

Reproducibility package for “The Potential Market for Care in East Asia and Pacific”

Last updated: 18 June 2026 (CareSim_Methods_06-18-26.docx)

1 Overview

This README file provides all the necessary information to replicate the tables and figures presented in the working paper. Replication requires access to Microsoft Excel, STATA and Python. Please note that the replication package can only be run on Windows due to the system requirements of one of the Python packages. The replication process is organized into three main parts.

1. Data preparation (STATA)

This step prepares the underlying database for the Care Simulation Excel Model. The STATA .do files clean, harmonize, merge and forecast cross-country demographic data into a unified structure compatible with the Excel model. In parallel, additional databases required for the later analytical stage (Step 3) are also constructed and prepared.

2. Model iteration and output generation (Microsoft Excel and Python)

The code in step 1 is programmed to export the data into the “Data” sheet of the Excel model file “Care Simulation v15.xlsx”. The Python scripts automate the generation of all possible iterations of the Care Simulation Model. Each iteration represents a different combination of input parameters (e.g. demographic assumptions, policy scenarios). The outputs from all iterations are compiled and saved into a .data file for further analysis.

3. Post-processing and analysis (STATA)

The final step involves cleaning and restructuring the model outputs to produce key analytical indicators, such as potential market size for care and job creation estimates. These processed datasets are then used to reproduce the tables and figures in the working paper.

To replicate the results from start to finish, users should follow the order of execution described above. Detailed instructions for running each part of the code, including file paths and software requirements are provided in the subsequent sections of this README.

2 Data Availability Statement

Some data cannot be made publicly available

All data downloads should be downloaded directly into the “Data/Raw” folder

2.1 Data Sources

Dataset	Source	Data source details	Citation	Note
CLASS_2025_07_02.xlsx	World Bank	Data name: World Bank Country and Lending Groups Year: 2025 URL: ddh-openapi.worldbank.org/resources/DR0095333/download Access Date: October 2025 Access Type: Open License: CC BY 4.0	World Bank. 2025. "World Bank Country and Lending Groups" [dataset]. https://ddh-openapi.worldbank.org/resources/DR0095333/download	Global. Country classification by income and lending group.
UNSD — Methodology.csv	United Nations Statistics Division	Data name: Standard Country or Area Codes for Statistical Use (M49) Year: 2025 URL: unstats.un.org/unsd/methodology/m49/overview/ Access Date: October 2025 Access Type: Open	United Nations Statistics Division. 2025. "Standard Country or Area Codes for Statistical Use (M49)" [dataset]. https://unstats.un.org/unsd/methodology/m49/overview/	Global. Country/area code mapping. The UN does not attach a CC license; UNSD requests attribution.

Dataset	Source	Data source details	Citation	Note
		License: Free use for statistical purposes; attribution to UNSD (no CC license)		
ipumsi_00005.dat (IPUMS_CareSimulation.dta)	Minnesota Population Center (IPUMS International)	Data name: IPUMS International Year: 2025 Version: 7.6 (DOI 10.18128/D020.V7.6) URL: international.ipums.org Access Date: October 2025 Access Type: Accessible (free; individual registration and application required) License: IPUMS International; redistribution prohibited; each user licenses individually	Minnesota Population Center. IPUMS International: Version 7.6 [dataset]. Minneapolis, MN: IPUMS, 2025. https://doi.org/10.18128/D020.V7.6	IPUMS_CareSimulation.dta is the Stata-format version of the raw IPUMS International extract ipumsi_00005.dat; no variables were added or altered in conversion Data extract requested via IPUMS International (registration required). Variables: COUNTRY, YEAR, SAMPLE, SERIAL, HHWT, PERNUM, PERWT, RESIDENT, AGE, SEX,

