HOW DOES THE CARE GIVER/RECEIVER RELATIONSHIP AFFECT THE HOURS SPENT
ON CARING FOR SENIOR CITIZENS IN CANADA?

by

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ABSTRACT

This study examines the hours of care giving provided to senior citizens in Canada using the 2007 General Social Survey. Using Heckman's 2 Stage Correction to correct for sample selection bias, we find that care givers spend the most time caring for their spouses. However, women spend fewer hours caring for their spouses than men. This could be because women have a longer life expectancy than men, and therefore fewer women than men are actually providing care to a spouse. However, women spend more time caring for their parents than men do. Also, caregivers spend positive hours caring for a sibling of the same gender, but fewer hours caring for a sibling of the opposite gender than they do caring for non-immediate family members.

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CHAPTER 1   INTRODUCTION

1.1 OBJECTIVE OF THE STUDY

In 2002, over 1.7 million adults aged 45 to 64 provided informal care to almost 2.3 million seniors (aged 65 and over) with long term disabilities or physical limitations. Of this, 1.2 million (71%) care givers were employed (Pyper, 2006, p. 5). About half of these care givers were women, married, without children under 18 years of age living at home, and were living in urban areas. On average, care givers spent 2 hours a week providing care. Pyper (2006, p.5) also found that female care givers spent 3 hours, while male care givers spent half that time (1.6 hours). This is not surprising, considering the fact that traditionally women have engaged in care giving activities. With employment rates for women on the rise over the last 20 years and a significant risk of labour shortages in the future, both male and female care givers will find themselves caught between demands at work and demands for providing care. This will become especially problematic because care givers will more likely find themselves providing care for longer periods of time due to an increase in life expectancy.

The purpose of this study is to investigate how the care giver/receiver relationship affects the hours spent on caring for senior citizens in Canada by using the General Social Survey (GSS) from 2007. For this purpose, a regression model will be estimated to assess the impact of different socioeconomic and demographic variables on the number of hours

of care provided[1]. In this study, we will focus on care provided to the elderly population (those 65 years of age and older). The study will be organised in five Chapters. Chapter 2 will provide a review of existing literature on the subject of care giving, such as trends in care giving in certain countries, how care givers must deal with time conflicts between care giving and other activities, the institutionalization of the elderly, challenges faced by female care givers and care giving among visible minorities. Chapter 3 provides a profile of the Canadian care giver, based on the results of the GSS of 2007. Chapter 4 discusses theoretical background and provides an econometric analysis of the hours of care giving provided by an individual Canadian. A description of the model to be tested, variables to be used, possible econometric issues with the data and their remedy, and econometric results will be presented. A Oaxaca (1973) decomposition will be used in that chapter to decompose the differences in hours of care between men and women into the proportion of the difference ascribable to observable and unobservable variables. Chapter 5 will conclude the study.

1.2 IMPORTANCE OF THE STUDY

There are several reasons why such a study is important. First, over the past 25 years, Canadian population has shown an aging trend. As is shown in Figure 1 (Appendix A), the proportion of middle aged individuals (those between 45 and 64) and senior citizens (those aged 65 and over) in 2006 was greater than the proportions observed in 1986. In fact, the proportion of those 45 years of age and older rose from 29.4% in 1986 to 39.9%

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[1] Care is defined by the GSS as having provided assistance in the past 12 months to someone who has a long term health condition or physical limitations.

in 2006. Meanwhile, the proportion of the working age population (15 to 44) has decreased over the same time period. Based on these results, we can expect that the senior population in Canada will increase even more over the next 20 years. With an increase in the number of aged individuals, the number of elderly people needing care will increase.

As well, use of the public health care system by these peopleis, not surprisingly, likely to increase as well. Health care expenditures for the senior populationare are relatively high, as shown in Table 1 (Appendix A). What must be kept in mind, however, is that much of the increase in health care expenditure can be attributed to the last year of life of a care recipient.

In terms of the context and research question of the present study, the younger generation could face a greater responsibility of providing some kind of assistance to the older generation, particularly to immediate family members such as parents. This additional responsibility means that the demand for their time and attention will increase, and this can lead to the challenge of balancing both their work life and home life.

Secondly, as mentioned, an increasing aging population means that health care spending rises. This is shown in Table 2 (Appendix A). We see that by 2027, per capita health costs are expected to increase by a staggering 603% because of population ageing. The increase in health costs per individual over 25 is also expected to be very high, at 532%. By 2027, additional health costs as a percentage of provincial/territorial revenues could

be more than 11%. With increasing incidence of private health care giving (Table 3, Appendix A), this could lead to additional strain on private households wishing to provide care to the elderly.

Thirdly, there has been an increase in the amount of private sector health services that are provided. The decreasing share of public expenditure of total health care costs may mean that more of the responsibilities of providing care to the elderly will fall on private households, creating increased financial strain. With the increase in private health services, more and more individuals are opting to pay out of pocket for these services to get quicker treatment rather than wait for the procedure through the public system. Table 3 shows how the proportion of health care spending between the public and private systems has changed over time. The majority of health care expenditure is still based on public health care services. However, over the course of 20 years, across all age groups except for those between 25 and 34, the share of public health expenditures has decreased, while that for private health expenditures has increased. For those who were between 65 and 74 years of age, the share of private health expenditures jumped significantly in the 1990s, from 18.5% in 1990 to 24.9% in 2000. This increase in private health expenditure corresponds to an increase in available private health services in Canada in the 1990s, as well as the increase in the senior population.

Finally, an important social issue examined in this thesis is the possibility of differences in trends in care giving for the elderly between visible minorities and the rest of the population. Those who have been raised in different cultural backgrounds are exposed to

different views and opinions on life and how it should be lived. These differences in cultural expectations and beliefs have a great effect on the decisions that an individual makes on various aspects of their lives. With a growing visible minority population, the attitudes towards care giving, the decision to provide care to an immediate family member as opposed to a friend, neighbour or co-worker, and an individual's care giving behaviour itself could very well change as population demographics change. This could in turn affect how individuals use the health care system, whether they chose public or private health services and expenditures on health care for the senior population.

1.3 THEORETICAL BACKGROUND

Theoretical background for this study is provided by the theory of time allocation, first proposed by Becker (1965). The main proposition of this theory is that an individual allocates his / her time among different activities in such a manner that his / her utility is maximized. This theory is discussed in Chapter 4 where mathematical exposition of a utility maximization problem showing the choice between various activities is also provided. One of the activities in the context of present study is care giving provided by the individual. Any time allocated to this activity means less time is available to perform other market and non-market activities. The actual determination of time spent on each activity is dependent upon several socioeconomic characteristics of the individual which could include several observable and non-observable variables such as age, gender, income, education, ethnic background, taste, etc. The present study will analyze the impact of such factors on the hours spent by an individual in caregiving. A detailed list of

these variables and their expected impacts on hours spent in care giving will be discussed in Chapter 4 which also presents the economic model to be used in estimating the impact of each variable.

1.4 METHOD OF ANALYSIS

The analysis will be conducted partly by using descriptive tools of statistical analysis and partly by using econometric tools. A two-stage regression analysis will be conducted to estimate the hours of care giving provided by an individual by considering several socioeconomic and demographic variables. Corrections for sample selection bias that may result from an individual's decision to participate in care giving will also be made.

1.5 THE DATA USED IN THIS STUDY

This study will use micro data based on the 2007 General Social Survey of Canada (GSS). This is a yearly cross sectional survey which was started in 1985 and is used to "gather data on social trends in order to monitor changes in the living conditions and well-being of Canadians over time; and to provide information on specific social policy issues of current or emerging interest (Statistics Canada, 2008, par. 1)." Each year, the GSS asks different questions about various aspects of well-being and living conditions. Questions on care giving and care receiving behaviour were first asked in 1996 (where the sample included respondents of all ages), and again in 2002 (where the sample population included all respondents who were 45 years of age and older). The 2002

questionnaire was modified to include more detailed questions asking for various specifics about the respondent's care giving behaviour. This included new questions on topics such as how much time was spent providing assistance in transportation, domestic help, medical treatment, personal hygiene, etc., the number of people the respondent provided care to, how many people were assisting the care recipient, the relationship between the care giver and receiver, the travelling distance between care giver and receiver, etc.

Most currently care giving and receiving behaviour was examined by the GSS from 2007, which was entitled Family, Social Support and Retirement. Its purpose was to "better understand the needs and experiences of these Canadians by examining key transitions related to their families, care giving and receiving, work and retirement (Statistics Canada, 2008, par. 2)." Questions were asked on the following topics: well-being, family composition, retirement decisions and plans, care giving and care receiving experiences, social networks and housing. Since the survey deals with these topics ever five years, it allows researchers to examine trends among the older populations when it comes to work, family and social connections.

All respondents to the 2007 survey were aged 45 and older. The sample was selected in two ways. The first was to take those respondents to the 2006 GSS who were 45 in 2007. A total of 10403 individuals were selected this way. The second was to use the "Random Digit Dialing" method, in which a list of random phone numbers is created to reach households. A total of 13001 individuals were selected this way. In total, there were

23404 respondents to the 2007 GSS. The survey was voluntary, survey respondents provided the data, and the data was collected over a span of 10 months.

CHAPTER 2   LITERATURE REVIEW

This chapter will provide some background literature on elderly caregiving and various trends seen around the world. Subsequently, this chapter is organised based on geographic locations

Europe

Jacobzone's (1999) studied the trends in care giving in OECD countries. He found that life expectancy had increased significantly in these countries, which means that the population of elderly people had increased. The proportion of elderly people who lived alone was also increasing, which could be explained by an increase in the "individualization of lifestyles", where both parents and children demand more independence. The proportion of people with severe disabilities also increased across all countries. This can lead to major problems because when combined with an increase in life expectancy, countries now face an ageing population with a declining health status, meaning that the elderly are no longer able to live independent lives and will require assistance. The intensity of assistance required will also vary. In particular, Jacobzone found that the prevalence of disability was increasing in older women in Canada and Australia. When examining the act of care giving, he found that care giving for the elderly is "decentralised and often depends on family situations and local rules." Among the OECD countries, very few of them actually had a national system specifically designed to deal with long term care of the elderly. The United States and Canadian

federal governments simply give transfers for local funding of care giving. Because of such decentralization, equity issues are raised between countries, particularly in such areas as resources available to those who have a national long term health care insurance compared to those who do not. At the same time, Jacobzone argues that if public funding is introduced or increased, it could lead people to use more institutionalized care because of an increased burden on a pre-existing system, when at home help may be much more effective. It was also found that accommodation arrangements for the elderly are public in Nordic countries, mixed in Canada and Continental Europe, and completely private in the United States. For Northern and Scandinavian Europe, Australia and North America, the population in institutionalized care is approximately the same as those with severe disabilities.

Jacobzone also found that the financial cost of paid care giving for the elderly varied between 1% and 3 % of GDP. "Share of public expenditure in GDP is usually between 0.6% and 1%."(p.13) But the share of private expenditure, as it pertains to long-term care, was actually quite low in the United States, and higher in Australia, the United Kingdom and Scandinavian countries. Jacobzone suggests that the numbers could reflect public preferences in a given country for publicly funded long term care assistance. Public spending on health care was higher than on long term care from the years 1980 to 1995 in many of the OECD countries. Jacobzone says that this could be because countries with health care and pensions plans which are very "generous" probably do not feel the need to fund a program specifically for long term care.

Another study to come out of Europe is from Crespo (2006). The purpose of the study was to see the opportunity cost of time for women who provide intensive informal caregiving to their parents and work at the same time. Opportunity cost of time was measured as reduced employment. The study examined those women who were between the ages of 50 and 60 years because they were the most likely to be providing care. Using the Survey of Health, Ageing and Retirement in Europe (SHARE), Crespo reached two conclusions. First, if one was engaged in "intensive" caregiving (informal care provided on a daily or weekly basis) for at least one parent, the probability of the care giver being in the labour market dropped significantly. Secondly, not many studies have addressed the possibility of endogeneity between caregiving intensity and labour force participation. Crespo found that dealing with this problem resulted in a much larger effect of "intensive" informal caregiving on labour force participation.

Crespo also found that Northern European countries (Denmark, Netherlands, Sweden) have a tendency to provide formal (institutional) care to the elderly. These countries have the "highest percentage of people at nursing homes and receiving home care services."(p. 8) Southern European countries (Spain, Italy, Greece) do the opposite. Southern countries place less importance on public/private funded care systems and this has been "linked to relatively high availability of informal carers."(p. 3) This could be because Southern countries "have scarce and expensive formal care means provided by mixed social assistance systems and have traditionally relied on the family as the main source of care to elderly and dependent people."(p. 8)

On the other hand, Heitmueller and Michaud (2006) used the British Household Panel Study from 1991 to 2003 to find that providing care for the elderly in one's own home only reduced the probability of employment by a small amount. Furthermore, there was no significant effect on those providing care outside the home. However, intensity of care giving was not considered in this study.

