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Abstract

This paper explores how National Transfer Accounts (NTA) and National Time Transfer Accounts (NTTA) can be leveraged for effective policy engagement in aging Asia-Pacific regions. While existing research utilizes NTA primarily for standard data displays (stage 1), this paper proposes a framework for advancing NTA utilization. We categorize this progression into three stages: (1) standard methodology, (2) extensions and modifications for specific policy areas, and (3) policy-oriented modeling. The paper identifies key factors for successful policy guidance, including clear communication with policymakers and an understanding of institutional settings. It emphasizes the need for technical advancements, such as handbooks focused on the "second demographic dividend" and simulations incorporating policy scenarios. Collaboration with international organizations with diverse expertise, alongside multidisciplinary NTA teams with policy experts, is crucial for generating practical policy recommendations. Finally, capacity building in both NTA analysis and specific policy contexts is essential for optimizing NTA's impact on policymaking in aging societies.

Keywords: National Transfers Account (NTA) utilization, National Time Transfer Account (NTTA), Demographic change, Policy formulation

JEL Code: E19, J11, J18, J19

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1. Background and Introduction

The Asia-Pacific region exhibits significant demographic diversity. While some countries have undergone rapid aging, characterized by low fertility and increasing life expectancy, others are still navigating the demographic transition with declining birth and mortality rates. Ultimately, most countries within the region are projected to become aging societies, with varying levels of severity amongst sub-populations further complicated by existing inequalities and poverty.

The road ahead for these nations hinges on their ability to translate the challenges of rapid aging into opportunities for creating a more balanced society. This requires evidence-based policy options encompassing the entire life course. In this context, National Transfer Accounts (NTA) emerge as a powerful tool. NTAs provide a comprehensive, age-disaggregated accounting framework that reveals how economic resources are produced, consumed, and ultimately distributed across generations. This framework considers the roles of government programs, family networks, and financial markets in achieving this distribution.

Over 160 countries have already implemented NTA and National Time Transfer Account (NTTA) analysis. Some countries even generate regular NTA/NTTA statistics to monitor policy effectiveness. Notably, a regional network of NTA practitioners has also been established. In 2021, the United Nations Population Fund (UNFPA) Asia-Pacific had introduced a platform to institutionalize the NTA and Demographic Dividend (DD) application in Asia and the Pacific according to the project on ‘Strengthened, Accelerated and Mainstreamed NTA and DD (SAMANTA)’. The SAMANTA platform leverages existing mechanisms of the countries that UNFPA has the country program operations. The Asian Population Association (APA) Council facilitates networking among researchers and population practitioners. The UNFPA Asia Pacific Regional Office and its 22 Country Offices enable Population and Development Officers to connect and generate evidence-based population policy development.

This paper examines the current utilization of NTA/NTTA analysis to support population development issues, particularly social protection policies. We explore how governments can leverage this tool for policy development. The methodology involves a comprehensive desk-based review of NTA applications across various areas to understand its current impact on policy guidance. Additionally, the research team participated in NTA workshops with international experts, and key informants from eight countries: India, Indonesia, Japan, Malaysia, Maldives, Republic of Korea, Thailand, and Vietnam.

The paper is structured as follows. The next section provides a brief overview of NTA development. Section 3 classifies the different stages of NTA utilization, both current and potential. Section 4 discusses observations from successful utilization cases and identifies factors contributing to success. Section 5 offers recommendations to further enhance NTA utilization.

2. Fundamental Development of NTA

National Transfer Accounts (NTA) emerged to address limitations in the System of National Accounts (SNA) regarding age and intergenerational dimensions. NTA provides a comprehensive framework for age-disaggregated analysis, including estimates of private transfers within households (United Nations, 2013). Samuelson (1958) laid the groundwork for NTA by highlighting the importance of intergenerational transfers and introducing overlapping generation models. Subsequent research refined analysis of public and private transfers, saving, and asset accumulation (Arthur & McNicoll, 1978; Lee, 1980; Lee 1994a, 1994b; Mason, 1988). The formal development of NTA began in 2002 with international collaboration, culminating in the design and publication of the framework and manual in 2009 (Mason et al., 2009a, 2009b). Continued support from the United Nations Population Fund (UNFPA) facilitated global expansion and capacity building (United Nations, 2013).

