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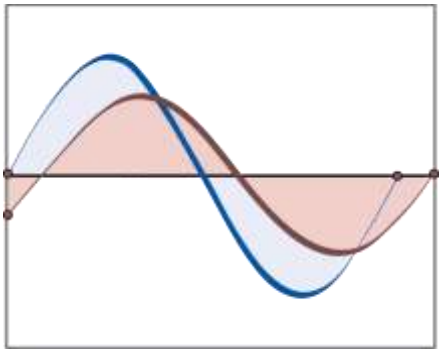

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# The Ageing Problematique in Trinidad and Tobago: Preparing for the potential impacts.

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**Abstract**

The concept of an ageing population pervades the economic literature as this demographic transition is very much a global phenomenon. This study is an initial undertaking to quantify some of the economic impacts of an ageing population in Trinidad and Tobago. Such an assessment can generate discussions on the potential impacts within the economic landscape, as the shifting demographics of the Trinidad and Tobago population poses fiscal and social costs to the domestic system. The context of an ageing population is one which may potentially create additional fiscal resource requirements while placing increased burdens on the shrinking labour force. Based on projections by age groups, the dependency ratio of the non-working aged population to the working aged has already caught the attention of the National Insurance System (NIS) engendering increased fiscal outlay on non-contributory pensions and targeted senior citizens' programmes/grants.

**JEL Classification Numbers: J26, J11, J01**

Keywords: Retirement, demographic trends, labour economics.

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# The Ageing Problematique in Trinidad and Tobago: Projecting for the future impacts

Dindial Ramrattan[1]

## 1. Introduction

Population ageing raises a range of economic and social considerations for policy makers and practitioners across the world. Internationally, the debate on ageing firstly emerged among developed nations coming out of the Vienna Plan of Action on Ageing (1982). Twenty years afterwards, the Madrid Plan of Action focused on building a society for all ages (Second World Assembly on Ageing 2002). Following from this has been extensive debate on the possible implications of an ageing population, as well as its pace of growth which is expected to be fastest in the developed and emerging market economies (Fiscal Affairs Department - IMF 2016). The European region became one of the first to respond to the issue as Germany and France made adjustments to their respective retirement age; Italy also made gradual increases to the country's retirement age as it spends more than 15 per cent of its Gross Domestic Product (GDP) on pensions (Franco 2002). In terms of building a society for all ages, the Madrid Plan represented a political declaration by governments of the world to provide enabling and supportive environments to older persons and including provision of the necessary health advancements.

The Caribbean has not been excluded from the reach of this demographic change as visible changes have been noted within the various countries' epidemiological profiles, as well as responsive changes to government spending and national programme development. In fact, in 1999, the Caribbean Community recognized the growing need for a systematic and coordinated approach to address the issue of ageing within the region; hence, the Caribbean Regional Charter on Ageing and Health. As the region emerges from the Global Financial Crisis 2008/2009 following which there has been a strong pickup in debt levels, there is a growing need for a holistic and participatory approach in formulating policies and programmes that will ease this demographic transition. The region of small island developing states is also notably at risk for labour market concerns as the ageing population may prove to negatively affect the labour force of the region. Additionally, debt concerns and social protection may prove to be competing interests for policy planners and decision makers as increased demand for resources by the aged population may need to be balanced within the economic realities of the region.

This study will be developed as an initial undertaking to quantify some of the economic impacts of an ageing population in Trinidad and Tobago. Such an assessment can add value to targeted discussions on the potential impacts within the economic landscape, as a result of the shifting demography of the country. Unlike some countries higher up the Caribbean archipelago, Trinidad and Tobago's debt levels remain manageable, albeit heightened in recent years. Buoyed by the country's energy resources and commodity price boom in the mid-2000s, Trinidad and Tobago was able to manage high levels of government expenditure and increased transfers and subsidies, before the onset of the Global Financial Crisis (GFC) 2008/2009. However, and following from falling commodity export prices and volumes, Trinidad and Tobago has been witnessing increasing levels of debt and greater constraints on government expenditure. Given the country's changed economic circumstance and in an effort to facilitate Central Government financial planning and preparedness, analysis of potential demographic shifts may be useful in understanding potential future demands resulting from the ageing of the population. It is also imperative that the social needs are not forgotten as governments attempt to match expenditure with revenue guided, in principle, by the Madrid Declaration – to which Trinidad and Tobago is a signatory; such an approach would also be in line with the words of Sir Arthur Lewis when he said, "good economics begins with an understanding of the conditions under which people live" (Theodore 2007).

In building this analysis, the MORTPAK software will be utilized to project population dynamics going forward. This study will project population growth and demographic layout to identify the population structure up to year 2050. In so doing, and using the

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appropriate demographic theory, projections will be provided allowing for impact scenarios detailing characteristics of the population such as age and gender, as well as providing estimates of employment to population and dependency ratios. Finally, the study will describe the potential transitions the economy is set to undergo as a result of the ageing population inclusive of changes to the structure of the labour force, and growing need for government expenditure on health and social programmes, particularly those directly benefiting older persons.

This study aims to highlight the potential demographic shift of the population of Trinidad and Tobago. Awareness of this oncoming transition may encourage increased consideration of this population transition in policy formulation. Another key objective of the study is to help prepare policy makers for the potential demographic shift and its impact on the macro-economy. Key macro-economic impacts may arise within the labour force, dependency ratios, government expenditure and national pension system. Additionally, the study can lay the ground work for further, more detailed analysis of impending impacts through use of census data and relevant household surveys. Finally, the study intends to encourage policy-makers to adopt a proactive approach in dealing with potential impacts and, as such, projects such impacts for the population up to year 2050.

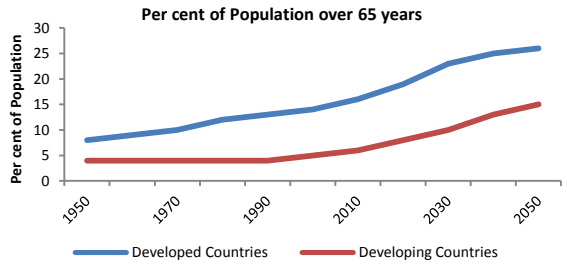
## 2. Literature Review

### 2.1 The International Reality: Global aging trends

Over the past century, the pace of population growth quickened compared to previous periods as advancements in healthcare and related technology provided for increased life expectancy throughout most regions of the world (Bloom 2016). In contrast, birth rates have been slowing as the average family size stood less than in previous decades with an increasing age at first birth per mother. To illustrate this point, in 1950 the average number of children per mother was 5 but sixty years following, this number was halved (Bloom 2016). This pattern may well continue into the coming decades as increased female participation within the education system and labour force adds further time pressures on the family unit. Further and adding to the ageing dynamic is the addition of post-war baby boomers (1946-1964) to the aged population; over the period 1946-1964 the rapid expansion in birth rates has given this cohort a significant role in the demographic shape of the world's population (European Commission 2014). As a result of this and the subsequent slowdown in birth rates, the ageing of this cohort tends to dictate a large proportion of the composition of the global population, particularly in developed countries.

The current data points to a near tripling of the numbers of persons aged 65 and over between 2008 and 2050 with more than sixty-five per cent of these persons living in developing countries (James 2009). However, additional data informs that the proportionate population over age 65 may remain larger in the developed world (26 per cent) compared to the developing (15 per cent) (Cumberbatch 2013) (Figure 1). Further, the ageing population may be expected to translate into increased dependency ratios for the age cohort 60 years and older; in fact, the old age dependency ratio for the world population has been projected to triple between 2015 and 2100 (Fiscal Affairs Department - IMF 2016). Another interesting and noteworthy dynamic is the fact that women are living longer than men. Between 2012 and 2015 there were 84 men per 100 women, aged 65 and above while for ages 85 years and above there were 61 men for every 100 women (Cumberbatch 2013). This may have implications for social welfare and non-contributory pensions given that female participation in the labour market is less than their male counterparts.