Giusta, Hashimzade and Jewell (2011) used the British Household Panel Survey to examine how following social norms and importance placed on relative income affected the supply of unpaid care and the utility of those who provided it. They found that providing care decreased utility levels, because of the long hours associated with the activity. Those who cared for their parents had a higher income compared to those who did not. This suggests that higher incomes make care giving more economically feasible for the provider. There were many more female care providers than male which showed conformity to the social norm that women are traditionally expected to be the ones who provide care. Those who agreed that they should look after their parents were less likely to be dissatisfied with life. Women also provided different types of care than men. Women tended to do the household chores such as cooking, cleaning, and helping with personal needs, while men did more of the repair work or yard work. As the hours of care giving increased, women's life satisfaction decreased, but there was no significant effect found for men. Women also had different reasons for providing care than men did. In regards to providing care, men did not care about what social norms dictated, but did place considerably more weight on relative income than women did. This means they are more likely to substitute away from providing care and spend more time in paid work.

This also means that the supply of care within families, especially the supply of care from men, is adversely affected.

Farre, Gonzalez and Ortega (2009) note that there has been an increase in immigration to Spain in the past several years. They study the effect this has had on the labour supply of skilled Spanish women by using the Local Population Registry Data, the Labor Force Survey, the 1991 Decennial Census and an instrumental variable approach. They found that the household services sector expanded due to the influx of immigrants. This growth in the sector has allowed highly skilled labour, mainly women, to increase their time spent at paid work by about 2 hours per week. The increase in labour supply because of the immigration is larger for women with more family responsibilities. It means that after giving birth, women are able to return to the labour force sooner, are able to keep working while fulfilling elderly care giving responsibilities for elderly males, and can postpone retirement even after their husbands have done so. For those women who were household heads, the responsibilities of providing care were more burdensome when the care was for elderly men than when the care was for elderly women. The authors suggest this may be because the elderly women have better health or can provide the female care giver help with childcare and housework.

Asia

Magnani and Rammohan (2009) used the Indonesian Family Life Survey of 2000 to examine the effect of providing care to the elderly on female labour supply. They found

that care giving had a negative effect on the labour supply and working hours for all care givers, but especially for those who were female. The presence of young children had a very significant effect on care giving (or elderly coresidence) and hours spent at work. Falling fertility levels, an increase in life expectancy and adult children emigrating away from home all had an impact on care giving.

Long, Campbell and Nishimura (2009) conducted a longitudinal study from 2003 to 2007 that examined the effects of the Long-Term Care Insurance System which was established by the government of Japan in 2000. The aim of the system is to provide care givers with more care giving support. Ageing and care giving is of particular interest in Japan because almost 21% of its population is 65 years of age or older (p. 1). This makes Japan the oldest country in the world. Past care giving trends in Japan show that the eldest daughter-in-law was expected to care for her in-laws. This expectation was viewed with resentment by daughter-in-laws, as they were essentially outsiders who had just entered the family who had to face the many unpleasant tasks of care giving. It also meant that a woman would have to give up employment opportunities, social activities and even some duties as wife and mother. Up until the 1990s, old folk's homes were a means of last resort for those elderly citizens with no family to look after them. Over the years, however, public opinion has changed. Japanese women are having fewer children, have a greater role in the labour market, and have learned new ideas and formed new opinions on their rights and independence.   At the same time, however, daughters have a natural affinity towards their own parents and are regarded as the best care providers for them. Elders also feel that they receive better care from their own daughters than they do

from their daughter-in-laws, most likely due to a sense of feeling closer to their own children. The authors found that daughter-in-laws made up 19.9% of care givers, indicating that they still provide a significant source of elderly care (p. 4). Daughters who cared for their own parents experienced more parental pleasure and support from siblings. However, because of more options now available to present and future care givers (brought about by government programs and changes in public opinion), care receivers face much more uncertainty about who in the family will care for them.

Liu, Dong and Zheng (2010) used the China Health and Nutrition Survey from 1993 to 2006 to examine the effect of parental care on married women's labour supply. They state that the well documented boom in the Chinese economy has certainly benefited the Chinese people. However, a change from a "centrally planned economy" to a market economy has increased the burden placed on women who are facing time demands both at home and at work. Because of the economic restructuring, demands at work have intensified and unfortunately, government and employer funding for child care services have been substantially cut. China's one child policy has resulted in a slowing down of population growth, and while it does mean that there are fewer people to care for in the future, this has led to an increase in the proportion of elderly dependents. Life expectancy, as well as the number of seniors with a long term health condition has also increased. These trends could very well lead to an even greater burden placed on women in the future. The authors first find that, not surprisingly, women face competing demands for their time by both elderly parents and their children. What is interesting, however, is that effects on labour market outcomes vary depending on which set of

parents women care for. If a woman cares for her own parents, there is no significant correlation with her employment status or the number of hours she works. However, a woman who cares for her in-laws is significantly less likely to be employed outside the house, andworks less hours.

Hayo and Ono (2009) used data from the Japanese General Social Survey from 2000 to 2005 to examine the determinants that shaped public attitudes towards elderly caregiving. They found that age was a significant factor in an individual's opinion towards elderly care. When individuals are at a working age and are facing the greatest burden of caring for elderly parents, they tend to support the public system. However, as they grow older and come closer to retirement age, they become more inclined towards the private sector of caregiving. This is known as the "life cycle effect – reflects the changes in economic constraints and perhaps preferences occurring over a lifetime (p. 7)." The authors also found that entrepreneurs were more supportive of an individual/family-based care system because they are covered by the National Health Insurance Institution, which is a separate insurance institution from that which covers public sector employees[2].

United States of America

Szinovacz's (1997) study uses the National Survey of Families and Households from the United States to examine whether "childhood living arrangements influence adult

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[2]Interestingly, those who had a financially stable and more generous pension plan, who had a higher income, who supported multigenerational cohabitation and hence supported the family based social security system, were more inclined to support the Liberal Democratic Party. Those who supported publicly funded programs had Communist Party leanings.

children's attitudes towards taking a parent into their home and whether adult children ever did have a parent living with them (p. 2)." By using logistic regressions to model the act of coresidence and OLS regressions to model attitudes towards coresidence, he found that race was a significant in influencing attitudes towards coresidence, with more adults of ethnic backgrounds not only taking parents into their home than non-ethnics, but also having a more positive opinion of doing so than non-ethnics. Those adult children who were raised in childhood by a woman were more likely to feel obligated in having their parents live with them in their old age. So a greater incidence of coresidence occurred between adult children and their mothers. Also, women who grew up in the presence of both their parents and grandparents were more likely to take in their own parents in their old age. The cultural explanation for this could be that for those who grew up in traditional extended families, special feelings are developed which make it more likely that they will support coresidence. However, this phenomenon is only seen in adult women.

Parental needs were also a strong determinant of parental coresidence for adult women, most likely because of the traditional role women have as care givers. The study also showed that the greater the number of siblings an adult had, the more spread out the responsibilities for elderly parents become, and the less likely an individual will have their parents living with them. However, Silverstein et al (1995) found that the children of ageing parents had different reasons for providing care based on whether they were sons or daughters. Sons took care of their parents because they had self-interests, feelings of obligation towards the parents and because of familiarity. Daughters on the

other hand felt a sense of intimacy towards their parents, and also had more altruistic reasons for caring for them. When examining the economic status of care givers, Crimmins and Ingagneri (1990), Kobrin (1981) and Ward et al (1992) found that those at the lower end of the economic spectrum were more limited in their options for alternative care (ie, retirement homes, hiring professional care, etc.), which meant that those households where parents lived with their adult children were more likely to be low income households.

Pezzin, Pollak and Schone (2006) determined how living arrangements for elderly disabled parents are decided on by adult children by using a two stage bargaining model. First, they provide several options for living arrangements: living alone, in a nursing home or with an adult child. Then the intensity of caregiving provided by each child in the family is determined. Using backwards induction, they calculate a rule that can be used to determine how much care a child provides in various living arrangements and in turn, determine the optimal living arrangements that would then occur. They find that the equilibrium found in the end may not be Pareto Efficient for two reasons. First, the outcome of the second stage (or bargaining power) is affected by what happens in the first. Second, after the first stage, family members do not make any contractual agreements about how much care they will provide in the second stage. These results can have an effect on the types of policy on elder care that should be implemented. For instance, if family care decisions are resulting in inefficient outcomes, then perhaps there should be more emphasis on public policy. For example, those who co-reside with

elderly parents could receive subsidies and those who do not could be taxed, in a move to achieve more efficiency.

Pezzin and Schone (1998) also conducted a similar study on female labour supply, household formation and informal caregiving. They used data from 1986-87 based on the Hebrew Rehabilitation Center for the Aged (HRCA) Survey of the Elderly, and the HRCA-NBER Child Survey. By using a Nash Bargaining Rule to determine household formation and intra-household decisions, and maximum likelihood estimates, they find that "competing demands on daughters' time [from children, elderly parents and work] reduce both coresidence and informal caregiving (p. 1)." This is of concern to some policy makers who worry that publicly funded formal care may be used as a substitute, rather than as a complement, for informal care provided by families. Intergenerational coresidence, however, is still very much an important means by which informal care giving is delivered, and publicly funded programs that offer subsidies for formal home care services could have a significant effect on an individual's decision to provide a coresidence option to his/her parents, and on informal caregiving.

Borsch-Supan (1989) used the American Housing Survey from 1974 to 1983 to create a multinomial logit model to describe the choice of living arrangements. He found that approximately "one third of all families with at least one elderly person do not live independently (p. 27)." More than 17% of all elderly individuals live with their adult children and most of them were heads of the household (p. 28). If the adult children were household heads, parents tended to be single, elderly and have a low income. Few lived

with distant relatives, and fewer still lived with non-relatives. For those elderly with low incomes, "demand elasticity for shared accommodations" is strongly negative. For those households with elderly parents and adult children, "supply elasticity for shared accommodations with respect to income is positive (p. 28)." Those children who care for parents had at least twice as much income than the average (p. 28).

Ettner (1995) used the 1987 National Survey of Families and Households and instrumental variables to correct for endogeneity to determine the effect of care giving for the elderly on the hours worked by the care giver. She found that parents of care givers tend to be older, are sicklier and have a lower socio-economic status than parents of non-care givers. Respondents who provide care have fewer siblings than those who do not, and male care givers are more likely to be living with their parents. Ettner suggests this may be because the men's wives provide assistance in care giving, while husbands of women care givers do not. For care givers who cared for parents outside the home, working hours declined by 0.15 hours per week for men and 2.14 hours per week for women (p. 9). Work hours are reduced even more if adult children co-reside with a parent with disabilities. Care giving also has a larger effect on women's working hours.

Engers and Stern (2002) use the National Long-Term Care Survey to see how families make elderly care decisions. They found that parents with more education were less likely to be cared for by their children. If the spouse is present, elderly couples are more likely to live alone than with their children. African American elderly tend to live alone. If the resource limits of the Medicaid program increased (ie, the minimum requirements

to qualify for funding increase), the value placed on entering a nursing home decreased. If an income limit exists, the value of entering a nursing home increases. The authors suggest that this could be because Medicaid does not cover all nursing home expenses, or because families are able to find loopholes in the rules to overcome them. Daughters were more likely to provide care than sons, and married children were more likely to care than single children. This is perhaps because married children had extra support to help share the caregiving work load. Children who lived in close proximity to their parents (between 1 and 10 minutes away) are more likely to care for parents than children who actually lived with them. The authors refer to Rosenzweig and Wolpin (1994) for an explanation, suggesting that many households with such cohabitation find that the parents are caring for the children, rather than vice versa. Moving from a state which provides eldercare programs or funding for those in need to a state which does not also reduces the chance that the senior home option will be chosen. When the authors used the model for voluntary care giving, they found that if families were given side payments to provide care, the larger the family, the higher the utility of the parent and the average child. This may be because larger families have more options available to them. However, the authors do point out that many of the variables which affect the decision to provide care (such as parent's income, child's income, parent's education) do not have that great an effect on the decision making process.

Leger (2005) used the Panel Study of Income Dynamics and its Parent Health Supplement in the United States from 1975 to 1991 to examine the effects of parental illness on the labour supply of adult children. He did this by examining what happened

when living arrangements changed before and during parental illness, examining individuals regardless of their caregiving status, and also dealt with the problem of unobserved heterogeneity, an issue not addressed by earlier studies such as that of Ettner (1995). Since the author uses panel data, he is also able to examine what happens when children are prepared mentally for future illness of parents. The financial impact can also be determined. Not surprisingly, he found that the labour supply of women is more affected by sick parents than the labour supply of men. Cohabitation is the living arrangement that affects female labour supply the greatest. Subsequent years of cohabitation shows further decrease in work hours. Leger suggests this may be because women leave the labour force in order to provide care. However, correcting for unobserved heterogeneity reduces this impact.

While men's work behaviour does not change before a parent's illness, they do reduce work hours in years after parents enter a senior home. Women show the same results. This could be either because they are still providing care even after parents enter the senior home, or male caregivers are suffering from adverse effects of providing care, such as reduced health status or stress. For women, however, the year prior to parental illness shows women working less if their parent will be put in a seniors home later on. This could be because parents still have immediate care needs before they move the following year, or because female caregivers are preparing the elderly parent for the transition. However, controlling for unobserved heterogeneity shows that women actually do not change their working behaviour in the year prior to parental illness. This

is either because children behaviour does not inherently change, they are not able to accurately predict future parental illness, or the specified model used is incorrect.

