

Human capital and post-retirement employment: The role of shared leisure and informal care

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Abstract

The current study examines the influences of leisure preferences and caregiving responsibilities on the relationship between human capital and post-retirement employment among Malaysian older adults. Cross-sectional data were collected between May and August 2023 from 770 participants aged between 60 and 74 years in the Klang Valley through survey questionnaires. Binary logistic regression was subsequently conducted to discover the relationships between the study variables. The results demonstrated a significant negative relationship between education and post-retirement employment, whereas work experience was positively correlated to post-retirement employment. Moreover, a positive interaction effect of human capital on post-retirement employment posited that higher human capital would increase the tendency to return to work after retirement. Meanwhile, spouse employment negatively impacted retirees' intention to return to work, which propounded that married couples preferred shared leisure activities. Grandchild care and unpaid care produced minimal impacts on post-retirement employment decisions. The study findings provided several implications for Malaysian companies, including the need for more training programmes, flexible work arrangements, and family-friendly policies, to accommodate retirees' employment preferences and caring responsibilities. Policymakers should also apply the current insights when developing pertinent strategies to improve economic resilience and employability of the ageing workforce.

Keywords: Human capital, Post-retirement employment, Shared leisure, Informal care.

Introduction

Retirement is not perceived as a career end but as a different professional development phase (Parker, 2022). Employment after retirement can be in terms of full- or part-time, which is not only an economic necessity but an accumulated human capital that signifies retirees are not ready to retire (Platts et al., 2023). While the influence of human capital on workforce participation has been extensively investigated, the relevant impact on employment after retirement is scarcely examined. Existing studies have neglected the relationships between human capital and older individuals' non-economic activities. Hence, the present study aims to appraise the influence of human capital on retirees' decisions to return to work and the moderating effects of shared leisure activities and informal caregiving. Specifically, leisure preferences would significantly impact the intention to remain economically active and employment decisions while being responsible for family care.

Malaysia is experiencing demographic alterations, wherein the elderly population is expected to achieve 15% or 5.81 million by 2030 due to declining birth rates. The trend provides significant economic implications as a 1% increase in the elderly dependency ratio could reduce GDP growth by 6.6% (Mohd et al., 2021). Moreover, elder individuals in Malaysia encounter increasing poverty risks with 5.7% living in extreme poverty, especially among households headed by individuals aged 65 years or older while more than 40% possess no available income source (Department of Statistics Malaysia, 2019; Ismail et al. 2015). Thus, encouraging older individuals to participate in economic activities could alleviate financial pressures on individuals, families, and governmental finances. Nevertheless, the overall labour force participation (LFP) rate among older individuals has declined over the past two decades, despite a rise in 2020 owing to retirees re-entering the labour market during the COVID-19 pandemic to address financial difficulties (Department of Statistics Malaysia, 2021). The scope and depth of social assistance for the elderly population in Malaysia are also inadequate as non-contributory social assistance is limited only to individuals or families below the poverty line (Khalid, 2023).

The current theoretical framework is based on the human capital theory (Becker, 1962) and the model of labour-leisure choice. Human capital theory posits that individuals invest in education and skills to maximise productivity and earnings. Meanwhile, the standard labour-leisure choice theory postulates that individuals with family responsibilities must simultaneously allocate respective time for labour, leisure, and unpaid care work to maximise their utility (Becker, 1981). Individuals encounter the traditional labour-leisure trade-off depending on the number of caregiving hours, wherein the decision of whether to work depends on the reservation wage, non-wage income, and various sociodemographic and other contextual variables. Particularly, an increase in caregiving hours reduces the maximum amount of time available for paid work when other variables are maintained constantly, which induces an availability effect to lower LFP (Becker, 1975).

The current study provided comprehensive recommendations for policymakers to address the challenges and opportunities associated with the ageing workforce. The proposed strategies emphasised older individuals' social cohesion, inclusivity, and unique needs in the labour market. In addition, this study sought to improve older employees' employability and promote economic resilience by recognising the

importance of leisure complementarity and the influence of family responsibilities on retirement decisions. Section 2 reviews previous research on the relationship between shared leisure and informal care in post-retirement employment. Section 3 outlines the materials and methods utilised in the present survey-based study and binary logistic analysis. Section 4 presents the primary findings and highlights the impacts of several factors, such as education, work experience, shared leisure, grandchild care, and unpaid care, on the probability of retirees returning to work. The final section provides conclusions based on the findings while delineating practical implications for Malaysian businesses.