**Figure 1: The growth of the Aged Population in the Developed and Developing World**




Source: Cumberbatch 2013

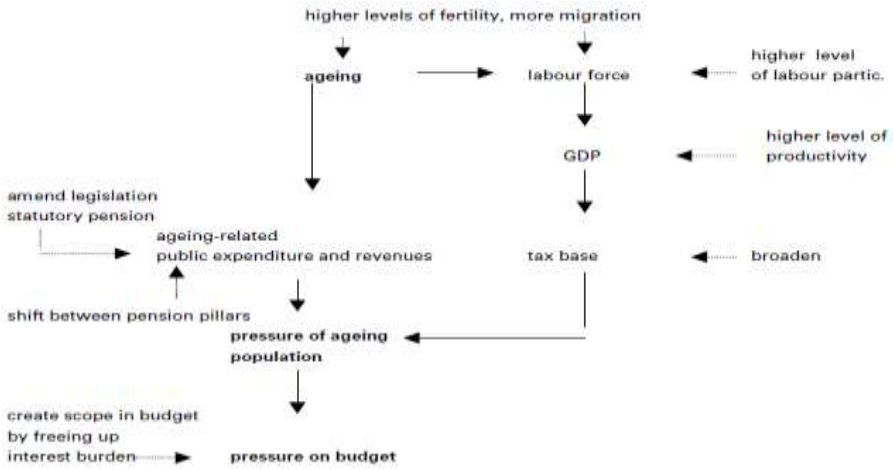
The United Nations defines 'active ageing' as the process of optimising opportunities for health, participation and security in an effort to enhance the quality of life as people age (Cloos. 2010). The Madrid Plan of Action (2002) has set the tone for much of the development in theoretical and practical approaches to ageing over recent years. Successive conferences on ageing stressed the importance of preparing for the macro-economic challenges of the 'greying' of the workforce while not limiting their capabilities in any way. Current theories on the potential impacts of an ageing population have been spread across various fields and areas of impact. These include the socio-cultural, psychological, health and economic spheres of analysis (Sander et al 2014). Sander et al (2014) further revealed that the changing demographics of world populations arose due to unprecedented economic, cultural, health and environmental advancements over the last few decades.

The fiscal challenges of population ageing must also not be underestimated. The ageing of the population can affect governments' fiscal approach through two channels, i) the expenditure component and ii) the growth enhancing component of the fiscal impulse (Clements 2015). Firstly, social welfare comprising payments through non-contributory pensions, old-age grants, health-care costs and associated grants can add to the spending burden as a direct result of the ageing population. Secondly, the ageing of a population may have implications for economic growth in countries as a large outflow from the labour force may restrict the production possibility of the respective economy (Fiscal Affairs Department - IMF 2016). This could directly impact the macro-economic fundamentals of the economy and potentially debilitate expenditure on other areas identified for development (Clements 2015). Research conducted on nations within the Organisation for Economic Co-operation and Development (OECD) showed that the more advanced economies within the OECD exhibited a positive correlation between the sovereign debt to GDP ratio and persons over age 65 and countries with an aged population, both OECD and non-OECD, realised lower rates of economic growth (Suk 2015). However, through proactive planning, inclusion of the aged population at various stages of the productive process – post retirement – may allow for transmission of their skills and experience to younger members of the workforce. Such a strategy can help improve growth rates in countries experiencing ageing of its mature labour stock.

These issues are not new to the international dialogue on ageing populations; in fact, at the turn of the millennium, much of Europe initiated the process of preparing their economies for the possible impacts of an aged population. In March 2001, the Stockholm European Council identified a multi-faceted strategy in addressing the need for policies specific to the ageing of their economies. The three broad strategic areas focussed on the issues of i) debt reduction, ii) employment and output, and iii) reform of the pension and health care systems with the latter specifically targeting the requirements of an aged population (Sociaal-Economische Raad 2002). In fact, the European Union's (EU) Economic Policy Committee estimated that expenditure related to ageing may increase by an average 5 per cent of GDP up to the year 2050 (Sociaal-Economische Raad 2002). Holistic approaches at development may assist in mitigating some of the potential pressures. As shown in Figure 2, such

reforms may require policy measures to encourage increased labour force participation – particularly by females, the underrepresented sex in the labour market (Sociaal-Economische Raad 2002). The reality of the specific country determines the approach taken, for example retirees in the United States are less dependent on government support than those in other developed economies (Suk 2015). As such, their strategy may be different from other countries.

**Figure 2: Direct approaches to ease the pressures of an ageing population**



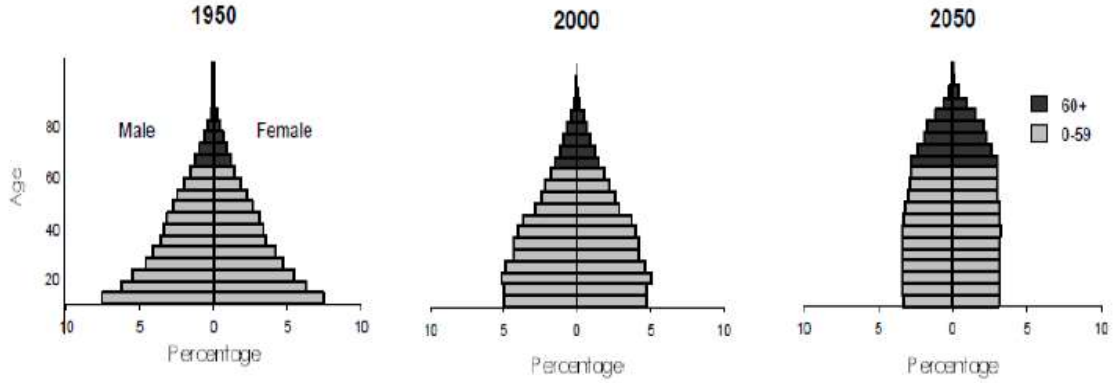

Source: SER 2002

**2.2 The Caribbean Reality: Caribbean Aging trends**

Ageing in the Caribbean is taking place at one of the more rapid paces throughout the developing world. The demographic composition of the region has been impacted by increased years of life expectancy in the post-war period, increasing from an average life expectancy of 50 years in the 1940's to an average of over 70 years by the 1990s (Rawlins 2010). Further, Rawlins (2010) presented data showing that the elderly population (65+ years) grew to 13 per cent in 2010 after averaging 10 per cent of the population in 1990 and 4 per cent in 1950. The ageing dynamic in the region may also be a function of increasing outward migration at younger working years followed by return migration in the older retirement years (James 2009). This adds further pressure on the expenditure and growth dynamics of the country. By the year 2050, it is projected that close to one quarter of the population in the region may be aged 60 years and older; additionally, the 5-year age breakdown within the 60+ categories may begin to skew towards the oldest years (80+) (Cumberbatch 2013).

While the Caribbean is expected to see a decline in population size towards the next century, the population structure is also expected to be top heavy as is expected with an ageing population (United Nations Population Divsion 2016). The factors at play are the anticipated slowdown in fertility rates (between 1.6 and 1.8 per cent) which is below replacement levels for the region (2.1 children per mother) and the improvements in health care leading to increased life expectancy throughout the region (St. Bernard 2016). Over the period 1950-2050 the region is projected to witness a significant narrowing of its population under the age of 15 which may be a function of the ageing of the previous generation and the lower than replacement levels of fertility rates. At the same time, the over 60 age categories show significant widening as 'baby-boomers' mature and mortality rates fall due to improvements in healthcare (Figure 3).