Men whose parents live with their siblings tend to work less, perhaps because parents live with the most productive son. This negative relationship no longer exists when controlling for heterogeneity, resulting in an increase in working hours in the first year their elderly parents move to a senior's home. This may be to cover expenses incurred, or because of some other unaccounted problem with endogeneity. Finally, women who lived with a sick parent lost US $4863 per year (1987 dollars, pg 20). Leger does not make the same calculation for men.

Canada

Under the Canada Health Act, home health care is not insured. This means that the cost to the care provider is directly out of pocket. In 1996, care provided by family members and volunteer workers was valued at $5.1 to $5.7 billion annually (Le Goff, 2002, par. 15). It was estimated that by 2002, this cost would be approximately $6 billion (Le Goff, 2002, par. 16). The increase in cost is not surprising, due to an increasing ageing population and an increase in salaries. Le Goff also states that because home care is not covered under a national system, the health care services and care giver support systems that exist across the country today vary from province to province. Informal care givers must often buy medical supplies, drugs, equipment, etc. out of pocket. If the care receiver lives with the care giver, additional costs of heating, food and transportation are

incurred, as well as the cost of possible modifications to the home in order to provide ease of access to the care recipient.

The Canadian Staying at Work survey, conducted by Watson Wyatt (2000, par. 1) found that "direct disability and absence management costs constituted 7.1% of business payrolls." When asked why employees were taking time off work, the reasons given were because of sick leave or personal/family leave to take care of a family member. Both such cases of absenteeism have been on the rise (Watson Wyatt, 2000). Being a care giver can cost not only the company the employee works for, but the government and society as well. If an individual decides to drop out of the labour force in order to provide long term care to a family member, not only does the government lose tax revenue, but the individual may be more likely to depend on publicly funded services such as welfare or pension funds. Because this individual has worked for less time in the labour force than others, he/she has spent less time building funds for his/her own future, and therefore has less financial stability in the future. This means that those who are still in the labour force must contribute more to both the public welfare system and public pension plan out of their own earnings.

Pyper (2006, p.2) also found that employed male care givers were twice as likely to work longer hours (more than 40 hours a week) at a paid job as women. Women who worked longer hours and provided more than 4 hours of care a week were more likely to feel socio-economic impacts than corresponding men. Those who provided care and also worked were more likely to reduce their working hours, change their working patterns,

turn down job offers or promotions, and take fewer vacations. Again, women were much more affected than men. As hours of care giving increased, care givers were more likely to feel that their health was affected and that they did not have time for themselves. This was regardless of how many hours they worked. As hours of work increased, care givers felt it was harder to balance care giving responsibilities and to try and meet other expectations from work and family. When asked what would help them to continue helping others, care giver said that occasional relief, flexible working hours, financial compensation and tips on being a more effective care giver were all significant factors.

More and more older workers (those between 45 and 54 years of age) are now finishing their parenting roles but are now facing the roles as care givers to elderly parents and/or grandchildren. For these individuals, work/life balance can be especially challenging because of these new responsibilities and no flexible work arrangements. One of the issues of concern when discussing work/life balance for those who provide elderly care is the issue of living arrangements of the care giver and the care receiver. Many care givers and receivers live in different places, and the distance between care givers and receivers can be challenging for care givers to provide the appropriate amount of time and the appropriate care to those who need it. In fact, Duxbory and Higgins (2005, 2008) have found that care giving responsibilities to the elderly who live faraway places workers at a higher risk of feeling dissatisfied with their work/life balance, because of increased feelings of guilt and stress.

Duxbory, Higgins and Schroeder (2009) used the National Work, Family and Lifestyle Study of 2001 to examine care giving trends in Canada. They found that about 16.8% of Canadians are part of the "sandwich generation" – those Canadians in the work force who are caring for both elderly parents and children (p. 8). In contrast, 11% of the workforce was described as only providing elderly care. The Canadian Council for Social Development (CCSD) says that the proportion of those in the sandwich generation will increase as more people are choosing to have families and raise children later in life (CCSD, 1996). Duxbory et al. (2009) report that care giving leads to care giver strain, which is defined as the physical, financial or mental stress that comes from looking after an elderly dependent. Those with high levels of strain are much more likely to miss at least 3 days of work in 6 months because of eldercare problems, and are also the least likely to be satisfied with life. They are much more likely to report high levels of stress, depression and poor physical health. Duxbory and Higgins (2003, 2004) also determined the financial costs of care giver strain; $1 billion was lost in absenteeism and $4 billion was spent on inpatient hospital stays due to care giver strain (pg 49). If companies were to invest more resources in reducing care giver strain, they could potentially save $128 per employee per year (pg 49).

Habtu and Popovic (2005) used the 2002 General Social Survey of Canada to conduct a study on how Canadian families balanced their work and home lives. They first predict that the population of those 85 years of age and older is expected to increase from 1.4% of the total population in 2001, to 4% of the total population in 2041. Coupled with an increase in smaller family sizes, this means that the ratio of care receivers to care givers

will increase. This ratio is also affected by "increased geographical mobility." They also found that more than 70% of caregivers who were employed had some university education, and were between 45 and 54 years of age. Women were more likely to help with indoor work, while men helped with outdoor activities. Women were more likely to reduce their hours of work and suffer a greater financial burden than men, and were also more likely to suffer a negative impact on their social and personal lives.

Pyper (2006) used the General Social Survey Cycle 16 under Statistics Canada from 2002 to examine how well individuals were able to balance career and care demands. The survey asked caregivers the amount of time spent on duties inside the house, duties outside the house, transportation, and personal care. Participants reported the average number of hours spent on these activities in the previous year and these numbers were then used to calculate an average number of hours per week. The caregivers were divided into 3 groups: Low intensity – up to 1 hour a week; Medium intensity – between 1 and 4 hours a week; High intensity – 4 or more hours a week. Four indexes were also created: the socio-economic index; the employment changes index; the guilt index; the burden index. Caregivers in this study were men and women between the ages of 45 and 64.

Pyper found that there are approximately an equal number of men and women between 45 and 64 who provide elderly care. Women spend more time than men in providing elderly care ("high intensity caregivers"), while men spend more time in paid work. High intensity caregivers experience more changes in their social activities, holiday plans and

sleep patterns. Those women who were high intensity caregivers AND work longer hours were more likely to report major socio-economic changes. "Two-thirds of women and nearly half of men who combined more than 40 hours of employment with 4 or more hours of care giving per week experienced substantial job-related consequences such as a reduction in hours or income or a change in work patterns." For those women who provided more than 1 hour of care per week, more than 6 in 10 experienced higher levels of guilt when their number of hours of employment increased. However, the care giving burden is more strongly related to the intensity of *care giving* rather than the intensity of employment itself. Longer employment hours were linked to higher stress level across all three care giving intensities. 82% of women working longer hours in the high intensity group were more likely to experience stress in balancing responsibilities, compared to 54% of women not employed (p. 6). Interestingly, for those men and women who worked long hours (40+) and provided high intensity care, 73% reported very good to excellent life satisfaction (p. 8).

Lilly (2008) used the 1996 and 2002 General Social Surveys and multivariate probit, logit and OLS regression to determine the effect of unpaid caregiving on the probability of labour force participation, the hourly wage rate, weekly hours spent on work and the probability of being an unpaid caregiver. She found that being an "unpaid caregiver was negatively associated with labour force participation; however, the effect on hours of labour market work and wages was uncertain (p. 2)." In 1996, male caregivers had lower wages than non-caregivers. Women at this time worked less hours in the labour market. In 2002, all primary caregivers were less likely to be in the labour force. Also, when

caregiving duties were light, caregivers were better able to balance both their careers and their caregiving responsibilities.

Dosman, Fast and Rowe (2006) calculated the cost of providing care through lost wages and hours of work by using the Labour Force Survey from 1997 to 2006. The sample was "employed individuals who lost time at work or quit their job to provide eldercare." The sample was split into two groups: from 1997-2001 and 2002-2006. The authors estimated the annual lost wages due to eldercare for the first group to be $80 million for men and $128 million for women (slide 10). These costs rose dramatically for the second group: lost wages rose by 62.5% for men and 79% for women. Not surprisingly, those who are not working face the greatest losses. Average annual lost earnings increases as the caregiver ages, peaking at around age 55 (slide 12). Those who had a university education were, on average, less likely to be lose work time than those who did not have a university degree. Men with a university degree were also less likely to give up hours of work, while the same general effect was also seen for women, though to a lesser degree. Those who were private sector employees were by far the most likely to face employment consequences for providing care than those who were public sector employees or self-employed. The self-employed, however, lost the most work hours in a week. Those who had temporary jobs also lost more work hours in a week than permanent job holders, but the differences seen were not great.

In conclusion, we see that regardless of geographic location and ethnic background, women face the greatest responsibilities when it comes to providing care to the elderly. There is a need for better support systems for caregivers, systems which offer both financial support and care provisions that help provide more effective care. The greater number of siblings in the family means that an individual will actually provide less care, simply because the responsibility is shared with more people. Whether or not adult children decide to place their elderly parents in a care facility is very much influenced by the regional social norms, as was seen in the case of Europe. However, as was seen in the case of Asia, the view of whether care provision is the responsibility of the government or the family changes over time with changes in quality of care provided, family dynamics, affordability, etc. The quality of care provided is also affected by the physical and mental health of the care provider, as pointed out by Duxbory and Higgins. This again means that caregivers need solid support systems from both the government and their employers to be able to maintain a health work-life balance.

CHAPTER 3   PROFILE OF A CAREGIVER IN CANADA

This chapter will present various traits of an average care giver in Canada. Various socio economic factors will be accounted for, such as hours spent on paid work, education levels, household income, gender, marital status, number of children and province of residence. Descriptive data are based on the Public Use Micro Data File, and have been weighted by households. All descriptive data tables are presented in Appendix B. The weighted frequency for females in the entire sample is 53.1%. As mentioned in the introduction, care is defined by the GSS as providing any sort of assistance to an individual who has a long term health condition or physical limitation.

3.1 NUMBER OF CAREGIVERS IN THE POPULATION

First, we examine the proportion of care givers in the population based on the care givers age.

Table 1: Percentage of Care Givers in Total Population

Age Groups	Male	Female	Total
45-54	30.2	38.6	34.4
55-64	31.1	40.0	35.6
65-74	26.8	29.9	28.4
75+	18.9	18.6	18.7
Total	28.5	34.2	31.5

Source: Based on Statistics Canada, 2007. References: Statistics Canada. 2007 General Social Survey: Care Tables. Catalogue No. 89 633 XWE.

Out of the total population of people aged 45 and older, the 55-64 age group has the largest percentage of its population providing care. The percentage of the population who provide care decreases after the age of 65. We can explain this trend through the

fact that as the care giver ages, so too do the care recipients. As the care recipients age, the likelihood that they will need care increases, so a family member will step in as a care giver. The care giver takes on this responsibility until the death of the care recipient, at which point the care giver stops identifying his or her self as a care givers. This would explain the decrease in the number of care givers after the age of 65. There is also the alternate explanation that as a care giver ages, he/she is more likely to suffer from physical or medical conditions that would make it difficult for them to care for an elderly dependent who also have a physical limitation or long term health condition. We also find that consistently more women provide care across all age groups than men, a trend that is supported by existing literature.

3.2 MARITAL STATUS

An individual's decision to provide care is affected by the personal ties the individual has. For example, the marital status of the care giver may determine whether the individual decides to care for those outside the immediate family. Table 2 presents all those caring for immediate family, extended family and friends/neighbours/coworkers, and provides a breakdown of these care givers based on marital status.

Table 2: Marital Status of All Care Givers (%)

Marital Status	Immediate Family		Extended Family		Friends/Neighbours/ Coworkers	
	M	F	M	F	M	F
Married/Common Law	15.9	16.6	6.5	6.1	11.9	10.3
Widowed/Separated/Divorced	2.3	7.0	0.6	1.7	3.1	8.9
Single (Never Married)	1.7	3.8	0.2	0.7	1.6	2.1
Total Percentage	47.3		15.8		37.9	
Total	100%					

Source: Statistics Canada, General Social Survey Cycle 21, 2007, Microdata. Results are based on author's own calculations. Variables used: ICG_Q160, ICG_Q170, ICG_Q180, SEX, MARSTAT.

We find that 15.9% of all caregivers are married men who care for immediate family. In general, more women provide care than men. However, one should keep in mind that the Canadian population in general consists of more women than men. This would imply that women are more likely to provide care than men, simply due to demographics. Most care givers seem to be either married or in a common law relationship. We find that more married men care for extended family and nonfamily members than women do. The proportion of married men and women who care for immediate family is about the same. However, we find in Table 3 that they do not spend as much time providing care as women do.

Table 3: Average Hours Spent in an Average Week on Care Giving by Marital Status of Care Giver (Hours ≥ 0).