While largely consistent with the SNA in core concepts, NTA differs in its treatment of institutions (focusing on intrahousehold transfers), income classification (labor and capital returns), and emphasis on age-specific flows. Building upon the SNA principle of total income equaling total expenditures, NTA decomposes transfer components by age as illustrated in Equation (1).

$$\text{Labor income} + \text{Non-labor income} + \text{Transfer inflow} = \text{Consumption} + \text{Transfer outflow} + \text{Saving} \quad (1)$$

Rearranging this equation yields core NTA concepts of lifecycle deficit/surplus (labor income minus consumption) and age reallocation (further decomposed into asset-based reallocation and net transfers by age) as represented by Equation (2).

$$[\text{Labor income} - \text{Consumption}] = [\text{Non-labor income} - \text{Saving}] + [\text{Transfer inflow} - \text{Transfer outflow}] \quad (2)$$

These concepts offer detailed insights into how individuals across age groups produce, consume, share resources, and save for the future, with a particular focus on age-specific patterns.

The NNTA extension captures the production, transfer, and consumption of non-market goods and services within households (e.g., childcare, eldercare). It assigns monetary value by using market wages for similar activities (Donehower, 2013).

The demographic dividend refers to economic benefits arising from a shift in population structure during demographic transition. NTA facilitates the disaggregation of demographic impacts on economic growth, as shown in the decomposition of income per capita per year in Equation (3).

$$\text{Growth rate (g) of GDP per capita} = (\text{Growth rate of Support Ratio (SR)}) \times (\text{Productivity}) \quad (3)$$

The first dividend reflects the automatic economic growth solely due to changes in age structure, where the working-age population grows faster than the dependent population. Studies have extensively analyzed the timing, duration, and level of the associated "demographic window" (d'Albis & Moosa, 2015; Eastwood & Lipton, 2011; Mason et al., 2017; Ogawa et al., 2010; Prskawetz & Sambt, 2014; Rosero-Bixby, 2011; Wolf et al., 2011).

The second demographic dividend arises from productivity growth during demographic transition. It stems from the "productivity" term in Equation (3) and is driven by factors like wealth accumulation (including human capital), leading to increased labor productivity, asset growth, and faster economic expansion. The first demographic dividend creates an opportunity for the emergence and sustained growth of a second demographic dividend even after the demographic window closes.

The second demographic dividend can be measured by the difference between the growth rates of the income or consumption index and the growth rate of the economic support ratio (Lee & Mason, 2007). The income index reflects income per equivalent consumer relative to income, while the consumption index considers consumption per equivalent consumer relative to income per equivalent consumer, assuming that productivity changes solely due to technological innovations. The magnitude of the dividend is assessed by comparing the percentage increase in the consumption and income indices to the percentage gain in the Economic Support Ratio (ESR) (Ladusingh & Narayana, 2012).

In the context of NTA, wealth is defined broadly, encompassing all future output, including physical property, stocks, bonds, and expected future transfers from adult children or public programs. Life cycle wealth refers to the net present value of an individual's future consumption minus future labor income, assuming no bequests. It can be further divided into child transfer wealth and life cycle pension wealth. Child transfer wealth represents the present value of all future transfers made to children by an adult. Life cycle pension wealth refers to the resources used to fund consumption during retirement beyond labor income. It is calculated as life cycle wealth minus child transfer wealth and can be held in two forms: assets (A) and pension transfer wealth.

Patterns of wealth accumulation for consumption needs of the elderly and children differ across countries due to variations in social justice systems and public policy approaches. High-income countries often have more generous public transfer systems that cover a significant portion of elderly needs. In contrast, middle- and low-income countries typically have less generous public programs, leading to greater reliance on asset accumulation and private transfers, which may not always be sufficient.