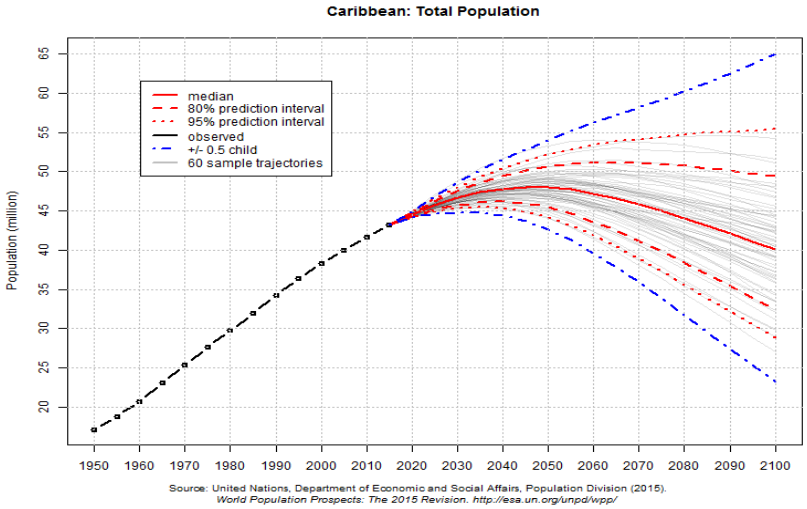
**Figure 3: Population Pyramids and Projection for the Caribbean 1950-2050**

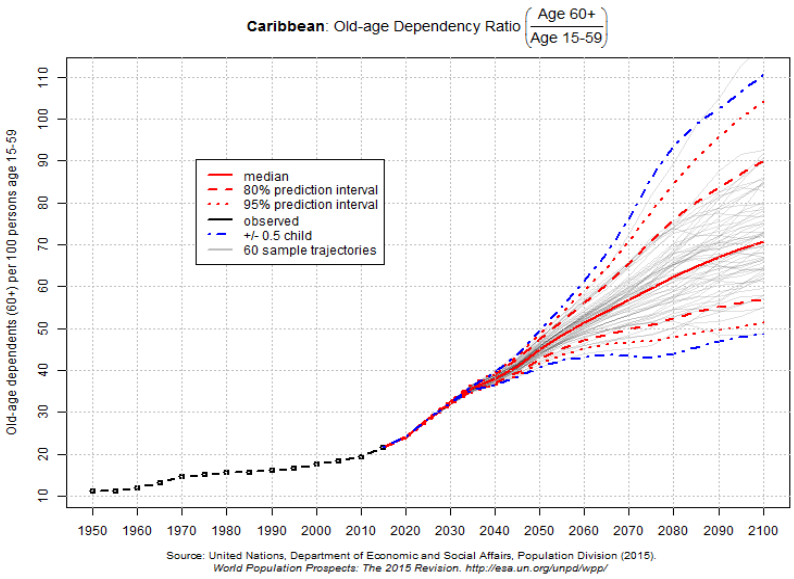



Source: Cumberbatch 2013

The growing population in the over 60 age categories combined with the narrowing of the younger segments may fuel an upward trend for old-age dependency ratios in the region. As the dependents (person over age 60) expand at a faster rate than the non-dependents (persons age 59 and under) the old-age dependency ratio can be also expected to increase over time (Figure 4). This increase indicates that there will be fewer persons supporting the expanding aged population. This may place further strain on public pension systems and the Central Governments' fiscal frameworks. Additionally, a more stringent measure of the anticipated impacts of the aged population is the ageing index. This represents the population aged 60 years and older as a ratio of the population under 15 years of age (Bloom 2016); this measure is also expected to increase over the time horizon.

**Figure 4: Projected Population Growth and Old-age Dependency ratio for the Caribbean 1950-2100**






Source: United Nations Population Division

Countries within the region have already begun to experience and react to some of the challenges posed by the ageing of their respective populations. In 2000, the National Insurance Corporation (NIC) of St. Lucia began a phased process of moving its retirement age from age 60 to age 65. The NIC adjusted the retirement age by a single year every three years, ending 2015. The NIC identified the decision to increase the retirement age as a strategic one aimed at ensuring the long-term viability of the plan and adherence to its mandate of providing social and financial protection to the population (National Insurance Corporation 2015). These changes were not exclusively occurring in St. Lucia but took place in many other countries within the region. In fact, in 2006 and as a result of a series of pension reforms commencing in 2003, Barbados initiated the process of moving its pensionable age from age 65 to 67. In due course, the country proposed the introduction of a flexible band for retirement spread across ages 60 to 70. Likewise, St. Vincent earmarked an increase in its retirement age in 2014 but this adjustment is to be implemented in the medium term.

## 3. Methodology

The research utilised secondary data to test for the particular relationships identified. The main focus of the research is to collate and present a forward-looking analysis of the impact of the ageing population on the macro-economic and social variables under consideration built on empirical evidence. The empirical analysis is simple in itself but for the projections up to 2050, demographic analysis and projections using MORTPAK will be undertaken. This process will require extensive population data on birth and death rates, life expectancy, population by sex and age groups and net migration and fertility rates. While an initial assessment suggests this data is available, the issue remains the timeliness of said information. As such, estimation of some variables will be required, particularly migration data. Once this is completed, the discussion will be developed using standardised population estimates for employment, health and welfare/pension considerations.

The initial charter of the research is to identify the current demographic profile of Trinidad and Tobago based on the 2011 Population and Housing Census. This investigation will help lay the platform for outward population projections and provides the necessary baseline for estimates of the macro-economic impact of the ageing population. Further, from the available census information, the necessary dependency ratios are to be calculated and compared to previous data. This will allow for a

monitoring of the path of age specific dependency in the domestic setting while also allowing a baseline comparison for the estimation of future changes. Projection of the dependency ratios may also set the tone for the development of a framework to respond to potential challenges placed by the ageing of the population, including demands on pensions/grants – both contributory and non-contributory, as well as the narrowing of the working age population which may impact the inflows to the National Insurance System (NIS) and tax base of the domestic economy. While the potential long-run impacts on growth are not captured within this study, the estimation of the labour force and dependent population can inform any future investigative work in this area.

The study utilises the MORTPAK software for projections of the five-year age groups between the years 2020 and 2050. These projections allow for an estimation of the population structure going forward and quantification of the potential demographic changes which may be expected. MORTPAK is software provided by the United Nations Population Division to developing countries to facilitate demographic measurement in their countries. The software allows for population projections including estimates of mortality and age breakdown of projected populations. MORTPAK, developed in 1988, uses a series of 17 demographic programmes to project population growth[2]. The programme uses a series of equations which allows for life-table construction, indirect fertility and mortality estimation in creating population projections. The United Nations model-life table system and generalized equations are the main tools to project for demographic changes in a given country. In cases where data to specific variables are unavailable, the researcher can perform the relevant estimation procedures and input this information into the system. MORTPAK also allows for variable measures of population growth using scenarios. The user can define whether a high growth, low growth or constant growth estimation is required. Dependent on which scenario is chosen, the software projects the mortality, fertility and migration rates for each scenario (theoretically).

The data required for the provision of projections includes the fertility rate, mortality rates by age groups and q(x,n) values (probability of dying), estimation of migration and available population data for the base period of the estimates. The software utilises the available information to make projections on population growth and structure, assuming that rates remain constant (constant projections). This essentially grows (or decreases, if that is the case) the population on annual basis considering the net population change. Using the age-specific fertility and mortality rates and estimation of migration across each life year, the base population for the respective age is adjusted accordingly.

$$\sum_{p=0}^{\infty} p_{t+n} = \sum (P_t + B_{t,t+n} - D_{t,t+n} + M_{t,t+n})$$

Where,

$P_{t+n}$ = the population change between time periods;
$P_t$ = population in base period (latest census);
$B_{t,t+n}$ = live births between time intervals;
$D_{t,t+n}$ = deaths between time intervals
$M_{t,t+n}$ = net migration between time intervals (in-migrants less out-migrants).

The above formula provides an estimate of population change over time. In the constant projections model, the birth and death rates are kept in line with recent trends; however, policy planners may increase or lower rates to ascertain the potential population change should they assume any shift in the demographic patterns. Using this formula, projections are compounded in each subsequent year. The projections will also be sex specific allowing for estimation of the male and female dynamics to be captured within the framework. Additionally, dependency ratios and household profiles may be computed based on the results obtained. In this case, the projections will be based on a constant growth framework and this can be amended as more timely

[2] http://www.un.org/esa/population/publications/mortpak/MORTPAKwebpage.pdf

and accurate data becomes available. For the purpose of population projections, the use of available data such as q(x,n) values (probability of dying) can be sourced from the 2011 Population and Housing Census and fertility and mortality rates may be obtained from the most recent Population and Vital Statistics Report (2008). Using these data points, the fertility rate imputed was 1.7 children with the highest age-specific fertility rate between ages 20-29.

Another critical component of the research exercise is the standardisation of the potential macro-economic impacts arising out of the ageing of the population. These impacts will require use of available labour force and demographic information to quantify the potential transition of the population's dependent and working populations, as the ageing process continues. In light of this, data from the quarterly Continuous Sample Survey of the Population (CSSP) can provide the necessary ratios to compute the impacts on the labour force and employment ratios, thereby informing of the standardised impact on the dependent population. Further, the available mortality and prevalence breakdown of chronic disease by age categories can help gauge the potential health demands arising out of the ageing of the population. It must be noted that the process of standardization uses empirical data to estimate future impacts. As such, these estimates are often used as a guide of constant projected impacts on the economy and can be updated as data becomes available.