Marital Status	Immediate Family		Extended Family		Friends/Neighbours/ Coworkers	
	M	F	M	F	M	F
Married/Common Law	5.82	10.63	6.07	7.82	4.28	6.27
Widowed/Separated/Divorced	10.35	12.29	3.87	14.70	4.58	6.99
Single (Never Married)	7.2	10.97	5.96	12.20	6.11	8.15
Total	6.47	11.11	5.88	9.49	4.51	6.75

Source: Statistics Canada, General Social Survey Cycle 21, 2007, Microdata. Results are based on author's own calculations. Variables used: ICGQ140C, ICG_Q160, ICG_Q170, ICG_Q180, SEX, MARSTAT.

Married male care givers who care for immediate family spend an average of 5.82 hours a week providing care. When we examine Tables 2 and 3 together, we find that while almost equal numbers of married men and women provide care, the responsibilities are not shared equally. More women who were previously in a relationship or were never married provide care to all three groups of individuals (Table 2), and Table 3 again shows us that regardless of their marital status, women are still spending more time providing care than men. We do find that women who were in a previous relationship spend the most time caring for immediate or extended family. In general, friends, neighbours and coworkers have the least amount of care giving time given to them.

3.3 CAREGIVER'S CHILDREN

Table 4 shows how the number of children of the respondent who are living in the household, of any age or marital status, is correlated with a person's decision to provide care.

Table 4: Care Giving Based on Number of Children of Care Giver (%)

Number of Children	Immediate Family		Extended Family		Friends/Neighbours/Coworkers	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**
0	21.0	32.9	23.5	30.3	27.1	38.2
1	7.7	11.8	6.8	11.9	6.7	9.7
2	10.3	8.6	11.3	7.4	7.0	6.1
3	2.1	3.1	3.0	3.3	1.5	1.5
≥ 4	1.9	0.7	1.4	1.0	1.4	0.7
Total %	**43**	**57.1**	**46**	**53.9**	**43.7**	**56.2**
Total %	**100**		**100**		**100**	

Source: Statistics Canada, General Social Survey Cycle 21, 2007. Results are based on author's own calculations. Variables used: ICG_Q160, ICG_Q170, ICG_Q180, SEX, CHLDHHLD.

This table shows, for example, that 57.1 % of all care givers who care for immediate family are women, and most of the people who provide care have no coresident children.

What is the probability that a person with a given number of children will provide care? We must find the *relative* probability that a person with a given number of children will provide care. This is done by dividing the proportion of the population with a certain number of children who provide care, by the proportion of the population who provide care for a certain care recipient group. The proportion of the population who provide care is presented in Table 1 in Appendix B. Relative probabilities are presented in Table 5.

Table 5: Relative Probability of Providing Care, Given Certain Number of Children

Number of Children	Immediate Family		Friends/Neighbours/Coworkers	
	Male	Female	Male	Female
0	1.85	1.64	2.81	2.39
1	0.68	0.59	0.69	0.61
2	0.90	0.43	0.72	0.38
3	0.18	0.15	0.15	0.094
≥ 4	0.17	0.03	0.14	0.044

Source: Statistics Canada, General Social Survey Cycle 21, 2007. Results are based on author's own calculations – the probability that an individual with a certain number of children provides care divided by the probability that an individual provides care. Variables used: ICG_Q160, ICG_Q180, SEX, CHLDHHLD.

We find that care givers with no children have a higher chance of providing care than the average care giver. Men with no children are 1.85 times as likely to provide care to immediate family as the average male care giver in the population. To put it another way, men with no children are 85% more likely to provide care to immediate family than an average male care giver. Those with 3 or more children have lower relative probabilities of providing care than those with 2 or fewer children.

Those who have no children are more than twice as likely to care for friends, neighbours or co-workers as the average care giver who cares for friends, neighbours or co-workers. However, when care givers have 1 or more children, they are *less* likely to care for friends, neighbours or coworkers. This makes sense, as an individual simply becomes too busy caring for their own children in the household. When individuals have 2 or more children, the relative probabilities for women are less than those for men.

Table 6 provides a break down of hours spent on care giving based on the number of children in the household. Females who have four or more children spend the most time

caring for immediate and extended family as well as friends, neighbours and coworkers. This may be because the sample size of females who have four or more children and provide some sort of care is small (as was accounted for in Table 5), but may also be because the older children do not require as much attention as they did when they were younger. Because these children are now more independent, women can now devote more of their attention towards those with a long term physical condition or health problem.

Table 6: Average Hours Spent in an Average Week on Care Giving Based on Number of Children of Care Giver (Hours ≥ 0).

Number of Children	Immediate Family		Extended Family		Friends/Neighbours/Coworkers	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**
0	7.42	10.85	5.60	8.74	4.91	6.44
1	6.75	11.02	6.58	10.91	5.20	9.15
2	5.80	12.65	4.9	10.8	2.91	4.81
3	2.46	6.21	11.81	6.42	3.41	5.86
≥ 4	3.45	29.24	2.50	13.15	2.85	10.92
Average Hours	**6.47**	**11.11**	**5.88**	**9.49**	**4.51**	**6.75**

Source: Statistics Canada, General Social Survey Cycle 21, 2007, Microdata. Results are based on author's own calculations. Variables used: ICGQ140C, ICG_Q160, ICG_Q170, ICG_Q180, SEX, CHLDHHLD, SEX.

3.4 CARE GIVER/RECEIVER RELATIONSHIP & HOURS SPENT ON CARE

Table 7 shows the proportion of care givers based on the relationship between the care giver and the care receiver. Specifically, the table describes the proportion of care givers to various immediate family members.

Table 7: Relationship of Care Recipient to Giver (As a Percentage of All Care Givers)

Care Recipients	Proportion of Care Givers (Age 45 +)		
	Male	Female	Total
Spouse/Partner	10.97	9.04	9.86
Ex Spouse/ Partner	0.58	0.28	0.41
Son	2.52	2.90	2.74
Daughter	1.40	4.19	3.01
Father	9.44	8.08	8.66
Mother	23.72	28.06	26.22
Brother	2.81	1.79	2.22
Sister	2.27	5.32	4.03
All others*	46.29	40.32	42.85
Total	**100**	**100**	**100**

*Includes care recipients who are extended family or friends/neighbours/coworkers.
Source: Statistics Canada, General Social Survey Cycle 21, 2007, Microdata. Results are based on author's own calculations. Variables used: CGPQ120C, SEX.

Among all immediate family relationships, the greatest proportions of care givers care for their mothers. This is seen for both male and female care givers. Perhaps this is due to the fact that women generally outlive men. There are more than twice as many men caring for their mothers as there are caring for their spouse/partner. For female care givers, there are three times as many women caring for their mothers as there are caring for their spouse/partner. There are also more women caring for their mothers, sons, daughters and sisters than there are men.

Table 8 describes the hours spent caring for immediate family members.

Table 8: Average Hours Spent in an Average Week on Care Giving Based on Care Giver/Receiver Relationship (Hours ≥ 0).

	Hours of Care Giving		
Care Recipients	Male	Female	Total
Spouse/Partner	21.19	31.15	26.07
Ex Spouse/ Partner	6.95	2.77	5.12
Son	19.08	27.24	24.03
Daughter	6.77	18.82	16.56
Father	6.44	10.84	8.80
Mother	7.16	12.22	10.26
Brother	4.17	8.78	6.32
Sister	5.57	8.80	8.03
All others	4.67	6.59	5.74

Source: Statistics Canada, General Social Survey Cycle 21, 2007, Microdata (weighted by households). Results are based on author's own calculations. Variables used: ICGQ140C, CGPQ120C, SEX.

We find that while fewer care givers care for their spouse/partner than for their mothers (see Table 6), both men and women spend more time caring for their spouse/partner than they spend caring for their mothers. We also find that in general, women spend much more time providing care to various immediate family members than men do.

3.5 LABOUR MARKET INDICATORS

We now examine how labour force participation, unemployment and household income vary between those who are 64 years of age or younger, and those who are 65 years of age and older.

Table 9: Labour Force Participation Rates, Unemployment Rates and Household Income of All Care Givers Younger and Older Than 65 (As Percentage of All Care Givers)

	Caregivers 45-64 Years of Age			Caregivers 65 Years of Age & Older		
	M	F	T	M	F	T
LFPR	80.9	67.5	73.4	13.8	6.0	9.1
Unempl. Rate	2.3	2.3	2.3	0.67	0.83	0.73
Income						
No Income	0.44	0.30	0.36	0	0	0
< $20 000	5.4	9.4	7.6	13.4	24.4	19.7
$20000-$39999	12.6	18.3	15.8	28.5	38.1	34.0
$40000-$59999	17.4	21.3	19.5	24.4	20.2	22.0
$60000-$79999	15.6	14.6	15.0	13.5	9.0	10.9
$80000-$99999	13.8	13.3	13.6	7.4	3.3	5.0
$100000 or more	34.8	22.7	28.1	12.8	5.0	8.4
Total	**100**	**100**	**100**	**100**	**100**	**100**

Note: Incomes listed are household incomes. Source: Statistics Canada, General Social Survey Cycle 21, 2007, Microdata (weighted by households). Results are based on author's own calculations. Variables used: ACMYR, ICG_Q110, SEX, INCOME (variable created by author by recoding the variable INCMHSDC), SENIOR (variable created by author by recoding the variable AGEGR5).

Labour force participation rates for caregivers between 45 and 64 years of age are much higher than those for caregivers 65 years of age and older. This is mostly due to the retirement age of 65. The care giver also incurs a financial cost for providing care, which would mean that in order to recoup some costs, the care giver either works longer or looks for work longer than they would have if they did not provide care. Unemployment rates between men and women 45 to 64 years of age are the same. Unemployment rates for men and women 65 years of age or older are much lower than those for their younger counterparts. Again, this can be attributed to the retirement age of 65, because once an individual retires, he/she will not be looking for work, which means that he/she is not considered to be in the labour force.

Taking a closer look at care givers based on income brackets, we find that for male and female caregivers 45 to 64 years of age, the greatest percentage of them have a household income of $100000 or more. For male and female caregivers 65 years of age or older, the greatest percentage of them have a household income between $20000 and $39999. This difference in income seen between the two age groups could be because those who are in a higher income bracket can afford to pay for hired help or respite home services for the care recipient. Both men and women 45 to 64 years of age show a similar trend of an initial increase in the proportion of care givers in a certain income bracket, and then a decrease until the household income reaches $100 000 or more, when the proportion of caregivers increases again. This rise and fall in the proportion of care givers could be because these income brackets are where the caregiver's marginal benefit of providing care is equal to the marginal cost. At higher income levels, the cost of providing an extra hour of care would be higher than the benefit from doing so, and therefore the caregiver will be less likely to provide care.

3.6 AVERAGE HOURS SPENT ON CARE GIVING & PAID WORK

The following figure shows how the hours spent on paid work and care giving changes as total household income increases.

Figure 1: Average Hours Spent in an Average Week on Care Giving and Paid Work (Hours ≥ 0)
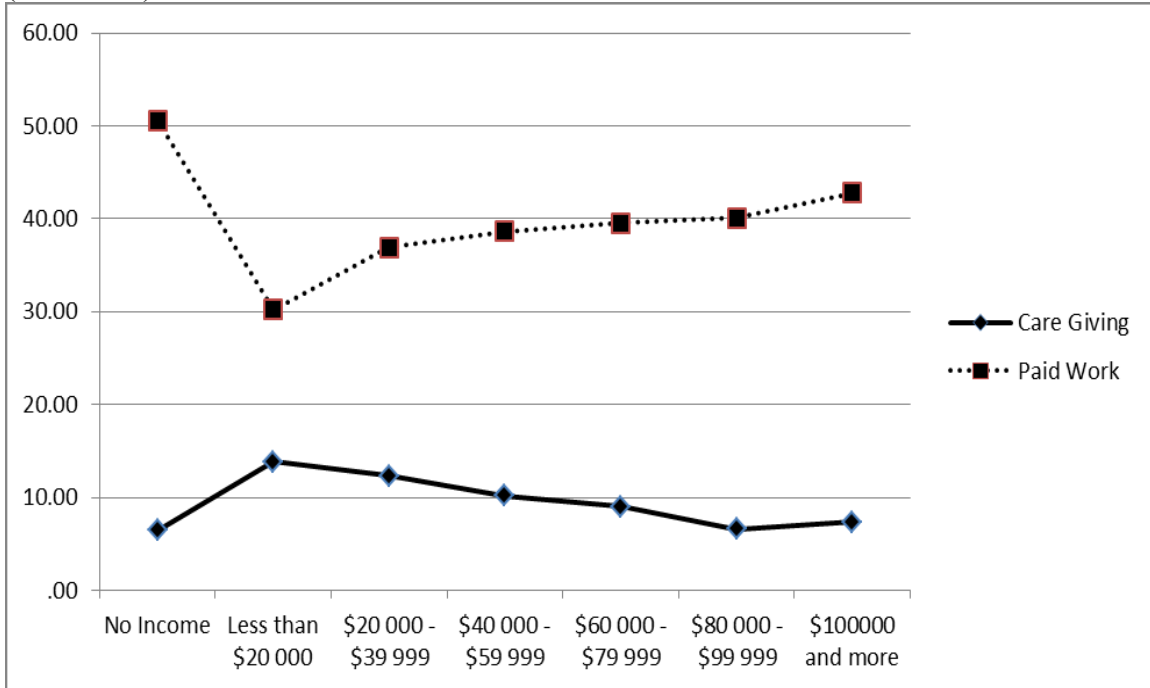
Source: Statistics Canada, General Social Survey Cycle 21, 2007, Microdata (weighted by households). Results are based on author's own calculations. Variables used: ICGQ140C, MAR_Q382, INCMHOUSE (variable created by author by recoding the variable INCMHSDC).