Dataset	Source	Data source details	Citation	Note
				AGEMARR, BIRTHYR, CHBORN, YRSCHOOL. Samples: Cambodia (1998, 2004, 2008, 2013, 2019); China (1982, 1990, 2000); Fiji (1966, 1976, 1986, 1996, 2007, 2014); Indonesia (1971, 1976, 1980, 1985, 1990, 1995, 2000, 2005, 2010); Laos (1995, 2005, 2015); Malaysia (1970, 1980, 1991, 2000); Myanmar (2014); Papua New Guinea (1980, 1990, 2000); Philippines (1990, 1995, 2000, 2010); Thailand (1970, 1980, 1990, 2000); Turkey (1985, 1990, 2000); Vietnam (1989, 1999, 2009, 2019)

Dataset	Source	Data source details	Citation	Note
MICS_CareSimulation.dta	IPUMS MICS (Minnesota Population Center)	Data name: IPUMS MICS Year: 2025 URL: mics.ipums.org/mics Access Date: October 2025 Access Type: Accessible (free; individual registration and application required) License: IPUMS MICS conditions; redistribution prohibited; each user licenses individually	Minnesota Population Center and UNICEF. IPUMS MICS [dataset]. Minneapolis, MN: IPUMS and UNICEF, 2025. https://mics.ipums.org/mics/	Data extract requested via IPUMS MICS (registration required). Unit of analysis: Women Variables: UNITANALYSIS, SAMPLE, COUNTRY, YEAR, ROUND, SUBNATIONAL, SERIAL, CLUSTER, HHNO, LINEWM, RESULTWM, WEIGHTWM, AGEWM, BIRTHYRWM, AGEFIRSTMARR, FIRSTBIRTHYR, CHEB, DOBFB. Samples: Fiji (2021); Indonesia (2011b, 2011c); Laos (2006, 2011, 2017); Thailand (2005, 2012, 2015a,

Dataset	Source	Data source details	Citation	Note
				2015b, 2016b, 2019, 2019b, 2022); Viet Nam (2006, 2010, 2013, 2020).
STATcompilerExport2025114_21321.xlsx	The DHS Program (ICF)	Data name: DHS STATcompiler Year: 2025 URL: statcompiler.com Access Date: November 2025 Access Type: Accessible (free; registration required) License: DHS conditions of use; micro-level data may not be redistributed	The DHS Program. 2025. "STATcompiler" [dataset]. ICF. https://www.statcompiler.com	Indicators extracted for KH, ID, MM, PG, PH, TH, TL, TR, VN. Indicators include children ever born, mean age at first birth and first marriage (by current age 20–45), and mean years of education (women and men). Aggregate values from underlying DHS/AIS surveys; registration required.
HFD_Japan_AgeFirstBirth.txt	Human Fertility Database (MPIDR & VID)	Data name: Human Fertility Database — Japan, cohort fertility (mean age at first birth) Year: 2025	Human Fertility Database. Max Planck Institute for Demographic Research (Germany)	Japan (JPN). Downloaded cohort summary indicators by birth order; cohort mean age at first birth

Dataset	Source	Data source details	Citation	Note
		URL: humanfertility.org Access Date: October 2025 Access Type: Accessible (free account required for download) License: HFD terms of use; attribution required; redistribution restricted	and Vienna Institute of Demography (Austria). Available at www.humanfertility.org (data downloaded on 15 October 2025).	by age 40. Account registration required for download.
UNdata_Export_20251016_034820166.csv	United Nations Statistics Division (UNdata)	Data name: UN Demographic Statistics Database (Population Census datamart, Table 58) Year: 2025 URL: data.un.org Access Date: October 2025 Access Type: Open License: Free use with attribution to UNSD (no CC license)	United Nations Statistics Division. 2025. "UN Demographic Statistics Database, Table 58" [dataset]. https://data.un.org	Country codes 242, 344, 36, 392, 410, 446, 458, 520, 554, 608, 702, 764, 792, 96. Table 58 (population census datamart).

