PUEY UNGPHAKORN INSTITUTE
FOR ECONOMIC RESEARCH

Altruistic care for the elderly: A gender perspective

by

MinhTam Bui and Ivo Vlaev

November 2021

Discussion Paper

No. 166

Altruistic care for the elderly: A gender perspective

By MINH TAM BUI AND IVO VLAEV*

Abstract

Ageing society poses an increasing need for elderly care and the essential role of unpaid family care. Using time-use data of Thailand 2014/2015, we found significant gender gaps in providing eldercare across heterogenous groups. The novelty of this study is a measurement of altruism proxy, its gender bias to examine the effects of caregiver's altruistic behavior on care provision and to explain the caregiving burden on women. Our analysis reveals that education has different effects on care among male and female caregivers, but not the employment status. The instrumental variable modelling reveals that reducing men's paid work is unlikely to raise their time spent on eldercare and swapping leisure time for care time is one-for-one among men but multiplicative among women. Strong associations between altruism and peer pressure imply behavioral change strategies to target social norms and underpin policy interventions beside the state provision of long-term care for a more equitable eldercare work.

Keywords: unpaid work, elder care, gender gaps, altruism, behavioral change, time use

JEL Classification : D13, D64, D9, J14, J16, J22

* Bui: Faculty of Economics, Srinakharinwirot University, 114 Sukhumvit 23, Wattana district, Bangkok, Thailand 10110 (e-mail: buithiminh@swu.ac.th); Vlaev: Warwick Business School, University of Warwick, Scarman Road, Coventry, CV4 7AL, United Kingdom (ORCID 0000-0002-3218-0144; e-mail: ivo.vlaev@wbs.ac.uk). We are grateful to the National Statistical Office of Thailand for the time-use survey data 2014/15. This paper is based upon research supported by the Puey Ungphakorn Institute for Economic Research (PIER) at the Bank of Thailand under Grant No. 2564. All opinions and any errors are our own.

I. Introduction

The world's population is growing older due to increasing life expectancy and falling fertility rates UNDESA (2019). Over the last decades, many developed and developing countries alike have dramatically aged, posing unprecedented challenges to national health and social care systems and intergenerational solidarity European Commission (2005); Ogawa et al. (2021); Prime et al. (2020); Starrels et al. (1995). The fastest growing elder groups in these countries are those most likely to need care. Meanwhile, long-term care (LTC) systems rely heavily on informal carers in both advanced and emerging economies (Courtin et al., 2014; Dukhovnov & Zagheni, 2019; Durán Heras, 2012). Informal (unpaid) caregiving by family members, friends and communities remains the primary source of LTC for the elderly in both measures, the numbers of carers and hours they spend on eldercare (Chari et al., 2015); Courtin et al. (2014). The recent pandemic, struck the world at a time of demographic change, complicated the practice of informal caregiving in several unique ways where the elderly is among the high-risk groups (Cohen et al., 2021) has obviously placed more burden on family caregivers to provide more care with diminished support while the healthcare systems deplete (Pickering et al., 2021; Prime et al., 2020).

Women represent a majority of family caregivers, and their work is more likely to be unpaid. Beside running household production, women are also primarily responsible for family caring. Across 13 countries in the Asia-Pacific, women spend two to ten times more on unpaid care work than men and when paid and unpaid work is combined, women work longer hours than men each day in all countries except New Zealand (ILO & UNDP, 2018). Around the world, women and girls are performing more than three-quarters of the total unpaid care work Addati et al. (2018). Such combined responsibilities often lead to restrictions in their labor supply, labor market outcomes, typically low-paid, part-time, precarious jobs (Chari et al., 2015; Charmes, 2019; Coverman, 1983) while also negatively affect their physical and mental well-being (Kossek et al., 2019). At the household level, it would constitute a gradual shift of familial care needs from childcare to elder care. Adults may spend more years caring for their parents than caring for their children as society are ageing (Bookman & Kimbrel, 2011).

Ample of empirical evidence across countries shows gender gaps biased to women in providing unpaid care, yet little is known about the drivers of those gaps. Caring for others often involves more personal connection, emotional attachment and moral commitment than other forms of work. It is even more with elder care as it requires time, physical effort and emotional energy (Cheng et al., 2020). What can be the traits or features of women that make

them more associate with eldercare in particular despite of its hardship? In contrast with childcare, eldercare is more demanding and stressful, likely to be emergency-driven (Koerin et al., 2008), related to unexpected illness (Bianchi et al., 2012). It also tends to confront with deteriorating trajectory or the death of frail elder (Smith, 2004). Gender gaps in elder caregiving is still largely unexplained and its motivations are rarely measured. Silverstein et al. (1995b) suggest that there are gender differences in children's motives to support to older parents.

Thailand has experienced a rapid increase in the elder population. Over 20 years, 1994-2014, the share of elder people aged over 60 years has doubled to 14.9 percent of the population (over 10 million people). The numbers continue to rise even faster recently, reaching 11.3 million in 2017 according to the survey on elder persons by the National Statistical Office (NSO, 2017), predicting a prospect of an aged society in the future, posing an urgent need for eldercare provision in the economy and society. Although most of the elderly in Thailand (99.2 percent) receive medical treatment benefits from the universal health insurance and other forms, daily care is critically essential in terms of physical health as well as mental and emotional well-being (NSO, 2017).

Ample of anecdotal evidence has been documented on the essential role of familial care in favor of so-far limited formal or institutional care (Ayudhya et al., 2007; Knodel et al., 2013; Knodel et al., 2018; TGRI, 2017). The prevalent preference for family members, especially adult children over non-relatives to be caregivers for elder persons and the dominant tradition of relying on adult children in providing care have caused challenges on long-term care alternatives for the public and private sectors (Knodel et al., 2013). In an Asian culture like Thailand caring for elderly parents as being altruistic or "*katanyu*" in Thai has been rooted in social, cognitive, physical, environmental, and economic factors (Ayudhya, et al., 2007). Yet, little is known on the extensivity and intensity of such unpaid work at the micro level as well as its drivers. What is the extent of gender inequality in care work for the elderly? Is there any difference in altruistic behavior across caregivers that place a caregiving burden on women? How does it affect the amount of time people spent on caring for elder family members? How do those care burdens associate with the women's paid work, employment status, leisure time for their own well-being? Our research is to fill this knowledge gap.

This study takes the advantage of the latest micro data from the nationally representative time-use survey in Thailand in 2014/2015. Our paper is the first study measure elderly care issues based on highly accurate time-use records and analysis while the ageing literature in Thailand having been relied on older persons surveys or small-scale qualitative surveys. We

attempt to understand the distribution and motivation of male and female caregivers for this unpaid care work, as well as the heterogeneous gender gaps across dimensions and settings.

The major contribution of our study to a larger body of literature in the area is not only about bringing empirical evidence on gender gap in elder caregiving, but we also explain those gaps by looking at the origin of these patterns from economic, social and behavioral perspectives. In our analysis of economic and sociological models, both opportunity costs of market paid work, altruism and its social norms are taken into account to understand gender gaps. In addition, the novelty is to bring new understandings of altruistic behavior by a measurement of altruistic time across groups. We make a farther step by recommending policy and behavior changes measures of to narrow such gender difference in providing informal family care to their elder members between male and female caregivers.

II. Elder Care and Gender

Care is defined as the activity provides what is necessary for the health, well-being, maintenance, and protection of someone or something. Care is the creation, development, and maintenance of human capabilities and the quality of life from birth to death (Folbre, 1986). Unpaid care work refers to all unpaid services provided within a household for its members, including care, housework and voluntary community work (Elson, 2002). The activity involves mental or physical efforts and is costly in terms of time resource. Unpaid care work is both an important aspect of economic activity and an indispensable factor contributing to the well-being of individuals, their families and societies (Stiglitz et al., 2017).

A. *Motivations for familial eldercare*

Two main relevant strands of scholarship can be drawn to understand motivations of family members providing care for their elder ones, namely: the economics of unpaid care work, its division within households and sociological models of intrinsic motives for care provision.

The idea of “for love or for money” (Folbre & Nelson, 2000) and the concept of unconditional versus conditional giving (Kohli & Künemund, 2003) provide a common understanding that intergenerational transfers and caring comprise several motives and that motives contribute significantly to the explanation of family caring behavior between generations. The assistance that adult children often provide to their elderly parents may combine prosocial and extrinsic motivations (England et al., 2012). Unconditional motives emphasize altruism, reciprocity, and normative obligation while conditional motives are more

associated with direct exchange (Kohli & Künemund, 2003). Care and assistance can be motivated by both altruistic concerns for the parent's well-being and an internalized sense of reciprocal obligations or may result from extrinsic motivations, such as direct expectations of payback, bequest from parents. As such, altruistic behaviors are crucial for understanding family caregiving behavior.

Theoretically in economics, the costs of caregiving are often discussed as a loss of time that could be spent on leisure or paid work. Economic analysis on the motivations of care work has been more focused on the quantitative aspects such as the forgone income, time costs on care or even the low-paid formal care work, i.e. extrinsic motivations but often understate the significant nature of care on intrinsic motivations and personal attachment (Folbre, 2012). Unlike other goods, motivations for care provision go beyond the extrinsic rewards emphasized by economists (wages, benefits, expected bequests) or even sociologists (social approval) to include prosocial motivations with intrinsic rewards, such as gratification to help or a desire to make care recipients better off (England et al., 2012). Hence, the simple contrast between doing something for love and doing something for money are not necessary to be exclusive in familial care work. Instead, they can be combined in enormous variations (Folbre & Nelson, 2000).

Meanwhile, sociological models also theorize motivations for interactions within the family through five primary motivations including (1) altruism, (2) exchange/reciprocity, (3) trust and common preferences, (4) biological pre-dispositions and (5) social/cultural norms (Bianchi & Joseph McGarry, 2007). In particular, the notions of altruism and reciprocity to motivate intergenerational relationships can also arise from and are maintained by social and cultural norms. Similar conclusions found in sociological research that motivation for giving and caring to kin consists of a complex pattern with a large amount of interactions among different motives (Kohli & Künemund, 2003). Intrinsic motivation plays a vital role in care work and prosocial motivation is uniquely central to the provision of high-quality care (England et al., 2012). Altruistic behaviors, stemming from many motives, are important for family caregiving.

In the Western culture, while childcare is governed by both social norms as well as legal requirements, in contrast, adult children may not anticipate providing personal care services to their elderly parents and may not face a legal requirement to do so (Kohli & Künemund, 2003). The opposite can be clearly seen in Asian culture. Unlike the dominance of institutional long-term care (LTC) western settings, in Asia, formal LTC systems remain in a nascent stage and LTC for the elderly is primarily provided by family members, who are informally employed women and sometimes the elderly themselves (World Bank, 2016).

Most countries in the Asia-Pacific region still rely on family to support older persons in terms of financial support, assistance, and care and altruism and filial piety toward parents remain one of the core values in society and a cultural norm, underlying intergenerational relations in many eastern and south Asian societies (Croll, 2006; Slote & DeVos, 1998). Adult children in eastern Asia typically hold strong beliefs regarding respect and obligations to assist their parents (Kim, Cheng, Zarit, & Fingerman, 2015), sacrificing for parents, co-residing and taking care of parents in return for parental generation's devotions (Knodel et al., 2018).

The social norms toward filial piety are so strong that adult children who do not behave consistent with filial piety are likely sanctioned by family members, communities, sometimes the state and the ageing parents are also suffered from the risk of adverse psychological well-being (Silverstein et al., 2006). Those cultural values and traditions of co-residing with parents, providing support and care for them are rooted in the culture. Even in different locations and settings, informal caregiving is still important within migrant minorities in the US, reflecting those norms are more grounded in cultural values than economic necessity (Gonzales, 2007).

B. *Gender gaps in eldercare motivations*

The motivations for eldercare can be different among male and female caregivers, meaning such motives are gendered. The seminal work of Gary Becker (1965) opened up the "new home economics" with time allocation playing a central role in household production model. Although not specifying care work, the division of labor in household production determined in the Becker's model is based on comparative advantage by which women should specialize in home production because they are good at home making, caring and nurturing and thus their best option. Meanwhile, it is better for men to engage in market paid work. Folbre (1986) criticised the unitary household model in which the household is treated as "almost a wholly, cooperative, altruistic unit".

The motives for caring are socially stratified, corresponding to the type of family relationship and also vary along gender lines, with women leaning more toward unconditional and less toward conditional giving than men (Kohli & Künemund, 2003). Research suggests that women tend to express more altruistic and caring preferences than men (England et al., 2012). Folbre and Nelson (2000) criticized the core of neoclassical economic analysis of being gender biased with men having stereotypically been associated with autonomy and individual accomplishments while women having traditionally been identified through physical and social connection, as child bearers, cooks, wives. It therefore neglects the "connected" aspects of

human life including responsibility for others and altruism. In contrast, approaches based on experimental, behavioral, and institutional economics often call attention to differences in preferences, including altruism. Similarly, sociologists emphasize the social construction of norms and values, examining the ways they may be shaped by institutional arrangements of familial caring (Bianchi & Joseph McGarry, 2007).

Empirically, the role of women, particularly daughters, as primary caregivers for parents is well documented from the early literature of social work that daughters are more likely than sons to be providing care to an impaired parent (Dwyer & Coward, 1991; Pratt et al., 1989). Historically, women have been the primary and often only caregivers while the role of sons as primary caregivers draw much later attention (Coward & Dwyer, 1990; Dwyer & Coward, 1991) when there was evidence that growing numbers of men started becoming elder caregivers. In addition, sons have rarely been identified as primary providers and usually have been relegated to secondary caregiving status (Coward et al., 1993) when women have a limit on their availability to provide care. It is also dependent on the network of siblings where daughters from mixed-gender networks reported significantly higher levels of stress and burden and more hours spent on caregiving than sons(Checkovich & Stern, 2002; Grigoryeva, 2017).