The estimates of old-age welfare expenditure will be derived using a blended approach; population data, sourced from the 2011 Population and Housing Census, and beneficiaries, recipients and expenditure data captured from the Social Sector Investment Programme (SSIP) and the Household Budget Survey (HBS) 2008/2009. The estimation process of potential future impacts were computed using the ratio of beneficiaries at the current time applied to the projected population up to year 2050. This process of standardisation provides a benchmark for policy planners. The estimation of Senior Citizens' Grants is also manually adjusted by amending the ratio of recipient per working age population. This allows the model to be somewhat dynamic where structural and cyclical movements may be included as the economy ages. In this instance, the adjustment was made accounting for the slow but steady pickup in female participation rates in Trinidad and Tobago.

*Data Sources*

The data used within this study comprised a broad range of household surveys and a certain component of macro-indicators. At the population level, data from the 2008 Population and Vital Statistics report provided the required birth and death rates, as well as fertility indicators. Further, the Vital Statistics component provided extensive data on cause of death allowing standardisation of death rates due to chronic disease. The HBS 2008/2009 guided the estimates of pension and Senior Citizens' Grant beneficiaries, as well as supplemented the estimates of the age breakdown of the labour market. Budget documents, namely the SSIP, provided further data on the recipients of Senior Citizens' Grants and estimates of the value of said payments – this was done using reports spanning the period 2005 – 2016. This data provided the base calculations of potential future recipients and payment values for said grant. Additionally, data sourced from the Actuarial Report of the National Insurance Board (NIB) further informed the impact on national pension schemes. The source of this data was publicly published Actuarial reports of the NIB covering the period 2006 – 2012. Population projections and migration counts required data from both the 2000 and 2011 Population and Housing Census. Additionally, the CSSP – between years 2000 and 2012, as well as quarterly labour force reports – post 2012 were used to update the labour market component of the study. Other sources of data included: the World Bank for health expenditure data and selected indicators from the Central Statistical Office.

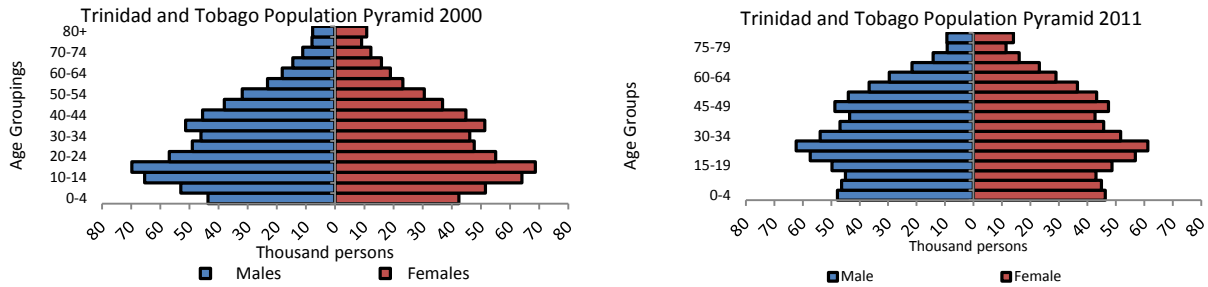
## 4. Baseline: Demographic analysis of Trinidad and Tobago's Ageing Population

*Population Dynamics*

The Central Statistical Office (CSO) last conducted a National Population and Housing Census in 2011. The data from this census showed the population pyramid becoming more top heavy, with 13.4 per cent of the population falling into ages greater

than 60 years compared to 10.0 per cent in 2000 (Central Statistical Office 2012). Additionally, in the case of the 2000 census, the 15-19 age group had the largest share of the total population; however, by 2011, the 25-29 age group held the largest population share. The population of elderly (over 60 years of age) is projected to increase to 17.7 per cent in 2025 and just over 30 per cent by 2050 (Rouse 2014). The projected demographic composition suggests that there will be further need for policies and programmes directly targeting the ageing population and responding to the macro-economic implications of such population changes.

**Figure 5: Trinidad and Tobago Population Pyramids 2000-2011**




Source: Central Statistical Office

*Dependency Ratios*

The dependency ratios for Trinidad and Tobago suggest some of the expected findings based on the literature reviewed but with one notable diversion from the norm. The comparison of the census data for 2000 and 2011 showed that while the dependency ratio (persons under age 15 and over age 60 as a proportion of the working age population – ages 15-59) declined over the period, the old age dependency ratio in fact increased; the overall falloff was due to a more rapid decline in the young age dependency ratio. Lower fertility rates contributed to this reduction in the young population as birth rates of those who transitioned into the over 15 age categories was less than the required for replacement. An additional contributing factor may have been increased levels of migration of persons within these age categories. The overall dependency ratio fell from 55 dependents per 100 working age persons, in 2000, to 51 dependents per 100 working age persons in 2011. The respective age ratios showed contrasting movements as the old age dependency ratio (persons over age 60 as a proportion of the working age population – ages 15-59) rose from 16 dependents per 100 working age persons (2000) to 20 dependents per 100 working age persons in 2011. Conversely, the young dependency ratio (persons under age 15 as a proportion of the working age population – ages 15-59) exhibited a sharper movement in the opposite direction with a decline to 31 dependents, in 2011, from 39 dependents per 100 working age persons in 2000 (Table 1). If one were to apply the more widely used definition of dependency (persons over age 65 and under age 15) and the working population as persons between ages 15 and 64 – the ratios are lowered but the pattern remains the same. Using this metric, the old age dependency ratio increased to 13 dependents per 100 persons of working age in 2011 from 10 dependents per 100 working aged persons in 2010. In this period, the young dependent ratio fell by 9 persons to 29 young dependents per 100 working aged persons in 2011.

These relationships validate the literature of Rouse (2014) and Cumberbatch et.al (2013) which suggested that the ageing population dynamic is the result of slowing growth in the younger age categories and comparatively faster movements in the older groupings.

**Table 1: Trinidad and Tobago Dependency Ratios 2000-2011**

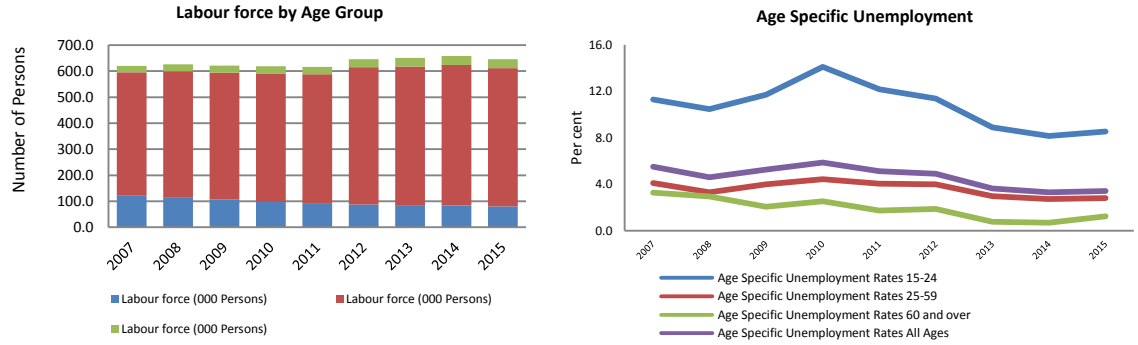
| | 2000 | | | 2011 | | |
|---|---|---|---|---|---|---|
| | **Both Sexes** | **Male** | **Female** | **Both Sexes** | **Male** | **Female** |
| **Working Years 15-59** | | | | | | |
| Age Dependency Ratio - Total | 0.55 | 0.54 | 0.56 | 0.51 | 0.50 | 0.52 |
| Age Dependency Ratio - Old | 0.16 | 0.14 | 0.17 | 0.20 | 0.19 | 0.22 |
| Age Dependency Ratio - Young | 0.39 | 0.39 | 0.39 | 0.31 | 0.31 | 0.31 |
| | | | | | | |
| **Working Years 15-64** | | | | | | |
| Age Dependency Ratio - Total | 0.48 | 0.47 | 0.49 | 0.42 | 0.41 | 0.43 |
| Age Dependency Ratio - Old | 0.10 | 0.10 | 0.11 | 0.13 | 0.12 | 0.14 |
| Age Dependency Ratio - Young | 0.38 | 0.38 | 0.37 | 0.29 | 0.29 | 0.29 |