Dataset	Source	Data source details	Citation	Note
BarroLee_YearsOfSchool.dta	Barro and Lee (retrieved via World Bank WDI API)	Data name: Barro-Lee Educational Attainment Dataset (average years of schooling, by 5-year age group) Year: 2013 (2021 update) URL: barrolee.com (accessed via databank.worldbank.org WDI API) Access Date: May 2026 Access Type: Open License: Free for academic use with attribution to original authors	Barro, Robert and Jong-Wha Lee. 2013. "A New Data Set of Educational Attainment in the World, 1950–2010." Journal of Development Economics 104: 184–198. https://doi.org/10.1016/j.jdeveco.2012.10.001	Global. Retrieved via WDI API. Indicators: BAR.SCHL.1519, BAR.SCHL.2024, BAR.SCHL.2529, BAR.SCHL.3034, BAR.SCHL.3539, BAR.SCHL.4044, BAR.SCHL.4549, BAR.SCHL.5054, BAR.SCHL.5559, BAR.SCHL.6064, BAR.SCHL.6569, BAR.SCHL.7074. Barro-Lee 2021 update; original methodology Barro and Lee 2013. Redistributed through the WDI; original source barrolee.com.
UNESCO_YearsOfSchool.dta	UNESCO Institute for Statistics	Data name: UNESCO Institute for Statistics (UIS) education indicators	UNESCO Institute for Statistics. 2026. "UIS.Stat Bulk Data	Global. Retrieved via WDI API. Indicators: SE.SCH.LIFE (school

Dataset	Source	Data source details	Citation	Note
	(retrieved via World Bank WDI API)	Year: 2026 URL: uis.unesco.org (accessed via databank.worldbank.org WDI API) Access Date: May 2026 Access Type: Open License: CC BY 4.0	Download Service" [dataset]. Montreal: UNESCO Institute for Statistics. https://uis.unesco.org	life expectancy), SE.PRM.AGES (primary school starting age).
WPP2024_Fertility_by_Age1.csv WPP2024_Demographic_Indicators_Medium.csv WPP2024_Population1 JanuaryBySingleAgeSex_Medium_1950-2023.csv WPP2024_Population1 JanuaryBySingleAgeSex_Medium_2024-2100.csv	United Nations, Department of Economic and Social Affairs, Population Division	Data name: World Population Prospects 2024 Year: 2024 URL: population.un.org/wpp Access Date: October 2025 Access Type: Open License: CC BY 3.0 IGO	United Nations, Department of Economic and Social Affairs, Population Division. 2024. "World Population Prospects 2024" [dataset]. https://population.un.org/wpp/	Global. Four files from WPP 2024 (medium variant): Fertility_by_Age1 (fertility rates by single age); Demographic_Indicators_Medium; Population1 JanuaryBySingleAgeSex_Medium 1950–2023 and 2024–2100.

Dataset	Source	Data source details	Citation	Note
x_Medium_2024-2100.csv				
undesapd_1970-2030_fp_rev-2024_rev.xlsx	United Nations, Department of Economic and Social Affairs, Population Division	Data name: Estimates and Projections of Family Planning Indicators 2024 (women of reproductive age married or in a union) Year: 2024 URL: un.org/development/desa/pd/data/family-planning-data Access Date: October 2025 Access Type: Open License: CC BY 3.0 IGO	United Nations, Department of Economic and Social Affairs, Population Division. 2024. "Estimates and Projections of Family Planning Indicators 2024" [dataset]. https://www.un.org/development/desa/pd/data/family-planning-data	Global. Proportion/number of women of reproductive age (15–49) married or in a union, 1970–2030.
GBD_HALE15.dta GBD_LE15.dta	Institute for Health Metrics and Evaluation (IHME), Global Burden of Disease	Data name: Global Burden of Disease (GBD 2021) — life expectancy and healthy life expectancy at age 15 Year: 2024 (GBD 2021 round)	Historical (1990–2021): Institute for Health Metrics and Evaluation (IHME). GBD Results. Seattle, WA: IHME,	Global. LE at 15 (GBD_LE15.dta) and HALE at 15 (GBD_HALE15.dta), 1990–2050. Values for 1990–2021 are publicly downloadable from

