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Living Arrangements of Elderly: Evidence from Household Income Expenditure Survey

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Abstract An increase in the number of elderly has many social implications and demands from a nation to ensure that their well-being and welfare are well taken care of. The purpose of this paper is to determine the factors influencing living arrangements for the elderly in Malaysia. The traditional notion that children will have to take care of their parents when they grow old is slowly changing due to urbanization and high cost of living. We see that more and more of the elderly are independently taking care of themselves. The 2009 Household Income Expenditure (HIES) survey data was used to understand the living arrangements of Malaysia's elderly population. The study found that 64.17 % of elderly co-resided with at least one adult child, indicating that familial support was still important despite modernization. Almost a quarter of the elderly live by themselves, either with spouse only (17.94 %) or lived alone (6.18 %). A multinomial logistic regression was performed to understand the factors influencing the living arrangements of the elderly. Predictive probability was run to compute the marginal change in the probability of living arrangement. It is predicted that male elderly and elderly who lived in rural area are more likely to live alone while older and Chinese elderly are more likely to co-reside with an adult child. As would be expected, still married elderly is more likely to co-reside with their spouses.

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Elderly who is still working and having received at least primary education is least likely to co-reside with an adult child.

Keywords Elderly · Living arrangements · Multinomial logit · Socio-demographic factors

Introduction

Globally, there are more than 600 million older people over the age of 60 years with more. More than half of this number live in Asia. The United Nations projects that the proportion of the Asian population aged 65 and over will more than quadruple by 2050 (Abdel-Ghany 2008; Bongaarts and Zimmer 2002). The increase in the number of elderly poses many serious social implications to a country, particularly regarding their welfare and well-being. While there is no consensus on the implications of the economic development on the well-being of the elderly (Hugo 1978), the many factors that affect their well-being include income, living conditions and arrangements, social contacts, and physical and mental health (Hugo 1991).

In Asia and the pacific, it is an accepted notion that the elderly are taken care of by their children. In Malaysia, this concept is called *balas-jasa* or repaying the parents for the sacrifices they made when raising their children. Therefore, one can expect that many elderly in South East Asian countries rely on family for economic and social support. The 1985 ASEAN Aging Survey found that 22 % of males and 47 % of females indicate that their major source of support is their children and grandchildren (as cited in Hugo 1991). Nevertheless, the current economic development has led to changes in the family structure in many South East Asian countries, including Malaysia where there is a considerable shift of dependence from an extended family to a nuclear family.

The existing studies on the living arrangement of the elderly mainly focus on East Asia, South East Asia, and Latin America where decreasing family sizes is causing alarm regarding the care of the elderly (Asis et al. 1995; Bongaarts and Zimmer 2002; Cameron 2000; Truong et al. 1997; Martin 1989). Bongaarts and Zimmer (2002) examined the living arrangements of the elderly across 43 developing countries and found that a significant proportion of elderly live alone. Female elderly were better prepared than male elderly to live alone. Bongaarts and Zimmer also found that sharing a residence with adult children is common in Asia and Africa. Amin (1998) found that even after rapid fertility declines, the elderly and women continue to rely extensively on family support. Karagiannaki (2011) showed that there was a decline of co-residence in Greece given that there was an increase in the proportion of older people living alone from 10 % in 1974 to 20 % in 1999, and a rise in the proportion of older people living with their spouses only, from 32 % to 47 %.

Saad (1998) found that if the elderly have high incomes or assets, they are better prepared to live independently. Co-residence of the elderly with one of their adult children is most common in the least developed societies (Asis et al. 1995). Martin (1989) argued that urban crowding, housing shortages, or the need of care for their grandchildren also led to co-residence. In such ways, the elderly receive the social, monetary, and health support they need from the younger generation. Patrilineal or

bilateral[1] social patterns influence the living arrangement of the elderly. Mason (1992) found that patrilineal adults tend to live with a married son and most likely receive care from a daughter-in-law when needed such as in China and India. In the bilateral cases, women and men are considered equal members of their natal families such as in Thailand and Cambodia. In this case, there is little preference with respect to the gender of the co resident child.

Further research is important in understanding the determination of co-residence and the implication and challenges faced since data alone does not provide comprehensive information as to address the issues. This paper investigates the current living arrangements of the elderly in Malaysia and determines the socio-economic factors influencing their living arrangements.

