Three Essays on the Allocation of Time in Canada

by

Adian A. McFarlane

A Thesis submitted to the Faculty of Graduate Studies of

The University of Manitoba

in partial fulfilment of the requirements of the degree of

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DECLARATION OF CO-AUTHORSHIP

I hereby declare that the first and third essays of this dissertation (chapters 2 and 4) include material that is the result of joint research with Lindsay Tedds. The extent of the co-authorship for these essays is as explained below.

Chapter 2   "Work, rest, and play: Exploring trends in time allocation in Canada and the United States"

In this chapter of the dissertation, I am the lead author. I cleaned the data, estimated the econometric models, and wrote the first and subsequent drafts of the manuscript: introduction, methods, results conclusion. I also interpreted the results, refined the research questions, and finalised the manuscript.

In this chapter, Lindsay provided the topic, research question, framework for the paper, and identified suitable data sources. Lindsay reviewed the preliminary results, aided in their interpretation, and provided direction for further analysis. Lindsay also guided the revisions of the manuscript, provided detailed comments, and rewrote some text.

Chapter 4   "People who care; people who share"

In chapter 4, I am also lead author. I performed the data cleaning, formulated additional hypothesis, and estimated the econometric models. I also wrote the introduction,

literature review, theoretical framework, data description, methods, results, and conclusions—therefore the first and subsequent drafts of the manuscript.

In this chapter, Lindsay provided the topic, refined the research questions, and identified the data source. Lindsay also advised on the appropriate econometric methodology, and aided in revisions to drafts of manuscript, though to a lesser extent than in chapter 2.

Except for the above qualifications, I do herby certify that this dissertation and the research therein is the product of my own work.

ABSTRACT

This dissertation consists of three essays that are linked together by their focus on the allocation of time. The first essay is an analysis of time use in Canada (1986 to 2005) and the U. S. (1985 to 2005) after controlling for demographic changes. There are three main findings. First, in 2005, the average weekly hours spent on market work is higher in Canada than in the U.S. (37.29 vs. 33.29). Second, between 1986 and 2005 market work increased by an average of 3.75 hours per week in Canada, while in the U.S. it remained relatively stable. Third, over the sample period, time spent on leisure, measured in a variety of ways, increased in the U.S., while time spent on leisure generally fell in Canada; in addition, the least educated allocated more time to leisure relative to the most highly educated in both countries.

In the second essay, the two most recent Canadian time diary surveys (1998 and 2005) are used to analyse the time fathers allocate to childcare and the impact of fatherhood on the time men allocate to market work. The results reveal that fathers spent, on average, more hours per week on market work than non-fathers, but that the time spent on market work increases with educational attainment of non-fathers only. In addition, fathers with higher education spent more time on childcare, even after controlling for socioeconomic and demographic factors.

The third essay is an assessment of the nature and presence of the interdependency of the decisions to give time and money using 2004 Canadian philanthropic data. The objectives

are to determine whether those who give money necessarily give time, and vice versa, and assess the impact of socioeconomic and demographic variables on donating behaviour. The main finding is that donating money increases the probability of being a volunteer, but being a volunteer does not affect the probability of donating money. Moreover, the decision to give money is the single most important determinant of the decision to give time.

ACKNOWLEDGEMENTS

THREE ESSAYS ON THE ALLOCATION OF TIME IN CANADA

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CHAPTERS

CHAPTER 1

INTRODUCTION

This dissertation is a study on the allocation of time, which pervades almost every sphere of human social and economic activities. The allocation of time also influences social and economic welfare within a country and differences in welfare that exist across countries. Therefore, it is not surprising that the study of the allocation of time has received increasing interest from academicians and policy makers alike. One additional benefit derived from the study of the allocation time is particularly relevant for policy purpose. Specifically, the consequences of changes in the economic environment and public policy on individual welfare can be better understood by examining how individuals choose to reallocate time as their circumstances change.

Through three essays, the purpose of this dissertation is to contribute to literature on time allocation in general, and on how time is allocated in Canada in particular. The first essay is a comparative analysis of the major trends in time use in Canada compared to the United States over a twenty-year period, the focus being more on Canada. The second essay examines the time Canadian men allocate to two activities, namely market work and childcare, along their education (income) profile. In the third essay, the links between the decision to allocate time to volunteering and the decision to contribute money to a

charitable organisation are examined. The common theme unifying the three essays is not only analysis of an individual's use of time, but also how changes in socioeconomic status can be identified, issues of gender differentiation explored, and the transmission of social advantage or disadvantage assessed by using time use data. While each essay's contribution to the literature is primarily empirical, their results demonstrate that an analysis of time use can elucidate how changes in policy can potentially impact on the economic and social welfare of individuals and society as a whole. In addition, the results show that the analysis of time use data can serve to enrich our understanding of the relationship between economic and non-economic activities that, in turn, can aid in the correct formulation public policies aimed at increasing social welfare.