The current literature on the second demographic dividend and wealth analysis primarily relies on theoretical macroeconomic partial equilibrium models with simplified assumptions regarding income, consumption, saving, wealth, and transfer options. While simulation models have been conducted in

various countries such as the United States, Japan, Taiwan, Brazil, China, India, and Nigeria, these studies often focus on different exogenous policy scenarios related to transfer programs, such as varying ratios of asset and transfer wealth for pensions. However, these exercises have primarily been academic endeavors and have not yet translated into concrete policy implementation (Ladusingh & Narayana, 2012; Lee & Mason, 2007).

3. Overview of the NTA Utilization

The three stages of NTA utilization can be visualized in Figure 1. Each stage builds upon the previous one.

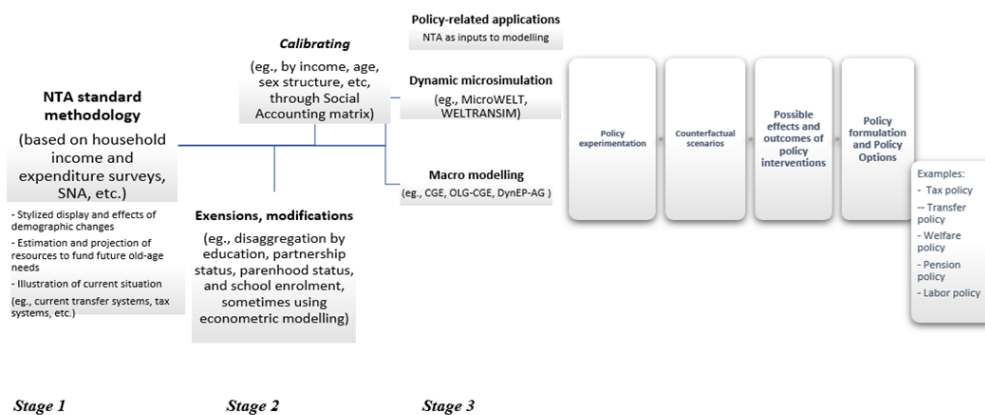


Figure 1: Illustration of potential of NTA usage in modelling for policy process

Source: Authors' illustration

Stage 1: Standard Methodology

The first stage involves constructing a standard NTA using official statistics like national household surveys and labor force data. This stage primarily provides: (i) stylized displays of demographic impacts, (ii) estimations of future funding needs, and (iii) illustrations of current policy landscapes (e.g., tax and welfare systems). Existing literature demonstrates widespread utilization of this initial stage (Ladusingh & Narayana, 2012). Other sample studies utilizing NTA in Stage 1 is shown in Table 1.

Table 1 Sample studies on NTA standard methodology and utilization in Stage 1

Studies	Utilization types	Findings and Data
Salas and Raccelis (2007)	Stylized displays of demographic effects	- Provides an overview of the NTA system in the Philippines - Data sources: System of National Accounts.

Ogawa, Mason, Chawla and Matsukura (2010)	Stylized displays of demographic effects	- Displays the impact of population aging on both public and private intergenerational transfers in Japan in the last two decades. - Data sources: National Income and Product Accounts, Japan's Unprecedented Aging and Changing Intergenerational Transfers 151 (NIPA), Labor Force Survey
Zannella (2015)	Stylized displays of demographic effects	- Develops a comprehensive account of resource reallocations between population members in Italy, encompassing the age and the gender perspective, the public and the familial institutional sectors, and the market and non-market dimensions of the economy. Data sources: Labour Force Survey, Population Survey
Temple et al (2017)	Stylized displays of demographic effects	- Illustrates the use of NTA for understanding ageing and the economic life cycle in Australia. - Data sources: National demographic and administrative data sets
Mason and Lee (2022)	Estimation and projection	- Uses NTA to study and understand the life cycle fundamentals. - Data sources: The data are based on the NTA framework (Lee and Mason 2011; United Nations Department of Economic and Social Affairs: Population Division 2013), which provide estimates of how individuals at every age acquire and use economic resources to meet their current material needs, help others, and prepare for the future.