Source: Central Statistical Office 2012

*Labour Market*

At first glance, the growth pattern within the labour force and employment numbers does not appear to show any significant transition over the period. Growth in the labour force has been observed over the period, with falling unemployment rates over most age categories. In 2015, the total number of persons employed grew by some six per cent from 2007, accompanied by growth in the labour force of around 3.7 per cent. As a result of the faster pace of growth in numbers employed, the total unemployment rate declined from 5.6 per cent in 2007 to 3.4 per cent in 2015. However, a detailed analysis by age categories paints a more concerning picture and one with significant future implications. Between 2007 and 2015, the numbers of persons employed and the labour force within the 15-24 age categories declined by more than 30 per cent and 35 per cent, respectively (Figure 6). Conversely, the respective ratios for persons over age 65 increased by more than 40 per cent. While the nominal value for the over 65 category is significantly less than that of the younger age grouping, this pattern will have meaningful impacts as the population ages further, especially given the fact that the age category 50-59 – which accounts for around one in five persons employed and in the labour force – also expanded at a rapid pace (persons employed increased approximately 35 per cent and labour force grew by close to 32 per cent between 2007 and 2015).

**Figure 6: Labour force and Age Specific Unemployment Rates**




Source: Central Statistical Office

The data on emigration for Trinidad and Tobago coming out of the 2011 Population and Housing Census also fits into the *a priori* expectations as derived from the literature. Excluding the not stated category, the largest number of persons leaving the country came from the age groupings 15-29; in fact, these three groups, identified in Figure 6, accounted for over 40 per cent of the persons leaving the country by 2011; further, of the total persons leaving the country, females accounted for 56.6 per cent (Table 2). The educational attainment of outward migrants also adds cause for further investigation. The two segments of out-migrants accounting for the largest share (excluding those not stated) were persons having achieved secondary (56.9 per cent) and tertiary level (18.4 per cent) education. This reveals that a large proportion of the lost workers are the more skilled or trained persons. Further, total out-migrants between ages 15-39 with either primary or secondary education accounted for just about 50 per cent of all persons leaving the country; this represents the more productive life years. Of total migrants, persons with tertiary level educational attainment and between ages 15-64 accounted for just under 15 per cent.

The headship of households was also analysed according to age groupings coming out of the 2011 Population and Housing Census. The data showed that of the majority of heads of households fell into the age categories 40-64 (55.4 per cent) with 20.1 per cent of all heads of households being of age 65 and above; the remaining quarter of all the target population were aged 15-39 years.

**Table 2: Profile of Persons who emigrated, 2011**

| | Persons Emigrated | | | Educational Attainment - Emigrants | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total* | Male | Female | None** | Primary | Secondary*** | Tertiary**** | Other | Not Applicable | Not Stated |
| **All Ages** | **15,455** | **6,421** | **8,745** | **448** | **1,560** | **8,801** | **2,837** | **151** | **546** | **1,111** |
| **0-4** | 525 | 176 | 187 | 297 | - | - | - | - | 5 | 223 |
| **5-9** | 298 | 121 | 151 | 36 | 226 | - | - | - | - | 35 |
| **10-14** | 609 | 285 | 314 | 2 | 293 | 286 | - | 1 | 1 | 25 |
| **15-19** | 2,177 | 964 | 1,186 | 6 | 55 | 1,997 | 62 | 13 | 1 | 42 |
| **20-24** | 2,325 | 940 | 1,365 | 6 | 53 | 1,622 | 575 | 16 | 13 | 40 |
| **25-29** | 1,858 | 746 | 1,099 | 5 | 66 | 993 | 704 | 23 | 15 | 52 |
| **30-34** | 1,229 | 537 | 684 | 2 | 43 | 694 | 419 | 13 | 19 | 38 |
| **35-39** | 734 | 292 | 437 | 2 | 57 | 437 | 185 | 8 | 19 | 28 |
| **40-44** | 518 | 194 | 318 | 3 | 72 | 284 | 119 | 2 | 16 | 22 |
| **45-49** | 461 | 156 | 303 | 8 | 93 | 208 | 94 | 20 | 17 | 22 |
| **50-54** | 299 | 100 | 196 | 5 | 77 | 118 | 57 | 6 | 24 | 13 |
| **55-59** | 199 | 61 | 139 | 2 | 49 | 86 | 32 | 2 | 18 | 11 |
| **60-64** | 122 | 50 | 71 | 2 | 33 | 49 | 18 | 4 | 9 | 7 |
| **65-69** | 70 | 26 | 45 | 4 | 21 | 21 | 6 | - | 9 | 10 |
| **70-74** | 29 | 10 | 19 | 3 | 7 | 4 | 4 | 2 | 1 | 7 |
| **75-79** | 22 | 10 | 11 | - | 8 | 6 | 2 | - | 3 | 3 |
| **80+** | 32 | 9 | 22 | - | 19 | 4 | 2 | 3 | 1 | 2 |
| **Not Stated** | 3,948 | 1,746 | 2,199 | 62 | 388 | 1,994 | 559 | 38 | 375 | 534 |

Source: Central Statistical Office 2012

**Table 3: Headship of Household by Age groups, 2011**

| | Relationship to Head of Household | |
|---|---|---|
| | **Head** | **Spouse/Partner of Head** |
| | *(per cent)* | |
| **All Ages** | 100 | 100 |
| **0-14** | - | - |
| **15-19** | 0.2 | 0.6 |
| **20-24** | 1.7 | 3.9 |
| **25-29** | 5.5 | 8.8 |
| **30-34** | 8.0 | 11.1 |
| **35-39** | 9.2 | 11.9 |
| **40-44** | 10.0 | 12.0 |
| **45-49** | 12.4 | 13.6 |
| **50-54** | 12.4 | 12.0 |
| **55-59** | 11.1 | 9.6 |
| **60-64** | 9.4 | 6.8 |
| **65+** | 20.1 | 9.7 |

Source: Central Statistical Office 2012

* No sex was given for 289 migrants, therefore the male and female components do not equate to the total.

** Includes only ECCE/Nursery/Kindergarten

*** Includes secondary and post-secondary

**** Includes Non-University and University

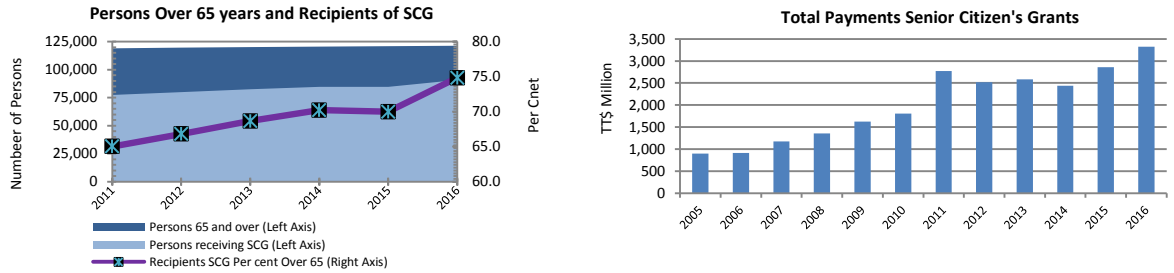
*Central Government Expenditure*

Central Government expenditure on an ageing population is another facet of the macro-economic landscape which may become increasingly important as the ageing of the population accelerates. Over the period 2007-2015, the number of persons in receipt of the Senior Citizen's Grant expanded by more than 25 per cent with expenditure on the programme increased by almost 150 per cent. The significant expansion in expenditure was the result of two changes over the period, i) growing numbers of persons on the programme and ii) changed maximum payment and income ceilings over the period. As a result of these demographic and policy changes, the revised estimate of expenditure for Fiscal Year 2016 reached a record high of TT$ 3.3 billion (Figure 7). Additionally, three quarters of the population over age 65 were in receipt of the grant, of which three in every four beneficiaries were estimated to be receiving the maximum amount[3] (Ministry of Social Development 2007-2016); thus, this signals that a large segment of the aged population are without sufficient contributory pension and annuity payments in the older years.

