

Demographic Shifts and Trade Dynamics: Comparative Insights from Malaysia and Thailand within ASEAN

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Abstract

Demographic shifts is increasingly recognised as a major structural transformation with far-reaching implications for economic performance, labour markets and international trade. While a substantial body of literature has examined the effects of demographic change on economic growth and fiscal sustainability, relatively little attention has been devoted to its implications for trade dynamics, particularly within Southeast Asia. The paper examines how demographic shifts, such as population ageing and changes in labour force structure, affect trade patterns in Malaysia, Thailand and ASEAN and empirically estimates the impact of demographic shifts on trade variables. The paper employs descriptive analysis as well as empirical analysis using bounds testing Autoregressive Distributed Lag (ARDL) approach to estimate both short-run and long-run relationships between trade outcomes and demographic variables. The results reveal that the effects of demographic ageing on trade are heterogeneous across countries. Percentage of total population aged 65 years and above significantly affects Malaysia's trade balance in the long run, although its effects on export performance, import demand and trade openness are not statistically significant. In Thailand, percentage of total population aged 65 years and above is positively associated with exports and trade openness, indicating that structural transformation and productivity-enhancing adjustments have enabled the economy to maintain trade competitiveness despite a shrinking workforce. At the ASEAN level, demographic variables significantly influence trade openness but exhibit limited effects on exports, imports and trade balance, reflecting the diverse demographic profiles of member states. The findings suggest that demographic transition is not merely a social challenge but an important determinant of trade dynamics. As ASEAN economies continue to age at different rates, demographic considerations should be incorporated into trade, industrial and regional integration strategies to sustain long-term competitiveness and economic resilience.

Keywords: Population ageing; demographic transition; trade openness; exports; ARDL; Malaysia; Thailand; ASEAN.

1. Introduction

Demographic shifts and trade dynamics have become increasingly important issues for ASEAN countries. Malaysia and Thailand are two key middle-income economies in the region, both facing major demographic transitions (Alam et al. 2023; Thanh Trong et al. 2024). These include an ageing population, a declining number of young workers and significant changes in labour force structures. At the same time, international trade is undergoing profound transformation due to the COVID-19 pandemic, rising geopolitical tensions, the growing threat of trade wars and repeated

disruptions to global supply chains (Thanh Trong et al. 2024). Escalating trade disputes among major economies have increased uncertainty in global markets, weakened multilateral trade frameworks and raised the risk of protectionist policies. Together, these developments have created new challenges and uncertainties for economic growth and regional integration.

Because of these changes, population trends can no longer be seen only as social or welfare issues. Demographic factors now directly influence international trade, foreign direct investment, labour markets, and overall economic competitiveness (Ghosh et al. 2024). Countries that do not adjust their trade, labour and industrial policies to demographic change may face higher production costs, labour shortages, reduced export competitiveness, and greater dependence on migrant workers (Rodrik & Stiglitz 2025). This situation is especially relevant for Malaysia and Thailand as both countries rely heavily on trade-led growth and manufacturing-based development strategies.

Malaysia and Thailand play important roles as manufacturing and trading centres within ASEAN. They are deeply involved in sectors such as electronics, automotive production, agriculture, and services. An ageing population can affect what these countries export, the types of skills workers need and the cost structure of production (Wei 2025; Williams & Duminy 2025). For example, a shrinking labour force may limit production capacity, while changes in workforce composition may push firms towards automation and higher value-added activities. These developments will not only shape national trade performance but also influence ASEAN's overall economic integration and its position in the global economy.

Globalization itself is also changing. In the past, global trade focused mainly on low costs and efficiency. Today, governments and companies place greater importance on supply chain security, resilience and risk reduction. As a result, production is becoming more regional rather than fully global (Ali et al. 2025; Williams & Duminy 2025). This shift creates new opportunities for ASEAN countries including Malaysia and Thailand, to attract trade and investment as alternative production hubs. However, the ability to benefit from these opportunities depends strongly on domestic conditions, especially population structure and labour availability. Countries with ageing populations must invest more in automation, technology and high-skilled workers to remain competitive.

While many studies already exist on population ageing, international trade and ASEAN economic integration, most of this research examines these topics separately. Studies on ageing often focus on social welfare systems and government spending, while trade studies usually focus on tariffs, trade agreements and macroeconomic indicators (Lee & Song 2025). There are very few studies that analyse demographic change and international trade together, particularly in the ASEAN context. Even fewer studies provide a direct comparison between Malaysia and Thailand, despite their similar economic roles and shared exposure to demographic pressures. In addition, existing research rarely explores how trade itself can influence demographic structure through employment creation, migration flows, and changes in workforce composition.

To address these gaps, this paper aims to analyse the interaction between demographic factors and international trade in Malaysia and Thailand within the ASEAN context. The main objective of this paper is to understand how population change and trade influence each other, rather than treating them as separate processes (Marois et al. 2024). Specifically, the paper seeks to examine

how demographic shifts, such as population ageing and changes in labour force structure, affect trade patterns in Malaysia and Thailand. At the same time, it aims to empirically estimate the impact of population ageing on trade variables.

By examining both directions of this relationship, the paper provides a more complete and balanced understanding of how population and trade shape each other over time. Through a comparative approach, the paper highlights similarities and differences between Malaysia and Thailand, offering insights into how middle-income ASEAN countries can respond to demographic change while maintaining trade competitiveness. The findings are expected to help policymakers design trade, labour, and industrial policies that are better aligned with demographic realities, while also supporting ASEAN's goal of building a more inclusive, resilient, and sustainable regional economy.

2. Stylized facts on demographic shifts and trade

This section provides information on demographic trends of economic communities in the ASEAN region, with emphasis on Malaysia and Thailand, trading blocs, and regions, by presenting the demographic changes that countries and regions undergo.

2.1 World Population trends

Global population change is entering a new and important stage. Population growth around the world is no longer fast. According to the United Nations World Population Prospects 2024, the world population reached about 8.2 billion in 2024. It is expected to continue growing, but much more slowly than before. The global population is projected to reach its highest level around the mid-2080s, at about 10.3 billion people. After that, it is expected to slowly decline towards the year 2100 (Dahlman 2025; Kasun 2018; United Nations 2024). This marks a major shift from the twentieth century, which was a time of rapid population growth in many parts of the world.

The main reason for this slowdown is the sharp decline in fertility. Today, the global fertility rate is around 2.3 births per woman (United Nations 2024). This is much lower than in the past. More importantly, more than half of all countries now have fertility rates below the replacement level of 2.1 births per woman. Replacement level means the average number of children needed to keep the population size stable (Berde et al. 2025; Cheng et al. 2022). When fertility stays below this level for a long time, population growth slows and may eventually turn into population decline. Many factors have contributed to lower fertility. People are getting married later and having children later. Women are spending more years in education and are more active in the workforce. Living costs, especially in cities, have increased, making it harder for families to raise many children. As a result, smaller families have become more common, and in some countries, many people choose not to have children at all (Fomichova et al. 2025; Skakkebaek et al. 2022).

At the same time, people around the world are living longer. Improvements in healthcare, nutrition, and living conditions have increased life expectancy in almost every region (Robine 2021). When fewer babies are born and people live longer, the age structure of the population changes. This leads to population ageing. Today, population ageing is happening in every region of the world

(The et al. 2025). The share of older people is increasing, while the share of children and young people is decreasing. One important result of population ageing is the rise in old-age dependency ratios. This means there are fewer working-age people to support a growing number of older persons (Muszynska & Rau 2012). This creates challenges for many countries. Governments face higher costs for pensions, healthcare, and long-term care (Jeon & Kwon 2017). In line with the analysis of Bloom and Freeman (1986), countries facing a rapid decline in their working-age population are likely to experience labour shortages that constrain economic expansion

These global demographic changes have wide effects. Economically, slower population growth can reduce labour supply and productivity Bloom and Freeman (1986). Socially, ageing populations require stronger healthcare systems and better social protection (Jeon & Kwon 2017).. Politically, demographic change affects migration, inequality, and relations between generations (Champion 1994; Sciubba 2025). Some countries now rely more on migration to support their workforce, while others struggle with population decline.

In conclusion, the world is moving toward a future shaped not by fast population growth, but by low fertility and population ageing. The key challenge of the twenty-first century is not managing population increase but adapting to ageing societies and slower growth. How well countries respond through policies on work, health, education, family support, and migration will strongly influence their long-term development and social stability.