Even among older people, gender inequality can be seen among themselves as caregivers or provider of care to spouse. With an earlier statutory retirement age than men, older women in many countries have a longer retirement duration, exacerbating the circumstances for women because of their longer life expectancy than men. A lower statutory retirement age for women, often considered as a “reward” for them, actually leads to greater inequality between men and women in income and caring responsibilities (ILO & UNDP, 2018).

Silverstein et al. (1995a) examined gender differences in the factors that influence middle-aged children to provide instrumental social support to their elderly parents, with tests of equivalence between sons and daughters. Their findings indicated that intergenerational affection is the factor that most motivates daughters to provide support, while filial obligation and legitimation of inheritance most motivate sons. Campbell and Martin-Matthews (2000) investigated socio-demographic, family structure and other factors that predict men's filial care involvement to their older parents or parents-in-law. Their findings show that distance constraints and commitments of young children, appear to be legitimate reasons for less care involvement. Further, living nearby and being without siblings may “default” men into being more involved in care. This research recognized men's filial care as a more complex issue than a ‘gender difference’ focus on caregiving allowed.

Susilo and Liu (2020) showed that altruistic behaviors differ substantially across different activity types among six typical shared activities in the households such as grocery shopping, household chores, babysitting, picking up children, relaxing, and social activities. Income and the presence of children polarize husband's altruistic behaviors, wives have a lot of power in influencing husbands' time allocations for activities such as baby-sitting. At the same time, the results also show the significant role of opportunities, such as accessibilities to wider crowd and amenities, in shaping household members' altruistic behaviors.

The trade-off between caring and earnings is very gendered (Bookman & Kimbrel, 2011) because women who are caring for elders generally reduce their work hours, leave the workforce, or make other adjustments that have negative financial or career implications. Caring responsibilities are also related to the quality of female employment with the unequal amount of time spent by women on unpaid care work increasing the probability that they will be engaged in part-time or in vulnerable employment (Hegewisch & Gornick, 2011). The struggle for women to reconcile care responsibilities with paid employment can lead to "occupational downgrading", where women choose employment below their skills level and accept poorer conditions. In addition, part-time employment and the informal sector are another alternative for women although this has negative long-term implications like superannuation contributions and retirement incomes.

All in all, it is still a challenge to our understanding of the complex association between gender (of both caregivers and recipients) and patterns of eldercare. In the language of collective action, men can "free-ride" on women's caring preferences and thus have some incentive to reinforce them.

In an aging society like Thailand, while most of the elderly receive medical treatment benefits from health insurance in one type or another, the informal care for older members within households is still critically important with regards to physical and mental health as well as emotional well-being in their daily lives. Despite an increasing state financial allowance, non-financial intergenerational support for older parents by adult children remains largely intact (Knodel, 2014; Teerawichitchainan, 2020; Teerawichitchainan & Pothisiri, 2021). Similarly, filial piety and parental care remain one of the fundamental traditions and social norms in Thai society and adult children's co-residence with their elder parents has been and continues to be the lynchpin of the traditional familial system of old age support (Ayudhya et al., 2007; Knodel et al., 2013; Knodel et al., 2018; TGRI, 2017). The latest survey data shows that for 1.56 million Thai elders who need care and assistance from others, 99% of their main

caregivers are family members (33% are spouses and 67% are the elders' biological children and in-law children). Only 1% are paid caregivers beside a small number of volunteers and community members (NSO, 2018). This preference for family members and the dominant tradition of relying on adult children in providing care (Knodel et al., 2013) have brought challenges to long-term care alternatives from the public and private sectors. A very small number of paid non-relative caregivers for a small minority of older Thais in urban areas, was reported (Teerawichitchainan, 2020). Although this type of paid care work could be a potential solution, the prospect of a market for paid eldercare has not been clear in the immediate future.

Gender inequality among caregivers is also an important issue in Thailand where traditional society dictates women are to care for their homes and families, including both children and ageing relatives (Peek et al., 2016). It is also a deeply entrenched normative acceptance that women are the appropriate gender to provide personal care (Knodel et al., 2018). That study also reports a higher chance for a daughter to provide care for their elder parents than a son and even among in-law children. As for spousal caregiving, women are more likely to be the care providers to their husbands who are typically older than their wives. While calling for government attention on the gender aspect of LTC, questions have been raised on the extent to which sons will sufficiently take this responsibility in caring for the family elder members. There has not been cultural adaption with men taking larger domestic responsibility given the changing role of women who are also bread winners, especially in cities (Peek et al., 2016).

The evidence from various countries, developed and developing alike, as documented in the literature discussed above, reveals unpaid informal care can hinder women's opportunities to participate in the labor market and their choice of decent work. What is the extent of such gender inequality in care work for the elderly? How do those care burdens associate with the women's employment status, their leisure time for their own well-being? This is not yet known, and our research is to fill this knowledge gap. To the best of our knowledge of the literature in Thailand, we have not seen any work specifically looking at the unpaid eldercare by measuring time of caregivers spend to reveal care intensity. Beyond the scope of a country study, our analysis also offers a measurement of altruistic behaviors and explore its role in determining the provision of care, given the importance of social values and norms toward familial piety. The objective is beyond policy design from economic and social respects, grounded by empirical evidence, we also propose some behavioral change measures and technique towards men with the aim to redistribute the burden of informal care work.

III. Data and Methods

A. *Data and sample*

This study uses a cross-sectional dataset from a recent nationally representative time-use survey in Thailand 2014/2015 sourced from the NSO (2016). Extensive research on Thai ageing relies extensively on the Older Persons Survey dataset, surprisingly we found no studies on elder care using time-use data. A limited number of studies deployed previous rounds of time-use surveys 2002 and 2009 (Floro & Pichetpongsa, 2010; Pichetpongsa & Floro, 2007; Yokying & Floro, 2020) Yokying et al. (2016) but they looked at the overall unpaid work.

In 2009, the NSO of Thailand adopted international standards of the International Classification of Activities for Time Use Statistics - ICATUS 2005 (NSO, 2017). Time diaries are a 24-hour record of respondent's activities in 15 major divisions with each time interval of 10 minutes. Unpaid adult care is classified as a class of major division 7 - *providing unpaid caregiving services to household members*. A summary of ICATUS 2005 classifications with categories of adult care is described in Appendix A. We also make an assumption on elder care as adult care based on a justification in Appendix B.

This dataset contains 83,866 individuals (cases) of which 73,306 are non-missing, making an equivalent of 12.5 percent for missing information cases. Like any other activities, the adult care is recorded as either a primary (main) or secondary (supplementary) activity which is carried out simultaneously beside the main task, implying multitasking. Our sample is confined to only individuals who are involved in adult care as their main task or a secondary activity in each 10-minute time slot. The sample size, hence, is of 733 individuals aged from 6 to 85 years. We measure the care workload by the number of episodes (times) and the total duration (minutes) in one day, reflecting the extensity and intensity of the work. There are 1,405 episodes from 633 caregivers doing care work as primary tasks and 171 episodes (135 individuals) as secondary tasks, making a total of 1,564 episodes (733 individuals) involved in adult care. Although our descriptive analyses cover all age groups, the regression analyses limit only to caregivers aged from 15 years old - as the working age in Thailand. The number of observations reduces respectively to 664 caregivers.

B. *Proxy measurement for altruistic behavior*

We look at altruism as the course of actions beyond just perceptions, meaning that the way people spend their time shows how altruistic they are. There exists some literature supporting

the comparison between for "other" and for "self" using different types of resources such as money, time, love as in Couch et al. (1999). For instance, there is evidence from the experimental games literature - where altruism has been measured in the lab with dictator games. In a standard dictator game (Forsythe et al., 1994), each subject is assigned a role as either a dictator or a recipient. Dictators are given foxed resource (money or tokens) and they are paid for the amount they decide to keep for themselves; while recipients are paid for the amount the dictators decide to pass. On average, dictators give about 28 percent of the pie (Engel, 2011). Many participants also have a strong preference for equality, which brings about a large proportion of equal division decisions (Camerer, 2011). The modified dictator games (Andreoni & Miller, 2002) were created for identifying heterogeneous distributional preferences among populations. Participants in such studies make multiple allocation decisions playing a series of dictator games that vary both the relative price of giving and the available budget (participants are usually paid for two decisions - one as a dictator, and one as a recipient). Varying the price allows measuring selfishness (allocation to self), while varying the endowment allows measuring efficiency-equality tradeoffs (concerns for increasing total payoffs versus concerns for reducing differences in payoffs between self and other). Therefore, such games measure distributional preferences which have been used to explain issues such as political participation (Dawes et al., 2011), career choices (Fisman et al., 2015), and, more relevant for our study, intergenerational sharing (Porter & Adams, 2016). Our altruistic time ratio uses the same structure where the agents distribute time rather than money or tokens.

With regards to altruistic motivations for caring, it can be reflected by the time (quantity and quality) spent on other people in our daily life. With time-use data, we attempt to examine the overall altruistic behavior of people by comparing the amount of time an individual spent **for other** (family members or people in their community) versus the time amount **on themselves** such as personal cares, self-maintenance, leisure, hobbies, sport, cultural activities. Those activities are required to be unpaid, and the formula below helps to calculate time altruistic ratio with more descriptive detail in Appendix B.

(1) $$\boldsymbol{Altruistic\ time\ ratio} = \frac{Time\ spent\ on\ \boldsymbol{other}}{Time\ spent\ on\ \boldsymbol{self}} = \frac{\boldsymbol{O_i}}{\boldsymbol{S_i}}$$

The subscriptive *i* represents an individual *i* and O stands for "other" whereas S for "self". The core idea here is that given a certain amount of time left after committed work/study, how an individual allocates his/her time for others versus oneself (without expectation of money/remunerations). In addition, the **quality of time** is another aspect of altruistic behavior.

Without qualitative information in the time-use survey, we presume the efforts and intensity of caring can be expressed by how attentive people are on their activities as a primary or secondary task. This consideration is for another version of altruistic time measure covering time on both primary and secondary activities.

C. *Empirical approach*

There are two key components of the analysis: (1) descriptive analysis; (2) econometric models. Results from these components will serve as a foundation for behavioral change design afterward. We begin by describing the distribution of unpaid eldercare work among Thai male and female caregivers as their primary and secondary activities. Some key indicators include number of care episodes and care duration during a day disaggregated by age group, employment status and the regularity of those activities. Following this, we measure the time altruistic ratio as described in formula (1) and test for the mean difference in altruistic behavior of men and women and examine gender gaps across sub-groups by marital status and employment status. The bulk of our analysis is individual-level econometric models using OLS multivariate regressions and 2-SLS instrumental variable regression. The basic equation is as follows:

$$(2) Caretime_i = \beta_0 + \boldsymbol{X}\acute{\beta} + \beta_1 female_i + \beta_2 IrrDay_i + \beta_3 female_i * married_i + \varepsilon_i$$

where $Caretime_i$ is the duration of eldercare (minutes) per day as the main tasks or both primary and secondary activities, $\boldsymbol{X}$ is a set of control variables including household demographic characteristics and individual characteristics ranging from age, marital status, relationship to the household head, education level, employment status beside some location controls. Table C4 of the online Appendix summarizes statistics of all variables. The parameters of interest are β_1 and β_2 telling the gender difference in elder care and whether people tend to care more on the day off their regular schedule. Some interaction terms are then added to explore if there are multiplicative effects when caregivers are married women or they are men caring for the elderly on their irregular days, for instance.

Our next specification in equation (3) is to investigate altruistic motivations of care with the time altruistic ratio (a proxy) entering the regression as a predictor and an interaction term with the *female* dummy. Due to a high collinearity between gender and the altruism proxy, we run the model (without interaction terms) on male and female sub-samples while the full model in (3) are tested with care time as primary and both primary and secondary tasks.

(3)$Caretime_i = \beta_0 + \boldsymbol{X}\hat{\beta} + \beta_1 IrrDay_i + \beta_2 Altrui_i + \beta_3 female_i * Altrui_i + \varepsilon_i$

Finally, to measure tradeoffs in time allocations, we propose two instrumental variable (IV) models. Within the time constraint of 24 hours, people can only do more of one activity by reducing their time on other activities. We explore how time in paid work and leisure can be swapped for eldercare. Elder care is time-consuming and often interferes with paid employment, imposing high opportunity costs (Chari et al., 2015). In econometric analysis, this translates to simultaneous causality between the dependent variable and its predictor often referred to as the "chicken and egg" problem (Coverman, 1983; Heitmueller, 2007; Sarkisian & Gerstel, 2004). Such endogeneity problem would require different approaches like simultaneous equations or IVs to avoid under (or over) estimating the true effects and inconsistent estimators (Carlson, 2021; Sarkisian & Gerstel, 2004).

Within the limitations of a cross-sectional time-use dataset, some instruments are adopted. The (paid) work time is instrumented by the work/employment status– a categorical variable of five different groups while the leisure and personal care time is instrumented by the time altruistic proxy described above. In addition, we pick an average of leisure time within a group of women (of men) in the same age range residing in the same province for each individual. This method is called "peer effects". The two-stage least square regression is as below:

To ensure the validity of these instruments, we examine their relevance and exogeneity by conventional criteria (Stock & Watson, 2012). Economic theories suggest that the employment status of workers determines that amount of time they spend on their work. There is certainly a variation in paid worktime among employers, wage employees, own-account workers, housemakers and the unemployed. In addition, the question on respondents' employment status in the survey refers to seven days before their time-use is recorded, making a smaller possibility that an individual's time allocation of the recorded day can influence the choice of people on their employment/work status. Such status can only and indirectly influence the care time for family through the duration of paid work. As for time altruistic proxy, the formula in (1) shows its correlation with time spent on self-leisure and personal care, thus it is highly relevant.

IV. Results

A. *Descriptive analysis*

Eldercare workload by gender, primary versus secondary activities. Table 1 shows that caring for older adults is provided more by women than by men no matter as the main or secondary

activities. In the sample of 663 caregivers doing this primary task, almost two thirds are women. The share is more than half as for secondary tasks. Women also seems to do this care work many times and longer duration in a day as the main task, almost two- hour difference, and 2.4 episodes among women as compared to 1.9 among men. Meanwhile, the gender gap in secondary eldercare is not significant. On the extreme, some women work over 13 hours per day (790 minutes) on elder care, compared to seven hours (440 minutes) by some men. There are also more variations in all indicators within female caregivers with a high deviation among the group of women than those of men.