Here we find that as the household income increases from less than $20 000 onward, there is a steady decrease in the number of hours spent providing care, with a slight increase in time when household income is $100 000 or more. This can be explained through the fact that as income increases, the opportunity cost (or foregone income) of providing an additional hour of care also increases, which means that care givers would like to spend more time doing paid work. This is supported by the same graph because we can see that as household income increases from less than $20 000 onward, the hours spent on paid work also increases. However, one must be careful in claiming that there is a substitution effect between the two activities. All that can be said conclusively is that

household income increases as hours of paid work increase, and hours spent on care giving decrease as household income increases.

3.7 PROVINCE OF RESIDENCE OF CARE GIVERS

Figure 2 describes the proportion of care givers caring for immediate family, extended family and friends, neighbours and co-workers based on the care givers province of residence.

Figure 2: Proportion of Care Givers Based on Province
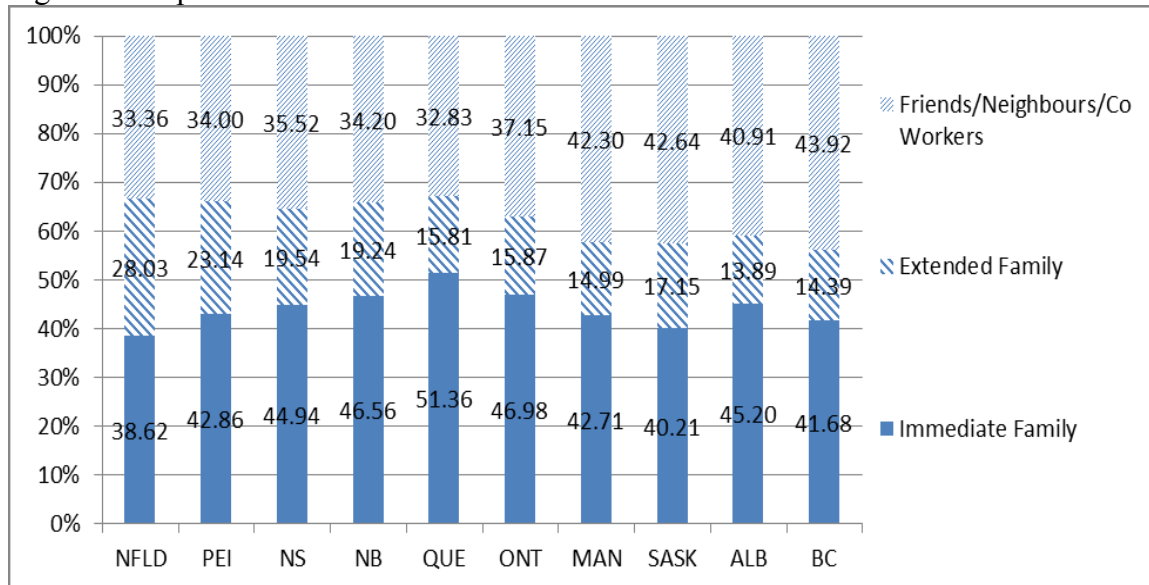
Source: Statistics Canada, General Social Survey Cycle 21, 2007, Microdata (weighted by households). Results are based on author's own calculations. Variables used: ICG_Q110, ICG_Q160, ICG_Q170, ICG_Q180, PRV.

We see that the greatest proportion of care givers across all provinces provide care to immediate family. The greatest proportion of immediate family care givers reside in Ontario and Quebec. Manitoba and British Columbia have approximately the same

proportion of care givers to each care recipient group. They, along with Saskatchewan, have the greatest proportion of care givers caring for friends, neighbours or coworkers. Care givers aiding extended family members consistently make up the smallest proportion across all provinces.

3.8 EDUCATIONAL ATTAINMENT OF CARE GIVERS

Table 10 breaks down the number of care givers based on their highest level of education.

Table 10: Educational Status of Care Givers (As a Percentage of All Care Givers in a Care Recipient Category).

Education Level	Immediate Family		Extended Family		Friends/Neighbours/Coworkers	
	Male	Female	Male	Female	Male	Female
University Degree	20.5	21.2	24.7	21.9	19.2	21.2
No University Degree	22.3	36.0	21.4	32.0	22.0	37.6
Total	439206 = 100%		157356 = 100%		345297 = 100%	

Source: Statistics Canada, General Social Survey Cycle 21, 2007, Microdata (weighted by households). Results are based on author's own calculations. Variables used: ICG_Q110, ICG_Q160, ICG_Q170, ICG_Q180, SEX, EDUCATION (variable created by author by recoding the variable EDU10).

As education attainment increases, the proportion of people providing care decreases across almost all care recipients and both genders. We again find that in total, more people care for friends, neighbours and coworkers than for extended family members. If we examine how much time care givers with a certain level of education spend providing care, Table 11 shows that those with a university degree spend less time providing care. Again, females spend more time providing care than males.

Table 11: Average Hours Spent in an Average Week on Care Giving Based on Education Status (Hours ≥ 0).

Education Level	Male	Female	Total
University Degree	5.16	8.86	7.03
No University Degree	8.56	12.54	10.92

Source: Statistics Canada, General Social Survey Cycle 21, 2007, Microdata (weighted by households). Results are based on author's own calculations. Variables used: ICG_Q110, ICGQ140C, SEX, EDUCATION (variable created by author by recoding the variable EDU10).

We can use Table 12 to see how hours spent on paid work changes with education, and then compare these results with those from Table 10.

Table 12: Average Hours Spent in an Average Week on Paid Work Based on Education Status (Hours ≥ 0).

Education Level	Male	Female	Total
University Degree	42.4	37.2	40.3
No University Degree	43.1	35.3	39.5

Source: Statistics Canada, General Social Survey Cycle 21, 2007, Microdata (weighted by households). Results are based on author's own calculations. Variables used: ICG_Q110, MAR_Q382, SEX, EDUCATION (variable created by author by recoding the variable EDU10).

We find that males who have a university degree spend a little less time on paid work, while females who have a university degree spend more time. At the same time, those who have a university degree spend less time on care giving. Perhaps those with university degrees are more efficient in providing care and have more knowledge about the kind of care that is appropriate for the care recipient. This efficiency then allows females to spend more time at the work place.

3.9 VISIBLE MINORITY CARE GIVERS

We now examine trends among visible minority care givers. Table 13 describes the proportion of visible minorities who provide care to 3 different groups of individuals.

Table 13: Proportion of Visible Minority Population Providing Care (%)

Care Giver/Receiver Relationship	Male (Aged 45 +)	Female (Aged 45+)
Immediate Family	30.7	28.9
Extended Family	14.5	6.7
Friends/Neighbours/Coworkers	33.1	24.9
Total Percentage	78.3	60.5

Source: Statistics Canada, General Social Survey Cycle 21, 2007, Microdata (weighted by households). Results are based on author's own calculations. Variables used: ICG_Q110, ICG_Q160, ICG_Q170, ICG_Q180, SEX, VISMIN.

We find from Table 13 that greater proportions of visible minority males provide care than visible minority females. The greatest proportions of visible minorities who provide care do so for friends, neighbours and coworkers, with immediate family having the second greatest proportion. This could be because those visible minorities who have immigrated to Canada have done so in order to acquire an education or to get a job. Because of this, the first few years that an immigrant spends in a new country can be financially uncertain. Financial uncertainty will discourage immigrants from bringing elderly family members with them. Another explanation is that the elderly parents of these immigrants may not want to move to a new country because they are physically unable to do so, or because they have no desire to leave their home in their old age. Their adult children who have immigrated can face difficulty in providing them with the care they need from outside the country.

Table 14 shows the average number of hours that visible minorities spend providing care.

Table 14: Average Hours Spent in an Average Week on Care Giving Based on Visible Minority and Native Care Givers (Hours ≥ 0).

Care Giver/Receiver Relationship	Visible Minority		Natives	
	Male	Female	Male	Female
Immediate Family	5.39	15.75	6.55	10.91
Extended Family	7.86	27.87	5.81	9.16
Friends/Neighbours/Coworkers	7.08	7.46	4.37	6.72

Source: Statistics Canada, General Social Survey Cycle 21, 2007, Microdata (weighted by households). Results are based on author's own calculations. Variables used: ICG_Q110, ICGQ140C, ICG_Q160, ICG_Q170, ICG_Q180, SEX, VISMIN.

We also find from Table 13 that visible minority females spend the most time caring for all three groups. Visible minority males spend more time caring for extended family and friends, neighbours and coworkers than nonvisible minority males.

3.10 SUMMARY

Based on the data, we have found that care givers have a range of characteristics. 35.6% are 55 to 64 years of age and the majority are female. Most care givers are married or in a common law relationship. Not surprisingly, most care givers tend to care for their immediate family members and also spend the most time caring for them. Also, of all those who care for immediate family, the proportion of married/common law males and females is about the same. However, married men do not spend as much time as married women. While not as many individuals care for extended family as for non-family members (friends, neighbours or coworkers), those who do spend more time caring for

extended family than those who care for non-family members, perhaps because while extended family may live out of reach of a potential care giver, family ties are such that those who do live close by receive more attention and care from extended family. Also, those individuals who have no children living with them are more likely to provide care.

Male and female care givers aged 45 to 64 years have higher labour force participation rates than those who are 65 years of age or older, simply because of the retirement age. There are significantly fewer caregivers aged 65 or older across all income brackets than those care givers who are aged 45 to 64 years. The greatest proportions of male and female caregivers have a household income of $100000 or more. Also, as income increases, the care giver will spend less time providing care and more time in paid work, suggesting that the two activities are substitutes of one another. There are fewer care givers with university degrees than those without, and those with university degrees also spend less time on care giving, possibly because they are more efficient in providing care. More visible minority males provide care than visible minority females, but also spend much less time providing this care.

CHAPTER 4 ECONOMETRIC ANALYSIS

This chapter first provides an explanation of the theory of allocation of time which provides the basis for analyzing an individual's time spent on various activities in a given period. The econometric model which will be used in this analysis will be presented next, followed by a description of the variables used in the model. All variable definitions are taken directly from the General Social Survey, and coding is also described. Issues involved in the estimation of econometric model that arise due to the use of micro data are discussed next followed by an explanation of the Oaxaca (1973) decomposition of the differences in hours worked between men and women. Finally, the results of econometric model are discussed.

4.1 THEORETICAL BACKGROUND

The theory of allocation of time, first developed by Gary Becker in 1965, provides the theoretical background for this study. This theory is based on the idea that household decision making is based in part on time available and how the time spent on certain activities is valued relative to time spent on other activities. The theory makes the assumption that households are both consumers and producers – that goods and services are provided by combining various inputs (goods and time) in such a manner that the cost of providing such goods and services is minimized (following the basic theory of the firm) and that the utility function of the individual producing them is maximized, subject to prices and constrained resources. Becker measures available resources by

"what is called full income, which is the sum of money income and that forgone or 'lost' by the use of time and goods to obtain utility, while commodity prices are measured by the sum of the costs of their goods and time inputs." (Becker, 1965, p. 25)

If earnings were to increase and other income were to decrease such that the full income remained the same, a utility maximizing individual would decide to spend more time on paid work than on other non-work activities. This is because the opportunity cost of time spent on other activities (which would be the forgone earnings the individual would have received had he/she decided to spend time on paid work instead) becomes too high. This means that in order to reallocate time spent on paid work, time spent on other activities, such as care giving, must be reallocated as well.