2.2 Demographic Shifts, Economic Integration, and Development Sustainability in ASEAN

ASEAN is one of the most important population and economic regions in the world. In 2022, the total population of the ten ASEAN Member States reached about 672 million people, making ASEAN the third-most populous region globally and accounting for around 8.4 per cent of the world's population (United Nation 2024). This large population base has long been seen as a major strength for economic growth and regional integration. However, ASEAN is now undergoing a significant demographic transition that is changing the region's development path (Lee & Song 2025). This demographic transition is happening at uneven speeds across ASEAN. Countries such as Thailand, Singapore, and Viet Nam are ageing rapidly due to low fertility rates and longer life expectancy (Wei 2025; Williams & Duminy 2025). In contrast, countries like the Philippines, Cambodia, and Lao PDR still have relatively youthful populations, with higher fertility and a larger share of young people (Ali et al. 2025; Williams & Duminy 2025). As a result, ASEAN is a region where young and ageing societies exist side by side, creating both opportunities and challenges for regional cooperation.

One clear sign of demographic change is the growth of the elderly population. In Malaysia, the share of people aged 60 years and above increased from 5.3 per cent in 2000 to 7.5 per cent in 2022 (DOSM 2022). During the same period, the elderly population grew much faster than the working-age population. Although the number of working-age people is still increasing in ASEAN, the pace is slowing, and the old-age dependency ratio is rising (Fernandez et al. 2025; Wei 2025). This trend places growing pressure on labour markets, healthcare systems, and social protection across the region.

These demographic changes are closely linked to ASEAN's economic integration agenda under the ASEAN Economic Community (AEC). The AEC aims to build ASEAN as a single market and production base, with freer movement of goods, services, investment, capital, and skilled labour (Magashazi & Acheampong 2025). A large and productive workforce has been central to this vision. However, rapid ageing in some countries means that the window to fully benefit from a demographic dividend is narrowing. According to Wei (2025) some ASEAN countries are ageing before reaching high-income status, limiting their ability to build strong economic and social systems in advance.

Foreign Direct Investment (FDI) plays a critical role in this context. Evidence from Kholil et al. (2025) indicates that ASEAN continues to attract significant foreign direct investment, even as global FDI growth moderates. FDI supports industrial development, technology transfer, job creation and ASEAN's integration into global value chains. FDI has also helped ASEAN strengthen manufacturing, digital services, renewable energy, and supply-chain resilience (Mason et al. 2022; Sobirov et al. 2025). However, demographic change is beginning to shape investment patterns. Ageing societies face tighter labour markets, increasing the importance of productivity, automation, skills development, and higher-value investment (Mason et al. 2022). At the same time, younger ASEAN countries remain attractive destinations for labour-intensive and expanding industries (Park 2024). This creates a need for better coordination between demographic realities, AEC policies, and investment strategies.

2.3 Malaysia and Thailand in Demographic Transition

Malaysia is firmly situated in the late stage of demographic transition, characterised by sustained population growth alongside rapidly declining fertility and accelerating population ageing (Ja'afar 2020). Over the past two decades, Malaysia's total fertility rate (TFR) has fallen sharply to around 1.5–1.7 births per woman, well below the replacement level of 2.1 (Dhukari et al. 2024). This decline marks a significant structural shift in family formation, reproductive behaviour, and societal norms, reflecting rising education levels, delayed marriage, higher female labour force participation, urbanisation, and increasing costs of living (Dhukari et al. 2024; Ja'afar 2020). While the country's population continues to grow, this expansion is no longer driven by high fertility but rather by population momentum and migration inflows.

A key indicator of Malaysia's demographic transformation is the steady rise in its median age, which now stands at approximately 31 years and continues to increase. This ageing trajectory culminated in a significant milestone in 2021, when Malaysia officially entered the category of an ageing nation (Ho 2025). Projections suggest that by 2048, at least 14 percent of Malaysians will be aged 65 and above, placing the country firmly within the "aged nation" classification (Goldstone 2026; Ho 2025). This transition is occurring at a pace faster than that experienced by many high-income countries in the past, raising concerns about preparedness, particularly in healthcare, pensions, labour markets, and social protection systems.

Malaysia thus faces what can be described as a demographic paradox: the population is still expanding in absolute size, yet it is ageing rapidly while fertility continues to fall. This dual dynamic creates complex policy challenges. On the one hand, a growing population may suggest continued economic potential and market expansion. On the other, the shrinking proportion of

youth and the inevitability of an older population structure present long-term constraints on labour supply, productivity, and fiscal sustainability. If unaddressed, these pressures may erode development gains and strain public finances, particularly in health and eldercare.

Thailand presents a more advanced and cautionary version of this demographic future. Unlike Malaysia, Thailand has already entered a phase of outright population decline. Recent data show that annual births have dropped to historically low levels, falling below 500,000, while deaths now exceed births. Thailand's TFR, estimated at around 1.0–1.3, is among the lowest in Asia and reflects deeply entrenched low-fertility dynamics that have proven difficult to reverse, despite policy incentives and family-support measures (Pramarpa & Guest 2024)

The demographic consequences for Thailand are profound. The country is moving rapidly towards super-aged status with projections indicating that nearly one-third of its population will be elderly by the early 2030s (United Nation 2024). This transformation is unfolding within a context of a shrinking working-age population, raising acute concerns about labour shortages, declining economic dynamism, and increasing dependency ratios. According to Marois et al. (2024) Choomplang & Negishi (2025) for Thailand, demographic ageing is no longer a future risk it is a current structural reality shaping labour markets, industrial competitiveness, public spending and long-term growth prospects.

Thailand's experience illustrates the compounded effects of simultaneous ageing and population decline. A reduced workforce constrains economic expansion, while higher numbers of elderly citizens increase demand for healthcare, pensions, and social services (Choomplang & Negishi 2025). Fiscal pressures intensify as the tax base narrows and age-related expenditures rise (Marois et al. 2024). These challenges are further magnified by uneven productivity growth and difficulties in attracting sufficient migrant labour to offset workforce contraction. As such, Thailand represents an advanced case of demographic transition in Southeast Asia, offering valuable lessons for neighbouring countries, including Malaysia (Jayawardhana et al. 2023).

For Malaysia, Thailand's trajectory serves both as a warning and a learning opportunity. While Malaysia has not yet entered population decline, the structural conditions that led Thailand to its current situation persistently low fertility, rapid ageing, delayed policy responses are increasingly evident (Jayawardhana et al. 2023). The window for proactive intervention in Malaysia is narrowing. Strategic responses focused on active ageing, productivity enhancement, lifelong learning, family-friendly labour policies, managed migration and eldercare system reform will be critical in shaping a more resilient demographic future (Mohan et al. 2025).

At the ASEAN level, these demographic shifts underscore the need for stronger regional cooperation. Member states are moving through demographic transition at different speeds, creating opportunities for labour mobility, skills matching, and shared policy learning (Park 2024). Thailand's super-ageing experience can inform Malaysia's medium-term planning, while Malaysia's current demographic momentum offers insights into managing transition before decline sets in. Collectively, ASEAN faces the challenge of maintaining growth, social cohesion, and fiscal sustainability in an era of demographic maturity.

2.2 Trade Blocs, Demographic Change, and Investment Dynamics in ASEAN

In an era marked by economic globalization and regional integration, trade blocs have emerged as critical platforms for enhancing economic cooperation, attracting investment and strengthening competitiveness among member states. Among these the ASEAN stands out as one of the most dynamic regional groupings, particularly following the establishment of the ASEAN Economic Community (AEC). According to Park (2024) the AEC seeks to transform ASEAN into a single market and production base, characterized by the free flow of goods, services, capital, and skilled labour, while positioning the region as an integrated participant in the global economy.

Within this integrated framework, Foreign Direct Investment (FDI) plays a pivotal role in shaping production networks, employment patterns, and trade competitiveness. ASEAN has consolidated its position as a leading FDI destination globally, with inflows remaining resilient even amid global economic uncertainty (Park 2024). In 2024, ASEAN attracted record-level investment estimated at around USD 225 billion, driven largely by manufacturing, digital industries, and supply-chain reconfiguration (Li et al. 2023; Rahman & Anis 2025). Malaysia and Thailand have both benefited from these investment flows, reflecting their strategic locations, industrial bases, and integration into regional value chains.