Dataset	Source	Data source details	Citation	Note
		URL: gbd2021.healthdata.org/gbd-results Access Date: January 2026 Access Type: Restricted License: IHME Free-of-Charge Non-Commercial User Agreement; redistribution restricted	University of Washington, 2025. Available from https://vizhub.healthdata.org/gbd-results/. (Accessed January 2026) Forecast (2022–2050): GBD 2021 Forecasting Collaborators. Burden of disease scenarios for 204 countries and territories, 2022–2050: a forecasting analysis for the Global Burden of Disease Study 2021. The Lancet. 16 May 2024.	the GBD Results tool (free account required). Forecast values 2022–2050 obtained by request (request to gbdsec@uw.edu; data received from ruris@uw.edu).
WBL_retirementAge.data	World Bank, Women, Business and the Law (retrieved via	Data name: Women, Business and the Law — retirement age indicators Year: 2024	World Bank. 2024. "Women, Business and the Law" [dataset]. Washington, DC: World Bank.	Global. Mandatory retirement age and minimum retirement age for full benefits. Retrieved via WDI API

Dataset	Source	Data source details	Citation	Note
	WDI API / Gender Data Portal)	URL: databank.worldbank.org (Gender Data Portal) Access Date: October 2025 Access Type: Open License: CC BY 4.0	https://wbl.worldbank.org	(Gender Data Portal). Indicators: SG.AGE.RTRE.FE, SG.AGE.RTRE.FL.FE.
manual_retirementAge.dta	National legislation (Myanmar; Nauru)	Data name: National retirement age legislation (manually constructed) Year: 2018–2025 URL: See Citation Access Date: October 2025 Access Type: Open (public legislation) License: Public government legislation	• Myanmar. Civil Service Rules, Rule 230. https://www.moi.gov.mm/moi:eng/news/6631 • Nauru. Superannuation Act 2018. https://www.paclii.org/nr/legis/num_act/nsa2018265.pdf	Constructed in Stata from national legislation. See Citation for full source list.
WDI_compulsorySchoolAge.dta	UNESCO Institute for Statistics and national	Data name: Official age of compulsory schooling (UIS), supplemented with national legislation	• UNESCO Institute for Statistics. 2026. "UIS Education Indicators" (indicator	Global. UIS indicator UIS.CEAGE.1 (official age of compulsory schooling) retrieved via

Dataset	Source	Data source details	Citation	Note
	legislation (Cambodia; Fiji)	Year: 2026 URL: See Citation Access Date: May 2026 (UIS); national legislation October 2025 Access Type: Open License: CC BY 4.0 / public legislation	UIS.CEAGE.1) [dataset]. Retrieved via World Bank World Development Indicators. https://databank.worldbank.org/source/world-development-indicators • Cambodia. Law on Education NS/RKM/1207/032. https://cdc.gov.kh/wp-content/uploads/2022/04/LAW-ON-EDUCATION_071208-.pdf • Fiji. Education Act [EDU 14,015], compulsory school attendance requirement. https://laws.gov.fj	WDI API; supplemented in Stata with national legislation. See Citation for full source list.

Dataset	Source	Data source details	Citation	Note
primarySchool_hours.xlsx	OECD and national Ministries of Education	Data name: Primary school instruction hours (compiled from OECD and national sources) Year: 2017–2025 URL: See Citation Access Date: October–November 2025 Access Type: Open License: OECD terms of use / public government sources	• OECD. 2017. Do Students Spend Enough Time Learning? Paris: OECD Publishing. (SGP, THA, HKG) • OECD. 2023. PISA 2022 Results (Volume II): Learning During – and From – Disruption. PISA. Paris: OECD Publishing. https://doi.org/10.1787/a97db61c-en (BRN, TUR) • OECD. Education at a Glance instruction-time data. https://data-viewer.oecd.org (AUS, JPN, KOR) • Philippines Department of	Manually compiled by the authors from OECD instruction-time data and national Ministry of Education sources. See Citation for full source list. Compilation method: compulsory instruction hours per year divided by days of schooling; under 40 hours/week or 8 hours/day classified as “half-day.”