Further, Central Government expenditure on health has been one of the largest segments of total government expenditure over the period 2007-2014. The growing expenditure on health has been spread across service delivery (Regional Health Authorities), provision of medications and health equipment (Chronic Disease Assistance Programme (CDAP)) and educational and awareness programmes. As a per cent of total expenditure, the government's share of spending has exceeded private expenditure over the period 2007-2014 (Figure 8). Additionally, fiscal expenditure faces the added need to provide a predefined list of pharmaceutical items to the general public through the CDAP programme. Based on the 2008/2009 Household Budget Survey, more than 40 per cent of the population over age 65 access this programme; as such, as the aged population expands this programme may require an increased allocation of fiscal resources.

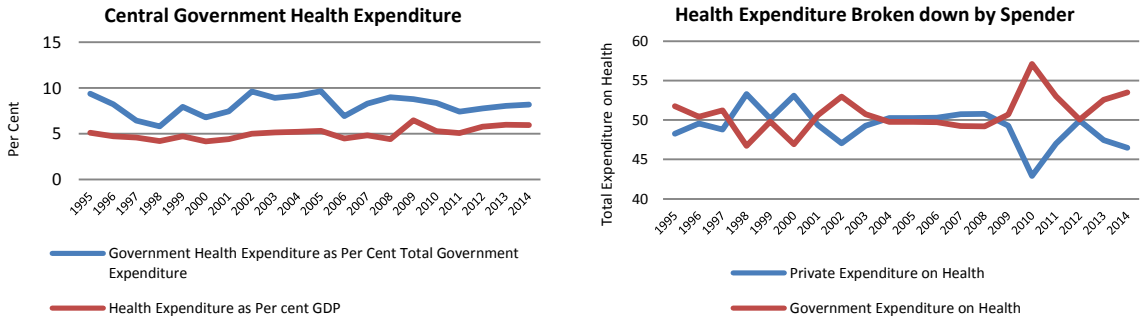
[3] The Senior Citizens' Grant is provided to those senior citizens who are without sufficient pension and annuity payments. A maximum level of monthly receipts is provisioned for within grant payments. Households receive part of or full payments to take their monthly receipts to a threshold amount. Households in excess of the threshold do not receive Senior Citizen's Grants.

**Figure 7: Current Senior Citizens' Beneficiaries and Grant Payments**




Source: Social Sector Investment Programme (various years) and 2011 Population and Housing Census.

**Figure 8: Health Expenditure and Spender**



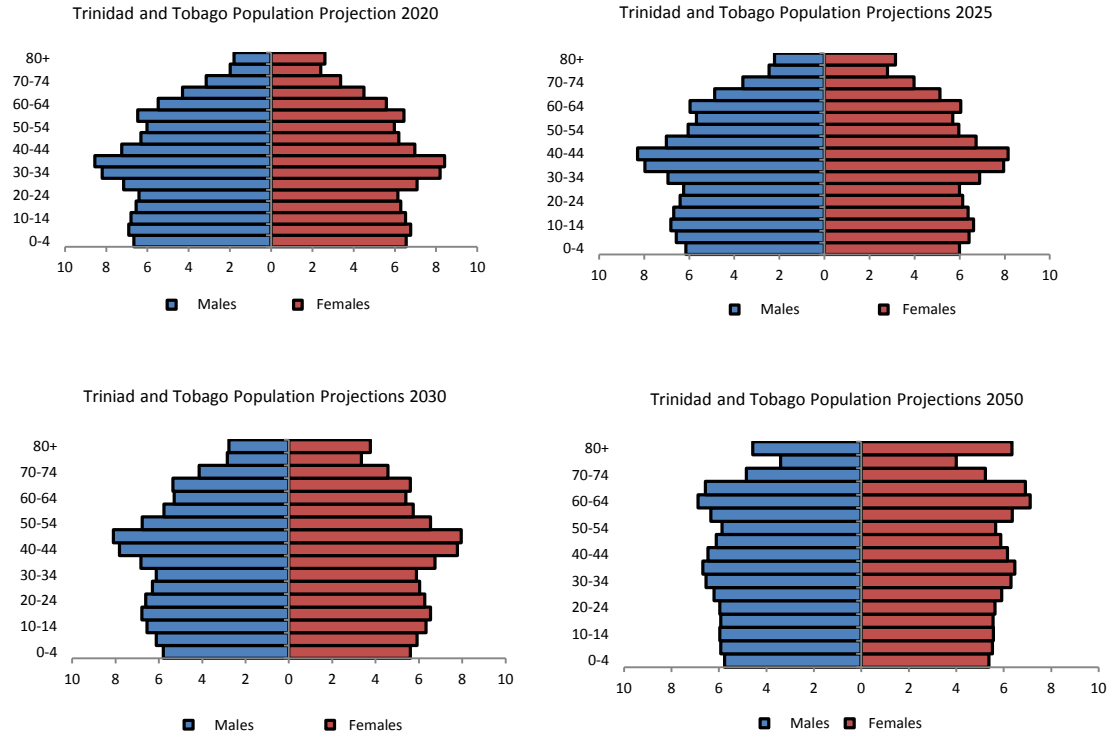

Source: Global Health Observatory Data Repository 2016

## 5. Population Projections for the Domestic Economy

*Population Dynamics*

The projections for the domestic economy show a further widening of the aged population aged 60 years and over. This is estimated to accompany a falloff in the persons of working age while the young population may remain, more or less, stable. By the year 2030, the modal age groups may be the 40-54 groupings for both males and females, further highlighting the ageing dynamics of the population. Further ahead, the projections for 2050 show a deepening of population ageing, with the age category 60 to 69 accounting for the highest proportion of the total population (Figure 9). As the population ages, the older categories may experience growing differentials between the numbers of females and males, with the former sex in the majority – post age 65. Further, the projections not only cater for population growth at the older ages but also predicts contracting populations at the younger groupings, with the less than age15 category most affected. The narrowing of the pyramid at the young and middle-aged categories may eventually cause a contraction in the total population by 2050, but with the largest age segments of the population falling within the older age categories. For this variable, the assumption is that the population undergoes constant changes by holding mortality and fertility rates constant. This helps capture what is the current path within the estimation process and provides policy-planners with estimates of potential impact.

**Figure 9: Trinidad and Tobago Population Projections 2020-2050**




This pattern is particularly worrisome as the working population is projected to decline over the twenty years ending 2050, resulting in a sharp increase in dependency ratios and threatening to strain both the contributory and non-contributory pension systems and welfare grants, *ceteris paribus*. By 2050, the overall dependency ratio is expected to increase to 0.61 dependents per working aged person, from 0.47 dependents in 2020. These projections suggest that the individual working aged person may be required to provide increased support over the period. Also important is that the increase in the dependency ratio is the result of a pickup in the old dependency ratio as the respective young dependency ratio is projected to decline. Over the period, projections suggest the old ratio may move to 0.18 dependents in 2020 before consistently increasing to reach 0.34 dependents in 2050; over the same period, the young ratio is expected to start at 0.30 dependents per working age person and slow to 0.27 dependents by the end of the reference period (Table 4).

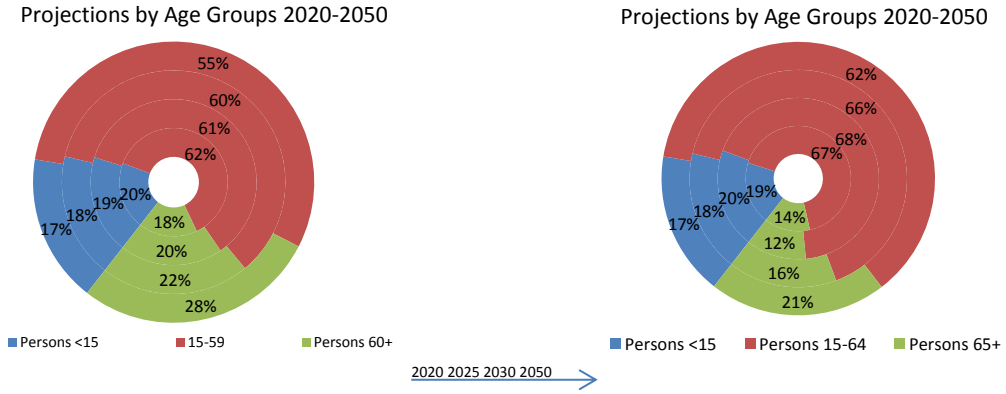
*Dependency Ratios*

Based on the population projections the working age labour force (ages 15-59) is expected to shrink over the period 2020 to 2050. Simultaneously, there may be an anticipated contraction in the young age categories but a significant upswing in persons aged 60 and above. As a result, the dependency ratio may increase to 60 dependents per 100 working aged persons in 2020 with consistent growth up to year 2050, where it should average more than 80 dependents per 100 working aged persons. This movement is anticipated as the old age dependency ratio climbs from 28 persons above age 60 in 2020 to 51 persons above age 60 per 100 working age persons in 2050. This may pose significant constraints to the labour market given the current retirement age (60 years) and the fact that a growing aged population could negatively impact the available labour supply. In contrast, the young dependency ratio is projected to lessen to 31 persons under age 15 per hundred working aged persons in 2050, from 32 persons in 2020 (Table 4).