However, economic integration and investment dynamics within ASEAN do not operate in isolation. They are increasingly influenced by demographic shifts, particularly population ageing, labour-force transformation, and changing consumer profiles (Li et al. 2023). Across ASEAN, the demographic structure is gradually shifting toward an ageing population, with the proportion of elderly persons rising faster than that of the working-age population (Mohan 2025). This trend presents both opportunities and constraints for trade and investment flows, as labour availability, productivity, and domestic demand patterns evolve.

2.2.1 Malaysia and Thailand Demographic Profiles within ASEAN

Malaysia and Thailand provide a compelling comparative perspective on how demographic change reshapes trade dynamics within the AEC. Malaysia retains a relatively younger population compared to regional peers, benefiting from a sizeable working-age cohort that continues to support manufacturing, services, and export-oriented industries (Pulami & Nepal 2024). This demographic advantage enhances Malaysia's attractiveness to foreign investors, particularly in technology-driven and services sectors, reinforcing its role as a competitive FDI host within ASEAN. Malaysia's demographic transition has been relatively gradual. As shown in Figure 1, the share of the population aged 65 years and above increased from approximately 3.4 per cent in 1980 to 7.8 per cent in 2024. Throughout the 1980s and 1990s, Malaysia benefited from a favourable demographic structure characterised by a large and expanding working-age population. This demographic dividend contributed to industrialisation, export expansion and sustained economic growth. However, since the early 2000s, the pace of ageing has accelerated, reflecting declining fertility rates, increasing life expectancy and changing family structures (Ja'afar, 2020; Ho, 2025). While Malaysia remains relatively younger than many developed economies, the country is gradually transitioning from a demographic dividend phase towards a mature demographic structure with increasing dependency ratios.

Thailand, by contrast, is transitioning more rapidly into an aged society, with individuals aged 60 and above accounting for approximately 20 percent of the population by 2024. The pace of population ageing in Thailand has already begun to exert pressure on labour supply, productivity growth, and long-term economic expansion. As a result, Thailand faces a dual challenge: sustaining its role in regional production networks while adapting policies to offset labour constraints through automation, skills upgrading, and targeted investment incentives. [jil.go.jp] These contrasting demographic trajectories influence FDI composition and trade specialization within the AEC. Malaysia's demographic structure continues to support labour-intensive and high-value manufacturing, whereas Thailand increasingly attracts investment in automation, advanced manufacturing, and health-related industries linked to its ageing population. Such variations underscore how demographic factors interact with AEC-driven integration to shape national trade strategies.

Thailand's demographic transition has occurred at a much faster pace. Similar to Malaysia, Thailand recorded an old-age population share of approximately 3.3 per cent in 1980. However, by 2024, this figure had increased to 15.4 per cent, positioning Thailand among the most rapidly ageing societies in Southeast Asia. The acceleration became particularly evident after the early 2000s, driven by persistently low fertility rates and longer life expectancy (Pramarpa & Guest, 2024; Marois et al., 2024). Unlike Malaysia, Thailand is already experiencing the economic consequences of an ageing population, including labour shortages, declining workforce growth and rising old-age dependency ratios. These developments are increasingly influencing industrial competitiveness, investment decisions and long-term economic growth prospects (Choomplang & Negishi, 2025).

At the regional level, ASEAN has also experienced a gradual ageing process. The average share of older persons increased from approximately 3.6 per cent in 1980 to 8.4 per cent in 2024. However, this regional average conceals substantial demographic heterogeneity across member states. While countries such as Thailand and Singapore are entering advanced stages of population ageing, others such as the Philippines, Cambodia and Lao PDR continue to benefit from relatively youthful populations (Ali et al., 2025; Park, 2024). This demographic diversity creates varying comparative advantages within ASEAN and has important implications for regional production networks, labour mobility and economic integration.

A comparison of Malaysia, Thailand and ASEAN reveals that demographic ageing is occurring at markedly different speeds. Although all three exhibited broadly similar age structures in 1980, their trajectories diverged significantly over the subsequent four decades. Malaysia has experienced a relatively moderate transition, while Thailand has undergone a much more rapid demographic transformation. Such differences are particularly relevant from a trade perspective because demographic structure influences labour endowments, capital accumulation, savings behaviour and consumer demand. As countries move through different stages of demographic transition, their trade patterns, comparative advantages and participation in global value chains are also likely to evolve (Mason et al., 2022; Lee & Song, 2025).

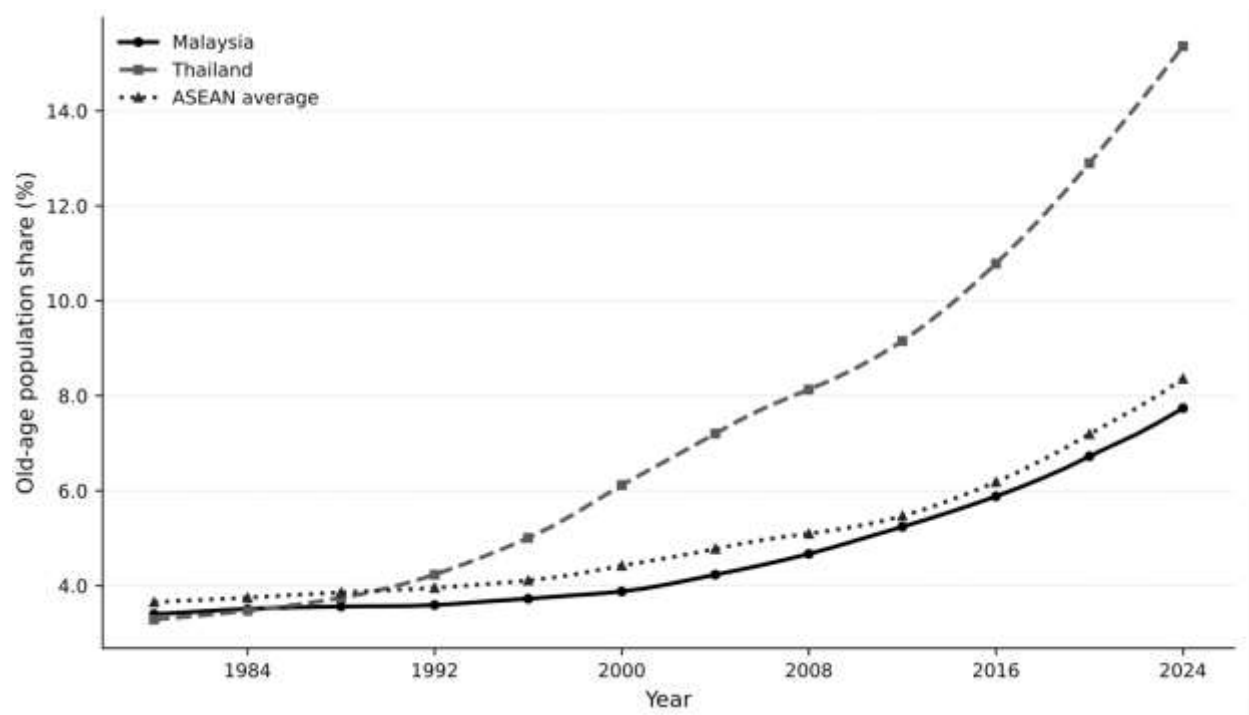


Figure 1. Malaysia, Thailand and ASEAN old age population share, 1980 – 2024

Source: World population prospect (2024)

3. Trade Implications of Demographic Change

At the regional level, demographic change is reshaping ASEAN's trade and investment landscape. An ageing workforce raises concerns over labour shortages but simultaneously demand for productivity-enhancing investment and technology transfer (Pulami & Nepal 2024). In line with Park (2024) argument that foreign investors responding to these trends increasingly view ASEAN not merely as a low-cost production hub but as a diversified investment destination with varying demographic and market characteristics across member states.

In this context, the AEC provides a critical institutional framework that allows countries like Malaysia and Thailand to complement rather than compete excessively (Park 2024). Through deeper integration, demographic disadvantages in one economy can be partly mitigated by regional labour mobility, capital flows and shared production networks. This reinforces ASEAN's model of open regionalism in which, regional integration supports global trade engagement rather than inward-looking protectionism (Pulami & Nepal 2024).