Literature Review

The human capital theory proposed by Becker (1962) propounded that individuals invest in education and skills to enhance personal earning potential. Working beyond the minimum retirement age is frequently driven by a combination of economic necessity and the accumulated human capital possessed by individuals (Burkhalter et al., 2022; Phillipson, 2019). While certain studies demonstrated no direct association between education and post-retirement work, other researchers suggested that higher educational levels significantly increased the likelihood of engaging in post-retirement employment (Galkutė, 2020). Retirees with higher educational levels tend to remain in the workforce due to increased job motivation and employment opportunities (Platts and Glaser, 2017; Leinonen et al., 2018). Comparatively, lower-educated retirees might experience employment challenges and tend to stop working for physical reasons (König, 2019; Baumann, 2016). Lower educational levels also act as a barrier to self-employment (Van Solinge, 2014). As such, low educational and income levels elevate the probability of individuals working beyond the statutory retirement age.

Work experiences play a significant role in shaping post-retirement employment opportunities, in which retirees with varied and rich work histories are more inclined to engage in post-retirement employment (Sewdas et al., 2017). Retirees with more work experience have accumulated various skills and experiences, which increase adaptability and attractiveness to potential employers. Similarly, extended work years are correlated to a smooth transition into post-retirement jobs in terms of part-time or consultancy roles (Moen et al., 2016; Gonzales et al., 2017). Retirees in positions of higher responsibility before retirement possess more advanced skills with high demand. Conversely, individuals with shorter work histories or employed in less skilled jobs encounter higher difficulties in searching for post-retirement employment (Beehr and Bennett, 2015). Human capital, which includes knowledge, skills, and abilities acquired through education, training, and work experience, is critical for employment after retirement (Sullivan and Al Ariss, 2019). Anxo and Ericson (2023) elucidated that post-employment motivation depends on job satisfaction resulting from skills, apart from the influences of soft skills and low automatability on retirement decisions. Accordingly, higher adaptability and reduced automation risk are observed, which promote longer working lives despite technological changes (Lee, 2023).

Tunney and Oude Mulders (2023) discovered that employers primarily rehired workers with special knowledge or experience after the stipulated retirement age. Pre-retirement job skills and experience also play a crucial role in post-retirement employment (Gonzales et al., 2017). Multiple studies assessed the impact of pre-retirement career

history on retirees' engagement in post-retirement employment. Specifically, individuals with psychological distress or traditional gender-role orientations tended to work in a different occupational field (Bennett et al., 2016). Contrarily, older workers with a strong social orientation or with caring roles frequently pursued more meaningful work or volunteer after retirement (O'Neill and Jepsen, 2019). Joint retirement among married couples also gained higher attention in recent studies, with leisure complementarity playing a central role in retirement decisions and indicating a higher preference for shared leisure activities. Pioneering research by Hurd (1990) underscored the linkage between spouses' retirement timings driven by a mutual desire for shared leisure activities.

Blau (1998) explored labour force dynamics and identified correlations between a spouse's work status and another's retirement decisions, which demonstrated the influence of employment status on retirement choices. Gustman and Steinmeier (2000, 2004) also developed a structural econometric model and hypothesised that married couples retired together due to shared leisure preferences and the increased retirement value after a spouse retired. Merkurieva (2023) reinforced and extended the theory to demonstrate the significance of leisure complementarities for one another. Furthermore, Stancanelli and van Soest (2016) revealed that retirement increased leisure time, following the wife's retirement among dual-earner couples. Other factors, including pension eligibility, retirement policies, labour market reformations, and individual preferences, should also be considered. For example, Michaud et al. (2020) highlighted the impact of social security on spousal benefits, which contributed another dimension to the understanding of joint retirement.

Grandparents provide additional childcare for working parents or accept primary caregiving roles when parents are unavailable (Floridi, 2022; Zanasi et al., 2023). Grandparents' childcare support is especially valuable for working females and contributes to increased LFP among younger mothers (Pinto, 2023; Yu et al., 2023). Nevertheless, grandparenthood in the context of caring for grandchildren leads to a decrease in labour supply, with relevant impacts varying across regions and demographics, although the general impact remains more pronounced in areas lacking formal childcare facilities (Bertogg, 2023). The arrival of the first grandchild also frequently triggers labour market exit, particularly among older women. The trend is continuously observed across different cultural contexts, including China and Japan (Malisa 2024; Frimmel et al., 2022; Ma, 2021; Kitamura, 2021). Simultaneously, the impact of grandparenthood on labour supply is moderated by the availability of external childcare support, the caregiving intensity, and the existing labour market attachment.

