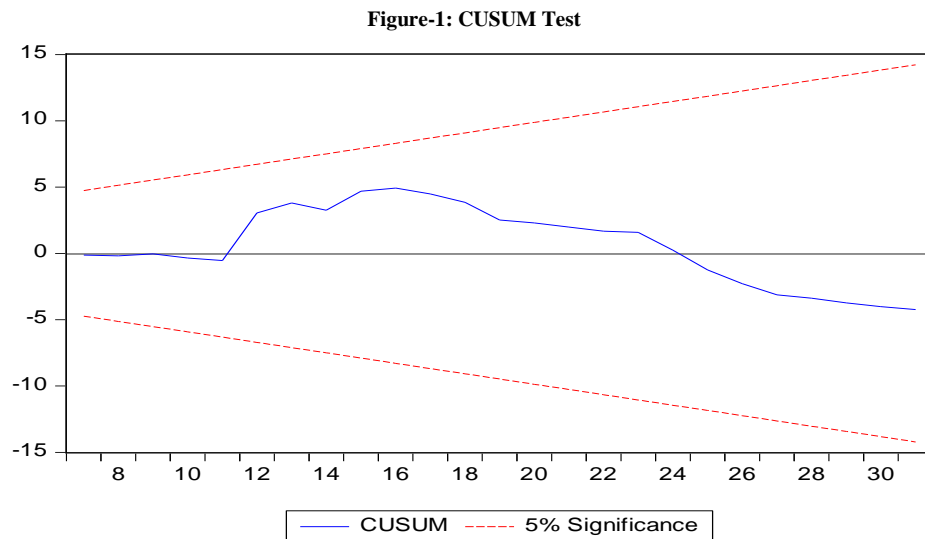
Table 7: Long-run elasticities

<i>Variables</i>	<i>Coefficient</i>	<i>t-Statistic</i>	<i>Prob.</i>
TXR	-0.044585	-2.159888	0.0406
EXP	0.087174	8.111814	0
LIEX	0.011524	2.538105	0.0178
<i>ECM Coint Eq (-1)</i>	-0.803993	-6.217242	0

Table 7 illustrates the long-term outcomes concerning both independent and dependent variables. The statistical significance of all independent variables is evident, demonstrated by probability values of less than five per cent. Notably, a persistent relationship exists with Social Contributions. Based on the significance levels observed, a one per cent increase in tax income corresponds to a 0.04 per cent decrease in social contributions, indicating an inverse relationship between these variables. Moreover, a positive correlation is observed between life expectancy and both social contributions and expenses. Specifically, a one per cent increase in expenses leads to a 0.09 per cent rise in social contributions, while a one per cent increase in life expectancy results in a 0.01 per cent increase in social contributions.

4.3 Stability parameter tests:

The findings' consistency and the ARDL model's stability were evaluated using the CUSUM and CUSUMSQ residual tests developed by Brown, Durbin, and Evans (1975). The CUSUM and CUSUMSQ test results, displayed in Figures 1 and 2, demonstrate the stability of our projected ARDL model and the absence of statistically significant basic variability evidence. The two straight lines that represent the 5 per cent significance level critical limits for the CUSUM and CUSUMSQ test statistics are found in Brown, Durbin, and Evans' formulae (1975). Consequently, the anticipated results are trustworthy and deserving of additional research. Thus, the model is appropriate for assessing how life expectancy, tax expenditures, and revenue affect India's social security.



Source: Author's own calculation

5. Result and Discussion :

This empirical investigation unveiled a negative correlation between tax income and Social Security contributions. Subsequent studies, such as those conducted by Torres et al. (2012), have echoed this relationship, indicating a negative correlation between employee income tax and social security contributions. Avenue (1983) corroborated these findings in their research, demonstrating a negative correlation between tax rates and social security contributions. Specifically, higher tax rates were associated with lower social security contributions, particularly among individuals whose income fell below the cap. Furthermore, Mateos-Planas (2008) conducted a study revealing that reductions in tax rates and the replacement rate of social security led to a decline in contributions concurrent with the rate of population growth.