The experience of Malaysia and Thailand illustrates how demographic structures shape investment attractiveness and trade specialization within the ASEAN Economic Community. Aligning demographic realities with trade and investment policies will be crucial for sustaining inclusive growth and maintaining the region's relevance in an increasingly competitive global economy. The divergent demographic trajectories observed in Malaysia, Thailand and ASEAN suggest several important channels through which demographic change may influence trade performance

and economic integration. Demographic transition is not merely a social phenomenon but a structural force that shapes comparative advantage, trade competitiveness, consumption patterns and economic integration. Understanding these relationships is therefore essential for assessing the future trade prospects of Malaysia, Thailand and ASEAN as the region moves towards a more mature demographic profile.

3.1 Shift in Comparative Advantage (Supply-Side Effects)

One of the most direct channels linking demographic change and trade is through comparative advantage. Traditional trade theory suggests that countries specialise according to their relative factor endowments. As populations age, countries become relatively labour-scarce and capital-abundant, altering their comparative advantages in international markets. Cai and Stoyanov (2016) argue that changes in population age structure can modify comparative advantage because skills, productivity and labour market participation differ across age groups. Malaysia continues to benefit from a relatively large working-age population that supports manufacturing, electronics and export-oriented production. Thailand, however, is increasingly facing labour constraints arising from population ageing. As labour supply growth slows, firms may need to substitute labour with automation, advanced technologies and capital-intensive production methods. Consequently, ageing economies are expected to shift away from labour-intensive exports towards higher value-added and technology-intensive industries. Similar patterns have been observed in several ageing East Asian economies, including Japan and the Republic of Korea (Lee & Song, 2025).

3.2 Age-Dependent Consumption and Non-Homothetic Demand Patterns (Demand-Side Effects)

Demographic change also affects trade through consumption behaviour. Consumer preferences vary systematically across age groups, leading to changes in the composition of domestic demand. According to Mason et al. (2022), ageing populations tend to allocate a larger share of expenditure towards healthcare services, pharmaceuticals, medical devices and long-term care, while spending on education, childcare and youth-oriented products declines. As the elderly population expands, imports of healthcare-related products are expected to increase, creating new trade opportunities in health-related industries. This phenomenon reflects what trade economists describe as non-homothetic preferences, whereby consumption patterns change as demographic characteristics evolve, even if income levels remain constant.

3.3 Life-Cycle Hypothesis, Savings Behaviour and Trade Balances

The Life-Cycle Hypothesis developed by Samuelson (1958) and Modigliani and Brumberg (1954) provides another important mechanism linking demographic change and trade. Under this framework, individuals accumulate savings during their working years and draw down those savings during retirement. Consequently, population ageing may influence aggregate savings rates, investment levels and external balances. Countries with ageing populations often experience declining national savings as the proportion of retirees increases. This may reduce domestic capital accumulation and influence current account positions. Marois et al. (2024) argue that rising

dependency ratios in Thailand are likely to exert increasing pressure on domestic savings and fiscal sustainability. Similar challenges are expected to emerge in Malaysia as demographic ageing progresses. Through these channels, demographic structure can influence trade balances, capital flows and broader macroeconomic performance.

3.4 Market Size and Home Market Effects

Demographic change can also influence trade through market size effects. The Home Market Effect suggests that countries with larger domestic demand for particular products tend to develop stronger production capabilities and export advantages in those sectors. Krugman (1980) argues that producers benefit from economies of scale by locating production close to large consumer markets. Malaysia's relatively larger domestic market and more balanced age structure continue to generate demand for both youth-related and ageing-related goods. In contrast, Thailand's more rapidly ageing population is increasingly shifting domestic demand towards healthcare, wellness and elderly-care products. These changing demand structures may influence future patterns of industrial specialisation and trade within ASEAN. As demographic profiles diverge further across the region, market-size effects may become an increasingly important determinant of trade intensity and production location decisions.

3.5 Intertemporal Consumption Reallocation and Demographic Trade Structuralism

The fundamental realignment of global trade patterns can be explained via The Life Cycle Hypothesis (LCH), in which individuals' smooth consumption over their existence by functioning as net savers during their productive years and transitioning into "dis-savers" upon retirement (Ando & Modigliani, 1963). As a nation's demographic profile matures, this intertemporal optimization triggers a systemic shift from a production-oriented economy to a consumption-led one, directly impacting the current account balance (Sivathas, 2026). In this framework, the working-age population supports the export of labor-intensive goods while accumulating capital, whereas a rising old-age dependency ratio necessitates a greater reliance on imports to satisfy age-specific needs that the domestic labor force can no longer produced competitively.

The divergence in consumption habits between age cohorts is defined by non-homothetic preferences, where the income elasticity of demand for specific goods shifts as a population ages (Fajgelbaum et al., 2011). Demographic factors influence trade through demand-side channels when the age composition of the population serves as a structural determinant of consumer preferences. Differences in age cohorts generate non-homothetic consumption patterns that ultimately shape the composition of import demand. Younger households, which are often more constrained by income and liquidity, tend to consume more standardized and price-sensitive tradable goods, consistent with the sectors characterised by low-income elasticity described by Fieler (2011). As individuals move into their working years and incomes rise, consumption shifts towards higher-quality and more differentiated products, reinforcing the skill-intensive intra-industry trade patterns (Caron et al., 2014) and the quality-upgrading mechanisms proposed by Heins (2021). In contrast, older households exhibit distinct consumption preferences that extend beyond income effects. Even after accounting for differences in wealth, they allocate a larger share of expenditure towards services and specific tradable goods, particularly pharmaceuticals (Cravino

et al., 2022). Consequently, changes in a country's demographic structure can alter aggregate demand patterns, shift the national demand curve and ultimately influence comparative advantage through the Home Market Effect (Costinot et al., 2019).

This is empirically validated by the trends in baby carriages and parts thereof, as shown in Figure 2. Malaysia's import value for this category remained relatively stable until approximately 2005, after which it entered a period of significant volatility, peaking at over 43 million USD in 2023 before a sharp contraction to approximately 22 million USD in 2024. This trend is an indicator of falling birth rates and a shrinking working age population, signaling Malaysia's transition toward the "post-transition" demographic phase. In contrast, Thailand's imports of baby carriages have remained consistently lower and more stable, generally hovering below 10 million USD, reflecting its more advanced stage of demographic maturation. The demographic-trade trend is further validated by the consistent growth of imports in toys, games, and sports requisites in developing ASEAN nations like Malaysia and Thailand (Figure 3). Conversely, the elderly population reallocates disposable income toward the "silver economy," prioritizing healthcare, medical instruments, and pharmaceuticals. This "taste shifter" in the national demand curve is visible in the exponential surge of medical instrument imports, which reached 1.18 billion USD in Malaysia and 970 million USD in Thailand by 2024 (Figure 4). Furthermore, consumption in aged societies moves beyond material goods toward spiritual and leisure needs, such as tourism, elderly education, and specialized cultural services, as well as increased energy demand for home climate control.

Demographic shifts also operate through the Home Market Effect (HME), where a country's domestic demand structure dictates its trade comparative advantage. As a population ages and becomes relatively capital-abundant but labor-scarce, its comparative advantage migrates from labor-intensive manufacturing to capital-intensive and age-appreciating sectors. While industries dependent on "age-depreciating" motor and manual skills suffer productivity declines, sectors requiring speech, language, and interactive skills, often inherent to older, more experienced workers, become the new engines of specialization. This transition forces an industrial upgrading, where aging nations like Thailand must pivot toward high-end service exports and automated manufacturing to offset a shrinking labor supply.

Ultimately, this demographic divergence is contributing to a shift in the international trade of Malaysia, Thailand and ASEAN region. Younger, labor-abundant regions are increasingly specializing in the manufacturing of consumer durables for the aging North, while simultaneously building their own internal markets through a growing middle-class youth base. This global reallocation confirms that population aging is not merely a localized social challenge but a structural driver of international trade, necessitating deep economic integration between demographically heterogeneous trade blocs to maintain global equilibrium.