Prior scholars discovered that informal caregivers frequently experienced significant changes in personal employment situations, including absenteeism, care leave, working hour tension, and a higher unemployment risk (Keramat et al., 2023). Retirees caring for a spouse are significantly less predisposed to return to work compared to the impact on parent caregivers or family members with multiple caregiving roles (Bertogg et al., 2021). A significant decline in caregiving intensity is also observed with increased employment, particularly among women in demanding jobs (Carrino et al., 2019). While a negative association exists between informal care and employment, several studies reported only a small or no correlation between the two factors. Moussa's (2019) review of 48 LFP articles between 2006 and 2016 discovered only modest caregiving effects potentially owing to caregivers frequently reducing working hours while

maintaining certain employment levels compared to peers without caregiving responsibilities. Accordingly, this study bridged existing literature gaps by improving the comprehension of the interrelationships between social factors with human capital investment. This study evaluated the association between human capital and post-retirement employment by considering leisure complementarity, grandparenting, and unpaid care responsibilities. Resultantly, valuable insights were provided for policymakers to formulate more informed and culturally sensitive strategies for the ageing workforce.

Methodology

The present study employed a quantitative approach, namely a cross-sectional design. The data were collected through surveys, and correlation analysis was performed to determine possible relationships between the variables and the strength and direction of the associations. While online surveys are feasible for younger respondents, limited participation is an associated risk (Kelfve et al. 2020). Therefore, this study utilised a comprehensive set of survey forms to extensively measure shared leisure activities, family care responsibilities, and other sociodemographic factors, which could provide deeper insights into how individuals allocate personal time and resources to thoroughly understand post-retirement employment decisions. The current study recruited 770 participants from the Klang Valley, who were aged between 60 and 74 years old and either employed, including self-employed, or unemployed. Simple random sampling and a sample size suggested by Hsieh et al. (1998) were applied to select participants from both genders and age groups. The questionnaire was carefully crafted to suit adults above 60 years old by accounting for physiological changes in vision and cohort differences. Functional abilities in activities of daily living (ADL) were also evaluated through the five-item Barthel Index. The survey was available in both Malay and English and distributed physically unless specifically requested for a self-administered online or mailed survey. A pilot study comprising 40 participants was conducted in April 2023 before actual data collection between May and August 2023.

The STATA version 11 statistical software package was utilised for data analysis. The dependent variable was measured as a binary variable with 1 coded for working and 0 coded for not working. Human capital was measured via two primary explanatory variables, namely education and work experience. Education was determined by asking about the respondents' completed educational level through four options, namely "no education," "primary school," "secondary school," and "tertiary". Work experience was measured as a continuous variable and the number of working years was quantified. In addition, the spouse's employment status served as an indicator for shared leisure activities, which was recorded as a binary variable with 1 signifying that the spouse was employed and 0 as unemployed. Caring for grandchildren under 18 years old and unpaid care for family members and friends were quantified as continuous variables representing the weekly hours spent on caregiving tasks. Other explanatory variables, including age, gender, ethnicity, marital status, and family size, were also examined. The details of each variable are depicted in Table 1.

Table 1: The current list of variables

Variable	Description
Employment Status	1 = If an individual is employed, 0 = Otherwise
Age	Age in years
Gender	1 = Male, 2 = Female
Ethnicity	1 = Malay, 2 = Chinese, 3 = Indians/ Minorities
Marital Status	1 = married, 2 = Single, 3 = Widowed/ Divorced
Education	1 = No education, 2 = Primary, 3 = Secondary, 4 = Tertiary
Work Experience	Work experience in years
Family Size	The number of household members
Living Arrangement	1 = Staying alone, 2 = with spouse only, 3 = with children/ others
Home Ownership	1 = Outright, 2 = Mortgage, 3 = Rent
Government Assistance	Annual cash transfer in Ringgit Malaysia (RM)
Hospital Admission	1 = One-time or no admission, 2 = Two to three times, 3 = Four times or more
Active Daily Living (ADL)	1 = Independent, 2 = Assistance required
Spouse Employment	1 = Employed, 2 = Not employed
Childcare	Weekly hours
Unpaid Care	Weekly hours

Logistic regression was selected for the ability to model binary outcomes, which was an ideal statistical tool for analysing the dichotomous nature of employment status among the older population. The logistic model contained an advantage over the probit model as logistic models did not rely on the assumption of linearity between dependent and explanatory variables and homoscedasticity. The dependent variable in this study was a dichotomous outcome variable, and the explanatory variables were either continuous variables or categorical variables. The current logistic model is specified as follows:

$$\text{Prob}(Y_i=1)=P_i=F(Z_i)=F\left(\alpha + \sum \beta_i X_i\right)=\frac{1}{1+e^{-Z_i}} \quad (1)$$

Where P_i is the dependent variable and the probability of working after retirement, X_i represents explanatory variables, such as age, gender, ethnicity, and marital status, and α and β are estimated parameters.

$$\text{Prob}(Y_i=0)=1-\text{Prob}(Y_i=1)=(1-P_i)=\frac{1}{1+e^{Z_i}} \quad (2)$$

Combining Equations (1) and (2):

$$\frac{\text{Prob}(Y_i=1)}{\text{Prob}(Y_i=0)}=\frac{P_i}{1-P_i}=e^{Z_i} \quad (3)$$