Theories of the Elderly

With rapid growth of the aging population, the welfare and well-being of elderly citizens has become an important issue. According to the statistics from the Malaysia 2009 Household Income Expenditure (HIES) survey, 64.17 % of Malaysia's elderly co-resided with at least one adult child, the rate of living with spouse is 17.94 % and the rate of living alone is 6.18 %. This finding is supported by the concept of care-giving and reciprocal relationships of two generations in providing financial, physical, and emotional support which influence the living arrangement decisions and life satisfaction of the elderly. This pattern can be seen in most developing countries where familial support is rather important and is part of traditional values or norms. Family ties provide a form of "social insurance" for the elderly (Hildreth et al. 1980) and is important in their later years. Instrumental emotional support provided by relatives, friends, and organizations ensure that the individual receives the support needed by their loved ones in coping with their day-to-day routines (Quadagno 2005). A common assumption is that both generations require mutual need and support and research has shown that co-residence is equally important to both generations (Casterline et al. 1991). Therefore, it is not justifiable to consider elderly as a homogenous group that suffer from various chronic illness, are helpless, and are dependent upon others (Hildreth et al. 1980). This standpoint is supported by the activity theory and the continuity theory. At the same time, the disengagement theory opposes the activity theory and argues that the elderly willingly slow down their daily activities and engagement by retiring and becoming dependent on others.

Activity Theory

An individual's well-being is associated with the degree of activity and intimacy involved in achieving commensurate life satisfaction (Lemon et al. 1972). A high level of participation of older people is said to have a positive relationship between activity and life satisfaction. This premise is supported by Robert Havinghurts's activity theory. The social theory of aging provides a conceptual framework in enhancing personal satisfaction. By being active in the society, they adjust to the social roles and status of the elderly.

[1] A patrilineal system is a system where men dominate ownership of resources. Upon marriage, the women take the identification of the husband's family. A bilateral system is a system where men and women are equally important in emotional ties and ownership and transfer of property or wealth.

Satisfaction of the elderly motivates them to be independent (Yeh 2003). High levels of engagement in activities enhances personal satisfaction and helps in building social identity. In contrast, disengagement would reduce satisfaction in older people's lives. Thus, the elderly require a wide range of productive or recreational activities (Blace 2012). The elderly may find satisfaction in participating in family functions, visiting with kin, and offering services (Sussman 1970). Childcare and home maintenance activity is frequently seen as an act of offering help by the elderly to their adult children. These continuous activities foster higher life satisfaction among the elderly (Bild and Havighurst 1976; Graney 1975; Palmore 1975). The findings by Lemon et al. (1972) suggest that informal friendship group participation appears to be an important correlate to life satisfaction, as greater consistency of activity leads to greater life satisfaction.

Disengagement Theory

Activity theory is often contrasted with disengagement theory. Disengagement theory proposed by Cumming and Henry in 1961 depicts social disengagement of which the elderly relinquish roles due to retirement, widowhood, or inability to participate in former activities and societal roles as aging gradually sets in. It also posits a transfer of responsibility from the older to younger generations (Diggs 2008). Limitation of social interaction and a lack of interest and life motivation can be factors influencing the withdrawal of the elderly from the society. The actual process varies between cultures. It may be self-initiated or it may be initiated by the society, as the disengagement process provides an important life balance between the elderly and the younger generations (Harris 1975). Hence, the social order of the society is well maintained with the removal of older members from the society and its former role being taken over by the younger member enhances societal functions in a less destructive way (Uche et al. 2009). More opportunities are given to the younger members which benefit the elderly, as they are released from the hefty burden and major social roles in sustaining social equilibrium and stability. Therefore, the degree of life satisfaction of the elderly is comparative with the reduction of the important roles they play (Law 1997). Disengagement from major social roles is said to be inevitable when one grows old. Cumming and Henry (1961) also suggested that the elderly should reduce their activities and interact less frequently with others, and seek more passive roles instead of being active as proposed by activity theory.

Continuity Theory

The continuity theory of aging by Atchley (1999) proposes that individuals maintain their patterns of thought, activities, habits, relationships, values, and attitudes and adapt to changes to shape their present and future decisions and behaviors as an adaptation strategy through the retirement transition and normal aging process in their middle age and later life. The typical adaptive strategies are by "… dealing with a new environment in familiar ways … (by) search(ing) for linkages and familiarity …" (Atchley 1989, p.189). The middle aged and older adults do not really change as they age and choose to retain and maintain internal and external individuality (Minhat 2013). Atchley describes continuity in terms of both internal and external continuity and further elaborates how the middle aged and older adults are motivated towards maintaining both structures. The degree of one's personal history and their perception toward themselves and their social

environment determine the degree of an individual's life satisfaction. Internal continuity is comprised of self-esteem and self-identity while external continuity is a combination of social relationship and social roles and activities consistent with their past experiences, roles, and behaviors (Diggs 2008).