To provide a mathematical exposition to the above theory, one can begin with a simple 2 variable utility function. Suppose an individual's utility function is comprised of a composite of market goods x_1, as proxied by income, and non-market activities which standard economics texts refer to as leisure, x_2 that is viewed as a normal good (Benjamin, Gunderson, Lemieux, Riddell, 2007). An individual works in the market for wage income which is used to purchase the composite good. His/her utility function can be written as:

$$U = f(x_1, x_2) \quad (1)$$

Leisure, which is comprised of all non-work activities (also non-market activities) comprises of several activities. One of these activities, in the context of the present study,

is care-giving at home. Thus, for the purpose of present study, hours of leisure in a given time-period will be broken down into two parts; time spent on care giving z_{12}, and time spent on other non-paid activities, z_{22}. The utility function can now be modified as described below to incorporate caregiving activity as follows:

$$U = f(x_1, z_{12}, z_{22}) \qquad (2)$$

Each good, x_i, has a certain fixed price, p_i, viewed as its opportunity cost. The total cost of engaging in all three activities must not exceed the money income earned, which means that when the utility function (2) is maximized, it is done so subject to the budget constraint

$$m = p_1 x_1 + p_{12} z_{12} + p_{22} z_{22} \qquad (3)$$

In order to maximize utility, the individual will choose that amount of composite goods x_1, hours spent on care giving z_{12}, and hours spent on other activities z_{22}, which will place him/her on the highest possible indifference curve while simultaneously satisfying the budget constraint. In order to determine the utility maximization levels of these activities, we construct a Lagrangian in the following manner:

$$\pounds = U(x_1, z_{12}, z_{22}) + \lambda (m - p_1 x_1 - p_{12} z_{12} - p_{22} z_{22})$$

The first order conditions ($d\pounds/dx_i = 0$ and $d\pounds/d\lambda = 0$) for such an expression are

$$U_{x1} = \lambda p_1 \rightarrow U_{x1}/p_1 = \lambda$$

$$U_{z12} = \lambda p_{12} \rightarrow U_{z12}/p_{12} = \lambda$$

$$U_{z22} = \lambda p_{22} \rightarrow U_{z22}/p_{22} = \lambda$$

This means that

$$U_{x1}/p_1 = U_{z12}/p_{12} = U_{z22}/p_{22} \qquad (4)$$

Since composite goods are proxied by income, their unit price, p_1, is 1. The price of hours spent on care giving, p_{12}, and hours spent on other non-work related activities, p_{22}, are both equal to w. This is because w is the forgone wage that individuals give up for increasing time spent on non-work activities by one hour, and it is also the forgone wage that individuals give up for increasing time spent on care giving by one hour. This means that from the first order conditions,

$$U_{z12}/p_{12} = U_{z22}/p_{22}$$

now becomes

$$U_{z12}/w = U_{z22}/w$$

$$U_{z12} = U_{z22} \quad (5)$$

Since we know that $p_1 = 1$, we can combine (4) with (5) to get

$$U_{x1} = U_{z12} = U_{z22} \quad (6),$$

The above result shows that an individual maximizes utility by allocating his/her time between various activities (work, care-giving and a composite of all other leisure activities) in such a manner that the utility obtained by each activity is equalized at the margin. The actual determination of time spent on each activity is dependent upon several socioeconomic characteristics of the individual which could include several observable and non-observable variables such as age, gender, income, education, ethnic background, taste, etc. The present study will analyze the impact of such factors on the hours spent by an individual in caregiving. A detailed list of these variables and their expected impacts on hours spent in care giving will be discussed in the next section.

4.2 ECONOMETRIC MODEL

The following OLS model will be estimated:

$$\ln Y = \beta_0 + \beta_1 X_i + \beta_2 D_i$$

where *lnY* is the number of logged hours of assistance provided by the respondent in an average week. X_i is the vector of socio-economic variables included in the analysis. These are the age of the respondent, the number of children living in the respondent's household, the number of logged hours of paid work, the age of the primary care recipient, logged total household income, a dummy variable describing the respondent's gender, a dummy variable describing the respondent's marital status, a dummy variable describing if the respondenthas a university degree, a dummy describing the respondent's visible minority status, and dummies describing if the respondent lives in the Atlantic Canada Region, Quebec, Ontario or the Prarie Region. This makes British Columbia the base region. These regional dummies are included only in the first stage logistic regression. D_i is the vector of dummy variables which describe care giver/receiver relationships. This vector of dummy variables will be included in the second stage OLS regression. These include a dummy for those respondents who take care of their spouse, a dummy for those who take care of their father, a dummy for those who take care of their mother, a dummy for those who take care of their mother, a dummy for those who take care of their brother, and a dummy for those who take care of their sister. This means that the base case refers to all those care givers who provide care to individuals who are not immediate family members (ie, extended family, friends, neighbours, co

workers). A detailed description of each independent variable used in the model, as well as the predicted signs of the coefficients for each variable, can be found in Appendix C.

After running the model with OLS, we will determine if the care giver/receiver relationship matters in an individual's decision to provide care by checking to see which of the relationship dummies is statistically significant. The model will then be estimated separately, based on the significant relationship, for male and female care givers. We will then use the Chow test to determine if the differences in the coefficients between the male and female models are statistically significant. If they are, then Oaxaca Decomposition will be used to further explain this difference.

4.3 ECONOMETRIC ISSUES

Several issues can arise with cross sectional data analysis. One such issue is sample selection bias. This bias occurs when the sample used for estimation is not a true random sample. For instance, suppose that we are interested in how the number of hours a care giver provides is affect by a vector of explanatory variables, X. Based on how this research question is worded, this automatically means that the sample used will only be of those who actually provide positive hours of care. Those who do not provide care are therefore not included. Since those who do not provide care are excluded from the sample, the sample is non-random and estimating the effect of X on the number of hours of care provided will introduce a bias in the coefficients. In order to resolve this issue of a non-random sample, Heckman's (1979) 2 stage correction technique is used. To

implement Heckman's correction, the first stage is to estimate a model describing the likelihood of providing care by using a logistic model.

The definition of the logistic (or *logged-odds*) function is the following:

$$f(z) = 1/(1 + e^{-z})$$

where the variable z is the set of independent variables listed above and is defined as

$$z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k$$

z is known as the logit. *f(z)* is the probability of a certain outcome occurring, given the set of independent variables. In this study, *f(z)* is the probability that an individual will provide care, given the list of independent variables listed above.

For the purposes of this study, the dependent variable used for the logistic regression is a dummy variable, which is defined as 0 for those who do not provide any hours of care, and 1 for those who provide positive hours of care.

In order to implement Heckman's correction, we use the logistic regression of the form

$$\text{Log}(\, D=1 \mid Z \,) = \Phi(\, Z\gamma \,),$$

where D indicates care giving (=1 if respondent provided care, 0 if not), Z is a vector of explanatory variables, γ is the vector of unknown parameters from the logistic regression, and Φ is the cumulative distribution function of the standard normal distribution. From the results, we will be able to obtain the log likelihood of providing care for each individual. The second stage involves using these individual probabilities to create a transformation that is used as an additional explanatory variable.

First, we find the conditional expectation of hours of care given that the individual provides it is

$$E(Y \mid X, D = 1) = X\beta + E (\mu \mid X, D = 1) \quad (I),$$

where Y is hours of care and μ is the error term from the hours of care regression. Assuming the error terms are jointly normal, the second term in the above expression becomes

$$E (\mu \mid X, D = 1) = \rho\sigma_\mu\lambda(Z\gamma) \qquad (II),$$

where ρ is the correlation between unobserved factors affecting the decision to provide care and unobserved factors affecting hours of care provided, σ_u is the standard deviation of μ, and λ is the Inverse Mills Ratio evaluated at $Z\gamma$. Equation II is Heckman's correction term. Substituting II into I, we get the final result for Heckman's procedure

$$E(Y \mid X, D = 1) = X\beta + \rho\sigma_\mu\lambda(Z\gamma)$$

Since we are now correcting for those missing in the sample population, we can regard sample selection bias as a form of omitted variable bias. After obtaining the logistic regression estimates, we can construct the Inverse Mills Ratio and include it in the regression as another explanatory variable in a linear regression for the hours of care equation.

Another issue is that of heteroscedasticity, when the variance of the error term is not constant across observations. This means that one of the classical assumptions of the General Linear Model (that the variance of the error term is constant) is violated. In the context of this study, heteroscedasticity will occur because those individuals who are between 55 and 64 years of age are both more likely to provide care and spend more

hours doing so than those who are younger or older. The variance of the error term on the hours each individual provides will be larger than for those care givers who are younger than 55 and older than 64. Under heteroscedasticity, the variance of the coefficients will be larger because of which the hypothesis tests of individual coefficients will be unreliable. This unreliability will lead to misleading conclusions, and OLS estimates on heteroscedastic variables will not be BLUE (Best Linear Unbiased Estimators). A way to correct for this problem is to run an OLS regression using the logarithmic transformation of the dependent variable. Hence, we will take the natural logarithms of hours spent on care giving. Among the independent variables, hours spent on paid work, and total household income will also be taken in their logarithmic forms. By doing so, we are effectively scaling down the variables, and this scaling effect reduces the variance of the error terms.

4.4 OAXACA DECOMPOSITION

We have seen from our profile of a care giver and from the previous literature that there are differences in the hours of care giving provided by men and women to immediate family, extended family and friends and co-workers. These differences can be explained by differences in observable and unobservable characteristics. Differences in observable characteristics can be analyzed through demographic, economic and labour market factors such as age of the care giver, hours spent on paid work, and total household income. Unobservable characteristics may be accounted for by different preferences between men and women. For example, women may be more inclined to provide care to

their elderly parents because they still hold much of the responsibility of homework. If they are already responsible for child rearing, they may decide that this experience is enough to take on the additional work of caring for their parents, or elderly relatives, because they feel that they have the proper skills and efficiency required to effectively help them. Men on the other hand may prefer to spend more time doing paid work because for them, the opportunity cost of spending more time providing care is too high. These factors which affect an individual's decision to provide care cannot be easily described through quantitative means. However, we can use Oaxaca Decomposition to determine how much of the difference seen between male and female care providers can be explained by observables, and how much can be explained by preferences (unobservables).

We start by running the model separately for male and female care providers:

$$\text{Males: } \ln Y^M = \beta_0^M + \beta_1^M X^M \qquad \text{(I)}$$

$$\text{Females: } \ln Y^F = \beta_0^F + \beta_1^F X^F \qquad \text{(II)}$$

where the variable $\ln Y$ is the average logged number of hours spent in a week on care giving and X is the vector of independent variables as listed in section 4.2. In order to express the difference between men and women, we subtract II from I to obtain the expression

$$\ln Y^M - \ln Y^F = \beta_0^M + \beta_1^M X^M - (\beta_0^F + \beta_1^F X^F)$$

$$= (\beta_0^M - \beta_0^F) + \beta_1^M X^M - \beta_1^F X^F \qquad \text{(III)}$$

We now introduce a new term, $\beta_1^M X^F$. This term describes female characteristics (observables) if they were subject to male preferences (unobservables). We add and subtract this term from III to get

$$\ln Y^M - \ln Y^F = (\beta_0^M - \beta_0^F) + \beta_1^M X^M - \beta_1^F X^F - \beta_1^M X^F + \beta_1^M X^F$$

$$\ln Y^M - \ln Y^F = (\beta_0^M - \beta_0^F) + \beta_1^M (X^M - X^F) + (\beta_1^M - \beta_1^F) X^F \quad \text{(IV)}$$

If men and women have the same preferences for care giving, then the only difference that will arise between them will be from differences in care giving characteristics (observables). This is described by the term $\beta_1^M (X^M - X^F)$. The third term in expression IV, $(\beta_1^M - \beta_1^F) X^F$, describes how much of the male/female difference can be described by unobservable differences in the characteristics of men and women, such as different preferences.

4.5 REGRESSION RESULTS

The following table presents the first results from Heckman's 2 stage correction. As mentioned in Chapter 3, all results reported are weighted by household.

Table 15: First Stage Heckman Correction - Logistic Regression.

Variable		Coefficients		
Dependent Variable – Dummy describing if care is provided (1 for positive hours, 0 otherwise)		**General**	**Male**	**Female**
Constant		1.423*	6.995*	-2.176*
		(0.301)	(0.486)	(0.392)
Age of Care Giver (≥ 45)		0.002	0.009	0.013
		(0.010)	(0.016)	(0.014)
Age²		0.000**	0.000	0.000*
		(0.000)	(0.000)	(0.000)
Number of Children in Household		0.003	0.399*	-0.255*
		(0.005)	(0.009)	(0.006)
Ln Hours Spent on Paid Work		-0.012	-0.351*	0.043*
		(0.010)	(0.021)	(0.011)
Ln Household Income		0.195*	-0.188*	0.446*
		(0.012)	(0.022)	(0.015)
Dummy Variables	*Marital Status of Care Giver*	-0.158*	-0.404*	-0.124*
		(0.011)	(0.022)	(0.013)
	University Degree of Care Giver	-0.210*	0.002	-0.369*
		(0.010)	(0.016)	(0.013)
	VISIBLE dummy	2.822*	18.293	2.269*
		(0.081)	(288.320)	(0.082)
	FEMALE respondent dummy	-0.384*		
		(0.010)		
	Living in Atl Region	0.346*	0.182*	0.357*
		(0.025)	(0.047)	(0.031)
	Living in Quebec	-0.663*	-1.184*	-0.422*
		(0.016)	(0.030)	(0.019)
	Living in Ontario	0.011	-0.706*	0.391*
		(0.015)	(0.030)	(0.019)
	Living in the Prairie Region	-0.099*	-0.547*	0.071*
		(0.018)	(0.033)	(0.022)
Cox & Snell R Square		0.018	0.026	0.022

Note: * denotes a P value of 0.000, ** denotes a P value of 0.010. Standard errors are reported in brackets. Sample consists of those individuals aged 45 or older who provide 0 or positive hours of care to an individual aged 65 or older. Source: Author's calculations based on Statistics Canada, General Social Survey Cycle 21, 2007, Microdata.

All variables included in the general regression were statistically significant, except for

age of caregiver, number of children in the household, hours spent on paid work, and

whether the caregiver lived in Ontario. Numbers of children in the household has a positive coefficient. Older children could provide assistance to the respondent in providing elder care, thus making it more likely that the respondent will provide such care. As the log of household income increases, the log likelihood of providing care also increases, perhaps because the respondent feels that with a higher income, he/she can afford the costs of providing elderly care. Marital status has a negative coefficient. Finally, a puzzling result is the negative coefficient on the dummy describing the respondent's gender. It means that women are less likely to provide care than men, which is contradictory to both the original hypothesis and numerous other literatures in the field (see Chapter 2).