Dataset	Source	Data source details	Citation	Note
			Education. 2019. DepEd Order No. 021, s. 2019. https://www.deped.gov.ph • New Zealand Ministry of Education. School opening and closing instruction. https://www.education.govt.nz • World Bank. 2025. Instruction Time and Student Learning. P500538. https://documents1.worldbank.org/curated/en/099112025063522251/pdf/P500538-fcebe6ac-3ba3-49d4-8923-bc6018fd7dfc.pdf	

Dataset	Source	Data source details	Citation	Note
			(KHM, IDN, LAO, MYS, MMR, VNM) • Xu, X. 2023. "Break time on the school schedule: Evidence from basic education schools in China." Science Insights Education Frontiers 19(2): 3103–3113. (China)	
ILO_childcare_policyDetailed.xlsx	International Labour Organization, World Bank (WBL), and national sources	Data name: Childcare policy details (manually compiled from ILO, WBL, and national sources) Year: 2022–2025 URL: See Citation Access Date: October 2025 Access Type: Open	• Addati, Laura, Umberto Cattaneo, and Emanuela Pozzan. 2022. Care at Work: Investing in Care Leave and Services for a More Gender Equal World of Work. Geneva: International Labour Organization. https://doi.org/10.5439	Manually compiled by the authors from ILO, World Bank (WBL), and national sources. See Citation for full source list.

Dataset	Source	Data source details	Citation	Note
		License: ILO copyright (reproduction by request) / CC BY 4.0 (WBL) / public sources	4/AQOF1491 (Table A.7) - World Bank. 2024. Women, Business and the Law 2024: Childcare, East Asia and Pacific Profile. Washington, DC: World Bank. https://wbl.worldbank.org/content/dam/sites/wbl/documents/2024/WBL2024_Childcare_EAP_Profile.pdf (Table 5) - World Bank. 2022. Women, Business and the Law. Washington, DC: World Bank. https://documents1.worldbank.org/curated/en/099920506142212106/pdf/IDU06448436a0a74e04b770996e0fd5	

Dataset	Source	Data source details	Citation	Note
			0f013bf98.pdf (Figure 5) • Fiji Ministry of Education. 2025. Pre-Primary Education Policy. https://www.education.gov.fj/wp-content/uploads/2025/04/PPE_Policy_WEB.pdf (definition 4.1.4) • Hong Kong SAR. Working Family Allowance Scheme. https://www.wfsfaa.gov.hk/en/wfao/wfas/overview.php	
enrollment.csv	UNESCO Institute for Statistics	Data name: UIS net enrollment rates (SDG 4 monitoring) Year: 2025	UNESCO Institute for Statistics. UIS Data Browser. https://databrowser.ui.s.unesco.org	Global. Net enrollment rate indicators (NER.0.CP, NER.01.CP, NER.02.CP, NERT.1.CP).

Dataset	Source	Data source details	Citation	Note
		URL: databrowser.uis.unesco.org Access Date: November 2025 Access Type: Open License: CC BY-SA 4.0	(extracted 6 November 2025).	
WUP2018-F02-Proportion_Urban.xlsx	United Nations, Department of Economic and Social Affairs, Population Division	Data name: World Urbanization Prospects: The 2018 Revision (proportion urban) Year: 2018 URL: population.un.org/wup Access Date: October 2025 Access Type: Open License: CC BY 3.0 IGO	United Nations, Department of Economic and Social Affairs, Population Division. 2018. "World Urbanization Prospects: The 2018 Revision" [dataset]. https://population.un.org/wup/	Global. File F02 (proportion urban). Retrieved 27 October 2025.
WB_urban_formalization.dta	World Bank and ILO (retrieved via WDI API)	Data name: World Development Indicators — urbanization and employment indicators Year: 2026	World Bank. 2026. "World Development Indicators" [dataset]. Washington, DC: World Bank.	Global. Retrieved via WDI API. Indicators: SP.URB.TOTL.IN.ZS (urban population, % of total);