**Table 4: Projected Dependency Ratios 2020-2050**

| | 2020 | | | 2025 | | | 2030 | | | 2050 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Working Years 15-59** | **Both Sexes** | **Male** | **Female** | **Both Sexes** | **Male** | **Female** | **Both Sexes** | **Male** | **Female** | **Both Sexes** | **Male** | **Female** |
| Age Dependency Ratio - Total | 0.60 | 0.59 | 0.62 | 0.65 | 0.63 | 0.67 | 0.40 | 0.39 | 0.41 | 0.82 | 0.78 | 0.85 |
| Age Dependency Ratio - Old | 0.28 | 0.27 | 0.30 | 0.33 | 0.31 | 0.35 | 0.36 | 0.33 | 0.38 | 0.51 | 0.47 | 0.55 |
| Age Dependency Ratio - Young | 0.32 | 0.32 | 0.32 | 0.32 | 0.32 | 0.32 | 0.30 | 0.30 | 0.30 | 0.31 | 0.31 | 0.31 |
| | | | | | | | | | | | | |
| **Working Years 15-64** | | | | | | | | | | | | |
| Age Dependency Ratio - Total | 0.47 | 0.46 | 0.49 | 0.50 | 0.49 | 0.52 | 0.34 | 0.34 | 0.35 | 0.61 | 0.59 | 0.64 |
| Age Dependency Ratio - Old | 0.18 | 0.16 | 0.19 | 0.21 | 0.20 | 0.23 | 0.25 | 0.23 | 0.27 | 0.34 | 0.31 | 0.37 |
| Age Dependency Ratio - Young | 0.30 | 0.30 | 0.29 | 0.29 | 0.29 | 0.29 | 0.28 | 0.28 | 0.27 | 0.27 | 0.28 | 0.27 |

**Figure 10: Projections of Dependent Age Groups and Working Population 2020-2050**




*Labour Market*

The aggregation of these movements may reduce the available labour force, given current employment practices. By 2050, the working aged groups may account for 55 per cent of the total population, down from a projected 62 per cent in 2020 while the population above age 60 may grow to almost 30 per cent in 2050 – up from a projected 18 per cent in 2020 (Figure 10). Such a situation may transmit into some tightening of labour market conditions and potential loss of skilled, trained and experienced workers, should current labour market practices be maintained (retirement at age 60) and insufficient succession planning be adopted. Further, the potential fall out in tax revenues from a reduced work force and changed consumption patterns of an older population are also noteworthy. The shrinkage of the population by 2050 and possible growth in the old age populations may also require more extensive policies and programmes by the government to provide appropriate amenities and suitable infrastructure for the growing aged population, including an expansion of social spending on initiatives such as Senior Citizens' Activity Centres and increased subventions to Senior Citizens' Homes, unless more market oriented strategies are implemented to keep persons engaged for a longer period, such as voluntary continuation of employment past age 60.

For this analysis, the model estimates that the retirement age is held constant and there is no significant changes within the structure of Trinidad and Tobago's labour force. Certain professions may encourage or, alternatively, dissuade older persons from participating in the labour force and this may impact participation and unemployment rates in each age category. However, in keeping with analysing in line with the current reality, no estimation of such potential changes is accounted for.

Currently, National Insurance Benefits are provided at age 60 and above to persons who would have contributed into the system during their working lives. As at Fiscal Year 2014, the number of recipients of said pensions amounted to 135,049 persons but this is projected to increase to more than 350,000 persons by the 2060-2063 period; however, the contributors into the plan are expected to decrease to 378,352 persons by the end of this reference period. As a result, the contributor to pensioner ratio is expected to decrease from 3.7 persons to 1.1 persons over this period (National Insurance Board 2013). This has resulted in amendments to the contribution arrangements over the years to properly protect against any depletion of the NIB's funding base for purposes of sustainably managing the plan.

*Central Government Expenditure*

Further, another important aspect of pension provision and, by extension, fiscal expenditure which needs to be considered going forward is the provision of the Senior Citizens' Grant – an allocation which is given to persons beyond age 65 falling within a stated monthly income range. This grant has been viewed as a means to ensuring senior citizens have access to an acceptable standard of living given their incomes, post retirement. Over time, the maximum income ceiling and grant amounts have been adjusted considering the economic realities of the day. Assuming that the current rate of access to the grant is maintained over the period and given population projections, it is estimated that by 2050 close to 220,000 persons will be accessing this grant. Given the current rate of payment, this may be approximated to a fiscal cost of just under TT$ 7.5 billion (Table 5), more than double the revised estimate value for Fiscal Year 2016 (TT$ 3.3 billion). Such an extensive fiscal outlay requires further investigation as this is an item of recurrent expenditure and may continue to increase as population ageing deepens. As stated in previous components, the aim of the study is to measure what potential impacts are given the current reality. As such, analysis for this section uses the current payment rates for Senior Citizens' Grants and maintains the ratio of beneficiaries to population, going forward. The model is dynamic enough that it can be adjusted to changes in these relationships, as they happen.

**Table 5: Projected Senior Citizens' Beneficiaries and Payments 2020-2050**

| | 2020 | 2025 | 2030 | 2050 |
|---|---|---|---|---|
| | (Number of Persons) | | | |
| Projected Population 65+ | 169,121 | 201,343 | 232,863 | 293,129 |
| | | | | |
| Projected SCG Beneficiaries | | | | |
| - 75 per cent | 126,841 | 151,008 | 174,647 | 219,847 |
| - 50 per cent | 84,561 | 100,672 | 116,432 | 146,564 |
| | | | | |
| Projected SCG Payment | ( TT$ per year) | | | |
| - current average (75 per cent assumption) | 4,286,614,967 | 5,103,327,600 | 5,902,236,400 | 7,429,754,939 |
| - current average (50 per cent assumption) | 2,011,217,919 | 2,857,743,312 | 3,402,218,400 | 3,934,824,267 |

Another concern may be the fact that, given the current incidence rates of chronic non-communicable diseases (CNCDs), the quantum of persons living with CNCDs may also place additional demands on fiscal expenditure, specifically healthcare costs. Such a burden may add further strain to both the expenditure and growth dynamics of Central Government spending. Going forward, frequent updates of this framework may provide suitable demand estimation for public healthcare resources in the country. Using prevalence rates, standardised to 2011, the prevalence of chronic diseases such as malignant neoplasms, diabetes mellitus, heart disease and hypertension are all expected to increase by significant levels over the period 2020-2050.

Such an increase may lead to increased demand for medication, given the current framework of access under the CDAP. Additionally, demands on public health systems may also increase, adding to the demands for government expenditure on the health sub-sector.

**Table 6: Projected Prevalence of Chronic Diseases 2020-2050**

| Projected Prevalence of Chronic Diseases* | | | | |
|---|---|---|---|---|
| | **Malignant neoplasms** | **Diabetes mellitus** | **Heart disease** | **Hypertension** |
| | (Number of Persons over age 65) | | | |
| **2011** | 1,854 | 26,271 | 8,640 | 30,804 |
| **2020** | 2,636 | 37,446 | 12,290 | 43,887 |
| **2025** | 3,149 | 44,549 | 14,666 | 52,267 |
| **2030** | 3,658 | 51,468 | 17,023 | 60,480 |
| **2050** | 4,645 | 64,139 | 21,559 | 75,741 |

* 2011 represents actual data sourced from the 2011 Population and Housing Census. All other years are projected.