Modernization Theory

Despite modernization, intergenerational support remains strong and the changes have not been dramatic with only 6.18 % of individuals living alone in Malaysia. The ramification of modernization is reflected through the changes in family structures and a shift from a vertically extended family to a smaller nuclear family and the weakening of family kinship (Lin 2001). Cowgill Donald (1986) has adapted modernization theory in explaining ageing. The status of the elderly substantially decreases parallel with demographic transition of modern society and industrialization. According to Cowgill Donald (1986), the social roles and social status of the elderly deteriorate with the advances in health technology, economic growth and production, advance technology, urbanization, improved rate of literacy and education. As a result of urbanization and modernization, the job competition prevails between the older member of the society and the younger adults. Consequently, the older adults are forced out of the labor market due to having less education which eventually lead to a decline in social status, income, or prestige. An increase in population mobility has also weakened the intergenerational kinship. Intellectual and social segregation becomes more apparent as the younger generation are more knowledgeable and talented than their parents (Law 1997).

Methodology and Data

This study used the 2009 Household Income Expenditure (HIES) data provided by the Department of Statistics (DOS) and Economic Planning Unit (EPU), Malaysia. The data was filtered to include only the elderly. A total of 7,708 observations were used as a sample to understand the living arrangements of the elderly in Malaysia. Following the earlier work of Martin (1989), this study used multinomial logistic analysis to understand the living arrangement of Malaysian elderly. The categories of the dependent variables for the multinomial regression analysis are:

1. Lived alone (based outcome)
2. Lived with others
3. Lived with spouse only
4. Lived with other elderly
5. Lived with adult child
6. Lived with young child

In this analysis, children were segregated between adult children and young children. An adult child was defined as an income earner be they the head of the household or just a member. From the HIES 2009 data, it was identified that the average years of a working adult was 28 years old. Hence 28 years was taken as the initial age for an adult child. Any child aged 27 years and below was considered a young child. While it is important to note

that the labor force reported working the age as early as 15 years, the percentage of working children aged below 28 years old was negligible.

Table 1 provides the descriptive statistics of the variables used in the analysis, including the descriptive statistics of the elderly's living arrangement. There were more female elderly compared to male elderly. Most of the elderly were still married. It could be implied that the number of elderly decreased as age increased. There were a majority of Bumiputera elderly followed by the Chinese, Indian, and other ethnic groups. The percentages were in line with the ethnic composition of Malaysia. The data also indicates that the majority of the elderly only had primary education followed by no education or informal education. Only a small percentage of 4 % had tertiary education. As could be seen, approximately 74 % of elderly co-resided with their children. As put forward by Bongaarts and Zimmer (2002), co-residing provides benefit to both the parents and children. Elderly received the social, financial, and health support from their children while the children benefit from the elderly taking care of their younger children or looking after the home while the adult children were away.

Multinomial Logistic Estimation Results

Multinomial Logit Model

This paper performs multinomial regression to predict living arrangements (lived with others, lived alone, lived with spouse only, lived with other elderly, lived with adult child and lived with young child), lived alone designated as the reference category. The probability of living arrangement in other categories is compared to the probability of living along. Given that our model has six (6) categories, this would require the calculation of M-1 equations, one for each category relative to the reference category, to describe the relationship between the dependent variables (living arrangement) and the independent variables (Williams 2016). Hence, given the first category (lived alone) as the reference, then, for m = 2, 3, …, M,

$$\ln \frac{P(Y_i = m)}{P(Y_i = 1)} = \alpha_m + \sum_{k=1}^{K} \beta_{mk} X_{ik} = Z_{mi}$$

That is, for each category, there will be M-1 predicted log odds, one for each category, relative to the reference category. X represents the independent variable and k corresponds to the number of independent variables.

Probabilities are therefore calculated as

$$P(Y_i = m) = \frac{exp(Z_{mi})}{1 + \sum_{h=2}^{M} exp(Z_{hi})}$$

and for the reference category

$$P(Y_i = 1) = \frac{1}{1 + \sum_{h=2}^{M} exp(Z_{hi})}$$

Table 1 Description and summary statistics of the variables

Characteristics	Percentage
Gender:	
Male (reference category)	48.05
Female	51.95
Age:	
60 - 64	36.33
65 - 69	25.72
70 - 74	18.82
75 - 79	9.8
80 and above	9.29
Marital Status:	
Married	65.08
Others (reference category)	34.92
Ethnicity:	
Bumiputera	50.86
Chinese	34.9
Indians	5.28
Others (reference category)	8.96
Education:	
Primary	43.25
Secondary	19.42
Tertiary	3.79
None (reference category)	33.54
Strata:	
Urban	64.72
Rural (reference category)	35.28
Working Status:	
Working	24.55
Not Working/Others (reference category)	75.45
Living Arrangements:	
Lived with others	0.26
Lived alone (reference category)	6.18
Lived with spouse only	17.94
Lived with other elderly	1.31
Lived with adult child	64.17
Lived with young child	10.15