Considering that this study's findings show a favorable correlation between social security contributions and the total life expectancy at birth (in years). This result is in line with studies conducted in 2013 by Bruce & Turnovsky, who discovered a favorable correlation between social security, consumption, and life expectancy. The study emphasizes how compensation benefits have a direct effect on life expectancy. Bilal et al. (2019) also discover a direct association between life expectancy and compensation benefits, as well as between social security and life expectancy, which is in line with the conclusions of Bruce & Turnovsky (2013). Their study emphasizes the link between low social security and a shorter life expectancy.

Furthermore, a June 2020 study discovered that the life expectancy of older wage workers significantly increases due to their reliance on social security as a supplementary source of income instead of just financial advantages from significant pension funds. Palmer (2019) also demonstrated how these elements lead to a significantly higher rise in life expectancy. While population increase has a negative influence on overall revenue due to its per capita impact on life expectancy, the former element deals with rising earnings and pension benefits. Alfano and Capasso's (2021) findings contradicted the earlier deduction. They discovered that while avoiding social security contributions decreases with increasing life expectancy, it climbs in response to gains in other long-term assets' returns. In a similar vein, our recent study reveals a favorable relationship between a country's GDP and social security

contributions. Ito and Tabata's (2008) study, which outlines non-monotonic growth-inequality interactions, lends evidence to this association. Furthermore, the correlation between longevity, growth in per capita income, and the increase in social security contributions, as illustrated by the government's distribution of educational costs in the overall budget, is consistent with the findings of Glomm and Kaganovich (2008).

6. Conclusions :

Retirement incentives linked to required social security contributions have been studied, with a primary focus on industrialized nations. A 2004 study by Gruber found that if governments offer more progressive incentives, people will be more likely to work into old age. On the other hand, the empirical data differs based on the model parameters applied. Less developed countries have comparable circumstances, however they are developing more slowly because of insufficient public pension systems. The governments of these countries need to give their public pension systems top priority even though their populations are smaller.

Advances in pay and the pension benefit system are correlated with increases in tax revenue, social security contributions, and per capita income. It is expected that this trajectory will accelerate economic growth and serve as a catalyst for changes in the real wage rate. In addition, social security contributions support the growth of human capital and its eventual expansion. The idea that the social security contribution system lowers tax rates and promotes development, however, is not well supported by data. To support the country's economic growth, social security reforms are essential. People will eventually be forced to stop dodging taxes because government organizations will be giving them additional benefits in an effort to improve the wellbeing of the country's citizens. As such, it is critical to create unambiguous and open programs that aim to assist the same groups of people who are unemployed and provide support until they find work. Moreover, it is imperative that the government provide the National Social Security Board more authority. Tax revenue and social security contributions are inversely correlated.

Additionally, there is a positive relationship between the amount spent on social security and the average life expectancy at birth. In particular, an increase in costs of one percent translates into an increase in social security contributions of 0.09 percent (as a proportion of revenue). Similarly, the total years of contributions to social security (as a percentage of revenue) increase by 0.01% for every 1% increase in life expectancy. Another justification is that, even in the case of government incentives for the wellbeing of society, people are still required to comply with taxes regulations. This dedication promotes a steady stream of tax revenue, which in turn propels the growth of the country.

7. Policy Suggestions and Recommendations :

- Our study revealed that expenditure and life expectancy positively affect social security contributions, but there's a negative relationship between social security contributions and tax receipts. To address this, we recommend prompt tax structure modifications to ease burdens for households contributing substantially to social security.
- To address the fiscal challenges of prolonged lifespans, policymakers should prioritise reforming tax structures rather than solely burdening labour immigrants. This entails revising average and marginal tax rates within the existing system to ensure sustainable support for longer retirements without disproportionately impacting any specific group.
- To close the social security coverage gap and align with Sustainable Development Goal (SDG 1) on ending poverty and (SDG 10) on reducing inequality, policymakers should focus on improving institutional efficiency, expanding legislative frameworks, and introducing tax incentives for caregivers of elderly dependents.
- Prioritise initiatives promoting elderly self-reliance through digital literacy, financial inclusion, post-retirement employment, and community engagement to foster socio-economic development in alignment with SDG 1 and SDG 10 goals for a secure and inclusive society.

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