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POPULATION AGEING AND ECONOMIC GROWTH IN MALAYSIA: A CONCEPTUAL FRAMEWORK OF LABOUR MARKET ADJUSTMENT AND PRODUCTIVITY

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Abstract: *Population ageing is becoming an increasingly important structural feature of Malaysia's demographic and economic development. Declining fertility and rising longevity are changing the age composition of the population, with potential implications for labour supply, productivity and economic growth. Existing studies generally associate population ageing with slower economic growth, but the mechanisms underlying this relationship remain insufficiently integrated. This paper develops a conceptual framework linking population ageing to economic growth through labour-market adjustment, effective labour supply and labour productivity. The framework distinguishes demographic ageing from actual economic participation and argues that the economic consequences of ageing depend partly on how workers, firms and institutions adjust to demographic change. Effective labour supply is conceptualised to include labour-force participation, employment, working hours, health, skills and the productive utilisation of older workers. The paper also considers technology, human capital, workplace adaptation and informal caregiving as factors that may condition the relationship between ageing and productivity. Malaysian evidence indicates that older persons possess additional potential work capacity, while international evidence suggests that technology, training and health can influence the productivity of older workers. The paper*

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therefore proposes that population ageing should not be interpreted as an automatic decline in productive capacity. Instead, its economic effects depend on the interaction between demographic change, labour-market adjustment and productivity-enhancing mechanisms. Four conceptual propositions are developed to guide future empirical research on Malaysia.

Keywords: *population ageing, economic growth, labour-market adjustment, effective labour supply, labour productivity, older workers, Malaysia*

Introduction

Population ageing is an increasingly prevalent demographic phenomenon in Malaysia. The reduction in fertility, increase in longevity and changes to the population structure are causing the relative importance of older age groups to increase gradually. The consequence of this transition extends beyond just the population composition since the demographic structure influences the supply of labour, household behaviour, intergenerational transfers and the demand for health and care services. Consequently, population ageing has become an important issue in discussions of Malaysia's long-term economic growth.

The relationship between demographic change and economic growth is well established in economic and demographic research. During earlier stages of demographic transition, declining fertility can increase the relative size of the working-age population and have favourable conditions for economic growth. Bloom and Williamson (1998), for example, showed that demographic change contributed to East Asia's economic performance when the working-age population expanded more rapidly than the dependent population. However, this demographic advantage is transitional since as fertility remains low and longevity increases, the age structure will shift towards older populations, potentially reducing the relative size of the working-age population.

Population ageing does not mechanically translate into lower economic growth since the conventional old-age dependency ratio provides useful information about demographic structure but does not measure actual economic participation. Individuals classified as older may continue to work while some individuals of conventional working age may remain outside the labour force due to health conditions, caregiving responsibilities, retirement decisions or other constraints. Consequently, the economic consequences of ageing are partly dependent on how much demographic change is translated into changes in actual labour input.

The Malaysian evidence illustrates this complexity. Mohd et al. (2021), using annual Malaysian data from 1981 to 2019 with an autoregressive distributed lag framework, reported a significant negative relationship between old-age dependency ratio and economic growth. Their analysis also identified labour participation, human capital and physical capital as significant factors associated with economic growth. These findings demonstrate that demographic ageing can create economic pressure, but they do not explain the mechanisms through which this pressure is transmitted.

Other Malaysian research provides a different but complementary viewpoint. Mansor et al. (2024) estimated the potential for greater labour-force participation among older Malaysians and found significant additional work capacity, particularly among men, urban residents and individuals with lower educational attainment. This finding is important because it demonstrates that an ageing population can contain underutilised productive capacity. The

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relevant economic issue is therefore not how many people are in conventional working-age categories, but how much productive labour can be mobilised.
Research on older workers in Malaysia similarly indicates that participation is associated with factors beyond chronological age. Murthy et al. (2019), based on a survey of older workers aged 55–60 in private education and medical industries, identified health, education, intention to continue working after retirement and age discrimination as factors associated with participation. These findings suggest that labour-market institutions and individual characteristics influence the extent to which population ageing becomes a constraint on labour supply.