Authors own estimates based on HIES2009

Multinomial Logistic Results

Table 2 presents the result of the multinomial regression analysis. The coefficients reflect the effects of the variables on the log odds of living with others versus living

Table 2 Multinomial Regression Analysis

	Coefficient	Relative Risk Ratio
Lived with others (not related)		
Gender	−0.2773445	0.7577934
Strata	−1.236013*	0.2905403
Marital status	0.293131	1.340618
Age	−0.0233887	0.9768827
Working status	0.2360491	1.266236
Education		
Primary	0.1351297	1.144685
Secondary	0.2131463	1.237566
Tertiary	0.6309664	1.879426
Ethnicity		
Chinese	−2.01225**	0.1336875
Indian	−1.238885	0.289707
Bumiputera	−1.130271*	0.3229457
Constant	1.206701	0.9711129
Live with spouse only		
Gender	0.6193712***	1.85776
Strata	−0.1400937	0.8692768
Marital status	23.17988	1.17E + 10
Age	0.0181172*	1.018282
Working status	−0.76527788***	0.4652047
Education		
Primary	−0.1419138	0.867696
Secondary	−0.0439367	0.9570145
Tertiary	−0.5900164†	0.5543182
Ethnicity		
Chinese	0.4370197†	1.548087
Indian	1.281642***	3.60255
Bumiputera	0.596763	1.81623
Constant	−21.08726	6.95E-10
Live with other elderly		
Gender	0.4528488†	1.572786
Strata	0.1478837	1.159378
Marital status	1.779893***	5.92922
Age	0.042026**	1.042922
Working status	−0.0687673	0.9335439
Education		
Primary	0.2420179	1.273817
Secondary	0.1923342	1.212075
Tertiary	−0.2493261	0.7793258
Ethnicity		

Table 2 (continued)

	Coefficient	Relative Risk Ratio
Chinese	−0.2847766	0.7521823
Indian	−0.1488318	0.861714
Bumiputera	−0.735039†	0.4794868
Constant	−4.99707 ***	0.0078348
Lived with adult child		
Gender	0.1949851	1.215293
Strata	−0.5229966***	0.5927417
Marital status	3.331509***	27.98052
Age	−0.0068714	0.9931522
Working status	−0.8397687***	0.4318104
Education		
Primary	−0.4910942***	0.6119564
Secondary	−0.6684721***	0.512491
Tertiary	−1.546342***	0.2130259
Ethnicity		
Chinese	−0.3428198*	0.7097661
Indian	0.4054853	1.50003
Bumiputera	−0.2942038	0.7451246
Constant	2.694556***	14.79895
Living with young child		
Gender	0.7916562***	2.207049
Strata	−0.0348006	0.9657979
Marital status	3.699602***	40.43121
Age	−0.043974***	0.9569789
Working status	−0.6499783***	0.5220571
Education		
Primary	−0.1598069	0.8523084
Secondary	−0.2954472	0.7441987
Tertiary	−1.155509**	0.3148972
Ethnicity		
Chinese	−0.707556**	0.4928473
Indian	−0.1651644	0.8477543
Bumiputera	0.1358077	1.145462
Constant	2.191207**	8.946009

Authors own estimates based on HIES2009

***, **, *, 1 %, 5 % and 10 % significance level

alone (the based outcome), the log odds of living with spouse only versus living alone, the log odds of living with other elderly versus living alone, the log odds of living with adult child versus living alone, and the log odds of living with young child versus living alone. The independent variables considered in the analysis are gender, strata, marital

status, age, working status, education and ethnicity. We believe that the analysis would merit the inclusion of number of children in a household and elderly's health condition as two variables that affect elderly's decision to live alone or not. Nevertheless, number of children in household is found to not statistically significantly influence living arrangement and therefore not retained in the final estimation. Unfortunately, the HIES2009 data that we acquired do not have information on elderly's health.

Being a female significantly increased the log odds of living with spouse only, the log odds of living with other elderly, and the log odds of living with young child. Living in a rural area significantly decreased the log odds of living with others and the log odds of living with an adult child. Marital status was found to be statistically significant in influencing the log odds of the living arrangements relative to living alone. Being married significantly increased the log odds of living with other elderly, the log odds of living with an adult child, and the log odds of living with young child.