Where P_i is the probability that Y_i incorporates the value 1, $(1-P_i)$ is the probability that Y_i is 0, and e is the exponential constant. Employing the natural log of both sides in Equation (3):

$$Z_i=\ln\left(\frac{P_i}{1-P_i}\right)=\beta_0+\beta_1\text{Age}_i+\beta_2\text{Sex}_i+\beta_3\text{Race}_i+\beta_4\text{Marital}_i+\beta_5\text{Educ}_i+\beta_6\text{Exp}_i \quad (4)$$

$$\begin{aligned}
& +\beta_7\text{Family}_i + \beta_8\text{Liv_Arr}_i + \beta_9\text{Home}_i + \beta_{10}\text{Govt}_i + \beta_{11}\text{Health}_i + \beta_{12}\text{ADL}_i + \beta_{13}\text{Spouse}_i \\
& +\beta_{14}\text{Child}_i + \beta_{15}\text{Unpaid}_i + \beta_5\text{Educ}_i\beta_6\text{Exp}_i + \beta_5\text{Educ}_i\beta_6\text{Exp}_i\beta_{13}\text{Spouse}_i \\
& + \beta_5\text{Educ}_i\beta_6\text{Exp}_i\beta_{14}\text{Child}_i + \beta_5\text{Educ}_i\beta_6\text{Exp}_i\beta_{15}\text{Unpaid}_i + u_i
\end{aligned}$$

Where,

Age = Age
 Sex = Gender
 Race = Ethnicity
 Marital = Marital Status
 Educ = Education
 Exp = Work Experience
 Family = Family Size
 Liv_Arr = Living Arrangement
 Home = Home Ownership
 Govt = Governmental Cash Assistance
 Health = Hospital Admission
 ADL = Active Daily Living
 Spouse = Spouse Employment
 Child = Childcare
 Unpaid = Unpaid Care
 U = Error Term

Results

Table 2 illustrates respondents' demographic statistics among 770 employed and economically inactive older adults respectively. Age distribution demonstrated that 32.9% of respondents were between 60 and 64 years old, followed by 65 to 69 (33.8%), and 70 to 74 (33.3%). Moreover, 51.0% were females and 49.0% were males. Malay individuals were the majority (62.7%), followed by Chinese (25.3%) and Indians or minorities (12.0%). Most respondents were married (69.0%), followed by widowed or divorced (26.8%) and single (4.2%). Most respondents also possessed at least a secondary school educational level (60.6%) and cohabited with children (75.3%), with the remaining 18.6% living with spouses only and 6.1% living alone. Most respondents were healthy or only admitted to the hospital once (90.4%). A relatively small percentage of respondents required ADL assistance (9.4%). A total of 85.6% of the respondents stated that the spouses were unemployed.

Table 2: Respondents' demographic statistics

Demographic	n	Mean	SD	Minimum	Maximum
Age	770	66.99	4.360	60	74
60-64	253				
65-69	260				
70-74	257				
Gender				1	2
Female	393	0.32	0.468		
Male	377	0.44	0.497		

Ethnicity				1	3
Malay	483	0.36	0.481		
Chinese	195	0.43	0.496		
Indian/ Minorities	92	0.38	0.488		
Marital Status				1	3
Single	33	0.42	0.494		
Married	531	0.22	0.417		
Widowed/ Divorced	206	0.67	0.479		
Education				1	4
No Education	56	0.36	0.483		
Primary School	140	0.31	0.466		
Secondary School	467	0.35	0.477		
Tertiary	107	0.61	0.491		
Family Size	770	4.31	2.02	1	9
Living Arrangement				1	3
Staying Alone	47	0.38	0.491		
With Spouse Only	143	0.41	0.493		
With Children/ Others	580	0.37	0.484		
Home Ownership				1	3
Outright	520	0.37	0.482		
Mortgage	115	0.39	0.490		
Rent	135	0.42	0.496		
Governmental Cash Transfer	188	402.14	1,078.501	0	8,400
Hospital Admission				1	3
≤ 1 Time	696	0.40	0.1489		
2 to 3 Times	52	0.23	0.425		
≥ 4 Times	22	0.23	0.429		
ADL				1	2
Independent	698	0.41	0.492		
Assistance Required	72	0.07	0.256		
Childcare	163	4.46	12.97	0	91
Unpaid Care	107	3.83	14.85	0	196
Spouse Employment				1	2
Employed	111	0.77	0.420		
Not Employed	659	0.31	0.464		
Work Experience	669	26.746	13.58	0	51

The VIF was calculated for each independent variable in the logistic regression model to test multicollinearity. The results indicated that all VIF values were below the threshold of 10, with the highest VIF value being 2.8. Hence, multicollinearity was not an issue and allowed for proceeding with high confidence that the estimated coefficients were reliable. McFadden's R-squared value of 0.5139 was also reported for the current logistic regression model, which indicated a reasonable fit between the model and the observed data. The R-squared value was considered acceptable in social science research and suggested that this model contained satisfactory explanatory power.