Productivity is another important mechanism. The literature does not support a universal assumption that older workers are necessarily less productive. Poplawski-Ribeiro (2020) found that labour-force ageing was associated with slower total factor productivity growth across advanced and emerging economies. However, evidence from Japan and Korea shows that the productivity effects of ageing can depend on technology and industry characteristics. Lee et al. (2020) found positive productivity effects associated with older workers in industries with relatively high ICT capital, indicating complementarity between technology and older labour.

Health is also an important mechanism. Cylus and Al Tayara (2021), using data from 180 countries, found that the economic consequences of an ageing labour force were moderated by health conditions. Their findings indicate that population ageing does not necessarily result in economic decline when older workers remain healthy enough to participate productively.
These findings indicate that the relationship between population ageing and economic growth is more appropriately understood as a sequence of interconnected mechanisms rather than a direct demographic relationship. This paper therefore develops the following conceptual pathway:

Population Ageing → Labour-Market Adjustment → Effective Labour Supply → Labour Productivity → Economic Growth

Technology, human capital, health, workplace adaptation and informal caregiving are incorporated as supporting or conditioning factors.

The objective of this paper is to integrate these mechanisms into a coherent conceptual framework for analysing Malaysia. The paper contributes by bringing together demographic, labour-market and productivity perspectives that are often examined separately. It does not attempt to estimate the proposed relationships empirically. Instead, it synthesises existing evidence and develops four conceptual propositions that can guide future empirical research.

Literature Review

Population Ageing and Economic Growth

Population ageing represents a shift in the relative distribution of the population towards older age groups. From an economic perspective, this shift can affect the relationship between production and consumption across age groups. During the demographic transition, a growing working-age population can support higher production relative to the number of dependants. As the transition progresses, however, population ageing can reduce the relative share of working-age people.

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The demographic dividend literature provides an important foundation for understanding this process. Bloom and Williamson (1998) demonstrated that demographic transition contributed to East Asia's economic growth when the working-age population expanded relative to dependent populations. The implication is that demographic structure can influence economic performance, but the effect depends on the stage of demographic transition and the institutional environment in which demographic change occurs.

Mason and Kinugasa (2008) further argued that population ageing does not necessarily imply economic stagnation because demographic change can influence saving and capital accumulation. Their analysis of East Asia suggests that population ageing may contribute to a second demographic dividend under appropriate economic conditions. Thus, ageing can create constraints while simultaneously generating incentives for economic adjustment.

More recent cross-country research has generally identified potential negative growth effects when the share of older people increases while the working-age population contracts. Park et al. (2022), using data from more than 170 countries, found that an increasing share of older people combined with a shrinking working-age population was associated with lower economic growth. However, they also found that technological advancement, labour productivity, total factor productivity and automation could improve the contribution of older age groups to growth.

Lee and Shin (2021) provide further evidence by examining six channels through which ageing affects economic growth across 35 OECD countries. Their findings identify total factor productivity as an important channel while higher labour-force participation and working hours can partially compensate for demographic reductions in the working-age population.

The Malaysian evidence is broadly consistent with the concern that ageing can constrain growth. Mohd et al. (2021) reported a significant negative relationship between the old-age dependency ratio and economic growth in Malaysia. However, their findings also indicate the importance of labour participation, physical capital and human capital. This suggests that demographic ageing should be considered along the mechanisms through which the economy adjusts to demographic change.

The literature therefore establishes a potential demographic constraint but does not imply a fixed outcome. The economic effect depends on how changes in population structure affect labour supply, productivity and capital accumulation.

Population Ageing and Labour-Market Adjustment

Labour-market adjustment is a central mechanism linking demographic change to economic performance. As the working-age population becomes relatively smaller, an economy may respond through higher labour-force participation, delayed retirement, increased working hours, changes in occupational allocation or greater use of technology.

Older-worker participation is particularly important in this context. Conventional demographic indicators generally classify people according to age rather than economic activity. Yet older people can remain employed and contribute to production. This distinction is important for Malaysia because evidence suggests that older persons possess additional potential work capacity.