Dataset	Source	Data source details	Citation	Note
		URL: databank.worldbank.org/source/world-development-indicators Access Date: May 2026 Access Type: Open License: CC BY 4.0 (WDI); ILO-sourced indicators subject to ILO terms	https://databank.worldbank.org/source/world-development-indicators	SL.EMP.WORK.ZS and SL.EMP.TOTL.SP.ZS (employment, ILO modelled estimates). Employment indicators originate from the ILO.
EMP_2EMP_SEX_ECO_NB_A-20251022T1539.dta EMP_TEMP_SEX_EC2_NB_A-20251022T0821.dta	International Labour Organization (ILOSTAT)	Data name: ILOSTAT employment by sex and economic activity (bulk download) Year: 2025 URL: rplumber.ilo.org/files/website/bulk/indicator.html Access Date: October 2025 Access Type: Open	International Labour Organization. 2025. "ILOSTAT — Employment by sex and economic activity" [dataset]. Geneva: ILO. https://ilostat.ilo.org	Global. Bulk indicators EMP_2EMP_SEX_ECO_NB_A and EMP_TEMP_SEX_EC2_NB_A, downloaded from the ILOSTAT bulk download facility.

Dataset	Source	Data source details	Citation	Note
		License: ILOSTAT terms of use; attribution required		
GM-Fertility rates - Dataset - v14.xlsx	Gapminder (compiled from UN WPP and other sources)	Data name: Gapminder — Children per woman (total fertility rate), v14 Year: 2025 URL: gapminder.org/data/document/008 Access Date: October 2025 Access Type: Open License: CC BY 4.0	Gapminder. 2025. "Children per woman (total fertility rate), v14" [dataset]. Based on free material from gapminder.org, CC BY license. https://www.gapminder.org/data/document/008/	Global. Gapminder TFR series (v14), compiled by Gapminder from UN sources. Original underlying sources include UN World Population Prospects.
data.csv	UNESCO Institute for Statistics	Data name: UIS teacher data Year: 2025 URL: databrowser.uis.unesco.org Access Date: October 2025 Access Type: Open	UNESCO Institute for Statistics. UIS Data Browser. https://databrowser.uis.unesco.org (extracted 21 October 2025).	Global. UNESCO teacher data (UIS-EducationOPRI indicators 42116, 20160, 20162, 20182, 20176, 25003).

Dataset	Source	Data source details	Citation	Note
		License: CC BY-SA 4.0		
HH_SES_individual_M ASTER.dta	World Bank, East Asia and Pacific Poverty team (EAPPOV, via datalibweb)	Data name: EAPPOV harmonized household survey data (socioeconomic, individual level) Year: 2024 URL: github.com/worldbank/datalibweb Access Date: December 2024 Access Type: Restricted License: datalibweb terms of use; redistribution prohibited	World Bank. 2024. "EAPPOV Harmonized Household Survey Data" [dataset]. Accessed via datalibweb. Unpublished data.	Restricted. Retrieved via datalibweb: country(FJI FSM IDN KHM KIR LAO MHL MMR MNG MYS NRU PHL PNG SLB THA TLS TON TUV VNM VUT WSM) year(1996/2023) type(eappov) mod(i). Raw data cannot be made publicly available; access was obtained through the EAPPOV team and required prior approval from the relevant country economists. Only aggregated results may be reported. Terms of use:

Dataset	Source	Data source details	Citation	Note
				github.com/worldbank/datalibweb.
undesa_pd_2022_hh-size-composition.xlsx	United Nations, Department of Economic and Social Affairs, Population Division	Data name: Database on Household Size and Composition 2022 Year: 2022 URL: un.org/development/desa/pd/household-size-and-composition Access Date: October 2025 Access Type: Open License: CC BY 3.0 IGO	United Nations, Department of Economic and Social Affairs, Population Division. 2022. "Database on Household Size and Composition 2022" [dataset]. https://www.un.org/development/desa/pd/household-size-and-composition	Global. Household size and composition indicators. Direct download: un.org/.../files/undesa_pd_2022_hh-size-composition.xlsx.
officialStartingAge.csv	UNESCO Institute for Statistics	Data name: UIS official entrance age / duration data Year: 2025 URL: databrowser.uis.unesco.org Access Date: November 2025	UNESCO Institute for Statistics. UIS Data Browser. https://databrowser.uis.unesco.org (extracted 7 November 2025).	Global. Official entrance age and duration indicators (UIS-EducationOPRI: 10, 299902, 299905, 999973).