Table 3: Logistic estimation based on post-retirement employment

	Model 1	Model 2	Model 3	Model 4	Model 5
Age	- 0.490*** (0.039)	- 0.491*** (0.040)	- 0.494*** (0.040)	- 0.491*** (0.040)	- 0.493*** (0.040)
Female	- 0.076	- 0.093	- 0.039	- 0.093	-0.097

	(0.255)	(0.257)	(0.259)	(0.257)	(0.287)
Chinese	0.250	0.286	0.303	0.286	0.286
	(0.283)	(0.285)	(0.287)	(0.285)	(0.291)
Indian/ Others	0.056	0.110	0.062	0.110	0.083
	(0.380)	(0.381)	(0.387)	(0.382)	(0.380)
Single	0.995	0.934	0.941	0.934	0.918
	(0.653)	(0.639)	(0.638)	(0.639)	(0.643)
Widowed/ Divorced	0.038	0.028	0.002	0.028	0.022
	(0.341)	(0.343)	(0.343)	(0.344)	(0.343)
Education	- 0.455**	- 1.311***	- 1.322***	- 1.311**	- 1.305***
	(0.182)	(0.496)	(0.471)	(0.517)	(0.502)
Work Experience	0.072***	0.0007	- 0.002	0.007	0.0002
	(0.011)	(0.041)	(0.039)	(0.043)	(0.041)
Family Size	- 0.112	- 0.111	- 0.119	- 0.111	- 0.124
	(0.095)	(0.095)	(0.095)	(0.095)	(0.096)
Staying with a Spouse	0.158	0.148	0.180	0.148	0.130
Only	(0.679)	(0.673)	(0.673)	(0.673)	(0.676)
Staying with Children/	0.743	0.743	0.764	0.743	0.787
Others	(0.680)	(0.675)	(0.674)	(0.675)	(0.679)
Home Mortgage	- 0.756**	- 0.756**	- 0.702*	- 0.756**	- 0.758**
	(0.375)	(0.376)	(0.383)	(0.376)	(0.377)
Home Rent	0.708**	0.678*	0.702**	0.678**	0.660*
	(0.356)	(0.353)	(0.351)	(0.353)	(0.353)
Government Cash	0.0002**	0.0002**	0.0002**	0.0002**	0.0002**
Transfer	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Hospital Admission (2	1.002*	0.966*	1.012*	0.966*	0.967*
to 3 Times)	(0.565)	(0.558)	(0.564)	(0.558)	(0.563)
Hospital Admission ($\geq$	- 0.290	- 0.308	- 0.276	- 0.308	- 0.333
4 Times)	(0.823)	(0.806)	(0.803)	(0.806)	(0.807)
ADL – Assistance	- 4.077***	- 4.104***	- 4.160***	- 4.104***	- 4.065***
Required	(0.747)	(0.742)	(0.740)	(0.742)	(0.739)
Spouse Not Employed	- 1.719***	- 1.718***	0.033	- 1.718***	- 1.717***
	(0.364)	(0.366)	(0.845)	(0.367)	(0.367)
Childcare	- 0.053***	- 0.058***	- 0.056***	- 0.058**	- 0.058***
	(0.014)	(0.014)	(0.014)	(0.027)	(0.014)
Unpaid Care	- 0.026***	- 0.026**	- 0.026**	- 0.026**	0.003
	(0.010)	(0.010)	(0.010)	(0.010)	(0.014)
Human Capital		0.026*	0.070***	0.026*	0.027*
(Education x Work		(0.014)	(0.246)	(0.015)	(0.014)
Experience)			- 0.022**		
Human Capital x			(0.010)		
Spouse Unemployed				1.400	
Human Capital x				(0.0003)	
Childcare					- 0.0003*
Human Capital x					(0.0001)
Unpaid Care					
Constant	38.586***	41.108***	38.045***	41.108***	41.148***
	(3.279)	(3.633)	(3.763)	(3.675)	(3.651)
N	770	770	770	770	770
Log Pseudo-Likelihood	- 248.401	- 246.781	- 243.892	- 246.781	- 245.614
Pseudo R-Squared	0.5139	0.5171	0.5227	0.5171	0.5194

Notes: ADL = Active Daily Living; Standard errors are shown in parentheses; *** Significant level at 1%; ** Significant level at 5%; * Significant level at 10%