Unusual results are also seen when the regression is performed separately for male and female caregivers. For instance, as the number of children in the house increases, there is a positive log likelihood that males will provide care, whereas for females, there is a negative log likelihood. This makes more sense for females, because the presence of more children means women will devote more time caring for them. This is time not spent on caring for the elderly. The education level of male caregivers is statistically insignificant, while women with a university degree have a significant negative log likelihood of providing care. As the log of hours spent on paid work increases, however, men have a negative log likelihood of providing care, whereas women has a positive log likelihood of doing so. The regional dummy for Atlantic Canada is positive for both men and women. This makes sense, as the population of the region is generally older. The regional dummy for Quebec is negative for both men and women, which may indicate a

generally younger population. What is puzzling is that the Ontario and the Prairie regional dummies are negative for men but positive for women. However, these results are only for the first stage of the 2 Stage Heckman correction procedure, and we shall see in the following table if the coefficients seen on the above mentioned variables change after adding the correction term LAMBDA in the second stage, OLS regression.

Table 16: Second Stage Heckman Correction - OLS Regression.

Variable		Coefficients		
Dependent Variable – Ln Hours Spent on Caregiving (Hours > 0)		**General**	**Males**	**Females**
Constant		0.210**	0.600*	0.196
		(0.088)	(0.116)	(0.131)
Age of Care Giver (≥ 45)		0.087*	0.067*	0.114*
		(0.003)	(0.004)	(0.005)
Age^2		-0.001*	-0.001*	-0.001*
		(0.000)	(0.000)	(0.000
Age of Care Recipient (≥ 65)		0.004*	0.007*	0.002*
		(0.000)	(0.000)	(0.000)
Number of Children in Household		-0.027*	0.003	-0.001
		(0.001)	(0.002)	(0.002)
Ln Hours Spent on Paid Work		-0.011*	0.085*	-0.099*
		(0.003)	(0.005)	(0.004)
Ln Household Income		-0.187*	-0.225*	-0.190*
		(0.003)	(0.005)	(0.005)
Dummy Variables	*Marital Status of Care Giver*	0.045*	-0.004*	0.052*
		(0.003)	(0.005)	(0.004)
	University Degree of Care Giver	-0.105*	-0.156*	-0.034*
		(0.003)	(0.004)	(0.005)
	VISIBLE	0.212*	0.336*	0.145*
		(0.007)	(0.008)	(0.011)
	FEMALE	0.297*		
		(0.003)		
Care Giver/Receiver Relationship Dummy Variables	*Caring for SPOUSE*	1.350*	2.075*	0.869*
		(0.015)	(0.022)	(0.021)
	Caring for FATHER	0.436*	0.209*	0.665*
		(0.004)	(0.005)	(0.006)
	Caring for MOTHER	0.427*	0.256*	0.573*
		0.003)	(0.004)	(0.004)
	Caring for BROTHER	-0.201*	-0.137*	-0.311*
		(0.022)	(0.026)	(0.037)
	Caring for SISTER	-0.124*	-0.399*	0.043**
		(0.013)	(0.022)	(0.017)
Lambda		-0.315*	0.747*	-0.647*
		(0.030)	(0.038)	(0.037)
Adjusted R Squared		**0.092**	**0.075**	**0.086**
N		**650439**	**310829**	**339610**

Note: * denotes a P value of 0.000, ** denotes a P value of 0.010. Standard errors are reported in brackets. Sample consists of those individuals aged 45 or older who provide positive hours of care to an individual aged 65 or older. Source: Author's calculations based on Statistics Canada, General Social Survey Cycle 21, 2007, Microdata.

All variables in the general regression are statistically significant, and all non-relationship variables have the expected signs. This includes the FEMALE dummy, so the original hypothesis (that women spend more time providing care) is indeed correct. Of the five relationship dummies, SPOUSE has the greatest magnitude, which suggests that caregivers who care for their significant others devote more log hours to caregiving than those caregivers who care for someone else. The magnitude of the MOTHER coefficient is slightly smaller than that of the FATHER coefficient, so a caregiver who provides care to his/her mother provides less log hours of care than a caregiver who provides care to his/her father. Those who care for a sibling provided negative log hours of care compared to caregivers who care for someone else, which would suggest that perhaps the caregiving needs of siblings are being taken care of by someone else (for example, the sibling's own spouse or children). The visible minority dummy has a positive coefficient. This means that visible minorities seem to devote more log hours to caregiving than non-visible minorities, quite possibly due to different cultural expectations in regards to caring for the elderly. However, because this variable is not broken down into specific visible minority categories in the PUMF file, and because of too few observations, a more detailed analysis of this variable cannot be provided, except to say that differences would probably also exist between different visible minority groups.

We find that all variables are statistically significant in both the male and female caregiver models, except for the number of children in the household. It is interesting to note the differences in signs on variables between the two models. For instance, the

coefficient for the number of children in the household is positive for male caregivers, but negative for female caregivers. Perhaps female caregivers feel that more children in the household means more non-elderly caregiving household work is required and substitute away from time spent on caregiving to spend more time on other household activities. On the other hand, male caregivers may feel that having more children living the house provides them with more assistance in household work, and this help means male caregivers can devote more time to providing care to the elderly. The log of hours spent on paid work is positive for male caregivers, yet negative for female caregivers. Perhaps for males, spending more time at work means they must find more time from other parts of the day to provide care and to do so, males will spend less time on other household or social activities, and devote more log hours to elderly caregiving. It could also be a psychological effect, where males feel guilty about spending more time away from home at work, and thus to make up for the feeling of neglecting the care recipient, will devote more log hours to providing care by substituting away from other household activities. The negative sign for females shows the expected substitution effect as seen in Figure 1 in the descriptives of Chapter 3.

Looking at the magnitudes of the coefficients on the relationship dummies, we see that men spend much more log hours caring for their spouses than women spend caring for theirs. This could be due to the fact that women have a longer life expectancy than men, and therefore, there are fewer women whose spouses are alive and need care, than men whose spouses are still living. Women spend much more time caring for their fathers and mothers than men. Male caregivers provide negative log hours of care giving when it

comes to their sisters, while female caregivers provide positive log hours, which may simply be because of the level of comfort between care giver and receiver when it comes to providing support for personal grooming and hygiene. We also see that both men and women spend negative log hours caring for their brothers.

We can now conduct the Chow Test to determine if there is a statistically significant difference between the male and female models. The two models are

$$\ln Y = \beta_0 + \beta_1 AGE + \beta_2 AGE^2 + \ldots + \beta_{14} VISIBLE + \lambda_m \qquad \text{(Males)}$$

$$\ln Y = \alpha_0 + \alpha_1 AGE + \alpha_2 AGE^2 + \ldots + \alpha_{14} VISIBLE + \lambda_f \qquad \text{(Females)}$$

The null hypothesis states that the corresponding coefficients in each model are the same – that is,

$$H_0: \beta_0 = \alpha_0, \ \beta_1 = \alpha_1, \ \beta_2 = \alpha_2, \ \ldots, \ \beta_{14} = \alpha_{14}$$

The test statistic is constructed as follows:

$$F = \frac{\dfrac{Sc - (S1 + S2)}{k}}{\dfrac{S1 + S2}{N1 + N2 - 2k}} \sim F(k, N1 + N2 - 2K)$$

where Sc is the residual sum of squares for the combined regression, $S1$ is the residual sum of squares for the model for males, $S2$ is the residual sum of squares for the model for females, $N1$ is the number of observations for males, $N2$ is the number of observations for females, and K is the number of parameters (in this case, 17). These numbers are provided in Appendix 2. Substituting them into the equation, we get a critical value of $F=586.49$. This means that we can reject the null hypothesis, and say that there is indeed a statistically significant difference between the male and female caregiver models, and we can proceed with the Oaxaca Decomposition. In order to do so,

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we need the averages of the variables for males and females. These averages are

provided in Table 17.

Table 17: Variable Averages, Based on Care Giver Gender.

Variable		Males	Females
Ln Hours Spent on Caregiving		1.0881	1.4263
Age of Care Giver (≥ 45)		52.71	52.73
Age^2		2814.57	2813.70
Age of Care Recipient (≥ 65)		80.02	80.63
Number of Children in Household		1.05	0.75
Ln Hours Spent on Paid Work		3.7059	3.4814
Ln Household Income		11.2007	11.0418
Dummy Variables	*Marital Status of Care Giver*	0.81	0.60
	University Degree of Care Giver	0.35	0.3
	VISIBLE	0.06	0.04
Care Giver/Receiver Relationship Dummy Variables	*Caring for SPOUSE*	0.01	0.01
	Caring for FATHER	0.17	0.13
	Caring for MOTHER	0.43	0.51
	Caring for BROTHER	0.00	0.00
	Caring for SISTER	0.01	0.01
Lambda		0.1254	0.1745

Note: Sample consists of those individuals aged 45 or older who provide positive hours of care to an individual aged 65 or older. Source: Author's calculations based on Statistics Canada, General Social Survey Cycle 21, 2007, Microdata.

In general, variable averages between the genders are very close. There are relatively

larger differences seen in log of hours spent on caregiving, the number of children in the

household, log of hours spent on paid work, the age of the care recipient, and log of

household income, than in the other variables. The averages for the SPOUSE,

BROTHER and SISTER dummies are the same for both male and female caregivers.

Both male and female caregivers are, on average, 52.7 years of age and are providing

care to someone who is, on average, 80 or 81 years of age. We now have all the results

needed in order to calculate the Oaxaca Decomposition.

Table 18: Oaxaca Decomposition.

Variable		Coefficients		Variable Ave.		Variable Diff.	Coeff. Diff.
		Males	**Female**	**Male**	**Female**		
Ln Hours Spent on Caregiving				1.0881	1.4263		
Constant		0.600	0.196			0	0.404
Age of Care Giver (≥ 45)		0.067	0.114	52.71	52.73	-0.00134	-2.47737
Age²		-0.001	-0.001	2814.57	2813.70	-0.00087	0
Age of Care Recipient (≥ 65)		0.007	0.002	80.02	80.63	-0.00427	0.40315
Number of Children in Household		0.003	-0.001	1.05	0.75	0.0009	0.003
Ln Hours Spent on Paid Work		0.085	-0.099	3.7059	3.4814	0.019083	0.640578
Ln Household Income		-0.225	-0.190	11.2007	11.0418	-0.03575	-0.38646
Dummy Variables	*Marital Status of Care Giver*	-0.004	0.052	0.81	0.60	-0.00084	-0.0336
	University Degree of Care Giver	-0.156	-0.034	0.35	0.3	-0.0078	-0.0366
	VISIBLE	0.336	0.145	0.06	0.04	0.00672	0.00764
Care Giver/Receiver Relationship Dummy Variables	*SPOUSE*	2.075	0.869	0.01	0.01	0	0.01206
	FATHER	0.209	0.665	0.17	0.13	0.00836	-0.05928
	MOTHER	0.256	0.573	0.43	0.51	-0.02048	-0.16167
	BROTHER	-0.137	-0.311	0.00	0.00	0	0
	SISTER	-0.399	0.043	0.01	0.01	0	-0.00442
Lambda		0.747	-0.647	0.1254	0.1745	-0.03668	0.243253
Predicted Values		**-0.1065**	**1.41313**	**Total**		**-0.07297**	**-1.44666**
Differences in PVs		**1.51963**		**Total**		**-1.51963**	

Sample consists of those individuals aged 45 or older who provide care to an individual aged 65 or older. Source: Author's calculations based on Statistics Canada, General Social Survey Cycle 21, 2007, Microdata.

These results show that 0.07297 is the "explained" differential (which is the result of observable differences in the variables between men and women), while 1.44666 is the "unexplained" differential (which is the result of unobservable differences between men and women). This means that only 4.8% of the difference can be described by observable characteristics, while the remaining 95.2% of the difference is due to unobservable differences between male and female caregivers. This would imply that much of the difference seen in the number of hours of care provided by males and females to the elderly is because of different preferences male and female caregivers have, and this preference difference cannot be captured by the types of questions asked in the GSS[3].

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[3] These results were obtained by weighted male coefficients and female variable averages. Oaxaca Decomposition can also be conducted by weighting female coefficients and male variable averages – however, the results are the same.

CHAPTER 5   CONCLUSION

The purpose of this study was to examine care giving for the elderly in Canada. Specifically, the question asks whether or not the care giver/receiver relationship matters in determining whether or not an individual provides care, and if so, how. We used the General Social Survey of 2007, entitled Family, Social Support and Retirement. To answer the question, we used Heckman's 2 stage correction technique to correct for sample selection bias. This was done by first estimating a logit regression to determine the log likelihood that an individual would provide care. The estimated coefficients from this regression were then used to calculate the correction factor λ. The correction factor was used as a separate independent variable in the second stage OLS regression. The logistic regression results for the pooled data showed that all variables were statistically significant, particularly the immediate family relationship dummies. The coefficient with the largest magnitude was the dummy describing those who cared for their mothers. This means that the greatest log likelihood for providing care is for one's mother. However, when examining the results from the second stage OLS regression, we find that the most time is spent caring for spouses. This is seen for the pooled regression and when the regression is run separately for males and females. Perhaps this is because of a longer life expectance for women. If women are living longer than men, there are fewer women who care for their husbands than men who care for their wives. Women also spend more time caring for their parents than men do. When running the regression separately for male and female caregivers, the visible minority status dummy is statistically significant for male caregivers, whereas it is insignificant for female caregivers. These results mean

that immediate family relationships are significant factors in determining whether or not an individual will provide elder care.

