Theoretical Focus:

Timor-Leste's population has grown rapidly since its independence in 2002. With an annual average growth rate of 2.57% over the 20 years to 2022, its population almost doubled from 787,000 to 1,342,000. This growth has reflected similar trends in other post-conflict societies, and fertility is now in decline, falling from 7.8 in 2003 to 4.2 in 2016. However, several barriers to further fertility decline remain and could stall future human and sustainable development.

Timor-Leste's social fabric is a melting pot of different influences. Its linguistic and religious ties are a result of centuries of Portuguese colonialism. Meanwhile, the legacy of Indonesian occupation, from 1975 to 1999, was a decimated health system and diminished trust in family planning. Along with this, traditional belief systems preferencing larger families, influence of the Catholic church, and post-conflict mentalities have contributed to ongoing low uptake of modern family planning methods and contributed to the post-independence baby boom.

This research applies Bongaarts' Proximate Determinants model as a theoretical framework, which stipulates that a population's Total Fertility Rate (TFR) is acted upon by socio-economic 'indirect determinants' via reproductive behaviours, or 'proximate determinants' (Bongaarts, 1978). It furthermore sets out that that marriage and contraception are the most important proximate determinants in TFR decline (Bongaarts, 1983). As such, this research seeks to investigate what socio-economic and reproductive behavioural factors have contributed to declining fertility in Timor-Leste since independence. These findings are then used to identify potential enablers and barriers to ongoing fertility decline through these key proximate determinants. These findings are then concluded by evaluating the effects ongoing or stalling fertility decline could have on Timor-Leste's demographic and development future using population projections.

Data:

The first two stages of analysis rely on Demographic and Health Survey data from Timor-Leste (TLDHS) from the years 2009-10 and 2016. The two surveys provide coverage of the country's 13

districts [1] . They provide almost all required information for analysis of the Proximate Determinants, as well as proxy variables for quantifying statistical relationships between indirect determinants and proximate determinants.

Following this, population estimates from the recently completed 2022 census, are used as a base for projecting future population scenarios for Timor-Leste. The 2022 census estimated the population of Timor-Leste to be around 1,342,000, up from 1,183,000 in 2015. This dataset provides the most up to date population estimates available from the country's National Statistical Office, however, doesn't include updated TFR estimates.

Research Methods:

The proximate determinants are assessed using TLDHS2009-10 and TLDHS2016, with minor adjustments made where data is unavailable, using an amended model by Stover (1998). The original model sets out the relationship between TFR and the proximate determinants as four indices. This reduces a theoretical maximum Total Fecundity Rate reduced to the TFR using index values for each proximate determinant. However, due to differences in the observed and estimate TFRs and alternate model was also applied.

Following this, a binary logistic regression model was developed using selected proxy variables for key proximate determinants in TLDHS2016 data against a set of independent variables or indirect determinants. For the index of marriage, respondents' age at marriage is selected as the dependent variable, with those married after age 17 compared against those married prior to. For contraception, met demand for family planning is compared against respondents' not currently accessing family planning. Additionally, met demand for family planning is also compared against individuals with unmet demand to identify enablers and barriers to access. The independent variables were respondents' educational attainment, partners' educational attainment, female empowerment, recent employment, access to media, and household affluence.

[1] Prior to the creation of the 14th municipality of Atauro on 1st January 2022.

Findings on family planning and contraception outcomes are used to project possible future TFR scenarios for Timor-Leste's population in two stages. For the first stage, Age-Specific Fertility Rates are projected from 2016 to the 2022 census using TLDHS data from 2003, 2009-10 and 2016, resulting in a TFR of 3.32. In the second stage, these age specific fertility rates are held proportionally constant, and new TFRs calculated using Bongaarts' proximate determinants. For this, index values from 2016 are held constant except for contraception. In the high scenario, the contraceptive prevalence rate is increased by half of the unmet demand for family planning in TLDHS2016, resulting in a TFR of 3.38. In the medium scenario, contraceptive prevalence rate is increased by the full unmet demand for family planning in TLDHS2016, resulting in a TFR of 2.68. In the low scenario, the average contraceptive prevalence rate of South-East Asian countries is used, yielding a TFR of 2.24. These assumptions are phased in over the 10 years to 2031. The population is then projected a further 20 years to 2051 using Spectrum.

Expected Findings[2]

In analysing the proximate determinants, marriage is found to have the greatest effect on reducing fertility from the Total Fecundity Rate. Postpartum Insusceptibility was found to have contributed most to decline between 2009-10 and 2016, while contraception had a smaller effect.

In the binary logistic regression analysis, education and affluence variables were found to increase the probability of later marriage. Recent employment and media were found to increase the probability of a respondent currently using contraception, while these and partners' educational attainment also affected whether demand for family planning was met or unmet.

Future projection scenarios show that TFR continues to have a significant effect on population structure. In the high scenario the total population increases to 2.20 million by 2051. For the medium and low scenarios, it increases to 1.96 and 1.82 million respectively. The low (0.247) and medium (0.278) scenarios demonstrate much lower child dependency than the high scenario (0.319). All scenarios result in a decrease from child dependency from 2022 (0.348).

[2] This section contains recorded results as analysis for this project has already been carried out.

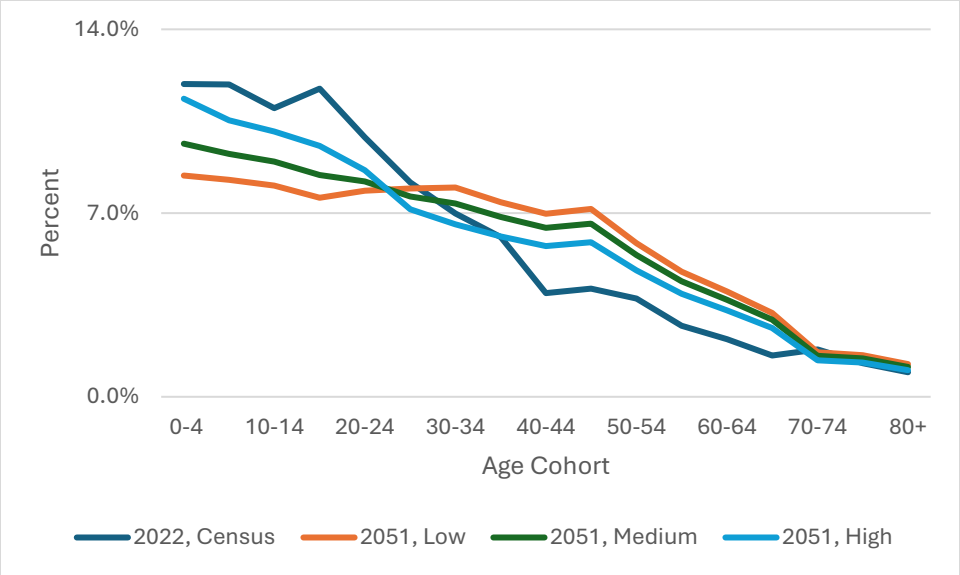

Figure 1: Observed and Projected Population Age Structure

These findings are significant as they provide a comprehensive picture of past fertility decline, ongoing barriers to women and couples' reproductive autonomy, and their implications for future population outcomes. The findings demonstrated here have the capacity to inform policy across a range of human and sustainable development areas, including but not limited to health and education provision, job creation, housing and infrastructure, reducing inequalities, and environmental impacts of growth. The findings emphasise the importance in reducing unmet demand for family planning in ensuring ongoing fertility decline and development gains for Timor-Leste's population.