Model 1 established a baseline in this study by examining the individual effects of demographic and socioeconomic variables on post-retirement employment. Model 2 introduced an interaction term for human capital (education x work experience) to explore the combined impact on later-life employment. Model 3 consisted of a tripartite

interaction between human capital and spouse employment status to understand the influence of couples' employment decisions on an individual's human capital. Model 4 appraised the association between human capital and childcare responsibilities and portrayed the impact of childcare responsibilities on the correlation between human capital and post-retirement employment. Model 5 assessed the interaction between human capital and informal caregiving responsibilities and provided insights into the impact of caregiving roles on post-retirement employment decisions. Table 3 illustrates that education in Model 1 was negatively associated with post-retirement employment ("No Education" as the reference category), whereas a positive correlation (0.072, standard error [SE] = 0.011) existed between education and work experience, which propounded that higher work experience might enhance employability in retirement years.

The positive impacts of work experience and negative effects of education in Model 1 became a significant positive effect of human capital in all models when the interaction term was introduced for human capital in Model 2. The changes posited a positive impact of human capital on post-retirement employment. Additionally, a tripartite interaction in Model 3 was included to investigate the interaction between human capital and spouses' employment status by combining human capital (education x work experience) with spouse employment (labelled as "Spouse Unemployed"). The presence of a negative interaction term (- 0.022, SE = 0.010) postulated the presence of leisure complementarity among married couples who sought to retire together and enjoy leisure activities. The findings highlighted the importance of shared leisure on post-retirement employment, which potentially outweighed the influence of an individual's accumulated human capital. Moreover, tripartite interactions were assessed between human capital and grandchild care (labelled as "Childcare") in Model 4 and between human capital and unpaid care in Model 5. Particularly, the interaction term between human capital and grandchild care was statistically not significant, which suggested no significant moderating effect of grandchild care on the correlation between human capital and post-retirement employment. Contrastingly, a negative interaction existed between human capital and unpaid care in Model 5, which indicated that unpaid care negatively impacted the relationship between human capital and post-retirement employment despite being negligible.

Table 4: Average marginal effects of spousal employment, childcare, and unpaid care

	Model 1	Model 2	Model 3	Model 4	Model 5
Age	- 0.049*** (0.001)	- 0.049*** (0.001)	- 0.049*** (0.001)	- 0.049*** (0.001)	- 0.049*** (0.001)
Female	- 0.007 (0.025)	- 0.009 (0.025)	- 0.003 (0.025)	- 0.009 (0.025)	- 0.009 (0.025)
Chinese	0.025 (0.028)	0.028 (0.028)	0.030 (0.028)	0.028 (0.028)	0.028 (0.028)
Indian/ Others	0.005 (0.038)	0.011 (0.038)	0.006 (0.038)	0.011 (0.038)	0.008 (0.037)
Single	0.103 (0.068)	0.096 (0.066)	0.096 (0.066)	0.096 (0.066)	0.094 (0.066)
Widowed/ Divorced	0.003 (0.034)	0.002 (0.034)	0.0002 (0.034)	0.002 (0.034)	0.002 (0.034)
Education	- 0.046** (0.018)	- 0.131*** (0.048)	- 0.131*** (0.045)	- 0.131*** (0.051)	- 0.130*** (0.049)
Work Experience	0.007*** (0.001)	0.000 (0.004)	0.0002 (0.003)	0.0000** (0.000)	0.002 (0.003)

Family Size	- 0.011 (0.009)	- 0.011 (0.009)	- 0.011 (0.009)	- 0.011 (0.009)	- 0.012 (0.009)
Staying with Spouse Only	0.015 (0.066)	0.014 (0.065)	0.017 (0.063)	0.014 (0.065)	0.003 (0.065)
Staying with Children/ Others	0.074 (0.066)	0.073 (0.065)	0.074 (0.063)	0.073 (0.065)	0.073 (0.065)
Home Mortgage	- 0.072** (0.034)	- 0.072** (0.034)	- 0.066* (0.034)	- 0.072** (0.034)	- 0.070** (0.034)
Home Rent	0.071** (0.036)	0.068* (0.035)	0.070** (0.035)	0.068* (0.035)	0.065* (0.035)
Governmental Cash Transfer	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000* (0.0000)
Hospital Admission (2 to 3 Times)	0.102* (0.057)	0.097* (0.056)	0.102* (0.056)	0.097* (0.056)	0.103* (0.056)
Hospital Admission (≥ 4 Times)	- 0.028 (0.080)	- 0.030 (0.078)	- 0.026 (0.077)	- 0.030 (0.078)	- 0.044 (0.074)
ADL – Assistance Required	- 0.412*** (0.070)	- 0.412*** (0.068)	- 0.413*** (0.067)	- 0.412*** (0.068)	- 0.413*** (0.068)
Spouse Unemployed	- 0.174*** (0.034)	- 0.172*** (0.034)	- 0.003*** (0.083)	- 0.172*** (0.034)	- 0.171*** (0.034)
Childcare	- 0.005*** (0.001)	- 0.005*** (0.001)	- 0.005*** (0.001)	- 0.005** (0.002)	- 0.005*** (0.001)
Unpaid Care	- 0.002*** (0.001)	- 0.002*** (0.001)	- 0.002*** (0.001)	- 0.002** (0.001)	0.0003 (0.001)
Human Capital (Education x Work Experience)		0.002* (0.001)	0.007*** (0.002)	0.002* (0.001)	0.002** (0.001)
Human Capital x Spouse Unemployed			- 0.002** (0.0009)		
Human Capital x Childcare				1.400 (0.000)	
Human Capital x Unpaid Care					- 0.0000** (0.0000)