Similar to the earlier findings of Martin (1989), being older significantly reduced the log odds of living with children in Malaysia. In this study, age was negatively related to the log of living with an adult child and the log odds of living with a young child. However, only the relationship with living with a young child was statistically significant. Being older was also found to significantly increase the log odds of living with a spouse only and the log odds of living with other elderly. If the elderly were still working the log odds of living with spouse only, the odds of living with an adult child and living with young child would decrease. These relationships were found to be statistically significant.

Education had a mix influence on the log odds of living arrangements. In the category living with an adult child, all education levels (primary, secondary and tertiary) were found to statistically decrease the log odds of living with an adult child. However, only tertiary education was found to statistically decrease the log odds of living with an adult child and the log odds of living with spouse only.

Similarly, ethnicity had a mix influence on the log odds of living arrangements. Ethnicity (Bumiputera, Chinese, and Indian as compared to the other ethnic groups) was found to statistically increase the log odds of living with spouse only. Specifically, being a Bumiputera was found to statistically decrease the log odds of living with others and the log odds of living with other elderly. At the same time, being a Bumiputera was also found to statistically increase the log odds of living with spouse only. While being a Chinese was found to statistically decrease the log odds of living with others, the log odds of living with an adult child and the log odds of living with a young child, being a Chinese was also found to statistically increase the log odds of living with spouse only.

Table 3 provides the percentage point change in the probability of living arrangement given a one-percentage change in the explanatory variables based on the estimates in Table 2. Discussion will be limited to the statistically significant variables shown in Table 2. As could be concluded from the average changes, the changes in the predicted probabilities of living arrangement when the independent variables changed was marginal, ranging from 0.1010 to 0.0013 percentage points.

There were mixed results on the probability change of living arrangement, as the elderly grows older (if age increased by one year). As the elderly get older, the probability change of living with a spouse, living with other elderly, and living alone increased. Nevertheless, the probability change of living with a young child decreased.

Table 3 Changes in predicted probabilities for living arrangement

	Average Change	Others	Spouse Only	Other Elderly	Adult Child	Young Child	Alone
Age	0.0013	−0.0000	0.0000	0.0005	0.0030	−0.0038	0.0002
Gender	0.0211	−0.0006	0.0001	0.0020	−0.0558	0.0612	−0.0070
Strata	0.0232	−0.0008	0.0001	0.0071	−0.0690	0.0500	0.0125
Working Status	0.0173	0.0015	0.0000	0.0094	−0.0520	0.0151	0.0258
Marital Status	0.1010	−0.0063	0.2834	−0.0203	−0.0891	0.0197	−0.1873
Primary Education	0.0174	0.0006	0.0001	0.0078	−0.0522	0.0317	0.0118
Secondary Education	0.0227	0.0011	0.0002	0.0110	−0.0681	0.0367	0.0189
Tertiary Education	0.0441	0.0066	0.0004	0.0219	−0.1323	0.0283	0.0749
Bumiputera	0.0168	−0.0010	0.0003	−0.0054	−0.0440	0.0437	0.0064
Chinese	0.0128	−0.0015	0.0003	0.0009	0.0264	−0.0368	0.0106
Indians	0.0200	−0.0009	0.0005	−0.0043	0.0594	−0.0469	−0.0077
Pr (y|x)*		0.0011	0.0003	0.0109	0.8448	0.1159	0.0267

Authors own estimates based on HIES2009

*Probability of y with respect to x; y is the dependent variable and x is the independent variables (age, gender, strata, working status, marital status, education and ethnicity)

This finding was similar to the finding of Giang and Pfau (2007) who attributed this finding to the fact that as elderly get older, their own children were also getting older, moved out from the parents' house, looked for a job, and got married and had their own life separately from the elderly. Another reason could be due to the fact that older people may have access to government assistance such as direct transfer cash and other financial assistance. In Malaysia, the Government provides various programs to the elderly to help them escape poverty such as Senior Citizen Aid (BOT). The total number of BOT recipients increased from 11,340 in 2002 to 120,496 in 2010 and the total value recipients received increased from RM17.6 million in 2002 to RM422.5 million in 2010. This shows that BOT assistance had increased from RM1,552 per year per recipient in 2002 to RM3,506 per recipient in 2010 (Hamid and Tyng 2013). This finding is supported by Costa (1999) and Engelhardt et al. (2005) who confirmed the existence of a strong positive relationship between the elderly's income and independent living.