By disaggregating caregivers in age groups, we found interesting and various gender gaps among caregivers as their ages change. Men at some certain age can spend more time, on average, caring for the elders in family than women, which is contradictory to a general understanding that women always take a larger burden of the elder care. For example, at the prime working age 20-24, male caregivers provide about half an hour of care than their female peers at the same age range and at the later middle age of their life 50-54, they also outperform with over 40-minute difference as compared to women. Whereas, at all other age groups, women usually take a larger burden of elder care in their life course from the prime working age 25-29 (biggest difference), their middle age (40-44) until their old age over 65. This observation poses an interesting question on the drivers for men and women to spend different time efforts in caring for their elder family members. It seems that those differences, either favoring men or women, are associated to their work commitments and their marital status and other unpaid family tasks over the course of their lives, or their changing altruism perception.

	Primary/main		Secondary	
	Female	Male	Female	Male
No. of caregivers	406	227	71	64
Share in total (%)	64.1	35.9	52.6	47.4
No. of episodes of adult care per day				
Min	1	1	1	1
Max	10	8	5	4
Mean	2.4	1.9	1.4	1.17
Std. Dev	1.6	1.3	0.8	0.52
Total duration of adult care per day (mins)				
Min	10	10	10	10
Max	1020	910	790	440
Mean	146	112	90	80
Std. Dev	142	135	123	85
Average length per episode (mins)				
Min	10	10	10	10
Max	510	335	790	440
Mean	59	61	68	68
Std. Dev	57	57	102	69

Source: Author calculations from the time-use survey data 2014/15 (NSO, 2016)

Table 1: Adult care as primary and secondary activity by gender

Elderly care is also classified by their types as physical, emotional or companionship. As expected, the dominant category of the adult care work as primary activities is physical care 83.2 percent out of the total 1,405 episodes (table C1 in Appendix). This share is even higher among women at 90.8 percent while it is only 65.6 percent among men. Intriguingly, men seem to take a major role in providing emotional support and travel related activities such as accompanying the elderly to see doctors, public places or visiting relatives. Physical care is a harder work as compared to more relaxing activities as emotional support and travelling.

Another conjecture that has been raised in the time allocation of housework and care work in the literature is that the differences between men and women can vary across different days of the week due to their paid work arrangement. However, the day-offs at work can be different from weekends for some. Our dataset provides detailed information on which day of the week their time slots were recorded and whether that day was of regular activities or something irregular. Table C2 in Appendix shows the difference in three indicators: number of episodes, total duration of unpaid care within a day and the average duration each time. Women's care work for the elderly tends to be higher by more than one hour in weekends compared to weekdays, especially on the total duration. However, men are more likely to work a little longer each time than women do. If the comparison is made between regular versus irregular days, the differences are mitigated considerably to only 21 minutes from 35.5 minutes.

There is a presumption that if men are busy during their regular days with paid work, on their irregular days which can be weekends or day off-work, they may spend more time on housework and care work, particularly some work that women are less capable doing it. Table C3 in Appendix classifies three types of care, differentiating by gender and by the regularity. Physical care shows an intriguing result. On regular days, on average, female caregivers spend 18 minutes more than men do but the reserve is true on irregular days with a larger difference. This is unlike the other two types of care, accompanying and emotional support.

There is a considerable increase in the total duration and the average length per episode of elder caring by both men and women caregivers when comparing irregular days with regular ones. For example, the total care duration increases 42 minutes for men and 28 minutes for women while the average length per episode increased by 28 minutes for both groups (Table C3 in Appendix 4). This trend is not applicable for a comparison between weekdays and weekends. There is also a big surge of two hours in physical care provided by men on their irregular days. Meanwhile the increase is much smaller among women, highlighting the chance of men getting more involved in eldercare when they have free time.

Who cares for whom? Literature in Thailand reports the prevalence of co-residing between adult children and older person in general. Although the Thai time-use data did not provide direct paring information on who care for whom in the households, there is information on the relationship of caregivers and the household heads instead. Without a loss of generality, we can assume that in households with adult children, the household head is normally at the old age. In that case, we found a similar pattern discussed in the literature. There is a fair share of unmarried sons and unmarried daughters providing eldercare to their parents, 50.6 percent versus 49.4 percent. However, among married children, the dominance goes to married daughters at 81.3 percent in comparison to only 18.7 percent being married sons. Regarding the in-law relationship, this dominance still holds with 68.4 percent being in-law daughters. Once again, this result leads us to a hypothesis that if there is an inequality toward women in providing eldercare for their parents, it can be intensified if caregivers are married**.**

To the focus of this study on the altruistic behavior of caregivers, we examine the question "for whom this care activity was?". Results show that over 90 percent of the timeslots on adult care was for their own household members with a little higher share among women (92 percent). For the elderly caring for themselves, it is also interesting to note that while over 6 percent of men spend their time slots for self-care, only 1.8 percent of women do so.

Similarly, relevant to the literature on Thai eldercare document the co-residing of caregivers with the elderly, the time-use data reaffirm with a high share of care episodes being implemented in the same households. Out of 1405 episodes, there are over 80 percent of those activities occurring in the households. This is an assurance that the majority of eldercare in Thailand is informal care provided by family members rather than institutional care at care centers or nursing home.

B. *Measuring time altruistic behavior by gender*

Using the method described in section II.B, the results of our calculation of altruistic behavior proxy based on time are shown in table 2 with key statistics by gender for the whole survey sample, not only limiting to elder caregivers. Clearly, we can see a higher level of altruism (by our definition) among women than men in all measures. The value of 0.149 on the first row of the table shows that on average, for every 100 minutes spent on themselves and for their own interest, women also spend almost 15 minutes on others, while men spend only 4 minutes on others for every 100 minutes on their own. More strikingly, 63 percent of all male respondents spend no time at all on others while only 29 percent of female respondents do the

same. That is why the median for male is 0 while for female is about 0.09. On the extreme, some women spent as much time on others as threefold of their "ME time", equivalently to an extremely altruistic person that we mentioned in our example. The standard deviation is also higher for women, showing a wider dispersion among women than among men. The t-test results confirm a highly significant mean difference between male and female altruism.

The right half of the table, covering both main tasks and secondary activities in the calculation of altruism proxy, shows similar gender patterns as those on the left but also reveals more interesting detail comparing the two versions of the altruistic measure. While the mean (and median), 75th percentile and 95th percentile statistics for males are all higher in the second version as compared to those in the measurement of only primary activities, the opposite is true for females. It means that men are more likely to spend time and care for other as their secondary activities than take it attentively (seriously) as their main tasks.

	only primary activities				primary & secondary activities			
	all	male	female	Diff. (t-stat)	all	male	female	Diff. (t-stat)
mean	0.095	0.039	0.149	-0.11 (-101.7)	0.091	0.042	0.139	-0.097 (-93.5)
median	0.021	0	0.088		0.026	0	0.082	
75th percentile	0.132	0.042	0.216		0.125	0.048	0.198	
95th percentile	0.407	0.191	0.527		0.385	0.202	0.486	
max	2.931	2.395	2.931		3.838	1.489	3.838	
std. deviation	0.164	0.092	0.196		0.155	0.093	0.184	
share of zeros	0.446	0.630	0.289		0.416	0.582	0.273	
observations	73,306	33913	33,393		73,306	33,913	33,393	

Source: Author calculations from the time-use survey data 2014/15 (NSO, 2016)

Table 2: Summary of weighted statistics on altruistic time ratio by gender

Meanwhile, a smaller number of women take this care work as secondary tasks. Mathematically, for men, when this secondary time amount is added to the ***O part*** of the formula (1) above, it can certainly improve the indicator whereas for women, they are more likely to spend their self-time as a secondary activity, adding up to the ***S part*** of the formula and thereby reduces the indicator value. Figure 3 and those in Appendix C further illuminate this altruistic behavior in sub-groups categorized by age, employment status and marital status.

At the early age (6-9), there is almost no difference in altruistic behavior between boys and girls. The difference starts in teenagers (10-14) when clearly girls are more helpful around their family than boys. The biggest difference (0.14-0.15) is found among prime age groups 25-29 and 30-34 years old when people start full time jobs and also building their families. Moreover, while the ratios are relatively constant among men across age group (0.04-0.048), it is more dispersed among women. The level of altruism starts to increase from young girls to young

working women, humping toward the middle age before rising again in their old age. A similar pattern across the life course can be seen for altruism ratios, covering the secondary activities.

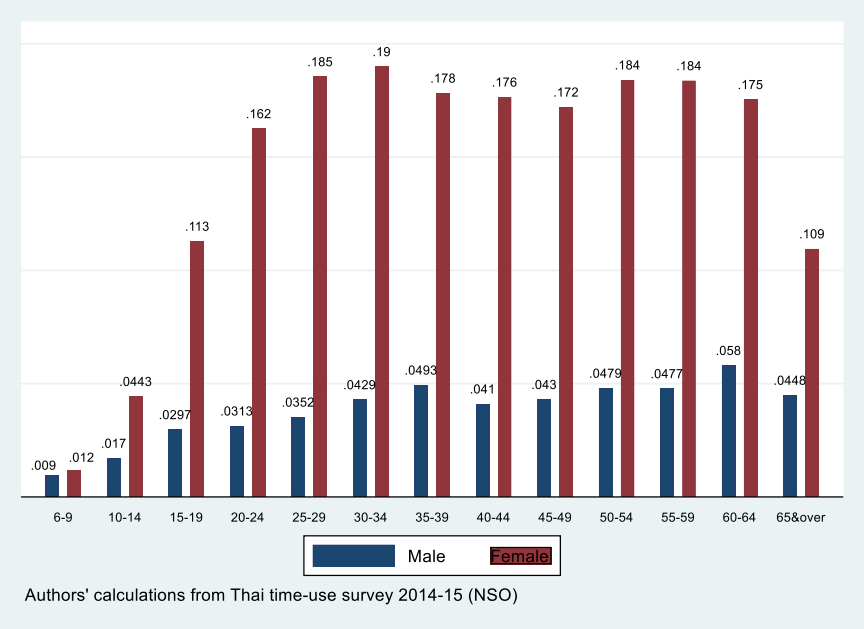


Figure 3: Weighted average of altruistic time ratio by gender, marital status and age group

By further disaggregating the altruism measure by different marital status, an intriguing feature has shown up that married people, both men and women, in any age group are more "time altruistic" than their respective peers who are single, divorce or separated (figure C2 in the Appendix). Clearly, married lives involve more commitments and more time needed to spend for other loved ones who can be young children, elder in-laws who are in need of more care. However, through a gender lens, the disparities among men with different marital status are very small (0.01-0.03) whereas those between married women and single women, for example, are enormously larger (0.2-0.28). This implies that the altruistic behavior of women is further magnified and intensified when more family duties are involved with their marriage, disproportionately to the way it affects married men. The largest gender disparity in altruism ratios is found among the prime working age married people (0.18-0.26). This evidence supports our hypothesis that marriage and family life change the altruistic behavior of people but more importantly its effects on women are more substantial than on men, causing an expansion of existing gender gaps. It is, therefore, important to know to how marital status influences people's allocation of time on elder care across gender.

Lastly, we explore the association of employment status on people's altruistic behavior. Employment status can affect time availability and flexibility of workers and here it shows different extent of effects on men and women when it comes to altruism. Our classification is

based on people's participation in the labor force and also their work status. The last category (in figure C2 of the Appendix), though named "unemployed", in fact, include both the unemployed and those who are not in the labor force such as homemakers, housewives, full-time students or retirees, etc. That figure C2 shows that for both gender groups, paid or wage workers seems to be the one with lowest time altruism as compared to people who have more free time, the unemployed or those with more time flexibility like own account workers who are self-employed, people who work for their family business without pay, or employers with their own business. However, such differences are very thin and not statistically significant among men while among women the gap is much wider. On average, a wage male worker is less "time altruistic" by around 0.018 than an unemployed male whereas the disparity is 0.1 when comparing the two similar work categories of women. Literally, it means that a female housemaker, for example, on average, spend 10 minutes for other people for every 100 minutes for herself, as compared to a full-time wage employee who spends only 1.8 minutes. A similar pattern is observed in both measure of time altruistic ration, in primary tasks only and with secondary tasks. Another phenomenal distinction between men and women that we have discussed at onset of this descriptive analysis is the fact that men are more likely spending time on eldercare as their secondary activities while women mostly take this care work as their main tasks. The figure C3 also displays a higher red column higher than a navy column for men in each employment category, but a reverse for women. This means that when men spend time on other people as a secondary task, it helps to raise his "time altruistic" behavior.

In summary, from descriptive results, we would integrate those factors in econometric models to disentangle their effects as well as potential interaction effects (employment status with gender, marital status with gender) while holding other demographic factors constant. It is to explain why men and women spend their time differently on elder care and how their altruistic behaviors can influence their care behaviors in third component of our analysis.

C. *Econometric models on the elder care behavior*

There are two types of modelling used in this study. One is a multivariate analysis to identify significant factors among individual and household characteristics that determine the amount of eldercare work of Thai male and female caregivers. Another is instrumental variable models to explore the allocation of time between activities and their effects on the duration of eldercare. Two key activities are examined, paid work and leisure time which are instrumented respectively by the employment status and time altruism plus leisure time of peers.

There are six hypotheses to be tested in our models:

H1: Female caregivers provide longer duration elder care per day than their male counterparts, motivated by their higher altruistic behavior.

H2: Married children tend to bear a larger burden of caring for elder parents than the singles or unmarried.

H3: There is a gender heterogenous effects of education levels on eldercare

H4: Overall, people spend more time on their irregular days to care for their elder family members, especially with male caregivers.

H5: Paid work and leisure time are closely and negatively associated with care time for elder family members with heterogeneous gender effects.

H6: There are different peer effects of leisure among men and women at similar age and in proximity, affecting their eldercare time**.**

Table C4 in Appendix summarizes key dependent variables - duration of eldercare time (as the main tasks and also secondary activities) together with a number of regressors beside some instruments used in the models.