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Mansor et al. (2024) examined the potential expansion of labour supply among older Malaysians using health and mortality information. Their results indicate significant additional work capacity among older people with the potential particularly evident among males and urban residents. This evidence challenges the assumption that population ageing automatically produces an equivalent decline in labour supply.

The determinants of continued employment are also important. Murthy et al. (2019) found that health, education, age discrimination and intentions to continue working after retirement were associated with older-worker participation in Malaysia. These factors demonstrate that labour-market adjustment depends not only on demographic conditions but also on the characteristics of workers and workplaces.

The broader Asian literature supports this perspective. Ogawa et al. (2021) developed the concept of a "silver" or "third" demographic dividend based on the potential use of the untapped work capacity of healthy older people. Their analysis included Malaysia and showed that the productive potential of older workers can form part of the economic response to population ageing.

Labour-market adjustment, however, should not be interpreted simply as encouraging people to work longer. Continued employment must be consistent with health, skills, job characteristics and worker preferences. The objective is therefore to understand the conditions under which additional participation can contribute to effective labour supply.

Effective Labour Supply and Older-Worker Participation

The concept of effective labour supply provides a more appropriate analytical perspective than population size alone. A conventional measure of labour supply focuses on the number of people participating in the labour force. However, productive labour input also depends on employment status, hours worked, health, skills, experience and the match between workers and jobs. An individual who is technically within the working-age population but unable to participate because of poor health does not provide the same effective labour input as a healthy employed worker.

Effective labour supply can therefore be understood as the quantity and quality of labour that can actually be mobilised for productive activity. In the context of population ageing, it includes at least five dimensions: participation, employment, working hours, health and skills.

Health is particularly important. Cylus and Al Tayara (2021) found that the economic consequences of an ageing labour force depend partly on the health of older workers. Their analysis of 180 countries suggests that healthier older populations can substantially reduce the potential negative economic effects associated with ageing.

The Malaysian evidence reinforces this point. Mansor et al. (2024) found that health capacity affects the potential for older Malaysians to remain economically active. Their analysis indicates that improvements in health can extend productive working lives and increase available labour supply.

Education and skills are similarly relevant. Murthy et al. (2019) identified education as a factor associated with older-worker participation in Malaysia. Longer working lives may therefore require continued investment in human capital so that workers can adapt to changing occupational requirements.

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The distinction between demographic dependency and effective labour supply is consequently important. A person aged 65 or above who remains employed contributes to economic production while a younger individual outside the labour force does not provide equivalent labour input. Demographic ageing therefore creates a potential labour-supply constraint, but the actual constraint depends on participation, health, skills and employment behaviour.

Population Ageing and Labour Productivity

The relationship between workforce ageing and productivity remains an area of debate. At the macroeconomic level, some studies report negative effects. Poplawski-Ribeiro (2020) found that labour-force ageing was associated with slower total factor productivity growth in both advanced and emerging economies. Calvo-Sotomayor et al. (2019), using panel data for 24 European countries, also examined the relationship between workforce ageing and labour productivity and contributed to the broader evidence that ageing can affect productivity performance.

However, these findings should not be interpreted as evidence that older workers are inherently less productive. Productivity depends on the nature of work, worker characteristics and the production technology available.

Lee et al. (2020) provide particularly relevant evidence from Japan and Korea. Their industry-level analysis found that older workers could have positive effects on labour productivity in industries with relatively high ICT capital. They also identified complementarity between ICT capital and older workers in both manufacturing and services.

This suggests that technology can change the relationship between workforce age and productivity. Older workers may possess accumulated experience and occupational knowledge that can remain valuable when combined with appropriate technologies and work organisation. Training also matters. Lee et al. (2022), using individual-level evidence from Korea, found that ICT skills and job-related training can help older workers remain productive. The study reported positive relationships between ICT skills, training and wages among older workers, particularly among highly educated workers and those in skill-intensive occupations.

The evidence therefore points towards a conditional relationship. Ageing may create productivity pressures in some circumstances, but these pressures can be moderated by technology, skills, health and workplace conditions.