The result indicated that the probability change of co-residence was higher for male as compared to female. The probability change of living with a spouse, other elderly, and young child increased if the elderly were female. As such, the probability of living alone decreased if the elderly were female. Similar to the findings in Vietnam by Giang and Pfau (2007), male elderly were more inclined to live alone as compared to female elderly. This could be related to the physical nature of the female who are more fragile and require the care of others. Nevertheless, one could not deny the fact that there were female elderly out there who would prefer to live alone and gain their independence rather than relying on others. Another reason could be due to the fact that women

acquire lower levels of formal education compared to men (Palloni 2001) and they have lower physical and mental health compared to men (Ramos 1992). This decreases female participation in the labor force. Thus, their saving for future retirement is inadequate and it is not enough for their basic needs when they retire. This leaves them dependent on their relatives. This can be justified from the results of Table 4 that revealed that in 2009, 70.63 % of the elderly having no formal education were female and only 29.32 % were males. Table 4 also shows that 62.09 % of elderly who have no work were female and only 37.91 % were males. Another reason could be that elderly women in Malaysia compose the majority of the population and have the highest percentage of unmarried, divorce, and/or widows than men. This situation lead them to be highly dependent on their children. Table 4 indicates that 78.5 % of the elderly who are unmarried were females and only 21.5 % were males. Therefore, widowhood and financial hardship are key factors that obliged elderly women to live with their children (Andrade and De Vos 2002). The Pearson Chi Square tells us that there are statistically significant associations between gender and education, gender and working status and gender and marital status. This means that male and female differ significantly on level of education, on working status and marital status.

As shown in Table 5, if the elderly were still working, the probability of living with spouse only increased marginally and the probability of living alone increased by 0.026 percentage points. The probability of living with an adult child decreased by 0.05 percentage points. An explanation of this situation was rather simple. A working elderly was still an income earner, and therefore was financially independent to cater for any expenses and had more control over his/her life. Hence, there was no strong reason to co-reside with an adult child to secure financial support. This finding supports the activity and continuity theories. As elderly are engaged in various activities, their level of satisfaction is high as stated in activity theory. Their satisfaction led them to prefer living independently. Table 5 indicates that only 16.8 % of elderly who do not work live with their spouse and this percentage increases to 21.40 % if the elderly is working. This is supported by many studies that confirmed that income is the key factor that determines their decisions concerning living arrangement. Several studies support that elderly with higher incomes or sufficient social pension are more likely to live alone (Costa 1998; Hotz et al. 2010; Engelhardt and Gruber 2004). McGarry and Schoeni (2000) found that while factors such as age, race, immigrant status, and education play important roles in determining the living arrangements for elderly people, income

Table 4 Percentage of the elderly based on type of education received, working status, and marital status according to gender in 2009

	Education				Working status		Marital Status	
	Primary	Secondary	Tertiary	None	Not working	Working	Unmarried	Married
Male	54.1	61.99	73.29	29.32	37.91	79.23	21.5	62.3
Female	45.9	38.01	26.71	70.68	62.09	20.77	78.5	37.7
Total	100	100	100	100	100	100	100	100
Pearson χ^2	$\chi^2(3) = 603.2652$, $p = 0.000$				$\chi^2(1) = 976.23$, $p = 0.000$		$\chi^2(1) = 1.2e+03$, $p = 0.000$	

Authors own estimates based on HIES2009

Table 5 Percentage of the elderly based on working status and type of education received according to living arrangement in 2009

Living Arrangement	Working Status		Education			
	Not Working	Working	None	Primary	Secondary	Tertiary
Others	0.2	0.4	0.2	0.2	0.3	0.7
Live Alone	6.1	6.4	7.1	6.1	4.8	6.2
Live With Spouse	16.8	21.4	10.8	19.6	24.1	30.8
Live With Other Elderly	1.3	1.3	1.4	1.3	1.1	1.0
Live With Adult Child	65.9	58.9	71.9	61.0	60.0	52.7
Live With young Child	9.6	11.7	8.5	11.7	9.8	8.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
Pearson χ^2	$\chi^2(5) = 34.3884, \quad p = 0.000$		$\chi^2(15) = 203.0642, p = 0.000$			

Authors own estimates based on HIES2009

growth and adequate social security benefits are the most significant aspects that determine their living arrangements. They found that income growth alone accounts for more than a half of the increase in independent living.

Living arrangement is indeed statistically significantly being associated with working status and education as shown by the Pearson Chi Square. Pearson Chi Square (Table 5) indicates that elderly's living arrangement differ significantly with their working status and education level.