Basic models with multivariate analysis on eldercare duration. The estimation results in table C5 of the Online Appendix, firstly, confirm our hypothesis 1 that female caregivers, on average, provide a larger amount of time- about 19 minutes per day on eldercare than male caregivers as a primary activity. However, the gender difference reduces to only 14 minutes and becomes insignificant when both main and secondary activities are counted in eldercare work. This is consistent with the hypothesis that like other unpaid work, women take a higher burden of eldercare and men would share more by participating in secondary care activities. Second, with a categorical variable for the relationship between caregivers and the household head, with single/unmarried children as the reference group, table 3 also indicates that married adult children are the most helpful group in caring for the elders in the house, spending an average of 90 minutes per day more than other children who are single. This difference reduces to 71 minutes when secondary activities on eldercare are included in model (2). Meanwhile, the marital status of caregivers shows a significantly negative effect on the duration of care, as compared to single caregivers. These two results seem to contradict. However, it is reasoned from our sample that not all single caregivers are necessarily unmarried children of the household heads. In fact, the category of single caregivers is very diversified on the relationship with the household heads, with almost of 40 percent is the head themselves.

Third, the age of caregivers is an important predictor considered in this basic model. Results show that as people age, every 10 years older, they tend to spend more 18-20 minutes per day in caring for their elders. Having at least one child in the family considerably reduces the amount of time people providing care for the elderly by 80 minutes per day, other factors equal. The magnitude of this effect clearly illustrates a trade-off between childcare and eldercare in some households with multiple generations and the burden of caregivers. Meanwhile, the household size (defined as the number of members aged 6 years old and over) does not demonstrate a significant effect on the duration of care. There are also no significant religious effects on the elder care time.

Forth, our analysis also covers education levels and work status of caregivers. With wage employees as a reference group, we found no substantial difference when comparing with own-account, unpaid homeworkers or the unemployed. There is only the employer group who seems to allocate much less time (60-80 minutes per day) than the wage employees. In contrast, the education of caregivers shows very strong heterogenous effects across levels with the largest difference found in those with primary education as compared to the base group of those with less schooling. However, this effect dissipate as people are more educated and we see no difference between university graduates (or higher) and the reference group in the duration they spend caring for their elder family members. This could associate with the types of work and occupations that educated people are more likely to be involved and often take more of their time for work and less time for family caring accordingly. Our model also controls for geographical regions and the urban/rural difference because this substantially influences people's lifestyle and ways allocating time in a day. Significant regional variations are found in providing eldercare, with caregivers in Bangkok tend to spend less time than their peers in other parts of the country.

As previous section described the separation between days within a week that people record their activities and days that people do not do their regular tasks. Two dummy variables to represent weekdays (versus weekends) and regular days (versus irregular ones) are also included in the basic model. As predicted, while the irregular day dummy shows a significantly positive effect on the duration of eldercare, the weekday dummy variable does not. This suggests that during the weekends or irregular days when people are less committed to their routine work or paid work, they can take more care for the elder in their family.

Finally, we consider some interaction effects to examine if a caregiver who is a woman and also married or if a man on his irregular days may spend more time on elder care due to some

multiplicative effects. For example, we include an interaction term of *male * irregular day* into the model (4) in table 3 to answer the hypothesis of men doing more eldercare on their irregular days, probably a day off, to redistribute the eldercare burden in the household between men and women. The result shows no significant interaction effects while controlling for both gender variable and irregularity of the days although the coefficient is positive at 22 minutes. This implies that doing more elder care on an irregular day by either male or female caregivers has a very similar effect on the total care time and that male caregivers are not particularly more helpful than their female counterparts. Similarly, model (5) also indicates no multiplicative effects of being a female caregiver and being married other than additive effects from the two characteristics. Although these results have dismissed any intensified effects speculated in hypothesis 4, it is important to confirm that male and female caregivers tend to provide more care to their elder family members on some particular (irregular) days, environment or situation.

Altruistic behavior and eldercare. Before including the altruism proxy into the model, through pre-screening we found a certain degree of correlation between the proxy and gender variable. A positive correlation coefficient with the female dummy variable suggest that women tend to be associated with high magnitude of the altruism proxy. Therefore, adding the altruistic behavior proxy into the original multivariate models (1) and (2) may lead to biased estimators. Instead, we run the extended model separately for the two sub-samples of only men and only women. Results in table 3 below show with highly significant and positive effects of altruism on eldercare time. The coefficient for male sub-sample is a little higher than those in the female sub-sample, 323 versus 309. These numbers mean that if the altruism ratio increased by 0.1 (i.e, 10 percent increase in time spent on other as compared to time on oneself), a caregiver in a respective group would provide more care to their elder family members by 32.3 or 30.9 minutes per day.

A simple test for coefficient difference between the two sub-samples cannot reject the hypothesis of coefficient equality (chi-square stat=0.11) indicating no significant heterogenous gender effects. Similarly, the interaction terms between the *altruism*female* dummy that we include in model (3) (primary elder care) and model (4) (primary and secondary activities) are both unimportant in determining the duration of care. In summary, we would say that while these results absolutely reaffirm the importance of altruism motive for eldercare in both male and female caregivers, the differential effects between them are very negligible.

	Primary	Primary	Primary	Primary & Secondary
	Male	Female	All	All
	(1)	(2)	(3)	(4)
Age	0.983	1.007*	0.908*	1.598**
	(1.30)	(1.74)	(1.95)	(2.43)
	(-0.08)	(1.70)	(1.36)	(1.56)
Weekday	2.392	-0.368	-3.908	-6.536
	(0.19)	(-0.02)	(-0.37)	(-0.51)
Irregular day	50.63**	13.50	25.59*	19.69
	(2.58)	(0.69)	(1.67)	(1.07)
Altruism proxy	323.9***	309.6***	343.7***	270.1***
	(6.23)	(10.47)	(6.99)	(4.21)
Altruism proxy * female			-62.68	-44.16
			(-1.31)	(-0.71)
constant	-39.96	-117.27**	-76.97**	-80.83*
	(-0.61)	(-2.35)	(-2.01)	(-1.86)
control for education level	YES			
control for employment status	YES			
control for relationship with HH head	YES			
control for marital status	YES			
control for area and regional effects	YES			
Adj R-squared	0.63	0.602	0.576	0.321
Observations	249	415	664	664

Notes: t statistics in parentheses *** p<0.01 **p<0.05 *p<0.1

Table 3: Altruistic behavior by gender on eldercare as primary and secondary activities

Instrumental variable model for time reallocation (care time versus worktime). We examine the tradeoffs of time on different activities by caregivers to gauge the heterogenous effects between males and females to recommend feasible interventions to redistribute care work. Therefore, we include two key activities into the econometric models, namely time for paid work and leisure time (next section). We use some IVs to mitigate the possibility of endogeneity caused by some simultaneous (bi-directional) causality between time variables.

Beyond the effects of individual and household characteristics, the results in table C6 in Appendix show that caregivers may swap their work time for care time significantly, but the OLS estimator seems to overestimate the exchange with a bigger magnitude of the coefficient. The IV estimators show a one tenth swift implying that on average, by reducing 10 minutes spent on paid work, a caregiver can increase one minute of care time for the elderly at home. Table C6 also elaborates the effects of paid work time on eldercare, disaggregated by gender. When we estimate the IV model separately for male and female caregivers, surprisingly, we found no significant time swap for men but considerably a higher swap for women, demonstrated by a strong negative coefficient of -0.152 at 1 percent level of significance. It

means that if a female caregiver spends 100 minutes more on her paid work per day, on average, per day, she can probably reduce time at home on eldercare by 15 minutes or so. Meanwhile, that coefficient for men is insignificant and negligible, implying that if we can reduce the (paid) work time of a man, it is very unlikely that he can increase his time on elder care. This trade-off is important for policy options if the objective is to reduce the unpaid care burden of women at home and increase their income generating opportunities in the labor market.

Using the IV models with a control for the amount of time caregivers spend on their paid work, there are more interesting effects of some predictors (or individual characteristics) revealed here which we could not see in the OLS models. While table 3 shows a dissipating effect of higher education on eldercare time in general (for male and female caregivers as a whole). Our intuitions may suggest that educated men women are more likely to have better jobs and thus they might have less time for caring. However, the IV models with sub-samples for men and for women luminate a distinction between highly educated women (with university degrees or higher) and highly educated men on the time amount they spend with their elder family members. In fact, contrasting to table C5 in Appendix, results show that female caregivers with high education outperform to all other groups of women with lower education. A highly positive coefficient of 62.44 for women with at least university degrees suggests that they indeed spend over an hour per day as compared to the base group of women with less than primary education, holding other factors equal.

Surprisingly, the reverse is found among male caregivers. Again, holding the work time constant, working men with university degrees provide the least care in terms of time spent for their family elders. A highly significant negative estimator of 60.4 means that when comparing with peers having less than primary education (the base), highly educated men provide much less eldercare even though they spend the same amount of time on paid work. In contrast to the ranking among female caregivers, the effects of education on male caregivers are totally different. Men with just primary education seem to be the most caring group, followed by those with higher secondary and the least education groups. Men with university degrees or higher turn out to be in the bottom of the eldercare ranking. This striking difference between men and women is further discussed, relating to social norms and the trade-off between "time and money" (Couch et al., 1999) where we may presume higher education is associated with higher earnings and consequently higher financial support to their parents in lieu of time.

Instrumental variable model for time reallocation (care time versus leisure time). We also investigate the influence of time spent on non-essential or more relaxing tasks and leisure such

as socializing, community, participation, attending cultural, entertainment and sports events or venues, or some games and hobby activities to see how they may affect eldercare. The tricky part here, similarly to the previous exercise, is a threat of endogeneity driven by simultaneous causality between the two variables. As explained in the methodology section, we experimented with two instruments. One is the time altruism ratio because altruistic behaviors affect how much time people spend time on themselves and thus indirectly affect time to care for elder relatives. Another is what we call the "peers' leisure" calculated as the weighted average of leisure time of people at the similar age (same age group), located in the same province and the same sex.

Results in table C7 shows the final effects (the 2nd stage of the 2SLS) but the first stage regression demonstrates strong correlations of these two instruments to leisure time of caregivers. More specifically, altruism proxy shows a significantly negative relationship toward leisure time of caregivers whereas the peer effects are highly positive, especially for men. When comparing the OLS and IV models for the whole sample (models (1) and (2)), it is very clear that the OLS understates the important negative effects of leisure time toward eldercare. Another important key message from this table is the differential effects in male and female care providers. Although both coefficients for male group and female groups are significantly negative, their magnitudes are far different. Swapping leisure time for care time among men seems to be one-for-one (with a coefficient= -0.99). If men manage to cut down their leisure time, they will remarkably increase their elder care time by almost the same amount. Whereas among women the ratio is close to one-for-two (coefficient = -1.89). This sounds impossible but if we consider secondary activities and multitasking which women often carry out, then it is understandable for women to even spend more time on care work than the amount they give up from leisure. We can loosely interpret these exchanges like a higher cost for women and less for men (or higher elasticity, although logarithm forms can be accurate). All in all, an important message can be drawn here that male caregivers can increase eldercare by reducing their leisure time by the same amount whereas their leisure time is very much influenced by how much time other men in their proximity, at similar age spending on leisure activities. This finding is important in designing appropriate, workable behavioral change technique for more equitable gender eldercare work.

V. Discussion and Implications

Using micro data from the time-use survey in Thailand in 2014/2015, we found that overall, Thai women tend to do the unpaid elder care work many times and longer duration in a day as the main task compared to men. As expected, this result is consistent with the literature. The gender difference become narrower when taking into account eldercare as secondary tasks which more often men than women undertake this unpaid work less attentively beside their main activities. More importantly, we also found heterogeneous gender effects across dimensions and settings in Thailand, such as age group, marital status, employment status and education attainment or even days of the week with different regularities.

Altruistic behavior is also found to be a strong determinant for the duration of eldercare. The proxy for altruism based on time allocation shows that women are more altruistic than men in all dimensions, which is very in line with the literature on gender and altruism (England et al., 2012). Our analyses confirm altruistic time ratios are among key drivers for wider gender gaps in providing unpaid eldercare. This is supported by the literature on the role of daughters taking care of elder parents than sons (Coward & Dwyer, 1990; Crawford et al., 1994; Delgado & Tennstedt, 1997; Dwyer & Coward, 1991; Pratt et al., 1989).

In a society with high social norms on altruistic behavior toward parents, gender difference in altruism would correspond to and explain for a significant difference in the amount of time for elderly care. If elder care is a default responsibility of families in the society, it is also the default obligation of women, daughters, wives rather than of men, sons and husbands in families. Changing these stereotypes and norms is challenging and takes time.

Time is the ultimate scarcity and also the great equalizer (Sawhill & Guyot, 2020) that we each have exactly 24 hours per day. Findings of this study reveal some opportunities for time reallocation among male and female caregivers among different daily activities. Typically, we explore a possible switch between time for paid work (and leisure time) for elder care time. A surprising discovery is that reducing paid-work time of men can hardly lead to an increase in the time they spend on elder care while the switch can be considerable among women. There is an empirical mix across countries. Wolf and Soldo (1994) show no evidence of reduced propensities to be employed, or conditional hours of work, due to eldercare provision. Meanwhile, employed adult offspring caregivers do not provide significantly less care to their parents than do the unemployed in African American families (Bullock et al., 2003). Sarkisian and Gerstel (2004) found employed women and men give equal amounts of help to parents, other things equal but the amount help depends on their employment characteristics.

We also found the effects of switching leisure time toward eldercare are very different between caregivers with one-to-one effect among men but multiplicative among women caregivers. This trade-off is important for policy options. If the objective is to reduce the family care burden of women and increase their income generating opportunities in the labor market, strong policy responses to provide support for both the healthcare system and informal caregivers is imperative. To discuss these issues, we associate our findings with the 3R framework of Elson (2017) toward reducing the eldercare burden on women caregivers. The model consists of three interconnected dimensions to address unpaid care work in development agenda: Recognition, Reduction, and Redistribution (the 3 Rs).