For Malaysia, this distinction is important because policies or organisational responses that simply classify older workers as less productive may overlook potential complementarities between experience, skills and technology.

Technology, Human Capital and Workplace Adaptation

Technological change can provide an important adjustment mechanism when demographic ageing reduces the rate of labour-force growth.

Automation and digital technologies can substitute for some labour inputs while also complementing workers in tasks where technology enhances productivity. Park et al. (2022) found that technological advancement, labour productivity and automation can improve the contribution of older populations to economic growth.

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The evidence from Japan and Korea is particularly relevant since these economies have experienced substantial population ageing alongside technological development. Lee et al. (2020) found that ICT capital enhanced the productivity of older workers in both countries. This indicates that technology need not simply replace older workers; it can also complement their productive capabilities.

Human capital is necessary for this complementarity. Lee et al. (2022) found that ICT skills and job-related training were associated with higher productivity indicators among older workers.

Workplace adaptation is therefore another relevant mechanism. As working lives extend, firms may need to adapt job design, working arrangements and training systems to accommodate differences in physical capacity, skills and preferences across age groups.

The implication is that technology, human capital and workplace adaptation should not be treated as separate issues. They interact to determine whether an ageing workforce represents a productivity constraint or an opportunity for maintaining productive capacity.

Informal Caregiving and Labour Supply

Population ageing can influence labour supply indirectly through informal caregiving. When the number of older people requiring assistance increases, family members may provide unpaid care. The time allocated to caregiving can compete with time available for paid employment. Consequently, the economic effects of population ageing may extend beyond the participation of older workers themselves.

Moussa (2019), in a systematic review of empirical studies, found that middle-aged women providing informal care to elderly parents were more likely to reduce their working hours than comparable non-caregivers. Heger and Korfhage (2020), using panel data covering 15 European countries and Israel, similarly found that informal care for elderly parents reduced employment and paid working hours for men and women.

These findings cannot be directly transferred to Malaysia because caregiving arrangements and institutional contexts differ across countries. Nevertheless, they establish a plausible mechanism that should be considered when analysing effective labour supply in ageing societies.

Informal caregiving is therefore incorporated into the framework as a potential constraint on effective labour supply. The magnitude of this effect will depend on household structure, caregiving intensity, gender roles, employment flexibility and the availability of formal care services.

Synthesis of the Literature and Research Gap

The literature establishes four broad conclusions.

First, population ageing can create a demographic constraint on economic growth by reducing the relative size of the working-age population. Malaysian evidence provides support for a negative relationship between old-age dependency and economic growth (Mohd et al., 2021).

Second, demographic ageing does not automatically translate into an equivalent decline in labour supply. Older-worker participation, health and employment conditions can alter the

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amount of labour actually available. Evidence from Malaysia demonstrate significant potential work capacity among older people (Mansor et al., 2024).

Third, the productivity effects of ageing are heterogeneous. Some evidence associates workforce ageing with slower productivity growth while other studies show that technology and training can support the productivity of older workers (Poplawski-Ribeiro, 2020; Lee et al., 2020; Lee et al., 2022).

Fourth, ageing can affect labour supply indirectly through caregiving responsibilities, potentially reducing the paid work of other household members (Moussa, 2019; Heger & Korfhage, 2020).

The main gap is therefore not a lack of research on population ageing. Rather, existing studies frequently examine demographic ageing, labour participation, productivity, technology and caregiving as separate mechanisms. There is a need for an integrated framework explaining how these mechanisms interact.

This paper addresses that gap by linking demographic ageing to economic growth through labour-market adjustment and effective labour supply while recognising productivity as the principal mechanism through which a constrained labour supply may affect economic performance.

Conceptual Framework

Theoretical Logic

The proposed framework works sequentially:

Population Ageing → Labour-Market Adjustment → Effective Labour Supply → Labour Productivity → Economic Growth

Population ageing represents the initial condition. It redistributes the population across age groups and reduces the rate of growth of the conventional working-age population.

In turn, labour-market adjustment reflects adaptation to this change. This includes older-worker participation and retirement, working hours and employment arrangements.

Effective labour supply captures productive labour, given participation, employment, hours, health and skills.