Source: Authors' compilation

Stage 2: Extensions and Modifications

Stage 2 builds on the standard methodology by further disaggregating data by factors like education and family structure (Abio et al., 2021). This allows for a more nuanced understanding of intergenerational transfers (Hammer & Prskawetz, 2022). Adjustments to the standard methodology are also made to analyze specific socioeconomic variables (Hammer, 2015; Mejía-Guevara, 2015; Miller et al., 2014). Stage 2 findings can inform policy agendas, as exemplified by Thailand's use of NTA data to analyze expenditure by income quintile (NESDC, 2021). NTA data has also been applied to research various social policy issues (Abío et al., 2017; Chen et al., 2012) and project healthcare expenditures (Mason & Miller, 2018).

Stage 3: Policy-related Applications

Stage 3 utilizes NTA data as inputs for economic and actuarial modeling. While less common, this stage offers significant potential. Lee & Mason (2007) employed NTA data in simulations to analyze the macroeconomic effects of demographic changes. Romero et al. (2010) used NTA data in OLG-CGE models to assess the impact of intergenerational transfers on capital stock. The AGENTA project further demonstrates the potential of Stage 3 by developing extended databases and OLG-CGE models

incorporating factors like education and gender (Hammer, 2015; Istenic et al., 2019a, 2019b; Sánchez-Romero et al., 2016, 2017).

While traditional inter-generational models often assume consumption smoothing for optimal living standards, its long-term predictive value is limited due to the difficulty of anticipating future events and age-varying time preferences (Ramsey, 1928; Rogers, 1994; Posner, 1995). Introducing age-variable time preferences into standard demographic shock models can yield more realistic estimations for designing policies like social security, pensions, and tax reforms. NTA data can serve as valuable input for microsimulations and OLG-CGE analyses in these areas. For instance, Cutler et al. (1990) demonstrated how microsimulations incorporating demographic changes impacted savings rates in the US. Such evidence can guide policymakers in formulating policies to strengthen social security trust funds without burdening future generations.

Despite the potential, a 2021 study by the Institute for Population and Social Research (IPSR) revealed limited utilization of NTA/NTTA data for policy development in 17 Asian and Pacific countries. Only 14 countries reported generating NTA data, and its use in policy areas like demographics, population, social issues, and economics remained low. This suggests a lack of awareness among policymakers regarding the value of NTA data in informing policy decisions. Literature review further confirms that most existing NTA applications in the region fall under the first two stages – standard methodology and specific policy extensions. The third stage, involving policy-oriented modeling with cost-benefit analysis and societal value assessments, is more prevalent in European countries, particularly for cross-country comparisons. This highlights the potential for expanding NTA/NTTA utilization in Asia and the Pacific for more comprehensive policy development. By incorporating age-varying preferences and integrating data with other models, NTA can provide more realistic estimations of policy impacts, leading to improved budget efficiency and long-term sustainability.

4. Synthesizing Findings and Enhancing NTA in Policy Guidance

This section synthesizes research findings and proposes recommendations for promoting NTA's utilization in policy development. The synthesis is organized into four key areas, namely; (1) understanding policymakers' prioritization, (2) Institutionalization of NTA, (3) Policy analysis techniques and improvement and (4) NTA Policy analysts' capacity building.

4.1 Policymakers' prioritization

First, it is important to note that policymakers prioritize clear, actionable recommendations over technical details. Key considerations for NTA analysis include:

- International Comparability: Are other countries implementing similar approaches? What alternatives exist?
- Cost-Benefit Analysis: What are the financial implications of different policy options?
- Expected Outcomes: What are the projected results of various policy scenarios?
- Impact Assessment: How will different options affect citizens and the nation?
- Cost-Effectiveness Analysis: How do costs and benefits compare across policy options?
- Optimal Policy Selection: Which policy option is most suitable?