Recognition. The essential role of informal elderly caregiving is widely accepted across countries and societies, yet making this unpaid work formally recognized is still challenging. Various forms and levels of support have been implemented to facilitate the role of informal caregivers in developed countries (Chari et al., 2015; Courtin et al., 2014; Peng, 2012). Financial support such as allowance to caregivers, and LTC vouchers (in South Korea) are often used at an early stage of policy development. In some states of the US, Medicare's Cash and Counseling program provides each eligible LTC beneficiary with a budget that may be used to pay any caregiver of the beneficiary's choice, including family caregivers (Doty et al., 2010). The design and implementation of those programs always require some monetary measurements of unpaid care using various methods such as opportunity costs or replacement costs with significantly different estimates. There is no such study in Thailand. Even if family care work is measured in time unit, it is not visible to policy makers. The first stage to make informal eldercare and unpaid care work in general visible is to measure it in monetary terms.

Reduction. The reduction of unpaid carework in general and particularly eldercare can only implemented as the next step upon an acknowledgement of this family work among LTC forms provided by other stakeholders. The "care diamond" (Razavi, 2007) refers to the institutional arrangements that contribute to the sum of societal welfare provided by the state, market, family and community or "non-profit" sector. In most of the developing and emerging economies, non-familial care facilities for the elderly are limited, the care provided by family members, household and kinship is critically essential while the state plays important role as well. Within the care diamond framework, the state, market and community can take more vital roles to reduce the burden on households is one of those manners.

In Thailand, while the market long-term care in care home, nursing home remains expensive for the majority to afford. Also, the challenge remains on the stigma of sending the elderly to care centers. Experiences from countries with strong filial care and support like China (Silverstein et al., 2006) and South Korea and Japan (Peng, 2012; Tamiya et al., 2009) have proved the importance of public policy in providing LTC as a head start to change those social stigmas. Other state-funded care vouchers for households in South Korea can be used to ease the high costs when families start using market care services. In China, the market open-up for competition and improvement in the quality of institutionalized elder care have shifted the social perceptions of formal care for older persons from a stigma to reinterpretation of filial piety (Zhan, Feng, & Luo, 2008).

Similar change in perceptions have also been seen in South Korea with a deep norm of familial care for elder parents, with a huge 90 percent of survey respondents thought children should care for their elderly parents in 1998. Almost twenty years later, in 2016 Korea Social Survey found only 30.8 percent of Koreans over the age of 13 believed the family should take care of their elderly parents, while 45.5 percent believed they should be cared for by "family, government, and society" (Peng et al., 2021) with over triple increase of LTC recipients in 2017 thanks to the Korean government policy on universal Long-Term Care Insurance in 2008.

Redistribution. The role of different sectors in providing care can be understood as a redistribution among sectors. Redistribution can also be implemented among individuals of the society to maintain equality. We are particularly interested in recommending solutions to redistribute the care for elder people more equally between men and women caregivers. If, men are unlikely to spend more time in caring for elder family members if they can reduce their time of paid work, it is hard to convince that once we allow paid leave for workers to take care of their parents, they will actually do so. In this case, a social policy of mandate leave used in some developed countries to increase childcare of fathers may not work well with elder care.

In the meantime, with various findings from our analysis on factors determining men's care time for the elderly, we recommend some more practical solutions to change their behavior and consequently achieve a better equality in this care work distribution. Traditionally, behavior change policies and interventions have tended to focus on providing new information, which seek to change the way people think about their behavior or different, financial or legal, incentives that change the consequences of behavior (Cecchini et al., 2010). These interventions can only get us so far because such behavioral interventions in health rely on influencing the way people consciously think about their behavior, but the problem is that a

substantial proportion of the variance in behavior is not explained by intentions. Several meta-analyses imply that changing intentions would account for less than one-third of the variance in behavior change (Webb & Sheeran, 2006). In contrast to such economic models of rational choice suggesting that we respond to information and price signals, insights from across the behavioral sciences suggest that human behavior is automatically (and often subconsciously) influenced by the context or environment within which many of our decisions are taken (Kahneman, 2011) – the 'choice architecture' - as it is called in the book Nudge (Thaler & Sunstein, 2008). The MINDSPACE framework (Dolan et al., 2010) is a summary categorization of a body of (largely automatic and contextual) effects on behavior (e.g. the concepts Messenger, Incentives, Norms, Defaults, Salience, Priming, Affect, Commitments, Ego, that have been found in experimental settings in the laboratory and in the field). MINDSPACE has already been applied to various behavioral issues and domains in public policy (Dolan et al., 2012; Vlaev et al., 2016) and such a framework can inform interventions to motivate caregiving. Many findings reported here open opportunities for interventions that target such automatic and innate responses.

Policies regarding caregiving for older adults may lead to changes in filial behaviors even in some deeply rooted cultures and societies with altruism and filial piety. These policies may in turn alter perception about filial support (Kohli, 1999). A type of prosocial motivation is embodied in moral values that specify giving care as an obligation or duty. For example, parents may believe that they have a moral duty to care for their children, and adult children may believe that they have a moral duty to repay that care when their parents need assistance in old age (Ibarra 2010, 130). Earlier, we discussed caring out of the expectation of reciprocity as an example of extrinsic motivation, which implies there might also be a possibility that internalized values may motivate care even when there is no expectation of future reward. Therefore, *'Give back'* messages could be successfully utilized in persuasive campaigns.

Conformity to norms of masculinity, for instance, may help explain why men tend to eschew care work, whether paid or unpaid. However, we also report an important result that men are more likely to spend care for others as their secondary activities rather than take it attentively as their main tasks; which may open opportunities for nudging caring behaviors, for example, by framing the caregiving for older adults as part of their secondary activities.Another important finding was that both male and female caregivers tend to provide more care to their elder household members on some particular (irregular) days which creates an opportunity for behavioral nudging – those are 'sensitive' times when to prompt men to help out.

We also discovered that men with just primary education seem to be the most caring group, followed by those with higher secondary and the least education group. Men with university degrees or higher, turn out to be in the bottom of the eldercare ranking. This behavioral pattern may be due to social norms about what educated and successful men should and should not do in Thai society. Social norms are the behavioral expectations or rules within a society or group. We are strongly influenced by what others do. Norms have stronger impact if the target audience is closely related to the group doing the desired behavior (i.e. 'people like you'). Note that our analysis revealed highly positive peer effects, specially for men. Campaigners can, therefore, use messages to reverse Thai men's perceptions of the social norms by informing, especially the more educated men, that men like them are more involved in eldercare.

Messages toward behavioral change could also be developed on the basis of data on time people devote to different activities (such as socializing and communication, community participation, religious practice, culture, leisure, mass-media and sports practices). We could use those as indicators who are more likely to respond to government messages, and specifically what messages and appeals, for helping the elderly. For those who want to be involved in community participation and religious practice, we could use '*Stand together'* messages which emphasize how our sense of self is rooted in our proud membership of collectives such as families, neighborhoods, communities linked to sense of duty, solidarity and inclusion. Messages should come from voices representative of and trusted by the group rather than those perceived as self-interested (Hogg, 2010).

'*Protect others'* messages are also promising, particularly when building on messages promoting collective identity and supportive social norms. Messages promoting care for others are rooted in the psychology of social identity (Moran & Sussman, 2014), social influence (Haslam SA, Reicher SD, Platow M. The New Psychology of Leadership. London: Routledge; 2020.) and moral behavior (Haidt, 2012). 'Protect each other' messages should stress how desired behaviors benefit the group and protect its most vulnerable members, including those we love. This should be enhanced by concrete examples, powerful images and the actual voices of those we need to protect (loved ones, the vulnerable) linked to clear, specific advice on how to implement care activities. Images and accounts of widespread population adherence (rather than examples of non-adherence) can persuade 'conditional co-operators' (those whose willingness to help others is conditional on others doing so) to over-ride individual self-interest and to act in the collective interest (Chaudhuri, 2011; Drury et al., 2019).

Persuasive messages may also be tailored to appeal to specific sub-groups based on gender, age or regional, ethnic or cultural affiliations (Kreuter & McClure, 2004) drawing on family and faith/interfaith voices particularly for some class and ethnic groups (Young et al., 2011). In doing so, it is critical to draw on voices which are appropriate to the group in question. For instance, young people are particularly influenced by the voices of peers and others of their age group including celebrities/influencers, which need to be harnessed to improve adherence among those aged 16-24 (Blakemore, 2018).

VI. Conclusion

This study examines the issues of unpaid eldercare work in Thailand from the economic, social and behavioral perspectives to understand how people make decisions on eldercare involvement, taking into account altruistic behaviors to the elderly between male and female caregivers. Going beyond identifying the gender gaps in providing eldercare, we explained those gaps by measuring a proxy for altruistic behaviors of caregivers and estimate its effects on providing care. Our findings are important to suggest economic and social policy for sustainable aging population in Thailand. Furthermore, using behavior change theory, we suggest specific strategies which can underpin inclusive policy conversations in design and interventions for an equitable distribution of eldercare from a gender lens.

From the findings, we also emphasize the crucial role of time-use data to provide a thorough understanding of unpaid care work in general and the need to conduct a comprehensive study to measure the value of informal care sector in Thailand. Unpaid care work in Thailand is not even included in the satellite account of its GDP. Valuing unpaid activities helps in assessing the (possible) impact of specific policies, such as promoting equal partnerships in providing familial care or policies addressing unequal burdens for total time spent on work at home or in the formal labor market, across gender and age categories (Van de Ven et al., 2018). In Thailand, it is also particularly important in bringing better understanding to the current policy debate on the impact of a fast-aging society. An adequate care for the elderly will not only become more crucial for their own well-being, but also critical to the economy as well as the government's role in step into addressing LTC provision or other substantial resources to ensure a friendly-ageing environment for Thai elders. Without an awareness of the informal care value, unpaid work of caregivers will be underestimated and never be properly viewed as one type of work or essential household production to the economy in building up human capital and labor resources.

REFERENCES

Addati, L., Cattaneo, U., Esquivel, V., & Valarino, I. (2018). Care work and care jobs for the future of decent work. *Op. cit*.

Andreoni, J., & Miller, J. (2002). Giving according to GARP: An experimental test of the consistency of preferences for altruism. *Econometrica*, *70*(2), 737-753.

Ayudhya, P. I. N., Boonvong, N., & Piromya, P. (2007). Caregiving for the elderly in Thailand.

Becker, G. S. (1965). A Theory of the Allocation of Time. *The Economic Journal*, *75*(299), 493-517.

Bianchi, S., Folbre, N., & Wolf, D. (2012). Unpaid care work. In *For love and money: Care provision in the United States* (pp. 40-64). Russell Sage Foundation.

Bianchi, S., & Joseph McGarry, K. S., Judith A. (2007). Intergenerational Ties. Meeting the Needs of Children with Disabilities,

Blakemore, S.-J. (2018). Avoiding social risk in adolescence. *Current directions in psychological science*, *27*(2), 116-122.

Bookman, A., & Kimbrel, D. (2011). Families and Elder Care in the Twenty-First Century. *The Future of Children*, *21*(2), 117-140. http://www.jstor.org/stable/41289632

Bullock, K., Crawford, S. L., & Tennstedt, S. L. (2003). Employment and Caregiving: Exploration of African American Caregivers. *Social Work*, *48*(2), 150-162. http://www.jstor.org/stable/23720840

Camerer, C. F. (2011). *Behavioral game theory: Experiments in strategic interaction*. Princeton university press.

Campbell, L. D., & Martin-Matthews, A. (2000). Caring sons: Exploring men's involvement in filial care. *Canadian Journal on Aging/La Revue canadienne du vieillissement*, *19*(1), 57-79.

Carlson, D. L. (2021). Time Availability: Assessing Causal Ordering in the Performance of Paid Labor and Unpaid Housework. *Journal of Comparative Family Studies*, *52*(2), 180-205.

Cecchini, M., Sassi, F., Lauer, J. A., Lee, Y. Y., Guajardo-Barron, V., & Chisholm, D. (2010). Tackling of unhealthy diets, physical inactivity, and obesity: health effects and cost-effectiveness. *The Lancet*, *376*(9754), 1775-1784.

Chari, A. V., Engberg, J., Ray, K. N., & Mehrotra, A. (2015). The opportunity costs of informal elder-care in the United States: new estimates from the American Time Use Survey. *Health services research*, *50*(3), 871.

Charmes, J. (2019). The Unpaid Care Work and the Labour Market. An analysis of time use data based on the latest World Compilation of Time-use Surveys. *International Labour Office–Geneva: ILO*.

Chaudhuri, A. (2011). Sustaining cooperation in laboratory public goods experiments: a selective survey of the literature. *Experimental economics*, *14*(1), 47-83.

Checkovich, T. J., & Stern, S. (2002). Shared Caregiving Responsibilities of Adult Siblings with Elderly Parents. *The Journal of Human Resources*, *37*(3), 441-478. https://doi.org/10.2307/3069678

Cheng, Z., Jepsen, D. M., & Wang, B. Z. (2020). A dynamic analysis of informal elder caregiving and employee wellbeing. *Journal of Business and Psychology*, *35*(1), 85-98.

Commission, E. (2005). Confronting demographic change: A new solidarity between the generations. *Green Paper COM*.