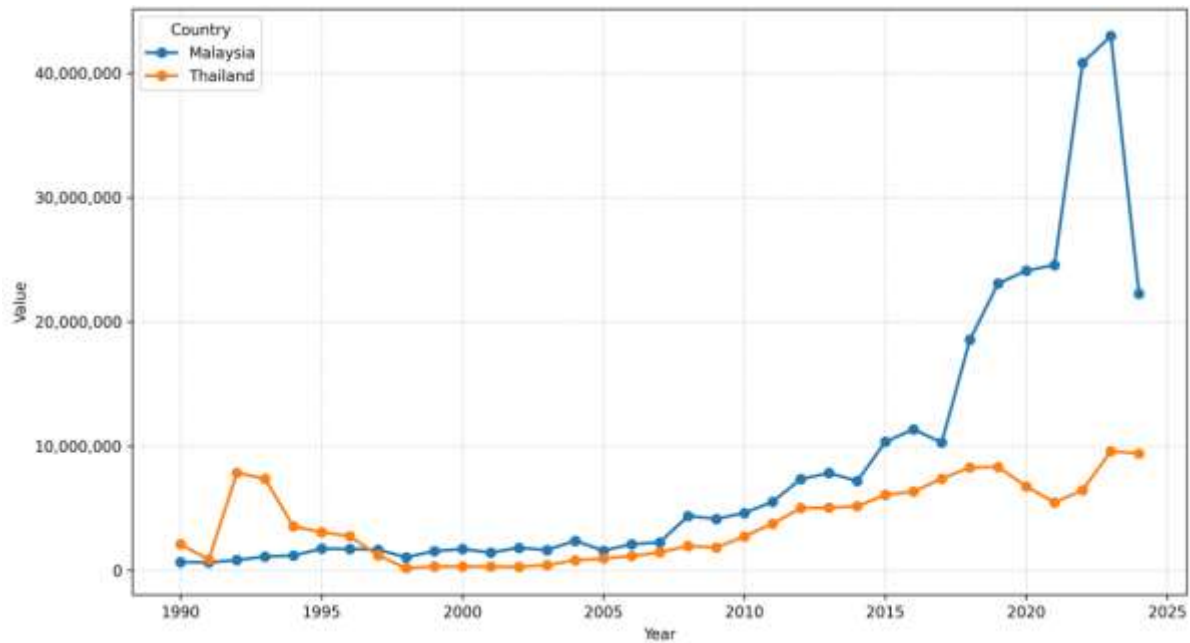


Figure 2. Malaysia and Thailand's share of aged-related imports (baby carriages and parts thereof)

Source: UN Comtrade Database, 1990 – 2024

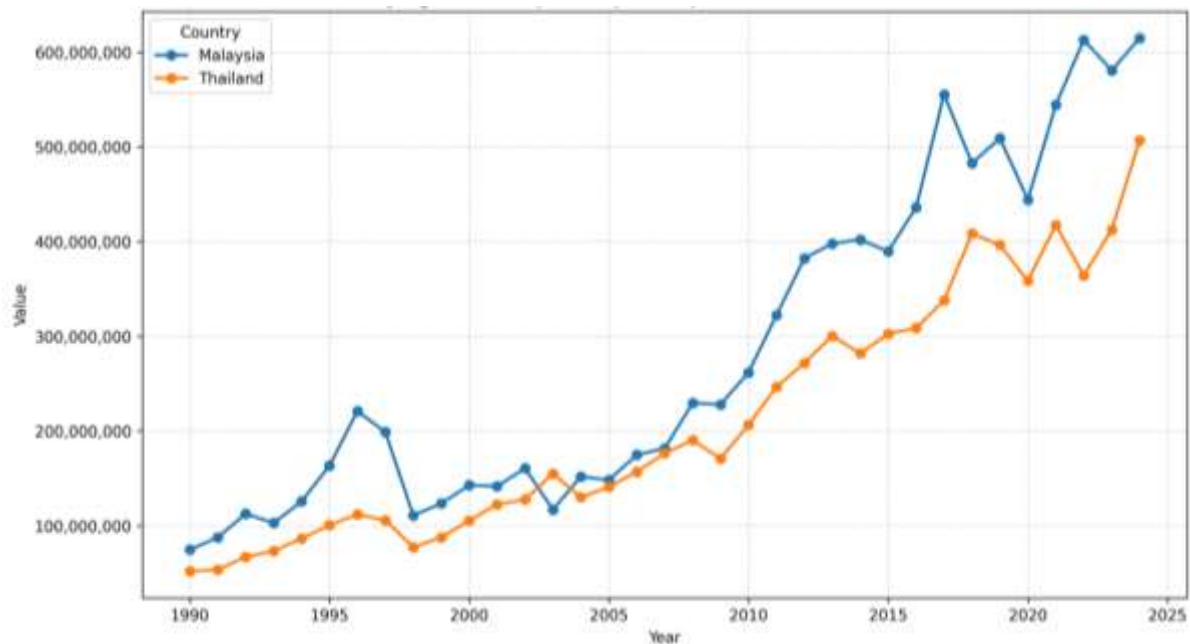


Figure 3. Malaysia's and Thailand's share of aged-related imports (toys, games and sports requisites; parts and accessories thereof)

Source: UN Comtrade Database, 1990 – 2024

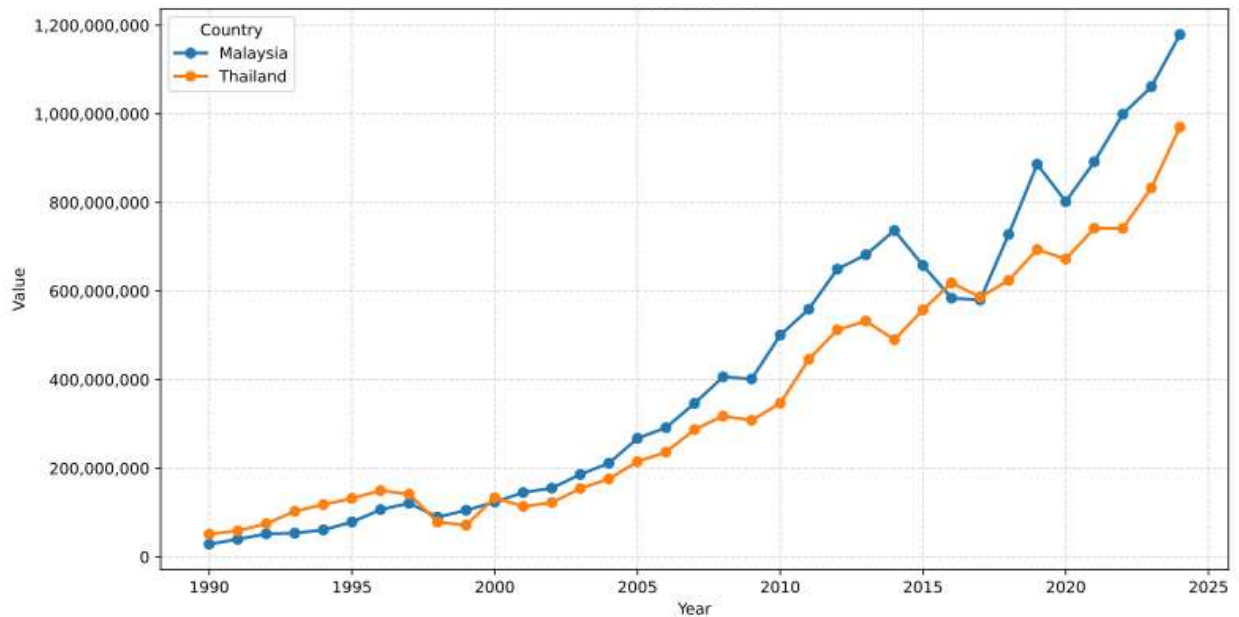


Figure 4. Malaysia and Thailand’s share of aged-related imports (instruments and appliances used in medical, surgical, dental or veterinary sciences, including scintigraphy apparatus, other electro-medical apparatus and sight testing instruments)

Source: UN Comtrade Database, 1990 – 2024

3.6 Relationship between Population Ageing and Trade Variables

The intersection of demographic transitions and international trade dynamics represent a fundamental structural shift in the global economy, moving beyond simple dependency ratios to reshape the very nature of national comparative advantage. As populations in the ASEAN region, specifically Malaysia and Thailand, undergo maturation, the systemic realignment of their trade profiles is driven by supply-side production shifts and demand-side non-homothetic preferences (Sivathas, 2026; Dalgin et al. 2008). This relationship is empirically captured in the correlation between age structures and key trade variables such as trade openness and export performance.

As illustrated in Figure 5, there is a distinct positive correlation between the old-age population share and trade openness across the ASEAN region. This relationship is attributed through the lens of non-homothetic preferences, where the income elasticity of demand for specific goods shifts as a population aged. Older households exhibit a distinct "taste shifter," reallocating spending toward age-specific tradables such as pharmaceuticals and medical instruments, which necessitates a higher volume of imports to satisfy these specialized needs. Incidentally, the relationship between the working-age population and trade openness suggests that as labour becomes relatively scarce in maturing societies, nations are compelled to pursue deeper trade integration and the offshoring of routine tasks to younger, labour-abundant regions to maintain economic equilibrium.