Notes: ADL = Active Daily Living; Standard errors are shown in parentheses; *** Significant level at 1%; ** Significant level at 5%; * Significant level at 10%

Table 4 depicts the average marginal effects, wherein higher educational levels generally produce a significant negative effect and suggest that increased education is associated with a decrease in post-retirement employment. An increase in each education level was also associated with a decrease of 4.6% in the probability of returning to work after retirement in Model 1 and 13.1% in the remaining four models. Comparatively, working experience demonstrated a positive effect with an additional year of work experience increasing the probability of returning to work by 0.7% in Model 1, whereas the impact was insignificant or negligible in the other four models. In addition, the presence of spousal employment decreased the likelihood of post-retirement employment by 17.3%, which reflected a preference for shared leisure among married couples. Engaging in childcare and unpaid care produced a marginal impact on post-retirement employment of - 0.5% and - 0.2% respectively, which postulated that caregiving duties negatively impacted the decisions to remain in or re-enter the workforce. The interaction in Model 2 between education and work experience also demonstrated a positive impact of human capital on post-retirement employment by 0.2%, with similar results in Models 4 and 5. Nonetheless, the interaction between human capital and spousal employment produced a slightly negative effect in Model 3 by - 0.2%. The interaction between human capital and grandchild care in Model 4 was

statistically insignificant while the interaction between human capital and unpaid care in Model 5 was significant despite being less interpretable in percentage terms.

Discussion

The current study discovered higher educational levels negatively impacted post-retirement employment compared to other studies mostly conducted in the United States of America (USA) and Europe with pension systems and old-age income security programmes for secure retirement, which reduced the need to return to work. Conversely, individuals in regions without pension or old-age income security systems who achieved lower educational degrees were more predisposed to re-enter the workforce due to economic necessity. The trend emphasised a gap between retirees with different educational achievements in terms of financial stability after retirement as individuals with higher educational attainments generally transitioned smoothly into retirement supported by adequate lifetime earnings and retirement savings (Cho et al., 2016). Nevertheless, the current study revealed a common factor, namely the role of work experience, which was significant across all educational levels and propounded that extensive professional experience was crucial in facilitating reemployment among retirees. While educational levels influenced retirement transitions and the tendency to return to work, professional experience played a positive role in enabling reemployment regardless of educational background.

The negative relationship between spousal retirement timing and the moderating effects on human capital and post-retirement employment was supported by multiple past studies. According to Carstensen and Reynolds (2023), elder individuals prioritise emotionally meaningful experiences over activities promoting learning, in which retirees may choose shared leisure activities with the spouse over engaging in post-retirement work by valuing the quality time and emotional satisfaction garnered from the engaged activities. Ekerdt (1986) also suggested that retirement involves a shift in social roles with a decreased emphasis on work-related identities. Engaging in shared leisure activities with a spouse in the current study might represent an alternative or more central role for retirees, which outweighed the role and utility of continued professional engagement. Furthermore, Wang and Schultz (2010) highlighted the conflict between work and leisure in the post-retirement phase, wherein retirees frequently encountered a trade-off between continuing work and engaging in leisure activities. A preference for spousal joint leisure activities may detract from the tendency or appeal of post-retirement employment.

Taniguchi and Kaufman (2022) underscored the impact of marital quality on joint decision-making. Spouses in more satisfying relationships may emphasise spending leisure time together over pursuing individual employment in retirement. Nimrod and Shrira (2016) demonstrated leisure activities significantly contributed to life satisfaction among retirees, wherein fulfilment derived from shared leisure activities with a spouse would reduce the need or desire for post-retirement employment as a source of life satisfaction. Economic models of retirement, such as by Gustman and Steinmeier (2014), account for the financial and utility aspects of retirement decisions. Shared leisure provides high utility while lowering the financial requirements for employment will reduce retirees' inclination to work after retirement. Henkens and van Solinge (2021) also revealed that retirement provided opportunities for engaging in

leisure activities previously constrained by work commitments, which supported the idea that the opportunity for increased leisure time with the spouse could be a compelling rationale for retirement over continued employment. Tunney and Oude Mulders (2023) delineated that personal relationships and leisure become more vital after retirement.