## 6. Policy Conclusions and Recommendations

The shifting demographics of the Trinidad and Tobago population is one which poses fiscal and social costs to the domestic system and can significantly alter the economic landscape. The context of an ageing population is one which may necessitate additional resource allocations while placing burdens on a shrinking labour force. Based on projections by age groups, the dependency ratio of the non-working aged population to the working aged has already caught the attention of the National Insurance System (NIS) and required increased fiscal outlay on non-contributory pensions and targeted senior citizens' programmes and grants.

Going forward, and given current dynamics, the growing population of persons over age 60 and falling levels at the younger aged groups can lead to tightening within the labour market; such a situation requires a planned approach to either develop an appropriate labour market strategy or review of existing retirement legislation. Review of the current retirement age and possible inclusion of a voluntary option to remain in the formal labour force post age 60 may be evaluated. Additionally, engaging retired persons to re-enter the labour force can help ease some of the impending concerns. A formal arrangement to benefit from the experience and knowledge of retired persons may also benefit the labour market. Mentorship initiatives, serving as training / guidance personnel within their specific fields will re-integrate / keep aged persons in the labour market for longer while benefiting the younger productive base. Proactive planning, inclusion of the aged population at various stages of the productive process – post-retirement – may allow for transmission of their skills and experience to younger members of the workforce. Such a strategy can help improve growth rates in countries experiencing ageing of its mature labour stock.

The provision of non-contributory pension benefits/welfare grants is also vital for the aged population given the high rates of access to the Senior Citizens' Grant. This is an important facility to ensure our elder population can lead comfortable and enriching lives, post-retirement. However, given population projections and current rates of access and payments, this grant may significantly expand over the reference period (2020-2050). For this reason, planning of fiscal expenditure may become critical to ensure that said payments do not become overly burdensome to the state's finances. Added to fiscal expenditure would be focus on provision of health services and medication with particular focus on the older population. Yet again, these services are crucial but need to be properly taken into account; else the state may be faced with quickly increasing demands

over a short space of time. It is thus imperative that the dialogue, planning and implementation of strategies begin to identify strategies to mitigate any significant labour market and fiscal concerns arising out of this demographic transition.

At the same time, standard practices, legislation and workplace protocols may have to be evaluated to mitigate economic pressures arising out of the aged population. Decent work agendas and a nurturing environment are immediate fixes for accommodating such a change. Amendments to the legislative structure, such as amending the retirement act and the NIS act are also key requirements to ensure the viability of any initiative to tackle the pending impact of the ageing population. Further, consideration may be given to having a tiered system of taxes with a lower income tax rate for elder persons. Modernisation of business practices and amended working hours for aged persons are micro-considerations which may be considered based on the industry / occupation, as more manual or exhausting jobs may require some special considerations based on age of employee. Such policy based responses may also prove useful such as pension reform and tax reform.

The entire concept of an ageing population requires a holistic overview of economic and social policies to ensure that the opportunities available to all aged groups are distributed in a fair and efficient manner. Such reforms may require policy measures to encourage increased labour force participation – particularly by females, the under-represented sex in the labour market. At the same time, it must be noted, the responses and policy changes are not universal final measures; in fact, the approach may need to be tailored to the specific economy's reality and existing rates of labour force participation, employment, output and enacted legislation.

# Bibliography


Bloom, David E. “Demographic Upheaval.” *Finance and Development*, 2016: 6-11.

Central Statistical Office. *2011 Population and Housing Census.* Port-of-Spain: The Central Statistical Office, 2012.

Central Statistical Office. *Household Budget Survey 2008/2009.* Port-of-Spain: The Central Statistical Office, 2012.

Clements, Benedict. *The Fiscal Consequences of Shrinking Populations.* International Monetary Fund, 2015.

Cloos., Patrick. “'Active ageing': a qualitative study in six Caribbean countries.” *Ageing and Society*, 2010: 79-101.

Cumberbatch, Anton. “Aging Caribbean Populations and Implications for Health Management and Financing.” *Caribbean Conference on Health Financing Initiatives.* Jamaica: Health Economic Unit, 2013.

“Aging Caribbean Populations and Implications for Health Management and Financing.” *Caribbean Conference on Health Financing Initiatives.* Jamaica: Health Economic Unit, 2013.

Derek Anderson, Dennis Botman, Ben Hunt. “Is Japan's Population Aging Deflationary?” *IMF Working Paper*, 2014.

*Eduardo Kien and Yoko Yasukawa.* 5 September 2016. https://www.weforum.org/agenda/2016/09/asia-pacific-ageing-what-we-can-learn (accessed December 9, 2016).

European Commission. *Population ageing in Europe: facts, implications and policies.* Luxemborg: European Union, 2014.

Faruquee, Martin Muthleisen and Hamid. “Japan: Population Ageing and the Fiscal Challenge.” *Finance and Development*, 2001.

Fiscal Affairs Department - IMF. *How to Assess Fiscal Implications of Demographic Shifts: A Granular Approach.* How to Notes, Washington D.C: International Monetary Fund, 2016.

Franco, Daniele. “Italy: A Never-Ending Pension Reform.” *Social Security Pension Reform in Europe* (University of Chicago Press), 2002.

Global Health Observatory Data Repository. *Health expenditure ratios, by country, 1995-2014 Trinidad and Tobago.* 07 11 2016. http://apps.who.int/gho/data/view.main.HEALTHEXPRATIOTTO?lang=en (accessed 10 08, 2016).

Hunt, Rosamund. *Japan's population is shrinking: what does it mean for the ecomony?* 26 February 2016. https://www.weforum.org/agenda/2016/02/japans-population-is-shrinking-what-does-it-mean-for-the-economy/ (accessed November 29, 2016).

James, Jeff. *Population Ageing in the Caribbean: Issues and Implications.* Antigua and Barbuda: HelpAge International, 2009.

John R. Beard, Simon Biggs, David E. Bloom, Linda P. Freid, Paul Hogan, Alexandre Kalache and S. Jay Olshanky. *Global Population Ageing: Peril or Promise.* Geneva: World Economic Forum, 2011.

Ministry of Social Development. *Social Sector Investment Programme.* Trinidad and Tobago: Ministry of Finance, 2007-2016.

National Insurance Board. *9th Actuarial Review.* NIB, 2013.

National Insurance Corporation. "NIC responds to concerns over new retirement age." *St. Lucia News Online*, 28 January 2015.

Presidency Conclusions. Stockholm: European Council, 2001.

Rawlins, Dr. Joan. "Ageing in the Caribbean: Exploring Some Major Concerns for Family and Society." *SALISES Conference - Turmoil and Turbulence in Small Developing States: Going beyond Survival*, 2010.

Rouse, Dr. Jennifer A. *Population Ageing in Trinidad and Tobago: Responding to the Needs of an Ageing Population.* St. Augustine: Health Economic Unit, University of the West Indies, 2014.

Sander, Miriam et. al. "The Challenges of human population ageing." *Age and Ageing Advance Access*, 2014: 1-3.

Second World Assembly on Ageing. *Political Decalration and Madrid International Plan of Action on Ageing.* Madrid: United Nations, 2002.

SER, Advisory Report. *Ageing Population and the EU.* Sociaal-Economische Raad, 2002.

St. Bernard, Dr. Godfrey, interview by Trinidad Newsday Verne Burnett. *Ageing TT* (19 May 2016).

Suk, Maury R. Randall and David S. "Soveriegn Debt, Aging Populations and Economic Growth: Differences between OECD and Less Developed Nations." *Global Journal of Business Research*, 2015: 67-74.

Theodore, Professor Karl. "The Fiscal Dimension and the Fiscal Implications of Financing of Public Health Care Services in the Caribbean." *Health for All: Can it be Financed? Fiscal Space and the Financing of Universal Health Care Systems in the Americas.* Inter American Development Bank, 2007.

United Nations PopulationDivsion. *Population and Development Database 2014.* 29 September 2016. http://www.un.org/en/development/desa/population/publications/development/population-development-database-2014.shtml (accessed September 29, 2016).

Yoshida, Reiji. “Japan Census Report shows surge in elderly population, many living alone.” *Japan Times*, 29 June 2016.