The impact of demographics is equally pronounced in export dynamics. Figure 6 demonstrates a strong positive relationship between the working-age population share and the log of exports, while the old-age population share also shows a significant correlation ($R^2 = 0.33$). This aligns with the concept of age-dependent comparative advantage. According to Cai and Stoyanov (2016), aging societies lose competitiveness in industries relying on age-depreciating skills (e.g., motor coordination and manual labour) but gain specialization in sectors requiring age-appreciating cognitive and interactive skills, such as management, speech, and communication. This transition forces an industrial upgrading where aging nations like Thailand must pivot toward capital-intensive and high-end service exports.

The emergence of a robust domestic "silver economy" creates the necessary scale for firms to achieve the productivity levels required to compete internationally in healthcare-related sectors. In this framework, the high domestic demand for medical goods in aging ASEAN states does not just drive imports; it also incentivizes the development of a specialized export base in these industries. Ultimately, the empirical evidence confirms that population aging is a structural driver of international trade, reshaping external accounts through the reallocation of factor endowments and the evolution of global consumer demand

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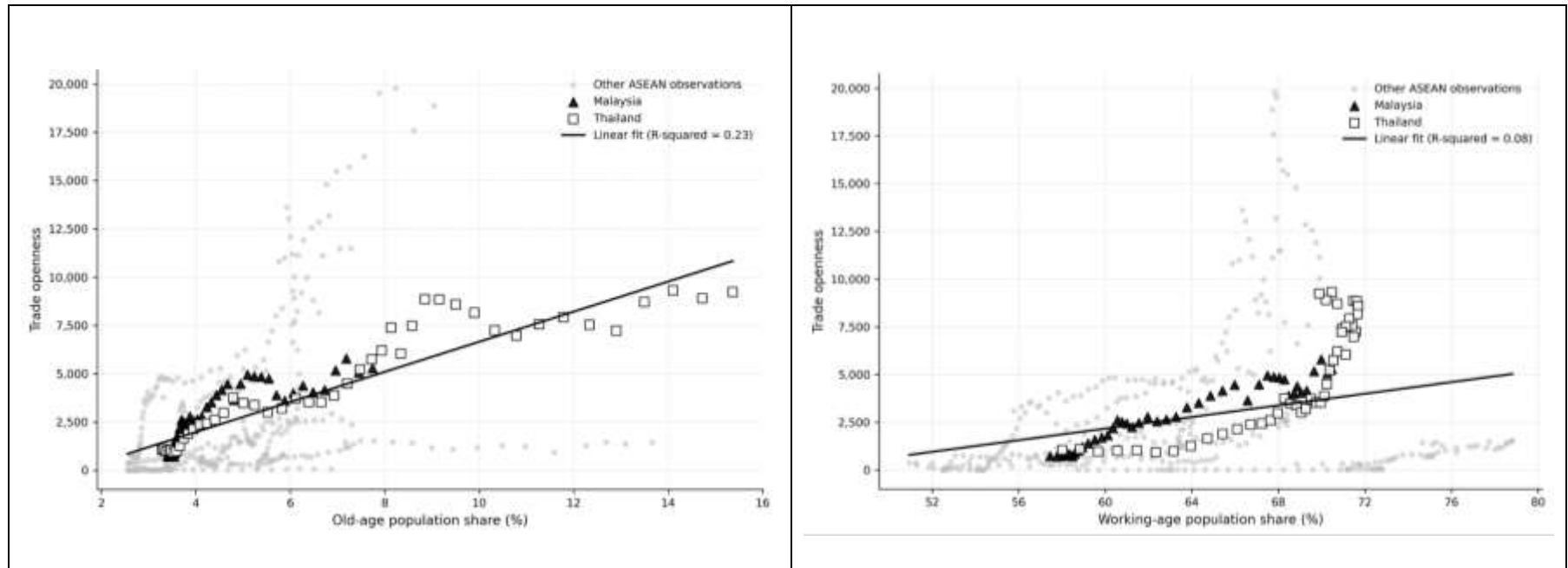


Figure 5. Relationship of old age population and working age population on trade openness

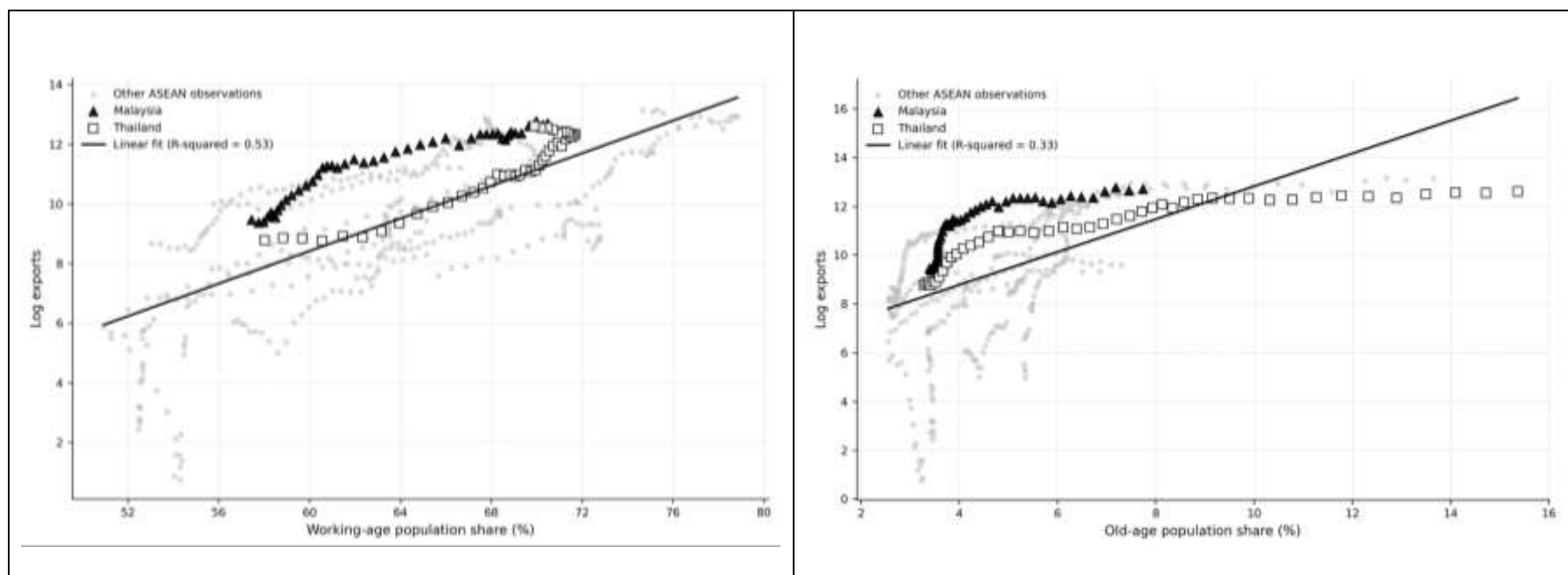


Figure 6. Relationship of old age population and working age population on log of exports

4. Empirical Evidence

This paper examines the relationship between demographic structure and trade performance using annual data covering the period 1980–2024. The analysis is conducted separately for Malaysia and Thailand, while a panel analysis is undertaken for ASEAN economies. The 45-year period captures demographic and trade data. Four trade indicators are used as dependent variables, namely exports (EXP), imports (IMP), trade balance (TB) and trade openness (TO). The key explanatory variables consist of old-age population share (OLD) and working-age population share (WORK), which capture the demographic composition of the population. In addition, GDP per capita is included to control for differences in economic development and purchasing power, while foreign direct investment (FDI) is incorporated to capture the effects of capital inflows, production capacity expansion and integration into international production networks. Together, these variables provide a comprehensive framework for examining how demographic and economic factors influence trade performance.