NTA advocates should address these questions with varying levels of detail depending on the policy stage. Initial agenda setting may require only quantitative answers to the first three questions. However, policy formulation necessitates more in-depth analysis using NTA modeling and other quantitative techniques.

Policy recommendations can be formulated even during early NTA development stages. Examples include India's analysis of life cycle deficits and demographic dividends using incomplete data, and Thailand's use of NTA data with equity indicators to target specific populations. Econometric and Socio-Economic Accounting (SEA) models, combined with survey and administrative data, can further strengthen policy recommendations.

4.2 Institutionalization of NTA

Three primary institutional settings for NTA development impact policy engagement are: research institutes, government agencies and collaboration. Each entity offer distinct advantages and disadvantages. The research institutes possess strong data analysis capabilities, allowing them to generate comprehensive findings. However, they may struggle to directly engage policymakers, potentially hindering the translation of research into actionable policy recommendations. On the other hand, government agencies have a clear understanding of policy issues and data needs within their specific domain. Conversely, their expertise in data analysis might be limited, and high staff turnover can disrupt ongoing projects. Collaboration between research institutes and government agencies presents a compelling approach. By combining their respective strengths, these models can foster effective policy formulation and evaluation. However, the complexity increases with the number of agencies involved. Successful implementation, like Thailand's National Statistical Office model, necessitates robust coordination mechanisms to ensure seamless collaboration.

4.3 Policy analysis techniques and improvement

Regarding Existing NTA handbooks, including the UN DESA draft handbook, primarily focus on descriptive analysis techniques. While valuable for initial stages, more advanced handbooks are needed for the following:

(1) Secondary demographic dividend analysis: This includes model simulations for various scenarios, such as public/private transfer options and asset reallocation strategies.

(2) Social risk management and social protection policy: Handbooks should cover basic concepts and current practices in these areas.

Technical cooperation with international organizations with expertise like ILO, UNICEF, or the World Bank is crucial for harmonizing terminology and statistical definitions across disciplines. For example, the term "PAYG" has different meanings in economics and social security contexts. Standardized definitions are essential for consistent policy analysis using NTA/NTTA models and SEA models.

4.4 NTA analysts' capacity building

An NTA analyst embodies a multidisciplinary role, akin to a chef crafting a well-balanced dish. Statisticians and economists form the core, meticulously dissecting and categorizing data into the specific accounts of the NTA/NTTA. This core is then enriched by the expertise of social policy experts, relevant ministry representatives, and potentially economic specialists. Capacity building in NTA methodology and analysis emerged as a universal request from key informants across all eight studied countries. However, a review of reports revealed additional knowledge gaps in the following areas:

(1) Social Protection Policy Analysis: Beyond economic growth, NTA analysts require a deeper understanding of trade-offs inherent in social protection policies. This includes considerations of equity and quality of life, often requiring additional research and complementary analysis techniques.

(2) Policy Context and Content: NTA analysts must be adept at navigating the specific policy landscape of their country. Familiarity with international best practices is equally crucial to formulate concrete policy options that resonate with policymakers' expectations.

(3) Standardized Terminology: Collaboration hinges on a common language. Mastering diverse definitions of technical terms across professions and organizations is essential for effective collaboration.

5. Conclusions and Recommendations

National Transfer Accounts (NTA) offer a valuable framework for analyzing age-disaggregated economic flows and resource allocation. This study explores potential for NTA as a policy tool, highlighting three stages of utilization, namely (1) Standard methodology and data displays, (2) Extensions and modifications and (3) Policy-related modeling. While current practice primarily focuses on stylized displays, significant potential exists for advanced policy-relevant modeling using NTA as an input.