Labour productivity represents the efficiency with which labour contributes to output. Productivity becomes particularly important when demographic change limits the scope for increasing labour input through population growth.

Economic growth is then viewed as the result of the interaction of these factors.

Population Ageing and Labour-Market Adjustment

Population ageing exerts a pressure for adjustment in the labour market but does not dictate the direction or magnitude of adjustment.

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Older-worker participation can raise effective labour supply if the aged remain healthy and willing to work but, if retiring earlier or constrained from participating, effective supply may fall more rapidly.

Malaysia's estimated additional work capacity among older persons illustrates this mechanism (Mansor et al., 2024).

Effective Labour Supply

Effective labour supply is a broader concept than just the number of working-age persons.

Participation, employment, working hours, health, skills and productive work capacity are all included.

It serves as a bridge between demographic structure and production and reflects an appreciation that ageing may have different economic effects depending on whether additional years of life are accompanied by additional healthy working years.

Labour Productivity

When labour-force growth is limited by change in demographics, productivity becomes increasingly important for maintaining output growth.

The mechanism may involve human capital, experience, technology, capital intensity and organisational adaptation. The evidence from international experience suggests that technology and training can complement older workers and help sustain their productivity (Lee et al., 2020; Lee et al., 2022).

Moderating and Supporting Factors

Four factors are incorporated into the framework.

Health affects the capacity of older people to participate in employment.

Human capital involves the ability of workers to adapt to changing occupational requirements. Technology can substitute for scarce labour or complement workers.

Caregiving can reduce the labour supply of working-age household members.

These factors do not represent distinct primary pathways but moderate the strength of the relationship between demographic ageing, labour supply and productivity.