By conducting the Chow Test, we saw that there is indeed a statistically significant difference between how much elder care male and female caregivers provide. In order to examine this difference, we conducted the Oaxaca Decomposition in order to determine how much of the difference can be explained by observable and unobservable characteristics. The results showed that only 4.8% of the difference could be explained by observable characteristics (differences in the variables), while the remaining 95.2% of the difference could be explained by unobservable characteristics, or differences in male and female caregiver preferences. This would suggest that when men and women provide care, they do so for vastly different reasons. These reasons could very well be due to societal and familial expectations, as well as personal views and opinions in regards to who is responsible for providing elderly care, and how much should be provided. Unfortunately, because of a lack of observations, the VISIBLE dummy for visible minorities cannot be examined in the same fashion. With more information, it would be interesting to conduct the Oaxaca Decomposition on visible minority caregivers and determine how much of the difference between visible minority and non-visible minority caregivers is due to a difference in observables and how much of the difference is due to differences in preferences.

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Figure 1: Age Distribution of Canadian Population over Time
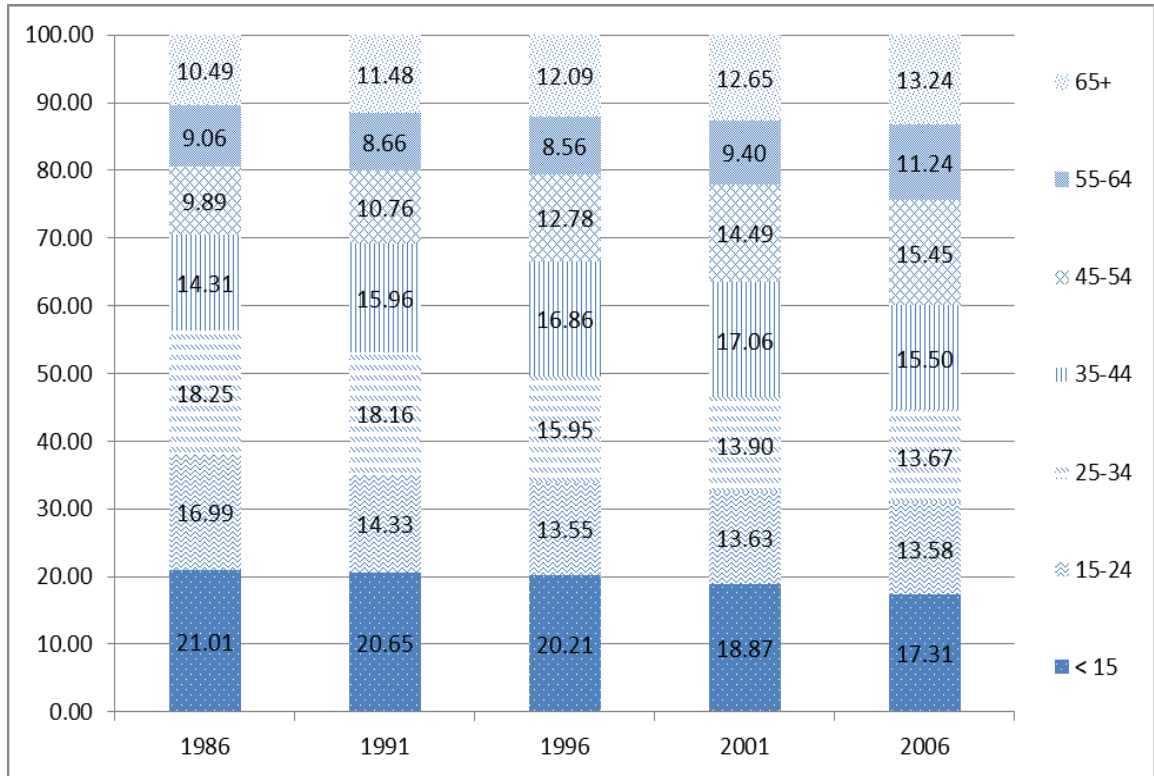
Source: Statistics Canada, 1986, 1991, 1996, 2001, 2006 Canadian Censuses, CANSIM using CHASS, Series No. v30597583, v30597586, v30597589, v30597592, v30597595, v30597598, v30597601, v30597604, v30597607, v30597610, v30597613, v30597616, v30597619, v30597622, v30597625, v30597628, v30597631, v30597634, v30597637, v30597640.

Table 1: Per Capita Total Health Expenditure as a Ratio of Expenditure of the 0-14 Demographic, By Age and Gender, 2001.

Age Group	Male	Female	Total
<15	1	1	1
15-24	1.11	1.52	1.30
25-34	1.02	1.63	1.31
35-44	1.15	1.57	1.35
45-54	1.62	1.88	1.74
55-64	2.41	2.64	2.52
65-74	4.70	4.55	4.61
75-84	8.83	8.75	8.72
85+	16.74	20.21	18.88

Note: A ratio greater than 1 indicates that health expenditures for that age group are greater than that of the 0-14 demographic. Source: Based on author's own calculations and data from Health Canada, 2001.

Table 2: Additional Health Costs Due to Population Aging.

Fiscal year	Per Capita ($)	Per Person Over 25 ($)	As % of Prov/Terr Revenues
2006-07	150	224	2.1
2011-12	316	450	4.1
2016-17	515	719	6.2
2021-22	756	1036	8.6
2026-27	1055	1416	11.1

Source: Ruggeri, 2002.

Table 3: Public Share of Total Health Expenditures By Age Group and Year.

Age	1980-81	1990-91	2000-01
< 15	64.9	63.8	60.2
15-24	78.5	77.6	66.2
25-34	69.2	70.1	72.2
35-44	68.1	64.9	63.6
45-54	70.6	65.4	61.2
55-64	75.8	70.9	66.2
65-74	82.9	81.5	75.1
75-84	84.3	84.1	80.4
85+	82.0	82.4	80.6
Total	75.2	74.2	70.7

Source: Health Canada, 2001.

APPENDIX B   DESCRIPTIVE STATISTICS

The following are tables of descriptive statistics for Chapter 3.

Table 1: Weighted Proportion of Individuals In the Population Who Provide Care (%)

Care Giver/Receiver Relationship	Male	Female
Immediate Family	26.47	35.2
Friends/Neighbours/Co-Workers	22.10	28.47

Source: Statistics Canada, General Social Survey Cycle 21, 2007. Results are based on author's own calculations.

APPENDIX C   DESCRIPTION OF VARIABLES

Age of Respondent - As an individual ages so too do the care recipients, making it more likely that care will be provided.   In the GSS, this variable is broken down into 4 different age groups; 45-54, 55-64, 65-74, and 75 and over.   This variable has been converted into a continuous variable by taking the midpoints of each age group.

Square of Age of Respondent - While the likelihood of providing care increases as an individual increases, it is also possible that the individual will be less likely to provide care because of their own declining health status. We therefore assume that there is a non-linear relationship between age and hours of assistance provided.

Marital status of respondent - It is expected that those who are currently in a relationship will be more likely to provide care. The GSS presents 6 different categories; married, common law, widowed, separated, divorced, and single (never been married). For the purposes of this study, this variable will be presented as a dummy variable: 1 for those who are currently in a relationship (married/common law) and 0 for those who are single (widowed/divorced/separated/never married).

Number of respondent's children living in the household (any age or marital status) - The more children an individual has, the more competing demands for the individual's time are created. This can have a negative effect on time spent on care giving. The GSS

presents this variable by listing those with 0, 1, 2, 3 and 4 or more children. For the purposes of this study, this last category will be simply referred to as 4.

Ln of hours spent on paid work - As the number of hours of paid work increases, more and more workers are experiencing conflicting demands both at home and on the job. This is referred to as "role overload" (too many things to do and not enough time to do it in) by Duxbory and Higgins (2001, 2009). It is expected that an increase in hours of paid work will cause time spent on care giving to fall, because of the substitution effect seen in Chapter 3.

University degree of respondent - Education can affect care giving behaviour for two reasons. First, those with a higher level of education may be more knowledgeable in how best to provide care. These care givers may know more about certain treatments or medicines, which ones are more effective, which ones may not be necessary, etc. This would mean that a care giver would become more efficient – by being able to provide quality, effective care that does not take too much time to give. This efficiency would mean that as the education level increases, the time spent on care giving decreases. The second affect education can have on care giving can be through the individual's earnings. Those with a higher level of education tend to also have higher earnings. A person with a higher level of education may decide to spend less time on care giving because they do not want to give up their higher earnings. In this study, this is controlled for by including household income in the regression as a separate variable. Therefore, the variable describing if an individual has a university education captures the taste of the individual

to provide care. We expect that those with a university education will spend less time providing care. In the GSS, this variable is coded with 10 different levels of education, which are doctorate/masters/some graduate, undergraduate, those who have some university, those who have completed community college, those who have completed trade school, those who have dropped out of either one, those with a high school education and those without. This variable will be a dummy variable: 0 for those who do not have a university degree and 1 for those who do[4]. The care giver's profile shows that those individuals who have a university degree are less likely to provide care. Those who do also spend less time care giving.

Age of primary care recipient - As the care recipient ages, it is more likely that they will require some kind of assistance in their day to day lives, so it is expected that the number of hours spent on care giving will increase. This variable is continuous in the GSS, from ages 10 and under to 100 and older. This study focuses on those who provide care to senior citizens. Statistics Canada defines seniors to be those who are aged 65 and older, while those aged 55-64 are those nearing retirement, and those aged 15-54 are the working age population. Therefore, only those care recipients who are aged 65 and older will be considered here.

Ln of total household income - Household income can come in one of two ways; either through paid work, or through non-work related activities. If household income only increases through unpaid work, such as through an inheritance or the lottery, the

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[4] The original GSS variable for education was used when tabulating descriptives for Chapter 3, but due to unexplainable results with different university or college degrees, the variable was recoded.

individual may decide to spend less time on paid work and more time doing other activities. However, there are a variety of unpaid work related activities the individual could decide to spend more time on – for example, leisure, child rearing, housework, community service, etc. This means that if household income increases, care giving activities may change very little or may not change at all. On the other hand, if household income increases because of an increase in the wage rate, then it is possible that the individual will spend more time at paid work and be less inclined to provide care, and will therefore provide less of it. In this study, it is expected that as household income increases, time spent on providing care will decrease because of the substitution effect between time spent on paid work and time spent of care giving, as seen in Chapter 3. The GSS breaks down income into 12 categories. Five of these categories are under $20 000. These will be recoded into one category as those who earn $20 000 or less, but will be treated simply as those who earn $20 000. Some of the income categories have a $10 000 range, and others which have a $20 000 range. In this study, we will make income continuous by taking the midpoints of each income range. The highest income group is for those who earn $100 000 or more, and will be treated simply as those who earn $100 000. We take the natural logarithm of household income to reduce the problem of heteroscedasticity.

Female respondent - It is expected that female respondents will be more likely to be engaged in care giving than men, as has been presented in the literature and has been shown in the care givers profile. If the relationship variable between care giver and

receiver is statistically significant, the same model will then be regressed separately for male and female care givers. The dummy will be 0 for males, 1 for females.

Atlantic Region – 1 if respondent lives in the Atlantic Region, 0 otherwise.

Quebec – 1 if the respondent lives in the Quebec Region, 0 otherwise.

Ontario – 1 if the respondent lives in the Ontario Region, 0 otherwise.

Prairie – 1 if the respondent lives in the Prairie Region, 0 otherwise.

The following variables describe various immediate family relationships of care recipients to respondents. Since the purpose of this study is to examine how care giver/receiver relationships influence the hours spent on caregiving, all relationships will be expressed as dummy variables. This assumes that all other variables in the regression will have the same effect on hours of caregiving regardless of relationship, and therefore comparison between different relationships will be easier to make.

Caring for SPOUSE - 1 if the care giver is caring for his/her spouse; 0 otherwise.

Caring for FATHER - 1 if the care giver is caring for his/her father; 0 otherwise.

Caring for MOTHER - 1 if the care giver is caring for his/her mother; 0 otherwise.

Caring for BROTHER - 1 if the care giver is caring for his/her brother; 0 otherwise.

Caring for SISTER - 1 if the care giver is caring for his/her sister; 0 otherwise.

Visible minority status of respondent - It is expected that because visible minorities come from various ethnic backgrounds, they experience different cultural expectations in

regards to caring for the elderly. This will then affect the hours they spend providing care, although whether it is a negative or positive effect is uncertain. The GSS presents this variable as those who are visible minorities and those who are not. The model will be regressed separately for visible minority care givers. This means that Oaxaca Decomposition can also be used to compare differences between visible minorities and nonvisible minorities.