To enhance National Transfer Account (NTA) utilization in policy development, this analysis recommends a four-pronged approach. First, NTA analysis should prioritize actionable recommendations aligned with policymakers' needs, tailored to the policy stage. Second, institutional settings for NTA

development need optimization, leveraging the strengths of research institutes, government agencies, and collaborative models. Third, advanced handbooks and standardized terminology across disciplines are crucial for improved policy analysis techniques. Finally, building the capacity of multidisciplinary NTA analyst teams, encompassing expertise in social policy analysis, policy context, and standardized terminology, is essential. By implementing these recommendations, NTA can evolve into a powerful tool for evidence-based policymaking, promoting sustainable economic growth in a changing demographic and rapidly ageing populations of Asia and the Pacific.

References

- Abío, G., Patxot, C., Sánchez-Romero, M., & Souto, G. (2017). The welfare state and demographic dividends. *Demographic Research*, 36, 1453-1490.
- Abio, G., Patxot, C., Souto, G., & Istenic, T. (2021). The role of gender, education and family in the welfareorganization: Disaggregating National Transfer Accounts. *The Journal of the Economics of Ageing*, 20, 1-16.
- Arthur, W. B., & McNicoll, G. (1978). Samuelson, Population and Intergenerational Transfers. *International Economic Review*, 19(1), 241-246. doi:10.2307/2526407
- Chen, Q., Eggleston, K., & Ling Li (2012). Demographic change, intergenerational transfers, and the challenges for social protection systems in the People's Republic of China. In Park, D. Lee, S-H., & Mason, A. (Eds.), *Aging, Economic Growth, and Old-Age Security in Asia*, pp. 161-202. Glos: Edward Elgar Publishing.
- Cutler, D. M., Poterba, J. M., Sheiner, L. M., Summers, L. H., & Akerlof, G. A. (1990). An aging society: opportunity or challenge? *Brookings papers on economic activity*, 1990(1), 1-73. PMID: 12344782.
- d'Albis, H., & Moosa, D. (2015). Generational economics and the national transfer accounts. *Journal of Demographic Economics*, 81(4), 409-441.
- Deaton, A. & Paxson, C. (2000). Saving and growth among individuals and households. *Review of Economics and Statistics* 82(2), 212-225.
- Donehower, G. (2013). Incorporating gender and time use into NTA: National Time Transfer Accounts methodology. Manuscript, University of California at Berkeley, mimeo. Retrieved from <http://www.ntaccounts.org>.
- Eastwood, R., & Lipton, M. (2011). Demographic transition in sub-Saharan Africa: How big will the economic dividend be? *Population Studies*, 65(1), 9-35.
- Hammer, B. (2015). National Transfer Accounts by education: Austria 2010. AGENTA Working Paper.