Couch, K. A., Daly, M. C., & Wolf, D. A. (1999). Time? Money? Both? The Allocation of Resources to Older Parents. *Demography*, *36*(2), 219-232. https://doi.org/10.2307/2648110

Courtin, E., Jemiai, N., & Mossialos, E. (2014). Mapping support policies for informal carers across the European Union. *Health Policy*, *118*(1), 84-94. https://doi.org/https://doi.org/10.1016/j.healthpol.2014.07.013

Coverman, S. (1983). Gender, Domestic Labor Time, and Wage Inequality. *American Sociological Review*, *48*(5), 623-637. https://doi.org/10.2307/2094923

Coward, R., Lee, G., & Dwyer, J. (1993). The family relations of rural elders. *SAGE FOCUS EDITIONS*, *162*, 216-216.
Coward, R. T., & Dwyer, J. W. (1990). The association of gender, sibling network composition, and patterns of parent care by adult children. *Research on Aging*, *12*(2), 158-181.
Crawford, L. M., Bond, J. B., & Balshaw, R. F. (1994). Factors affecting sons' and daughters' caregiving to older parents. *Canadian Journal on Aging/La Revue Canadienne Du Vieillissement*, *13*(4), 454-469.
Delgado, M., & Tennstedt, S. (1997). Puerto Rican sons as primary caregivers of elderly parents. *Social Work*, *42*(2), 125-134.
Dolan, P., Hallsworth, M., Halpern, D., King, D., Metcalfe, R., & Vlaev, I. (2012). Influencing behaviour: The mindspace way. *Journal of economic psychology*, *33*(1), 264-277.
Dolan, P., Hallsworth, M., Halpern, D., King, D., & Vlaev, I. (2010). MINDSPACE: influencing behaviour for public policy.
Doty, P., Mahoney, K. J., & Sciegaj, M. (2010). New state strategies to meet long-term care needs. *Health affairs*, *29*(1), 49-56.
Drury, J., Carter, H., Cocking, C., Ntontis, E., Tekin Guven, S., & Amlôt, R. (2019). Facilitating collective resilience in the public in emergencies: Twelve recommendations based on the social identity approach. *Frontiers in public health*, *7*, 141.
Dukhovnov, D., & Zagheni, E. (2019). Transfers of informal care time in the United States
the role of demographic differentials in intergenerational flows by age, sex, and racial and national background. *Vienna Yearbook of Population Research*, *17*, 163-197. https://www.jstor.org/stable/26928908
Durán Heras, M. Á. (2012). *Unpaid Work in the Global Economy* (8492937289).
Dwyer, J. W., & Coward, R. T. (1991). A multivariate comparison of the involvement of adult sons versus daughters in the care of impaired parents. *Journal of Gerontology*, *46*(5), S259-S269.
Elson, D. (2002). Macroeconomics and macroeconomic policy from a gender perspective. *Public Hearing of Study Commission on Globalization of the World Economy-Challenges and Responses, February 18 Deutscher Bundestag, Berlin*.
Elson, D. (2017). Recognize, reduce, and redistribute unpaid care work: how to close the gender gap. New Labor Forum,
Engel, C. (2011). Dictator games: A meta study. *Experimental economics*, *14*(4), 583-610.
England, P., Folbre, N., & Leana, C. (2012). Motivating care. *For love and money: Care provision in the United States*, 21-39.
Floro, M. S., & Pichetpongsa, A. (2010). Gender, Work Intensity, and Well-Being of Thai Home-Based Workers. *Feminist Economics*, *16*(3), 5-44. https://doi.org/10.1080/13545701.2010.499657
Folbre, N. (1986). Hearts and spades: Paradigms of household economics. *World development*, *14*(2), 245-255.
Folbre, N., & Nelson, J. A. (2000). For love or money--or both? *Journal of Economic Perspectives*, *14*(4), 123-140.
Gonzales, A. M. (2007). Determinants of Parent-Child Coresidence Among Older Mexican Parents: the Salience of Cultural Values. *Sociological Perspectives*, *50*(4), 561-577. https://doi.org/10.1525/sop.2007.50.4.561
Grigoryeva, A. (2017). Own Gender, Sibling's Gender, Parent's Gender: The Division of Elderly Parent Care among Adult Children. *American Sociological Review*, *82*(1), 116-146. http://www.jstor.org/stable/44245511
Haidt, J. (2012). *The righteous mind: Why good people are divided by politics and religion*. Vintage.
Hegewisch, A., & Gornick, J. C. (2011). The impact of work-family policies on women's employment: a review of research from OECD countries. *Community, Work & Family*, *14*(2), 119-138.

Heitmueller, A. (2007). The chicken or the egg?: Endogeneity in labour market participation of informal carers in England. *Journal of health economics*, *26*(3), 536-559.
Hogg, M. A. (2010). Influence and leadership.
ILO, & UNDP. (2018). *Time-use surveys and statistics in Asia and the Pacific: A review of challenges and future directions* (International Labour Office–Geneva: ILO, Issue.
Kahneman, D. (2011). *Thinking, fast and slow*. Macmillan.
Knodel, J. (2014). Is Intergenerational Solidarity Really on the Decline? Cautionary Evidence from Thailand. *Asian Population Studies*, *10*(2), 176-194. https://doi.org/10.1080/17441730.2014.902160
Knodel, J., Kespichayawattana, J., Wiwatwanich, S., & Saengtienchai, C. (2013). The future of family support for Thai elderly: Views of the populace.
Knodel, J., Teerawichitchainan, B., & Pothisiri, W. (2018). Caring for Thai older persons with long-term care needs. *Journal of aging and health*, *30*(10), 1516-1535.
Koerin, B. B., Harrigan, M. P., & Secret, M. (2008). Eldercare and employed caregivers: A public/private responsibility? *Journal of Gerontological Social Work*, *51*(1-2), 143-161.
Kohli, M., & Künemund, H. (2003). Intergenerational transfers in the family: What motivates giving. *Global aging and challenges to families*, 123-142.
Kossek, E. E., Thompson, R. J., Lawson, K. M., Bodner, T., Perrigino, M. B., Hammer, L. B., Buxton, O. M., Almeida, D. M., Moen, P., & Hurtado, D. A. (2019). Caring for the elderly at work and home: Can a randomized organizational intervention improve psychological health? *Journal of occupational health psychology*, *24*(1), 36.
Kreuter, M. W., & McClure, S. M. (2004). The role of culture in health communication. *Annu. Rev. Public Health*, *25*, 439-455.
Moran, M. B., & Sussman, S. (2014). Translating the link between social identity and health behavior into effective health communication strategies: An experimental application using antismoking advertisements. *Health communication*, *29*(10), 1057-1066.
NSO. (2016). *The Time Use Survey 2015* National Statistics Office of Thailand.
NSO. (2017). *Full Report on the Survey of the Older People in Thailand 2017*. N. S. O. o. Thailand.
Ogawa, N., Mansor, N., Lee, S.-H., Abrigo, M. R. M., & Aris, T. (2021). Population Aging and the Three Demographic Dividends in Asia. *Asian Development Review*, *38*(1), 32-67. https://doi.org/10.1162/adev_a_00157
Peng, I. (2012). Social and political economy of care in Japan and South Korea. *International Journal of Sociology and Social Policy*.
Peng, I., Cha, S.-E., & Moon, H. (2021). *An overview of care policies and the status of care workers in South Korea*. PGAE.
Pichetpongsa, A., & Floro, M. S. (2007). *Gender and time dimensions of informal workers' well-being: Evidence from Thailand*.
Pickering, C. J., Dancey, M., Paik, K., & O'Sullivan, T. (2021). Informal Caregiving and Disaster Risk Reduction: A Scoping.
Porter, M., & Adams, A. (2016). For love or reward? Characterising preferences for giving to parents in an experimental setting. *The Economic Journal*, *126*(598), 2424-2445.
Pratt, C. C., Jones, L. L., Shin, H.-Y., & Walker, A. J. (1989). Autonomy and decision making between single older women and their caregiving daughters. *The gerontologist*, *29*(6), 792-797.
Prime, H., Wade, M., & Browne, D. T. (2020). Risk and resilience in family well-being during the COVID-19 pandemic. *American Psychologist*, *75*(5), 631.
Razavi, S. (2007). The political and social economy of care in a development context: Conceptual issues, research questions and policy options. *Trabajo y empleo*.
Sarkisian, N., & Gerstel, N. (2004). Explaining the gender gap in help to parents: The importance of employment. *Journal of Marriage and Family*, *66*(2), 431-451.
Sawhill, I. V., & Guyot, K. (2020). The Middle Class Time Squeeze.

Silverstein, M., Cong, Z., & Li, S. (2006). Intergenerational transfers and living arrangements of older people in rural China: Consequences for psychological well-being. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *61*(5), S256-S266.
Silverstein, M., Parrott, T. M., & Bengtson, V. L. (1995a). Factors That Predispose Middle-Aged Sons and Daughters to Provide Social Support to Older Parents. *Journal of Marriage and Family*, *57*(2), 465-475. https://doi.org/10.2307/353699
Silverstein, M., Parrott, T. M., & Bengtson, V. L. (1995b). Factors that predispose middle-aged sons and daughters to provide social support to older parents. *Journal of Marriage and the Family*, 465-475.
Smith, P. R. (2004). Elder care, gender, and work: The work-family issue of the 21st century. *Berkeley J. Emp. & Lab. L.*, *25*, 351.
Starrels, M. E., Ingersoll-Dayton, B., Neal, M. B., & Yamada, H. (1995). Intergenerational Solidarity and the Workplace: Employees' Caregiving for Their Parents. *Journal of Marriage and Family*, *57*(3), 751-762. https://doi.org/10.2307/353929
Stiglitz, J. E., Sen, A., & Fitoussi, J.-P. (2017). Report by the commission on the measurement of economic performance and social progress.
Stock, J. H., & Watson, M. W. (2012). *Introduction to econometrics* (Vol. 3). Pearson New York.
Susilo, Y. O., & Liu, C. (2020). Chapter 23 - Who has more say on your daily time use? A quantitative intra-household time-use altruism analysis. In K. G. Goulias & A. W. Davis (Eds.), *Mapping the Travel Behavior Genome* (pp. 455-477). Elsevier. https://doi.org/https://doi.org/10.1016/B978-0-12-817340-4.00023-1
Tamiya, N., Chen, L.-M., & Sugisawa, H. (2009). Caregivers' decisions on placement of family members in long-term care facilities in Japan: analysis of caregiver interviews. *Social Behavior and Personality: an international journal*, *37*(3), 393-410.
Teerawichitchainan, B. (2020). Older persons in Thailand: an update from a recent national survey. *Asian Population Studies*, *16*(3), 243-247.
Teerawichitchainan, B., & Pothisiri, W. (2021). Expansion of Thailand's social pension policy and its implications for family support for older persons. *International Journal of Social Welfare*.
TGRI. (2017). *Situation Of The Thai Elderly 2016*. TGRI. http://www.dop.go.th/download/knowledge/th1512367202-108_0.pdf
Thaler, R. H., & Sunstein, C. R. (2008). Nudge: improving decisions about health. *Wealth, and Happiness*, *6*, 14-38.
United Nations Department of Economic and Social Affairs, P. D. (2019). *World Population Prospects 2019: Highlights* (9211514061).
Van de Ven, P., Zwijnenburg, J., & De Queljoe, M. (2018). Including unpaid household activities: An estimate of its impact on macro-economic indicators in the G7 economies and the way forward.
Vlaev, I., King, D., Dolan, P., & Darzi, A. (2016). The theory and practice of "nudging": changing health behaviors. *Public Administration Review*, *76*(4), 550-561.
Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological bulletin*, *132*(2), 249.
Wolf, D. A., & Soldo, B. J. (1994). Married Women's Allocation of Time to Employment and Care of Elderly Parents. *The Journal of Human Resources*, *29*(4), 1259-1276. https://doi.org/10.2307/146140
Yokying, P., & Floro, M. S. (2020). Parents' labour force participation and children's involvement in work activities: evidence from Thailand. *Oxford Development Studies*, *48*(3), 287-303.
Yokying, P., Sangaroon, B., Sushevagul, T., & Floro, M. S. (2016). Work-life balance and time use: Lessons from Thailand. https://doi.org/doi:https://doi.org/10.18356/1a175191-en
Young, M., Gavron, K., & Dench, G. (2011). *The new East End: kinship, race and conflict*. Profile books.

Appendix to
"Altruistic care for the elderly: A gender perspective"

A. Time-use survey data activity codes

Since 2009, the NSO of Thailand adopted international standards of the ICATUS 2005 (International Classification of Activities for Time Use Statistics) (NSO, 2017). Time diaries are a 24-hour record of respondent's activities which are typically a description of activities undertaken, the time spent on these activities, including start time and end time, during specified time intervals of 10 minutes. In 2005, The United Nations published the trial ICATUS and only until 2016, there was a more official version the United Nations guideline on time-use statistics (United Nations, 2016). Therefore, the dataset in this study follows the old classification of 15 major divisions of activities, of which group 7 covering work providing unpaid caring services to household members. Our analysis focus on the second class of this group (712) representing care work for dependent adults. Within this class, there are three categories of care, namely, caring for adults/physical care (07121), caring for adults/emotional support (07122) and accompanying adults to places (07123). In particular, the unpaid care services refer to caregiving services without remuneration for household and family members and for other households.

First, this dataset contains 83,866 individuals (cases) of which 73,306 are non-missing, making an equivalent of 12.5 percent for missing information cases. We limit our sample to cover only individuals and their episodes of activities involved with adult care as their main task or a secondary activity in each time slot. It means that the sample covers only individuals who spent at least 10 minutes in adult care for their family members and thus censoring out all respondents who spent no time on adult care. This is because the time-use diary, unfortunately, does not allow us to distinguish individuals who have no elder members, the sick or disabled adults in their households from those who did not provide care despite having one or some dependent adults living in the same household. With such limitations, the sample size is of 733 individuals aged from 6 to 85 years old. Although our descriptive analysis covers all age groups, the regression analysis limit only to caregivers aged 15 years old and over - as the working age in Thailand. The number of observations, therefore, reduces respectively to 664 caregivers.

Second, it should be noted that although we cannot specifically separate the elder care from the general adult care due to the lack of information on care recipients (and their age) and the ICATUS 2005 classifying these care activities with the same code, we make a "strong" assumption that this is for elder care in general. In fact, such care could also be for disabled or sick members of the households who are not in old age. The assumption is based our observation from care recipients' perspective, by which those who received care from family members as part of their personal care or health/medical care. Our own descriptive analysis shows that among care recipients aged from 20 years old and over, 41.5 percent are above 65 years old, 10.2 percent for the age group 60-64; 10.1 percent for 55-59 and 8.9 percent for 50-54, making a cumulative sum of over 70 percent of recipients aged 50 or above. Those recipients are certainly not the ones who receive care from 633 caregivers in our sample because the survey was designed to interview only one member of each household (NSO, 2017). However, with a nationally representative survey, we are confident that, the proportion of elders among adult care recipients in both perspectives should be very similar.