Table 1. Variables and their definitions

V ar ia bl e	Definition	So ur ce
Ol d- ag e po pu lat io n sh ar e	Percentage of total population aged 65 years and above	Un ite d Na tio ns W orl d Po pul ati on Pr os pe cts
W or ki ng - ag e po pu lat	Percentage of total population aged 15–64 years	Un ite d Na tio ns W orl d Po

ion share		population Prospects
GDP per capita	Gross domestic product divided by total population	World Development Indicators (WDI)
FDI (% of GDP)	Net foreign direct investment inflows as a percentage of GDP	World Development Indicators (WDI)
Export	Total value of goods exported by a country	United Nations Comtrade Database

I m p o r t	Total value of goods imported by a country	Un ite d Na tio ns Co mt rad e Da tab ase
Tr ad e B al an ce	Difference between exports and imports, calculated as exports minus imports	Un ite d Na tio ns Co mt rad e Da tab ase
Tr ad e O pe nn es s	Total trade as a percentage of GDP, calculated as $(\text{exports} + \text{imports}) / \text{GDP} \times 100$	Ca lcu lat ed fro m U N Co mt rad e an d W orl d De vel op me nt Ind ica tor

		s (W DI)
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This paper employs the bounds testing procedure developed by Pesaran and Pesaran (1997), Pesaran and Shin (1999), and Pesaran et al. (2001) within an autoregressive distributed lag (ARDL) framework because it allows the estimation of both short-run and long-run relationships and is suitable for small samples with variables integrated of mixed orders, $I(0)$ and $I(1)$. The full econometrics results of the estimated equations are shown in the Appendix. There are mixed of significant and insignificant variables for all models both for the long run and short run estimates. Nevertheless, the $ECM(-1)$ coefficients for all models are negative and statistically significant at the 1% significant level, which indicate rapid adjustment toward long-run equilibrium.

4.1 Malaysia

For Malaysia, population ageing influences trade primarily through its effect on the country's external balance rather than through export or import performance directly. In the long run, the old-age population share shows a positive and statistically significant effect on the trade balance, while its effects on exports, imports and trade openness are not statistically significant. This finding indicates that demographic ageing has not substantially altered Malaysia's trade volumes or degree of integration into global markets, but it has contributed to changes in the relationship between exports and imports.

This trend is largely explained by the gradual nature of Malaysia's demographic transition, in which the nation only officially became an "ageing society" in 2020, significantly later than regional peers like Thailand or Singapore. Malaysia continues to benefit from a relatively large working-age population and sustained labour force participation. Consequently, ageing has not yet generated sufficiently large labour shortages to significantly affect export competitiveness or import demand. However, as the population matures, shifts in national savings behaviour and consumption patterns are beginning to manifest in the trade balance as the elderly cohort transitions into a phase of "dis-saving" as prescribed by the LCH.

The short-run estimates reveal a different pattern. Changes in the old-age population share significantly reduce exports, trade balance and trade openness. These findings suggest that increases in the elderly population initially generate adjustment pressures through slower labour force growth and weaker productive capacity. However, the positive and significant lagged effect of ageing on trade balance and trade openness indicates that these short-run disruptions are subsequently offset as firms and markets adjust. The significant and positive impact of the working-age population share across all trade indicators further highlights the importance of labour availability for Malaysia's trade performance. GDP per capita also demonstrates a strong positive effect on exports, imports and trade openness, suggesting that economic development remains a key driver of Malaysia's trade expansion.

4.2 Thailand

For Thailand, the empirical results provide strong evidence that demographic ageing has become an important determinant of trade performance. In the long run, the old-age population share has a positive and statistically significant effect on both exports and trade openness. These findings suggest that despite experiencing one of the fastest ageing processes in Southeast Asia, Thailand has maintained and even strengthened its integration into international markets. Although Thailand is experiencing labour shortage due to ageing, automation, digitization, and other trends associated with Industry 4.0 alleviate some of these shortages while exacerbating others as the demand for skills evolves (World Bank, 2021). Such adjustments may support export performance despite slower labour force growth, in which technological advancements provide opportunities to increase productivity. Thailand's transition towards higher value-added manufacturing sectors may therefore explain the positive long-run relationship between ageing and exports.

Similarly, the positive effect of ageing on trade openness suggests that demographic transition may encourage greater reliance on international markets. As domestic demand growth moderates due to population ageing, firms may increasingly seek export opportunities abroad while importing specialised goods and services required by an ageing society.

Unlike Malaysia, Thailand's trade balance is not significantly affected by the old-age population share in the long run. Instead, the working-age population share exhibits a positive and significant effect on trade balance, indicating that labour force availability remains an important determinant of external competitiveness. GDP per capita continues to exert strong positive effects on exports, imports and trade openness, while FDI is associated with a deterioration in the trade balance, possibly reflecting the import-intensive nature of foreign-invested production activities.

In the short run, similar to Malaysia, ageing shows significant negative effects on exports, imports and trade openness. This finding suggests that demographic ageing initially creates adjustment costs, including labour shortages and weaker domestic demand. However, the positive long-run coefficients indicate that Thailand has largely adapted to these demographic pressures through structural transformation and greater integration into global production networks.

4.3 ASEAN

Unlike the country-specific results, demographic ageing for ASEAN mean estimates, does not significantly influence exports, imports or trade balance at the regional level. The only significant long-run demographic effects are observed for trade openness, where both old-age population share and working-age population share exhibit positive coefficients.

This finding reflects the considerable demographic diversity across ASEAN member states. While countries such as Thailand and Singapore are experiencing rapid ageing, others, including the Philippines, Cambodia and Lao PDR, continue to possess relatively youthful populations. As a result, the effects of demographic change are unlikely to be uniform across the region. Instead, demographic heterogeneity may generate complementarities within ASEAN, allowing younger economies to specialise in labour-intensive activities while older economies increasingly move towards capital- and technology-intensive production.

The positive relationship between ageing and trade openness suggests that demographic transition may strengthen incentives for regional and global integration. As populations age and domestic labour force growth slows, economies may increasingly rely on international trade, foreign investment and regional production networks to sustain economic growth. This interpretation is consistent with recent studies suggesting that demographic change is reshaping comparative advantage and participation in global value chains.

The short-run ASEAN estimates indicate that changes in old-age population share are not statistically significant across any trade indicator, suggesting that demographic effects emerge gradually rather than immediately. Instead, GDP per capita and FDI play a more important role in explaining short-run trade performance. GDP per capita positively affects exports, imports and trade openness, while FDI contributes positively to imports and trade openness. These results indicate that economic development and investment conditions remain the primary drivers of short-term trade dynamics across ASEAN economies.

5. Conclusion

Changes in population structure are becoming an increasingly important factor shaping economic performance and international trade. As countries move towards an ageing society, changes in labour supply, savings behaviour, consumption patterns and production structures have the potential to alter trade competitiveness and integration into global markets. While Malaysia is undergoing a gradual transition towards an ageing society, Thailand has aged at a much faster pace and has already entered a more advanced stage of demographic transition. At the regional level, ASEAN continues to exhibit substantial demographic diversity, with some member states remaining relatively youthful while others are experiencing rapid population ageing. The analysis of age-related trade patterns further suggests that demographic change influences the composition of demand, with ageing populations generating stronger demand for healthcare-related goods and services while younger populations continue to support consumption of youth-oriented products.

The empirical findings indicate that demographic ageing does not affect trade uniformly across countries. In Malaysia, the long-run effect of population ageing is most evident through its positive influence on trade balance, suggesting that demographic change may be operating through savings, consumption and external balance mechanisms rather than directly affecting trade volumes. In Thailand, population ageing demonstrates a positive long-run effect on exports and trade openness, implying that the economy has adapted to demographic pressures through structural transformation, productivity improvements and deeper integration into international markets. At the ASEAN level, demographic variables are found to influence trade openness rather than exports, imports or trade balance, highlighting the role of demographic diversity in shaping regional economic integration.

From a policy perspective, the results suggest that demographic change should not be viewed solely as a challenge to economic growth and trade competitiveness. Rather, demographic transition presents both risks and opportunities. For Malaysia, sustaining trade competitiveness will require continued investment in human capital, productivity enhancement and technological upgrading as the demographic dividend gradually diminishes. For Thailand, where ageing is more advanced, policies that support innovation, automation and workforce adaptation will be

increasingly important. At the ASEAN level, demographic heterogeneity can be leveraged as a regional strength through greater labour mobility, deeper economic integration and stronger participation in regional value chains.

Overall, the paper highlights that demographic transition is becoming an increasingly important determinant of trade dynamics in Southeast Asia. As ASEAN economies continue to age at different rates, demographic considerations should be incorporated more explicitly into trade, industrial and regional integration strategies. Future research could extend the analysis by examining sector-specific trade effects, incorporating migration dynamics, or exploring how demographic change influences participation in global value chains and the emerging digital economy.