- Hammer, B., Loichinger, E., & Fürnkranz-Prskawetz, A. (2016). Projections of the Labour Force by Age, Gender and Highest Level of Educational Attainment until 2050. Retrieved from <http://hdl.handle.net/20.500.12708/38908>.
- Hammer, B., & Prskawetz, A. (2022). Measuring private transfers between generations and gender: an application of national transfer accounts for Austria 2015. *Empirica*, 49(3), 573-599.
- Higgins, M. and Williamson, J.G. (1997). Age structure dynamics in Asia and dependence on foreign capital. *Population and Development Review* 23(2), 261-293.
- Institute for Population and Social Research (IPSR). (2021). NTA/NTTA Data Mapping, Stock-taking of the Initiatives and Utilization for Policy Development. Retrieved from https://ipsr.mahidol.ac.th/en/post_research/nta-ntta-data-mapping-stock-taking-of-the-initiatives-and-utilization-for-policy-development-in-asia-and-the-pacific/
- Istemic, T., Hammer, B., & Prskawetz, A. (2019a). European National (Time) Transfer Accounts. Vienna Yearbook of Population Research, 17, 201-221.
- Istemic, T., Hammer, B., Šeme, A., Dolinar, A. L., & Sambt, J. (2019b). European National Transfer Accounts: Agenta.
- Jorgensen, S. L., & Siegel, P. B. (2019). Social Protection in an Era of Increasing Uncertainty and Disruption: Social Risk Management 2.0. Social Protection and Jobs Discussion Paper; No. 1930. Washington DC: World Bank, Retrieved from <http://hdl.handle.net/10986/31812>.
- Ladusingh, L., & Narayana, M. (2012). Demographic dividends for India: evidence and implications based on national transfer accounts. In Park, D., Lee, S., & Mason, A. (Eds). Aging, Economic Growth, and Old-Age Security in Asia, pp. 203–30. Cheltenham, UK: Edward Elgar Publishing.
- Lee, R. (1980). Age Structure Intergenerational Transfers and Economic Growth: An Overview. *Revue économique*, 31(6), 1129-1156. doi:10.2307/3501185.
- Lee, R., & Mason, A. (2007). Population Aging, Wealth, and Economic Growth: Demographic Dividends and Public Policy. Paper presented at the WESS Background Paper. https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/PDFs/WESS/wess_bg_papers/bp_wess2007_lee_mason.pdf.
- Lee, R. D. (1994a). The formal demography of population aging, transfers, and the economic life cycle. In Martin, L.G., Preston, S.H. (Eds) Demography of aging. Washington (DC): National Academies Press (US); 1994. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK236666/>
- Lee, R. D. (1994b). Population Age Structure, Intergenerational Transfer, and Wealth: A New Approach, with Applications to the United States. *The Journal of Human Resources*, 29(4), 1027-1063. doi:10.2307/146133

- Lee, R. D., & Mason, A. (2011). *Population aging and the generational economy: A global perspective*. Edward Elgar Publishing.
- Maliki, M. (2011). The support system for Indonesian elders: Moving toward a sustainable national pension system. In Lee, R. & Mason, A. (Eds). *Population Aging and the Generational Economy: A Global Perspective* (pp 513-527).
- Mason, A. (1988). Saving, Economic Growth, and Demographic Change. *Population and development review*, 14(1), 113-144. doi:10.2307/1972502
- Mason, A., & Lee, R. (2022). Six Ways Population Change Will Affect the Global Economy. *Population and Development Review*, 48, pp-pp. 51-73. <https://doi.org/10.1111/padr.12469>.
- Mason, A., Lee, R., Abrigo, M., & Lee, S.-H. (2017). Support ratios and demographic dividends: Estimates for the World. Technical Paper, 1. mimeo.
- Mason, A., Lee, R., Donehower, G., Lee, S.-H., Miller, T., Tung, A.-C., & Chawla, A. (2009a). National transfer accounts manual. Draft Version, 1. mimeo.
- Mason, A., Lee, R., Tung, A.-C., Lai, M.-S., & Miller, T. (2009b). Population aging and intergenerational transfers: Introducing age into national accounts. In Lee, R. & Mason, A. (Eds) *Developments in the Economics of Aging* (pp. 89-122), University of Chicago Press.
- Mason, C., & Miller, T. (2018). International projections of age specific healthcare consumption: 2015–2060. *The Journal of the Economics of Ageing*, 12, 202-217.
- Mejía-Guevara, I. (2015). Economic inequality and intergenerational transfers: Evidence from Mexico. *The Journal of the Economics of Ageing*, 5, 23-32.
- Miller, T., Saad, P., & Holz, M. (2014). National inequality accounts: The case of Chile. *Policy in Focus*, 30, 12-14.
- NESDC. (2021). Current work on Thailand NTA. Retrieved from <https://ntaccounts.org/doc/repository/NTA14.Won.pdf>
- Ogawa, N., Mason, A., Chawla, A., & Matsukura, R. (2010). Japan's unprecedented aging and changing intergenerational transfers. In: National Bureau of Economic Research, Inc. *The economic consequences of demographic change in East Asia*, 19, pp. 131-160.
- Ogawa, N., Mason, A., Chawla, A., Matsukura, R., & Tung, A.-C. (2009). Declining fertility and the rising cost of children: What can NTA say about low fertility in Japan and other Asian countries? *Asian Population Studies*, 5(3), 289-307.
- Ogawa, N., Matsukura, R., & Lee, S.-H. (2016). Declining fertility and the rising costs of children and the elderly in Japan and other selected Asian countries An analysis based upon the NTA approach. In H. A. L. Kendig, P. McDonald, & J. Piggott (Eds.), *Population Ageing and Australia's Future*, pp. 85-110. ANU Press.