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Integrated Conceptual Model

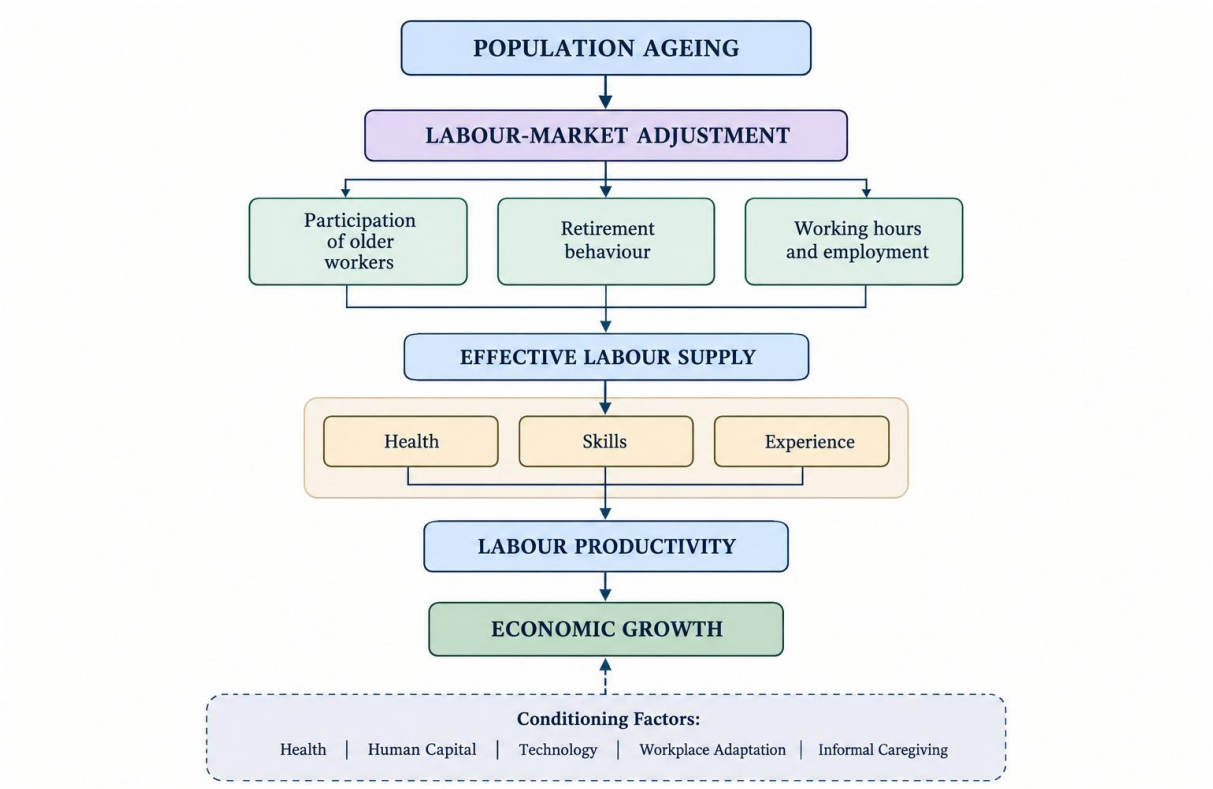


Figure 1: Conceptual Framework Linking Population Ageing and Economic Growth

The framework emphasises that demographic ageing is an initial condition rather than a deterministic economic outcome.

Conceptual Propositions

Proposition 1: Population Ageing and Labour-Market Adjustment

Population ageing raises the need for labour-market adjustment through changes in labour-force participation, retirement behaviour, working hours and employment patterns.

The proposition follows from the demographic transition literature and the evidence that changes in population age structure affect the relative availability of labour.

Proposition 2: Labour-Market Adjustment and Effective Labour Supply

Labour-market adjustment influences the effective supply of labour available to the economy by affecting participation, working hours, health-related work capacity, skills and the utilisation of older workers.

This proposition reflects Malaysian evidence showing that older persons have additional potential work capacity and that participation is associated with health and individual characteristics (Mansor et al., 2024; Murthy et al., 2019).

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Proposition 3: Effective Labour Supply, Productivity and Economic Growth

Effective labour supply contributes to labour productivity and economic growth, particularly when demographic conditions constrain the expansion of the labour force.

The proposition recognises that growth can be sustained through improvements in productivity even when demographic conditions limit labour-force expansion. Evidence from the international literature identifies productivity as an important channel through which population ageing affects growth (Lee & Shin, 2021; Park et al., 2022).

Proposition 4: Conditioning Role of Health, Human Capital, Technology, Workplace Adaptation and Caregiving

Health, human capital, technology, workplace adaptation and caregiving conditions moderate the relationship between population ageing, effective labour supply and productivity.

The evidence indicates that healthy older workers can contribute more effectively to economic activity, while ICT skills and training can support older-worker productivity (Cylus & Al Tayara, 2021; Lee et al., 2022). At the same time, informal caregiving may reduce the paid employment of working-age household members (Moussa, 2019; Heger & Korfhage, 2020).

Discussion and Implications

Reconsidering the Ageing–Growth Relationship

The framework suggests that population ageing should not be interpreted as an automatic reduction in economic growth.

The negative relationship identified in some Malaysian and international studies is important, but it represents an aggregate outcome rather than a complete explanation of the underlying mechanism. Malaysia's evidence of additional work capacity among older people demonstrates that the relationship between demographic structure and effective labour supply is not one-to-one.

The distinction is important because an ageing population can simultaneously create a demographic constraint and an opportunity for greater utilisation of existing labour capacity.

Effective Labour Supply as the Key Transmission Mechanism

The concept of effective labour supply provides a bridge between demographic change and economic performance.

If older workers remain healthy and participate in employment, the decline in the conventional working-age population may not translate proportionately into a decline in labour input. Conversely, if health limitations, early retirement or caregiving responsibilities reduce participation, effective labour supply may contract more rapidly.

This suggests that analyses based exclusively on dependency ratios may overlook important labour-market responses.

For Malaysia, the findings of Mansor et al. (2024) are particularly relevant because they demonstrate measurable additional work capacity among older people. The economic

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significance of this capacity, however, depends on whether suitable employment opportunities, skills and workplace conditions are available.

Productivity as a Long-Term Adjustment Mechanism

When demographic ageing limits the expansion of labour input, productivity becomes increasingly important.