Table A1: Classification of activities by major division, division, group and class with a focus on care activities

Major Division/Group/Class of Activities
01. Work for corporations, quasi-corporations, Government, NPIs
02. Work for households in primary production activities
03. Work for households in non-primary production activities
04. Work for households in construction activities
05. Work for households providing services for income
06. Work providing unpaid domestic services for own final use within HH
07. Work providing unpaid caring services to household members
071. Work time providing unpaid caregiving services to household members
0711. Childcare
0712. Adult care
07121 Caring for adults/physical care
07122 Caring for adults/emotional support
07123 Accompanying adults to places
072. Travel related to unpaid caregiving services to household members
079. Providing unpaid caregiving services to household members n.e.c.
08. Providing community services and help to other households
09. Learning
10. Socializing and community participation
11. Attending/visiting cultural, entertainment and sports events/venues
12. Engaging in hobbies, games and other pastime activities
13. Indoor and outdoor sport participation
14. Use of mass media
15. Personal care and maintenance

Source: United Nations - ICATUS, 2006

The tasks of adult care belong to the *major division* 07 in ICATUS 2005, i.e., providing unpaid caregiving services to household members. While the *division* 071 covers core activities of providing unpaid caregiving services to household members, the other activities such as travel related to unpaid caregiving services in households are also included in the division 072. The *group 0712* is for adult care beside the *group 0711* for childcare. There are three types of adult care corresponding to three classes of task, namely, caring for adults/physical care (07121), caring for adults/emotional support (07122) and accompanying adults to places (07123) as detailed in table A1.

B. Measurement of time altruistic ratio

First, we require activities to be *unpaid* and strictly measure beyond the time an individual spends on his/her committed paid work, time for learning, etc. The core idea here is given a certain amount of time left after a committed work/study, how an individual allocates her time on (and for) others versus on oneself (without any expectation of money/remuneration). By this definition, this indicator is not specific time spent only on older household members, but it reflects an overall attitude toward people in family, community and society.

Second, it is a ratio rather than an amount of time and more importantly it is independent from how much time people have left after their committed tasks. The two extreme examples we can imagine from this indicator is a **very altruistic** man/woman who spends most of their available time on caring for their child, their elder parents, on cooking, cleaning, laundry or even helping their frail neighbors while spend very minimum time on their sleep, watching TV, let alone playing sports or attending social events, etc. On the other extreme, we have a **very selfish** (self-interest) man/woman who spend no time at all on other people around them, but all their free time after work on their own interest like sleeping, TV and media, hobbies.

$$\textbf{\textit{Altruistic time ratio}} = \frac{\textit{Time spent on } \textbf{\textit{other}}}{\textit{Time spent on } \textbf{\textit{self}}} = \frac{\boldsymbol{O_i}}{\boldsymbol{S_i}}$$

The subscriptive *i* in the above formula is for each individual *i* and O stands for "other" whereas S stands for "self". Based on 15 major divisions of activities in ICATUS which is used in Thai time use survey data and on the two key questions asked in the survey, we can calculate the amount of time individuals spend on OTHERS (O) and on ONESELF (S) to come up with the "Altruistic proxy" time ratio. The two key questions are:

1. Is this activity PAID or UNPAID?
2. For whom are you doing this activity? The answer can be one of the following: oneself, own family members, other family, own and other family members, community

To be counted as "time for other", an activity in the survey must meet two conditions, namely UNPAID for the 1st question and all options except the first for the 2nd question. As for "self-time", two similar conditions include UNPAID and option 1 for the 2nd question. Some examples to clarify this definition as, when you cook a meal at home only for your own consumption but not for other family members, it is counted as "self-time" even though it is unpaid. But if a mother of three spend two hours each day to prepare breakfast and dinner for the whole family, it will be considered as "time for others" even though she also consumes the meals she made.

As priorly mentioned on the **quality of time** spend on other as another aspect of altruistic behavior, we do not have qualitative information from the time use survey to evaluate how people's satisfaction or happiness when receiving or spending time with others. However, we presume that how much attention you delicate on your activities somehow reflect your efforts and the level of caring. For this, there is information on the main (primary) and secondary tasks, asking respondents "what you are also doing at the same time when performing this primary activity?". Multitasking can be seen very often in our daily lives. A typical example of young parents is when they are working at home on their computers keeping an eye on their toddle playing around the house. This is called supervisory care and we also count it as "time for others" beside the same amount of time for paid work. Similarly, an individual can also watch TV or listen to music while doing their main activity on cooking or domestic chores. In this case the time they spent is double counted as "time for others" and "time for oneself". This concept is taken into account to produce the second version of altruistic time measure which covers both primary and secondary activities. However, given the lack of any attitude questions in the Thai time use survey, we are trying to measure something non-quantitative in nature but using numerical variables. Therefore, it is certainly far from a perfect measure.

C. Additional tables

Table C1: Care category by gender of caregivers

	All		Female		Male	
Episodes as primary activity	*Episode*	*%*	*Episode*	*%*	*Episode*	*%*
physical care	1,169	83.2	891	90.8	278	65.6
emotional support	79	5.6	43	4.4	36	8.5
accompanying to places	157	11.2	47	4.8	110	25.9
	1,405	100	981	100	424	100
Episodes as secondary activity						
physical care	23	13.5	18	18.8	0	0
emotional support	147	86.0	77	80.2	5	6.7
accompanying to places	1	0.6	1	1.0	70	93.3
	171	100	96	100	75	100

Source: Author calculations from the time-use survey data 2014/15 (NSO, 2016)

Table C2: Adult care workload on different days by gender

	Weekdays			**Weekends**		
	Female	Male	Diff.	Female	Male	Diff.
No. of episodes of adult care per day	2.3	1.9	0.4	2.6	1.7	0.9
Total duration of adult care per day	133.7	117.8	15.9	163.5	95.8	67.7
Average length per episode (mins)	58.7	63.9	-5.2	59.5	52.7	6.8
	Regular days			**Irregular days**		
	Female	Male	Diff.	Female	Male	Diff.
No. of episodes of adult care per day	2.5	1.9	0.5	2.1	1.6	0.5
Total duration of adult care per day	138.2	102.7	35.5	166.7	145.3	21.4
Average length per episode (mins)	55.4	54.6	0.7	82.9	83.4	-0.5

Source: Authors 'own calculations from the time-use survey data 2014/15 (NSO, 2016)

Table C3: Categories of care on different days by gender

Duration of care (minutes per day)	**Regular days**			**Irregular days**			**Irregular vs. regular**	
	female	male	Diff.	female	male	Diff.	female	male
physical care	200.0	182.2	17.9	232.5	310.7	-78.1	32.5	128.5
emotional support	71.2	55.2	16.0	96.7	70.0	26.7	25.5	14.8
accompanying to places	78.8	50.9	27.8	121.3	94.6	26.7	42.6	43.7

Source: Author calculations from the time-use survey data 2014/15 (NSO, 2016)

Table C4: Summary statistics

Description	Variable	Obs	Mean	Std. Dev.	Min	Max
Duration of eldercare in a day (mins, main task)	durA712all	664	121.5	142.8	0	1020
Duration of eldercare in a day (mins, main and sec. tasks)	durAB712all	664	134.7	145.9	10	1020
No. of episodes of eldercare in a day (main task)	countA712	664	2.05	1.59	0	10
No. of episodes of eldercare in a day (sec. task)	countB712	664	0.18	0.50	0	5
Geographical region (1-5)	REG	664	3.18	1.20	1	5
Metropolitan=1; Non-metropolitan =2	AREA	664	1.45	0.50	1	2
No. of HH. members aged from 6 years old	MEM_10	664	3.43	1.55	1	11
Dummy variable female=1; male=0	female	664	0.63	0.48	0	1
Age of caregiver	AGE	664	46.5	17.1	15	86
Marital status (married=1; single=2; other=3)	married	664	1.80	0.63	1	3
Religion (Buddhist=1, Islamic=0)	Buddhist	664	0.95	0.21	0	1
Employment status (1 to 5; employed=1, not working=5)	EMPstatus	664	3.96	1.26	1	5
Education level achieved (1 to 5, less than primary=1)	EduNew	664	3.17	1.63	1	5
Having at least 1 child in the HH (yes=1; no=0)	child	664	0.16	0.37	0	1
Day of the week (weekdays=1, weekends=0)	WKday	664	0.73	0.45	0	1
Day of irregular activities (irregular=1; regular=0)	irrDAY	664	0.15	0.36	0	1
Altruism time ratio (only main task)	ALTratioA	664	0.33	0.30	0	2.84
Altruism time ratio (main and secondary tasks)	ALTratioAB	664	0.31	0.27	0	2.84
Duration of paid work per day (mins)	PAIDwork	664	144.4	207.6	0	900
Leisure time per day (mins)	leisA	664	224.9	165.8	0	1060

Source: Author calculations from the time-use survey data 2014/15 (NSO, 2016)

Table C5: Multivariate model of eldercare as primary & secondary activities

Duration of care as dependent variable	Primary	Primary& Secondary	Primary	Primary	Primary& Secondary
	(1)	(2)	(3)	(4)	(5)
Female	18.65*	14.30	22.73**	23.92	19.12
	(1.67)	(1.09)	(2.02)	(1.46)	(1.43)
AGE	1.821***	2.004***	1.832***	1.795***	2.017***
	(3.59)	(3.24)	(3.61)	(3.51)	(3.25)
Marital Status (single as reference)					
Married	-59.51**	-53.52*	-59.91**	-53.34*	-53.99*
	(-2.07)	(-1.83)	(-2.09)	(-1.91)	(-1.85)
Divorced/Widow/Separated/Other	-66.67**	-69.74**	-67.37**	-66.68**	-70.56**
	(-2.03)	(-2.13)	(-2.05)	(-2.04)	(-2.15)
Education level (less than primary as reference)					
Primary	59.28***	34.02*	58.43***	58.47***	33.02*
	(3.48)	(1.75)	(3.42)	(3.37)	(1.70)
Upper secondary	39.88**	33.23	39.76**	38.42*	33.08
	(2.07)	(1.53)	(2.09)	(1.95)	(1.54)
Post-secondary/vocational	32.30**	23.59	32.41**	31.28**	23.72
	(2.12)	(1.21)	(2.15)	(2.06)	(1.23)
College/University of higher	9.393	-1.937	11.87	6.655	0.990
	(0.23)	(-0.04)	(0.27)	(0.16)	(0.02)
Employment status (wage employee as reference)					
employer	-59.56**	-79.83**	-58.99**	-58.81**	-79.16**
	(2.01)	(-2.51)	(-2.03)	(-1.99)	(-2.58)
own-account	-22.37	-10.05	-22.25	-22.34	-9.900
	(-0.97)	(-0.37)	(-0.97)	(-0.97)	(-0.37)
unpaid homeworker	0.387	20.95	1.872	1.682	22.70
	(0.02)	(0.71)	(0.07)	(0.06)	(0.77)
unemployed/homemaker	28.67	20.29	28.40	29.33	19.97
	(1.48)	(0.95)	(1.46)	(1.50)	(0.94)
Buddhist	-18.17	-12.18	-19.04	-16.96	-13.21
	(-0.88)	(-0.56)	(-0.90)	(-0.82)	(-0.60)
With children	-50.81***	-21.17	-49.95***	-50.82***	-20.15
	(-3.81)	(-1.05)	(-3.77)	(-3.81)	(-1.00)
HH adults	7.256	4.220	7.026	7.292	3.949
	(1.47)	(0.78)	(1.49)	(1.48)	(0.76)
Relation to HH head (unmarried children as reference)					
HH head	73.26**	60.67*	71.99**	72.20**	59.17*
	(2.01)	(1.66)	(2.01)	(2.04)	(1.65)
spouse of HH head	57.97	49.73	57.92	59.21	49.67
	(1.61)	(1.28)	(1.61)	(1.61)	(1.29)
married children	90.40**	71.74*	90.23**	89.85**	71.55*
	(2.48)	(1.96)	(2.48)	(2.49)	(1.95)
in-law children	51.87	23.16	49.86	51.96	20.78
	(1.13)	(0.50)	(1.07)	(1.13)	(0.45)
grandchildren	-34.81*	-35.80*	-33.76*	-35.08*	-34.56*
	(-1.93)	(-1.93)	(-1.88)	(-1.95)	(-1.85)
parents	35.03	29.17	36.76	35.87	31.21
	(0.56)	(0.48)	(0.59)	(0.57)	(0.51)
relatives	33.98	14.90	33.12	32.38	13.88
	(1.12)	(0.47)	(1.09)	(1.08)	(0.44)
others	31.53	1.815	28.94	28.41	-1.243
	(0.63)	(0.03)	(0.59)	(0.57)	(-0.02)

Table C5: Multivariate model of eldercare as primary & secondary activities (cont.)