- Posner, R. A. (1995) *Aging and old age*, University of Chicago Press.
- Prskawetz, A., & Sambt, J. (2014). Economic support ratios and the demographic dividend in Europe. *Demographic Research*, 30, 963-1010. Retrieved from <http://www.jstor.org.ejournal.mahidol.ac.th/stable/26348225>
- Ramsey, F. P. (1928) A mathematical theory of saving. *The Economic Journal*, 38(152), 543-59.
- Rogers, A. R. (1994) Evolution of time preference by natural selection. *The American Economic Review*, 84(3), 460-81.
- Romero, M. S., Patxot C., Renteria, E. Souto, G. (2010). From transfers to capital: analysing the Spanish Demand for Wealth using NTA. MPIDR Working Paper WP 2010-029, October Retrieved from <https://www.demogr.mpg.de/papers/working/wp-2010-029.pdf>
- Rosero-Bixby, L. (2011). Generational Transfers and Population Aging in Latin America. *Population and development review*, 37, 143-157. Retrieved from <http://www.jstor.org.ejournal.mahidol.ac.th/stable/41762402>
- Salas, J., & Racelis, R. H. (2007). Measuring economic lifestyle and flows across population age groups: Data and methods in the application of the National Transfer Account (NTA) in the Philippines. PIDS Discussion Paper Series, No. 2007-12. Philippine Institute for Development Studies (PIDS), Makati City. Retrieved from: <https://hdl.handle.net/10419/127949>.
- Samuelson, P. A. (1958). An exact consumption-loan model of interest with or without the social contrivance of money. *Journal of Political Economy*, 66(6), 467-482.
- Sánchez-Romero, M., Abio, G., Patxot, C., & Souto, G. (2016). Deliverable 5.3 Contribution of demography to the Spanish economic growth from 1850 to 2000. Retrieved from: <https://www.econstor.eu/handle/10419/195267>
- Sánchez-Romero, M., Abio, G., & Patxot, C. (2017). Deliverable 5.5: Overlapping Generations-General Equilibrium (OLG-CGE) Model: Underlying Assumptions and Projections. Retrieved from: <https://www.econstor.eu/handle/10419/195267>
- Temple, J. B., Rice, J. M., & McDonald, P. F. (2017). Ageing and the economic life cycle: The National Transfer Accounts approach. *Australasian Journal on Ageing*, 36(4), 271-278.
- Turra, C. M., Holz, M., & Cotlear, D. (2011). Who benefits from public transfers? Incidence across income groups and across generations in Brazil and Chile. In Cotlear, D. (Ed). *Population Aging: Is Latin America Ready?*, pp.211-232. The World Bank.
- United Nations. (2013). *National transfer accounts manual: Measuring and analysing the generational economy*. New York: United Nations.
- Wolf, C., Dalal, S., DaVanzo, J., Larson, E. V., Akhmedjonov, A., Dogo, H., Huang, M., & Montoya, S. (2011). Population Trends in China and India: Demographic Dividend or Demographic Drag? In

China and India, 2025: A Comparative Assessment (pp. 7–36). RAND Corporation.
<http://www.jstor.org/stable/10.7249/mg1009osd.10>

Zannella, M. (2015). Reallocation of resources between generations and genders in the market and non-market economy. The case of Italy. *The Journal of the Economics of Ageing*, 5, 33-44.

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