Dataset	Source	Data source details	Citation	Note
		Access Type: Open License: CC BY-SA 4.0		

2.2 Statement about Rights

I certify that the author(s) of the manuscript have legitimate access to and permission to use the data used in this manuscript.

3 Instructions for Replicators

New users should follow these steps to run the package successfully:

1. Users must first have access to all data files if they are not included in the reproducibility package. They should go to the mentioned links, download the listed files, and place them in the data folder.
2. Update the following file with your directory paths
 - a. main.do (line 16)
 - b. 02_generator.py (line 19)
3. Ensure all required software and dependencies are installed as listed in the Requirements section.
4. Run line 26 in main.do
5. Run python script "\Code\Python\02_generator.py"
6. Run line 36 – 39 in main.do
7. End

4 List of Exhibits

Selected tables and figures in the paper, as explained and justified below

Exhibit name	Output filename	Script / Source	Note
Figure 1a and 1b	N/A	N/A	Illustration of conceptual framework
Table 1	lifestagemarkers_1960vs1990.xlsx	04_analysis.do (line 22)	
Figure 2a	Figure 1.1 Care milestones, by birth cohort	Care Simulation V15.xlsx	Generated from Excel calculations in: • Rows 62 – 83 (Columns F–H) Inputs: • C3 = “Indonesia” • E5 = “1960”
Figure 2b	Figure 1.1 Care milestones, by birth cohort	Care Simulation V15.xlsx	Generated from Excel calculations in: • Rows 62 – 83 (Columns F–H) Inputs: • C3 = “Japan” • E5 = “1960”
Figure 3	care_cycle_1960_1990_IDN.png	04_analysis.do (line 103)	
Figure 4a	careYears_JPN_IDN.png	04_analysis.do (line 149)	
Figure 4b	careYears_JPN_IDN_share.png	04_analysis.do (line 161)	
Figure 5a	careYears_gains_IDN.png	04_analysis.do (line 169)	
Figure 5b	careYears_gains_JPN.png	04_analysis.do (line 169)	
Figure 6a	careSurplus_IDN.png	04_analysis.do (line 191)	
Figure 6b	careSurplus_JPN.png	04_analysis.do (line 191)	
Figure 7a	single_joint_care_share_IDN.png	04_analysis.do (line 241)	
Figure 7b	single_joint_care_share_JPN.png	04_analysis.do (line 241)	
Figure 8a	careTypes_IDN.png	04_analysis.do (line 262)	
Figure 8b	careTypes_JPN.png	04_analysis.do (line 262)	
Figure 9a	careFree_IDN.png	04_analysis.do (line 280)	