Duration of care as dependent variable	Primary	Primary& Secondary	Primary	Primary	Primary& Secondary
	(1)	(2)	(3)	(4)	(5)
Urban	29.30**	22.04	28.55**	29.72**	21.16
	(2.31)	(1.59)	(2.20)	(2.31)	(1.49)
Region (Bangkok Metropolitan as reference)					
Central	56.01**	57.02**	56.33**	55.20**	57.39**
	(2.51)	(2.42)	(2.51)	(2.48)	(2.43)
North	78.81***	71.26**	78.44***	78.33***	70.83**
	(2.67)	(2.32)	(2.64)	(2.67)	(2.29)
Northeast	46.67**	45.54*	47.05**	45.50**	45.99*
	(2.16)	(1.92)	(2.14)	(2.10)	(1.92)
South	44.65*	39.84	45.00*	44.47*	40.26
	(1.76)	(1.51)	(1.75)	(1.75)	(1.51)
Weekday	-5.477	-6.769	-5.477	-5.471	-6.770
	(-0.41)	(-0.49)	(-0.41)	(-0.41)	(-0.49)
Irregular day	70.30***	51.10**	60.42**	69.67***	39.43
	(3.28)	(2.27)	(2.33)	(3.26)	(1.41)
Male*Irregular day			22.31		26.34
			(0.57)		(0.65)
Female*Married				-10.68	
				(-0.45)	
constant	-167.9***	-147.9**	-167.4***	-110.2**	-147.3**
	(-3.03)	(-2.50)	(-3.04)	(-2.50)	(-2.50)
Adj-R squared	0.208	0.136	0.209	0.209	0.138
Observations	664	664	664	664	664

Notes: t statistics in parentheses *** $p<0.01$ ** $p<0.05$ * $p<0.1$

Table C6: Instrumental variable models for the effects of paid work time on eldercare

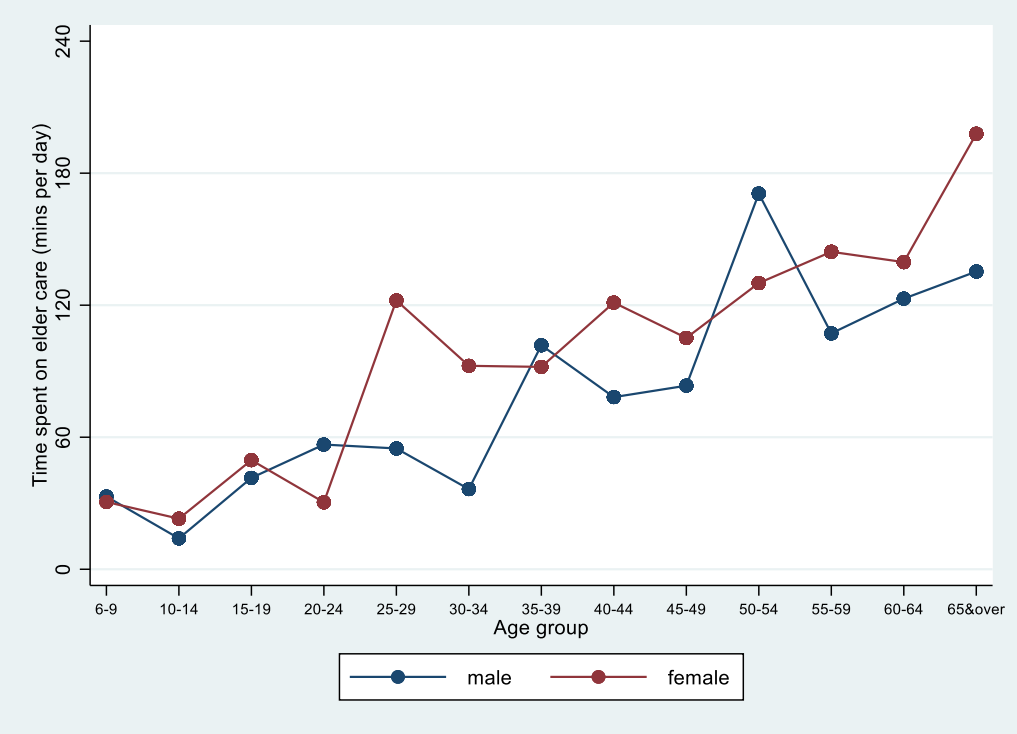
Duration of care as dependent Variable (primary activity)	OLS all	IV all	IV male	IV female
Time for paid work	-0.137***	-0.107***	-0.0396	-0.152***
	(-5.85)	(-2.65)	(-0.78)	(-2.61)
Female	16.24	16.84		
	(1.40)	(1.50)		
AGE	1.705***	1.793***	1.714**	1.890***
	(3.47)	(3.61)	(2.03)	(3.04)
Education level (less than primary as reference)				
Primary	61.57***	61.05***	71.45***	51.81**
	(3.71)	(3.79)	(3.34)	(2.25)
Upper secondary	48.69***	47.42***	59.58***	47.77*
	(2.60)	(2.60)	(2.62)	(1.78)
Post-secondary/vocational	40.67***	39.80***	44.63**	44.20*
	(2.60)	(2.61)	(2.40)	(1.85)
College/University of higher	18.01	16.22	-60.41*	62.44*
	(0.50)	(0.46)	(-1.72)	(1.89)
Buddhist	-28.04	-26.82	-11.44	-55.29*
	(-1.45)	(-1.40)	(-0.44)	(-1.64)
With children	-52.10***	-51.96***	-40.79*	-56.42***
	(-3.88)	(-4.00)	(-1.83)	(-3.62)
Weekday	-0.495	-1.183	19.87	-10.44
	(-0.04)	(-0.09)	(1.21)	(-0.56)
Irregular day	48.61**	51.57**	74.92**	46.17*
	(2.24)	(2.24)	(1.97)	(1.72)
constant	-68.13	-75.03	-65.95	-63.06
	(-1.43)	(-1.53)	(-0.81)	(-0.94)
control for employment status		YES		
control for relationship with HH head		YES		
control for marital status		YES		
control for area and regional effects		YES		
		25.87	20.73	14.7
1st stage F-stat *(p-value)*		*(0.000)*	*(0.000)*	*(0.000)*
2nd stage R-squared	0.221	0.22	0.226	0.249
N	664	664	249	415

Notes: t statistics in parentheses *** p<0.01 **p<0.05 *p<0.1

Table C7: Instrumental variable models for the effects of leisure time on eldercare

Duration of care as dependent Variable (primary activity)	OLS (1) all	IV (2) all	IV (3) male	IV (4) female
Leisure time	-0.187***	-1.478***	-0.993***	-1.898***
	(-4.41)	(-5.85)	(-3.78)	(-4.63)
Female	10.25	-47.86*		
	-0.87	(-1.95)		
AGE	1.661***	0.554	-0.142	1.61
	-3.41	-0.58	(-0.12)	-1.16
Buddhist	-26.33	-82.78	-101.8	-15.02
	(-1.11)	(-1.07)	(-1.10)	(-0.19)
With children	-60.51***	-127.7***	-59.30*	-179.8***
	(-4.41)	(-4.02)	(-1.95)	(-3.49)
Household adults	7.874	12.16	21.11*	-8.057
	-1.62	-1.57	-1.95	(-0.69)
Weekday	-9.421	-36.71	-10.39	-38.01
	(-0.70)	(-1.43)	(-0.36)	(-0.96)
Irregular day	76.09***	116.1***	106.8***	120.2**
	-3.57	-3.29	-2.99	-2.11
constant	-109.0**	298.8**	145.7	292.8*
	(-2.12)	-2.22	-0.92	-1.69
control for education level		YES		
control for employment status		YES		
control for relationship with HH head		YES		
control for marital status		YES		
control for area and regional effects		YES		
F-statistics *(p-value)*		5.84 *(0.000)*	5.14 *(0.000)*	6.51 *(0.000)*
N	664	664	249	415

Notes: t statistics in parentheses *** p<0.01 **p<0.05 *p<0.1



Source: Author calculations from the time-use survey data 2014/15 (NSO, 2016)

Figure C1: weighted average of time on elderly care by gender and age group

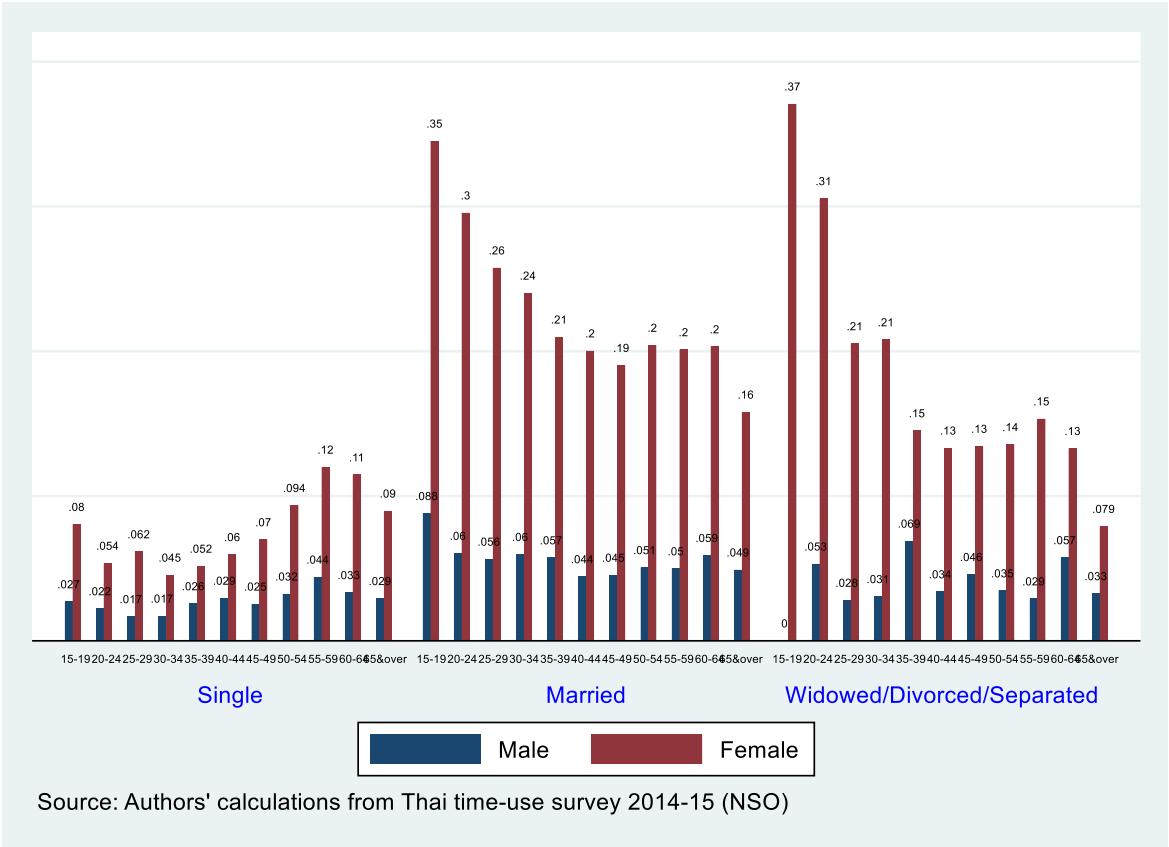


Figure C2: Weighted average of altruistic time ratio by gender, marital status and age group

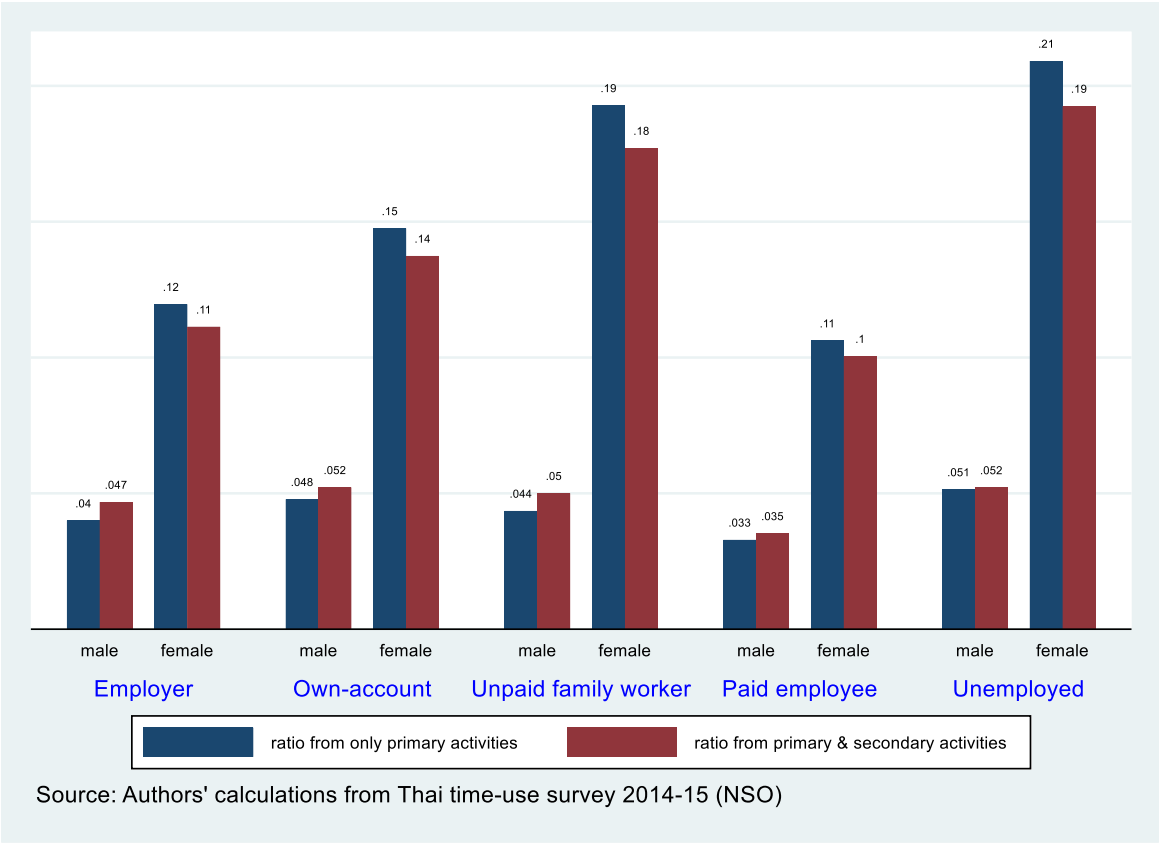


Figure C3: Weighted average of altruistic time ratio by gender and employment status

References

National Statistics Office. 2016. The Time Use Survey 2015. Bangkok: National Statistics Office of Thailand.

National Statistics Office. 2017. Full Report on the Survey of the Older People in Thailand 2017. Bangkok: National Statistics Office of Thailand

United Nations, (2006) Trial International Classification of Activities for Time-Use Statistics (Trial ICATUS) United Nations Statistics Division

United Nations, (2017). International Classification of Activities for Time-Use Statistics (2016), United Nations Statistics Division