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Appendix

A1. Long-Run ARDL Estimates for Malaysia

Variable	ln(exports)	ln(imports)	trade balance	ln(trade openness)
Old-age share	1.625 (16.27)	10.41 (15.71)	816,108*** (216,689)	3.492 (14.88)
Working-age share	0.606 (5.237)	3.889 (4.112)	136,664 (130,490)	1.197 (4.510)
ln GDP per capita	2.641*** (0.336)	2.546*** (0.318)	-6,587.0 (10,260.4)	1.613*** (0.313)
FDI (% of GDP)	0.011 (0.023)	0.030 (0.020)	-562.07 (740.13)	0.021 (0.020)
ARDL order	ARDL(1,2,1,1,0)	ARDL(1,1,1,1,0)	ARDL(2,2,1,2,2)	ARDL(1,2,1,1,0)
Observations	43	44	43	43
R-squared	0.995	0.995	0.950	0.989
Adjusted R-squared	0.994	0.994	0.928	0.985

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Lag orders are selected by AIC with a maximum of two lags.

A2. Short-Run ARDL Error-Correction Estimates for Malaysia

Variable	ln(exports)	ln(imports)	trade balance	ln(trade openness)
ECM(-1)	-0.436*** (0.151)	-0.462*** (0.121)	-0.880*** (0.109)	-0.452*** (0.135)
D.dependent variable(-1)			0.219 (0.159)	
D.Old-age share	-426.22** (178.49)	-186.40 (119.88)	-19,319,824*** (59,637.3)	-364.19** (163.22)
D.Old-age share(-1)	372.89** (161.68)		20,986,690*** (55,781.7)	285.93* (155.47)
D.Working-age share	47.99*** (18.22)	43.69*** (13.71)	4,271,403*** (62,929.8)	46.51*** (14.93)
D.ln GDP per capita	2.153*** (0.462)	3.087*** (0.447)	-51,024.3** (24,641.9)	1.587*** (0.431)
D.ln GDP per capita(-1)			-49,442.0* (28,315.8)	
D.FDI (% of GDP)	0.005 (0.009)	0.014 (0.010)	-554.02 (599.94)	0.010 (0.009)
D.FDI (% of GDP)(-1)			888.20* (519.70)	
Constant	-5.419** (2.600)	-6.505*** (2.118)	-49,916.4 (31,911.8)	-3.348** (1.682)
ARDL order	ARDL(1,2,1,1,0)	ARDL(1,1,1,1,0)	ARDL(2,2,1,2,2)	ARDL(1,2,1,1,0)
Observations	43	44	43	43
R-squared	0.640	0.739	0.649	0.582
Adjusted R-squared	0.579	0.705	0.553	0.512

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Short-run estimates are from the error-correction representation of the selected ARDL model. ECM(-1) is the speed of adjustment.

A3 Long-Run ARDL Estimates for Thailand

Variable	ln(exports)	ln(imports)	trade balance	ln(trade openness)
Old-age share	8.959** (3.574)	3.674 (3.889)	339,048 (214,789)	6.242* (3.561)
Working-age share	6.540 (4.323)	-5.881 (4.552)	759,399** (334,747)	-0.064 (4.236)
ln GDP per capita	2.130*** (0.500)	3.332*** (0.530)	-77,892.6** (37,361.2)	1.765*** (0.491)
FDI (% of GDP)	0.033 (0.021)	0.026 (0.023)	-3,113.8* (1,691.3)	0.031 (0.021)
ARDL order	ARDL(1,1,0,1,0)	ARDL(1,1,0,1,0)	ARDL(2,0,0,1,0)	ARDL(1,1,0,1,0)
Observations	44	44	43	44
R-squared	0.997	0.993	0.578	0.990
Adjusted R-squared	0.996	0.992	0.493	0.988

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Lag orders are selected by AIC with a maximum of two lags.

A4. Short-Run ARDL Error-Correction Estimates for Thailand

Variable	ln(exports)	ln(imports)	trade balance	ln(trade openness)
ECM(-1)	-0.451*** (0.109)	-0.576*** (0.139)	-0.641*** (0.143)	-0.501*** (0.126)
D.dependent variable(-1)			0.332** (0.141)	
D.Old-age share	-66.05** (26.92)	-93.67** (37.43)	217,498 (151,273)	-77.46** (30.60)
D.Working-age share	2.951 (1.878)	-3.387 (2.901)	487,152** (228,408)	-0.032 (2.123)
D.ln GDP per capita	1.617*** (0.366)	3.610*** (0.504)	-138,889*** (37,886.4)	1.619*** (0.401)
D.FDI (% of GDP)	0.015 (0.010)	0.015 (0.013)	-1,997.5* (1,025.1)	0.016 (0.011)
Constant	-5.013*** (1.402)	-6.963*** (1.899)	68,125.6 (63,220.3)	-3.162*** (1.062)
ARDL order	ARDL(1,1,0,1,0)	ARDL(1,1,0,1,0)	ARDL(2,0,0,1,0)	ARDL(1,1,0,1,0)
Observations	44	44	43	44
R-squared	0.627	0.703	0.523	0.544
Adjusted R-squared	0.578	0.664	0.443	0.484

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Short-run estimates are from the error-correction representation of the selected ARDL model. ECM(-1) is the speed of adjustment.

A5. Long-Run ASEAN Panel ARDL Mean Group Estimates

Variable	ln(exports)	ln(imports)	trade balance	ln(trade openness)
Old-age share	136.30 (125.43)	-97.22 (117.06)	2,304,532 (1,798,360)	34.49** (17.26)
Working-age share	-11.29 (21.23)	14.23 (10.10)	48,004.4 (195,410)	7.968** (3.184)
ln GDP per capita	2.558** (1.180)	0.895 (0.617)	-21,864.8 (15,298.4)	-0.114 (0.768)
FDI (% of GDP)	0.085 (0.075)	0.082** (0.034)	-270.80 (413.93)	0.102 (0.064)
ARDL order	ARDL(1,2,2,2,0)	ARDL(1,1,1,1,0)	ARDL(2,2,1,2,2)	ARDL(1,0,1,1,0)
Countries	10	10	10	10
Total observations	412	421	409	421
Mean R-squared	0.983	0.983	0.856	0.976
Mean adjusted R-squared	0.977	0.979	0.785	0.971

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Estimates are ASEAN Mean Group panel ARDL results. Models are estimated by country using the common AIC-selected lag order; reported coefficients are cross-country means. ASEAN is not measured using yearly averages.

A6. Short-Run ASEAN Panel ARDL Mean Group Estimates

Variable	ln(exports)	ln(imports)	trade balance	ln(trade openness)
ECM(-1)	-0.459*** (0.080)	-0.436*** (0.075)	-0.967*** (0.186)	-0.395*** (0.076)
D.dependent variable(-1)			0.233** (0.114)	
D.Old-age share	-167.68 (146.43)	35.64 (58.85)	50,825.3 (3,365,947)	8.956 (6.989)
D.Old-age share(-1)	168.68 (142.18)		1,875,350 (2,527,763)	
D.Working-age share	-37.67 (42.90)	-4.438 (12.57)	1,643,862* (928,470)	5.267 (7.239)
D.Working-age share(-1)	62.19 (48.12)			
D.ln GDP per capita	1.958*** (0.667)	1.936*** (0.399)	-33,696.9* (17,421.2)	0.793** (0.359)
D.ln GDP per capita(-1)	-0.540 (0.593)		14,548.4 (14,248.5)	
D.FDI (% of GDP)	0.011 (0.008)	0.023*** (0.007)	-374.41 (229.57)	0.017*** (0.006)
D.FDI (% of GDP)(-1)			34.39 (275.73)	

Constant	-5.312*** (1.665)	-2.573* (1.499)	50,044.4 (80,278.6)	-1.156 (1.278)
ARDL order	ARDL(1,2,2,2,0)	ARDL(1,1,1,1,0)	ARDL(2,2,1,2,2)	ARDL(1,0,1,1,0)
Countries	10	10	10	10
Total observations	411	419	409	419
Mean R-squared	0.591	0.533	0.631	0.447
Mean adjusted R-squared	0.488	0.467	0.525	0.370

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Estimates are ASEAN Mean Group panel ARDL results. Models are estimated by country using the common AIC-selected lag order; reported coefficients are cross-country means. $ECM(-1)$ is the speed of adjustment.