The probability of living with others and living with an adult child decreased if the elderly lived in rural area as compared to living in urban areas. However, the probability of living alone increased slightly by 0.012 percentage points if the elderly lived in rural area. This finding was similar to that of Mba (2013) and the United Nations (2005). An explanation for the living alone trend for the elderly in rural areas had to do with the lifestyle of the community in the rural areas. A popular possible explanation for such situations is the larger housing costs in urban areas (Giang and Pfau 2007). Previous studies argued that modernization played an important role in increasing elderly participation in the labour force. Since healthy and well educated elderly in urban areas who are still active can get better chances to work and gain more income rather than the elderly in rural area, therefore, elderly who live in urban areas are more likely to live with their spouse or alone. These studies concluded that modernization is likely to have an effect on intergenerational transfers (Andrade and De Vos 2002). This is not the case in Malaysia as results from Table 6 show that although most of the elderly who live in urban areas have higher levels of education compared to those who live in rural areas, the majority of those who do not work (68.60 %) live in urban areas and only 31.40 % of those who do not work live in rural area. This can be explained by the fact that elderly in rural area still have to be engaged in agricultural activities (their own land or as labourers) as young people prefer to migrate to big cities to work in industry and service sectors. This is true as Table 6 shows that only 31.4 % of the elderly who live with adults are from rural areas and 68.60 % of the elderly who live with adults are from urban areas. Pearson Chi Square indicates that location (urban and

Table 6 Percentage of the elderly based on living arrangement, working status and type of education received according to strata in 2009

	Living arrangement					Working Status		Education			
	Alone	With Spouse	With Other Elderly	With Adult	With Child	Not working	Working	Primary	Secondary	Tertiary	None
Urban	58.0	61.0	57.43	68.6	51.7	68.6	53.0	58.4	84.0	90.8	58.7
Rural	42.0	39.0	42.57	31.4	48.3	31.4	47.0	41.6	16.0	9.2	41.3
Total	100.0	100.0	100.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Pearson χ^2	$\chi^2(5) = 113.1350,\ p = 0.000$					$\chi^2(1) = 152.0172,\ p = 0.000$		$\chi^2(3) = 429.7965,\ p = 0.000$			

Source: Authors own estimates based on HIES2009

rural) have statistically significant association with elderly's living arrangements, working status and education level.

Elderly who were still married have a lower probability of living with other elderly, living alone, or with an adult child, but a higher probability of living with a young child. If the elderly were still married, it makes sense to continue living with their spouse. If the couple had any dependents, they too would co-reside with the elderly. This is consistent with Engelhardt and Greenhalgh-Stanley (2010) who found that widowed elderly are more likely responsive to home healthcare benefits rather than married elderly. In addition, Engelhardt et al. (2002) established a significant correlation between income and widows' living arrangement as well as between income and divorcees' living arrangement. Their results indicated that widows and divorcees are more sensitive to benefits in their living arrangements than other groups of elderly. They found that each 1 % rise in benefits would lead to a 1.3 % reduction in the share of widows living with others. At the same time, those who were never married are less elastic, and those who are married are not at all elastic.

If the elderly had at least a primary education, the probability of co-residing with at least one adult child decreased and the probability of living alone increased. This is similar to the finding of Bongaarts and Zimmer (2002). Nevertheless, if the elderly had tertiary education, the probability of living with a spouse and young child increased. This is true as shown in Table 5 that 71.90 % of those who had no formal education co-reside with an adult child and this percentage decreased to only 52.7 % when the elderly had tertiary education. This is supported by the modernization theory that claims that urbanization and modernization gave many challenges to elderly to compete with the young generation in the job market. The high level of education for young compared to lower education for elders oblige elders to leave the labour market. This lead to a decline in the elderly's economic status, as they have no or less income. Eventually, this obliges the elderly to co-reside with their children.

Being a Chinese or a Bumiputera as compared to other ethnic groups decreased the probability of living with others but increased the probability of living alone. Being a Chinese also increased the probability of living with a spouse only and adult child and decreased the probability of living with a young child. While the result indicates that the probability of living alone increased for Bumiputera and Chinese elderly, the result was otherwise for Indian elderly. This is true when results of Table 7 illustrated that 47.9 % of Indians elderly are unmarried and only 32.4 % and 34.9 % of Chinese and Bumiputera elderly are unmarried. In addition, the majority of Indian elderly are female. Although Table 7 shows that Indian elderly have the highest percentage of primary, secondary and tertiary education, the majority of them do not have work. Results of Table 7 indicated that only 17.90 % of Indian elderly have work and 82.1 % of them have no work. This could be one of the reasons for increasing the probability of living with adults and decreasing the probability of living alone or with spouse for Indian elderly. The Pearson Chi Square indicates statistically significant association between ethnicity and elderly's working status, education level and marital status. Nevertheless, the Pearson Chi Square tells us that there is no statistically significant association between ethnicity and gender, that is all ethnic group are independent of gender.