The interaction between human capital and grandchild care in Model 4 was discovered to be insignificant, which indicated that grandparenting did not significantly moderate the probability of post-retirement employment. The finding was aligned with and supported by existing literature, such as Mahne and Huxhold (2015) who demonstrated that grandparenting positively contributed to life satisfaction and well-being in later life without necessarily detracting from other pursuits. Hence, grandchild care did not significantly influence the tendency of post-retirement employment. Past academicians also emphasised the flexible nature of the grandparenting role (Silverstein and Marengo, 2001) compared to parenting, which does not necessitate rigid responsibilities that constrain employment decisions and allow retirees to balance the role with other activities, including work. Nonetheless, certain retirees frequently seek roles that provide continuity with the pre-retirement identity, in which professional work can fulfil the need and possibly supersede the grandparenting role (Ekerdt, 1986). Economic factors also frequently influence post-retirement employment decisions (Gustman and Steinmeier, 2004). The grandparenting role, which is not directly correlated to economic requirements or incentives, produces a limited impact on post-retirement employment decisions.

The interaction in Model 5 between human capital and engagement in unpaid care activities demonstrated a significant negative impact on the probability of retirees returning to work, although the impact was relatively negligible. Becker (1965) elucidated that the opportunity cost of time is a crucial LFP factor. Unpaid care work demands time but does not exert a high opportunity cost to significantly deter post-retirement employment, particularly when an individual's human capital value is high. The increasing number of middle-aged and older adults simultaneously caring for children and ageing parents has also been highlighted in existing studies (Miller, 1981). Nevertheless, the role may be less intensive for retirees compared to individuals in the workforce, which produces a lower impact on employment decisions. Calasanti and King (2007) posited that retirees frequently endeavour to attain a balance between caregiving responsibilities and personal interests, including potential post-retirement employment. The balance may lead to a lower influence of unpaid care work on post-retirement employment decisions.

Practical Implications for Asian Business

The current study found an unexpected relationship between education and post-retirement employment, with individuals without formal education having more employment opportunities after retirement. This surprising finding highlights the need for Malaysian employers to expand current training programs, particularly focusing on older workers with lower levels of education. To improve participation, training plans should be flexible and consider the specific challenges of older workers. Another important finding was the positive relationship between pre-retirement work experience and post-retirement employment. This highlights the opportunity for companies to hire

experienced retirees to leverage their expertise in specific industries or professions. Retired professionals, in particular, can act as advisors or mentors, providing valuable insight and expertise. By using this resource, companies can counteract the shortage of skilled workers, promote knowledge transfer and increase the overall efficiency of the organization.

The study also uncovered an interaction between human capital and spousal employment, suggesting that married retirees, regardless of the level of their human capital accumulation, preferred shared leisure activities with their spouses. To accommodate this preference, companies should consider introducing flexible work arrangements tailored to retirees' lifestyles. Additionally, benefit packages including wellness programs, travel incentives or sabbatical opportunities can be introduced to meet the unique needs of married retirees. Such initiatives not only increase job satisfaction but also promote employee retention and engagement. Furthermore, the interaction between human capital and grandchild care indicated that human capital was only marginally related to the likelihood of employment after retirement when retirees assumed care responsibilities for grandchildren. Malaysian employers should create work environments that enable retirees, especially grandmothers, to balance caring responsibilities and employment. Developing family-friendly policies that recognize the positive impact of grandparenthood on well-being can foster a supportive culture that benefits both retirees and employers.

In addition to economic considerations, the study highlights the importance of well-being and identity continuity after retirement decisions. Providing retirees with the opportunity to maintain their purpose and identity through part-time or flexible work arrangements can contribute significantly to their life satisfaction. Employers should focus on creating roles that match retirees' skills, interests and personal circumstances. In this way, companies can give older employees the opportunity to continue contributing to the workforce while meeting their care and leisure priorities. To further improve the employment prospects of retirees, Malaysian companies can adopt a multi-pronged approach that includes training, flexible work arrangements and supportive policies. Further training programs should not only address skills gaps, but also consider the physical and cognitive abilities of older workers. Flexible workplace designs and innovative benefit packages can create a win-win situation for employers and employees. In summary, the results of this study provide valuable insights for Malaysian companies seeking to harness the potential of the post-retirement workforce. By addressing the diverse needs of retirees through inclusive training programs, flexible work arrangements, and family-friendly policies, Malaysian employers can foster a more engaged and satisfied workforce. Such efforts not only contribute to company success, but also increase retirees' overall well-being and life satisfaction, which ultimately benefits society as a whole.

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