This does not mean that productivity must necessarily rise because of ageing. Rather, productivity growth can help compensate for slower labour-force expansion.

The evidence from Japan and Korea suggests that technological capital can complement older workers, while training and ICT skills can improve their productivity (Lee et al., 2020; Lee et al., 2022).

For Malaysia, this implies that the economic effects of ageing may depend partly on the speed and inclusiveness of technological adoption. If technology is adopted without corresponding investment in worker skills, the productivity benefits may be unevenly distributed across age groups.

Health and Human Capital

Health is a particularly important component of effective labour supply.

The evidence from Cylus and Al Tayara (2021) indicates that healthier older populations can substantially reduce the negative economic consequences associated with an ageing labour force. Malaysian evidence similarly demonstrates that health conditions are important for the work capacity of older people (Mansor et al., 2024).

Human capital is equally relevant. Longer working lives require workers to remain employable as occupational requirements change. Training and skills development can therefore influence whether older workers remain productive.

The implication is not that all older workers should remain employed, but that individuals who wish and are able to continue working should not face avoidable barriers arising from health, skills or workplace design.

Informal Caregiving and Household Labour Supply

Population ageing may also create labour-supply effects outside the older population.

Where adult children provide informal care to ageing parents, time available for paid employment may decline. International evidence provides support for this mechanism (Moussa, 2019; Heger & Korfhage, 2020).

The magnitude of this effect in Malaysia requires further empirical investigation. Nevertheless, the mechanism is relevant because the economic consequences of ageing may operate through several generations simultaneously.

The framework therefore treats caregiving as a factor that can reduce effective labour supply, particularly among working-age household members.

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Implications for Malaysia

The framework suggests that Malaysia's response to population ageing should be considered across three interconnected dimensions.

First, labour-market institutions should recognise the potential contribution of older workers. Evidence of additional work capacity suggests that demographic ageing does not necessarily require a proportional reduction in productive labour.

Second, productivity-enhancing investment becomes more important as demographic conditions constrain labour-force expansion. Technology, training and human capital can support productive employment across longer working lives.

Third, the economic consequences of ageing should be evaluated at the household level as well as the individual worker level. Informal caregiving may affect the labour supply of working-age adults and therefore represents a potentially important component of the ageing–growth relationship.

These implications follow from the proposed mechanisms and should be tested empirically rather than treated as universally applicable outcomes.

Future Research

Future research should empirically test the proposed relationship between population ageing, labour-market adjustment, effective labour supply, productivity and economic growth in Malaysia. Particular attention should be given to participation, working hours, health, skills and technology as potential mechanisms. Firm- and sector-level studies could examine whether the effects differ across industries and occupations, while longitudinal data could help identify changes over time. Research should also examine whether informal caregiving reduces the labour supply of working-age household members and whether formal care services moderate this effect.

Conclusion

Population ageing represents an important structural transformation for Malaysia, but its economic consequences cannot be determined solely from demographic indicators. The literature provides evidence that ageing can constrain economic growth through reductions in the relative size of the working-age population and through potential productivity effects. At the same time, Malaysian evidence indicates that older persons possess additional work capacity, suggesting that demographic ageing does not necessarily translate into an equivalent reduction in productive labour.

This paper proposes an integrated framework linking population ageing, labour-market adjustment, effective labour supply, labour productivity and economic growth. The framework distinguishes demographic ageing from actual labour-market participation and recognises that health, human capital, technology, workplace adaptation and caregiving can influence the strength of these relationships.

The central implication is that the economic consequences of population ageing depend partly on the capacity of the labour market and production system to adjust. Older-worker participation can contribute to effective labour supply when supported by health and

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appropriate employment conditions. Technology and human capital can support productivity, while informal caregiving may constrain the labour supply of other household members.

The proposed framework does not assume that population ageing will inevitably reduce economic growth. Instead, it identifies the mechanisms through which demographic change may affect economic performance and provides four propositions for empirical testing. Future research on Malaysia should therefore move beyond the simple question of whether ageing is harmful to growth and examine how demographic ageing changes effective labour supply and productivity, and under what conditions these effects are strengthened or moderated.

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