Table 7 Percentage of the elderly based on working status, type of education received, gender and marital status according to ethnicity in 2009

Ethnicity	Working Status		Education				Gender		Marital Status	
	Not working	Working	Primary	Secondary	Tertiary	None	Male	Female	Unmarried	Married
Others	69.6	30.4	28.2	10.4	2.0	59.3	47.5	52.5	37.0	63.0
Chinese	78.3	21.7	39.2	25.2	4.3	31.3	48.7	51.3	32.4	67.6
Indian	82.1	17.9	39.8	26.5	5.2	28.5	42.8	57.2	47.9	52.1
Bumiputera	73.8	26.2	49.0	16.3	3.6	31.1	48.3	51.7	34.9	65.1
Pearson χ^2	$\chi^2(3) = 39.9418$, $p = 0.000$		$\chi^2(9) = 345.0279$, $p = 0.000$				$\chi^2(3) = 5.19722$, $p = 0.158$		$\chi^2(3) = 39.2439$, $p = 0.000$	

Authors own estimates based on HIES2009

Conclusions and Policy Implications

Despite the notion that the family ties in the Asian culture is changing due to modernization, this study demonstrated that family ties remain an important value in the society. This study supported the findings of previous studies (Martin 1989; Chan and DaVanzo 1996; Department of Statistics 1998; Chen 1984; Alavi et al. 2011) who found that co-residing with adult children was still a preferred living arrangement among elderly Malaysians. Hypotheses based on modernization theory and related economic hypotheses of increase ability to purchase privacy received only weak support (Martin 1989).

The study indicated that there were many socio-economic factors that influenced the living arrangement of the elderly. In summary the main findings of this paper were:

i. A big percentage of Malaysian elderly were co-residing with an adult child.
ii. As the elderly grow older, they were more likely to co-reside with adult child.
iii. Male as compared to female were more likely to live alone and co-reside with an adult child.
iv. Elderly in the rural areas were more likely to live alone than to co-reside with an adult child.
v. Working elderly were least likely to co-reside with an adult child.
vi. Married elderly were more likely to live with their spouses.
vii. Having received at least primary education led to the least probability of co-residing with an adult child.
viii. Chinese were more likely to co-reside with an adult child.

This finding confirms the concept of *balas-jasa* that despite urbanization and industrialization, children still care deeply of the elderly. Comparing the study's findings with Martin (1989), the percentage of elderly living alone is on a decline. While this may seem that family ties are intact, further research needs to be conducted to better understand the issue of increasing co-residence of the elderly with children. A survey by EPF in 2003 revealed that 14 % of retirees finished their EPF savings within 3 years, 50 % of retirees finished their EPF savings within 5 years, and 70 % of retirees finished their EPF savings within 10 years (Bedi 2011). This makes them vulnerable to poverty and therefore the only way to support themselves is to co-reside with their children.

Given that Malaysia is moving towards becoming a developed nation by the year 2020, it is imperative that the nation is built on the basis of a knowledge society. This includes grooming elderly for a better financial management. For example, a study by the Department of Economics of Social Affair United Nations (UN) shows that there is slow paced change in creating an independent elderly in many developing countries (United Nations 2005). This poses an important role of the government and retirement providers in providing adequate retirement income for the elderly to ensure a smooth consumption at retirement. Abdelhak and Mohd (2014) found that cash transfer to employees falling under the bottom 40 % ranging between RM522 to RM808 seems to be a big burden on the government. The authors propose to the government as well as to EPF some implications in order to increase contributors' savings. These include increasing labour productivity through "incentive plans", increasing the retirement age,

increasing the contribution rate by offering to contributors higher tax relief that serves as incentive to contributing to their retirement fund.

Family support should remain the main foundation of retirement. The 2009 HIES data indicates a big percentage of elderly co-reside with an adult child. Nevertheless, with urbanization and high cost of living, the current generation is now re-thinking this concept as proven by Mohd et al. (2010) found that current working populations in Malaysia prefer not to co-reside with their children at an old age. However, this concept could only be realized should the current population have enough financial means to support themselves in the future. Apart from ensuring that they have adequate savings, planning on financial management need to be done now to ensure sufficient accumulation of wealth in the future.

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