Figure 9b	careFree_JPN.png	04_analysis.do (line 280)	
Figure 10a	total_care_years_subgrouping.png	04_analysis.do (line 307)	
Figure 10b	total_care_years_eff_subgrouping.png	04_analysis.do (line 307)	
Figure 11a	years_not_before_marriage_subgrouping.png	04_analysis.do (line 321)	
Figure 11b	years_not_after_kids_subgrouping.png	04_analysis.do (line 321)	
Figure 12a	market_demand_child_subgrouping.png	04_analysis.do (line 342)	
Figure 12b	market_demand_elderly_subgrouping.png	04_analysis.do (line 342)	
Figure 13a	market_private_demand_child_subgrouping.png	04_analysis.do (line 357)	
Figure 14a	jobcreation_childcare.png	04_analysis.do (line 396)	
Figure 14b	jobcreation_eldercare.png	04_analysis.do (line 409)	
Appendix Figure 1	yearsToReduceTfr.png	04_analysis.do (line 425)	
Appendix Figure 2	age_gap_firstMarriage_Child.png	04_analysis.do (line 465)	
Appendix Figure 3	FirstSecondAgeGap.png	04_analysis.do (line 485)	
Appendix Figure 4	CohortVsTotalFertilityRate.png	04_analysis.do (line 513)	
Appendix Figure 5	N/A	Care Simulation V15.xlsx	Screenshot of “Intergenerational” sheet
Appendix Figure 6a	3genVsUrban.png	04_analysis.do (line 541)	
Appendix Figure 6b	MMR_3genVsUrban.png	04_analysis.do (line 555)	
Appendix Figure 7	care_cycle_timeline_1960_1970_1980_IDN.png	04_analysis.do (line 565)	
Appendix Table 1	N/A	N/A	Basic demographic components in the Care Simulation Model
Appendix Table 2	LE_IDN_1970vs1990.xlsx	04_analysis.do (line 620)	
Appendix Table 3	HALE_IDN_1970vs1990.xlsx	04_analysis.do (line 636)	

Appendix Table 4		N/A	Illustration of the generational-linkage algorithm
Appendix Table 5	N/A	N/A	Illustration to summarize the household-type logic used

5 Requirements

5.1 Computational Requirements and Runtime

This simulation can only be executed on Windows systems, as the pywin32 dependency used for Excel automation is not compatible with macOS or Linux.

Typical runtime is about 2 hours, as the Python script iteratively controls Excel to generate results for multiple countries and cohorts. The following system specifications were used to benchmark this runtime:

- Operating System: Windows (x64-based PC)
- Processor: INTEL(R) XEON(R) PLATINUM 8562Y+ (2.80 GHz) (2 processors)
- Installed RAM: 64.0 GB
- Available RAM during execution: 15.3 GB
- Disk Capacity: 452 GB of 500 GB used

5.2 Software Requirements

- Microsoft Excel
- Stata version 18
 - wbopendata
- Python 3.11.11
 - xlwings 0.32.1
 - pandas 2.2.3
 - pyaml 6.0.2
 - pywin32 308

6 Code Description

Script	Description
main.do	Provides the ordered sequence of scripts for the full workflow. Each stage (cleaning, generation, processing and analysis) must be executed one at a time, as the Python step cannot be run directly within Stata
01_cleaning.do	Cleans raw input data and generates the data input for the Care Simulation Excel model
02_generator.py	Runs iterative simulations of the Care Simulation Excel model and compiles the results into a Stata-ready dataset
03_processing.do	Processes and formats the simulation outputs from Python for subsequent analysis
04_analysis.do	Produces all final analytical tables, figures, and summary outputs

all_countries.yaml	The master reference list of every World Bank country with their region group classifications. 02_generator.py reads this to know the full universe of countries it can iterate over and to attach regional metadata to each run.
care_variables_V15.yaml	The mapping between model parameters and their target cells in the Excel tool (Care Simulation V15.xlsx). It tells the 02_generator.py which variables to write where (and read back from) for each country.
familyType.yaml	Defines the scenarios and the parameter settings each one implies. The generator loops over these scenarios, applying the corresponding inputs to the workbook, though the paper uses only the 'Baseline' scenario.
supported_countries.yaml	The active subset of countries 02_generator.py should process in each run. It acts as the filter against all_countries.yaml, so the script only loops over (and produces outputs for) countries listed here.

7 Folder Structure

Data

```

├── Raw
├── Intermediary
└── Cleaned

```

Code

```

├── main.do
├── STATA
│   ├── 01_cleaning.do
│   ├── 03_processing.do
│   └── 04_analysis.do
├── Python
│   ├── 02_generator.py
│   └── all_countries.yaml

```

- └─ care_variables_V15.yaml
- └─ familyType.yaml
- └─ supported_countries.yaml

Outputs

- └─ Main
- └─ Appendix
- └─ Manuscript (CareSim_Methods_06-18-26.docx)
- └─ Model (Care Simulation V15.xlsx)