The first essay is co-authored with Lindsay Tedds. In this essay, we use time diary data to compare and contrast time allocation in Canada (1986 to 2005) and the United States (1985 to 2005). We control for demographic changes in both countries; this is in contrast to the approach most scholars have used in the existing literature. By controlling for demographic changes, we strip away the changes in time allocation that have occurred as because of factors such as increasing educational attainment, declining fertility rates, and changes in the age distribution of the population. What remains as a result, are changes in the allocation of time that are due to changes in policy and preferences over time. This essay is the first cross-country comparison of the time Canadians and Americans spend on various activities aside from market work.

Among the findings of the first essay are that a growing leisure inequality exists in Canada and the United States. Therefore, the least educated spend the most time on leisure compared to the most highly educated. One implication of this finding is that increasing income, which presumably is positively correlated with an individual's level of education, complicates welfare evaluation given that it is negatively correlated with the time spent on leisure. At the same time, much of the relatively greater time spent on leisure by the least educated may be unwanted, reflecting barriers they face in achieving desired labour market outcomes (e.g., getting part-time work when full-time work is desired). We also find that, in 2005, Canadians spend more hours per week on market work compared to their American counterparts. This latter result is in contrast to findings from most other studies that use non-time use survey data (e.g., labour force survey data).

In the second essay of this dissertation, I am the sole author. In this essay, the focus is on time allocation in Canada only using the 1998 and 2005 time use surveys. I assess whether, and to what extent, fatherhood affects the time men allocate to market work. I then examine how the time a father spends on childcare is affected by his educational attainment, the educational attainment of his spouse, and the age and number of children present in his household. The focus in this essay is on residential fathers and the time they spend on primary and secondary childcare. The tobit model is used to analyse the time spent in childcare and Cragg's double hurdle is used to analyse the time spent on market work.

The results of the second essay reveal that fathers work more market work hours per week compared to non-fathers and that the time a father spends on childcare increases with his level of educational attainment. This latter finding is in contrast to what would be expected given that higher educated, and presumably higher income, fathers would face a higher opportunity cost to allocate time to childcare and away from market work. This finding is discussed with reference to explanations posited by other scholars who report similar findings in the literature. In this second essay, I also find that the time fathers spend on childcare increases with their spouse's market work hours. This result is not as obvious as it seems, as several scholars actually find a statistically insignificant relationship between the employment status and market work hours of a father's spouse and the time he devotes to childcare.

The third essay of this dissertation is co-authored with Lindsay Tedds. In this essay, the focus is on linking time allocated to volunteering in Canada to monetary donations made to charitable organisations. Both are a part of the philanthropic sector that contributes to the social and economic well-being of Canadians. We examine the nature and presence of the interdependency of the decisions to give time and money; therefore, we focus on the participation decisions. Most scholars empirically analysing philanthropic behaviour fail to consider the interdependency that could exist between the decisions to gift time and money. The result of this failure is that their parameter estimates are likely biased and inconsistent. Further, among the few authors that have examined the joint determination of time and monetary donations, they have focused mainly the decisions relating to the level (intensity) of philanthropic donations made. However, the participation decision is

also an important area of study as it lends itself to a greater understanding of how to model the level of philanthropic donations made.

In this third essay, we use Canadian philanthropic data to assess whether those who give money necessarily give time, and vice versa, in addition to discussing the impact of socioeconomic and demographic variables on philanthropic behaviour in general. We account for the fact that the decisions to give time and money are potentially related through unobserved factors not accounted for by the inclusion of socioeconomic and demographic variables, and that the decisions to donate time and money might be interdependent. We use the single equation, bivariate, recursive, and simultaneous bivariate probit models in our estimations. We know of no other scholars using Canadian philanthropic data to examine philanthropic behaviour from this perspective. In addition, there is only one scholar, to our knowledge, that examines philanthropic behaviour as we do in this essay, this scholar using Japanese philanthropic data.

The results from the third essay reveal that ignoring the possible dual endogeneity that could exist between the decisions to gift time and money would lead one to conclude that the decision to give time increases the probability of making the decision to give money, and vice versa. However, when we control for potential dual endogeneity, the probability of giving time conditional on giving money is positive and statistically significant, while the probability of giving money conditional on giving time is statistically insignificant. Therefore, those who donated money are more likely to have donated time, while those who donated time would not have necessarily given money. Moreover, we find that the

decision to donate money has the largest impact on the decision to volunteer when compared to the other socioeconomic and demographic variables that we include in our analysis. Among these socioeconomic and demographic variables, we find that cultural heterogeneity, as measured by language spoken at home and place of birth, has a negative impact on the probability of donating either time or money.

CHAPTER 2

WORK, REST, AND PLAY: EXPLORING TRENDS IN TIME ALLOCATION IN CANADA AND THE UNITED STATES[1]

2.1 Introduction

Individuals can allocate their time endowment across a wide range of competing activities and these activities fall generally into one of four main categories: market work, nonmarket work (or household production), leisure, and personal care (e.g., sleep).[2] While the study of time allocation has its genesis in Becker (1965), to date, a great deal of emphasis has been placed by economists on exploring the allocation of time to market work, leaving a detailed analysis of time spent on other activities relatively unexplored (Hamermesh and Pfann 2005). This lack of exploration is surprising, given how time is apportioned to activities outside of market work affects how much time is allocated to market work itself. Further, how the dynamics of the time allocated away from market work changes within one country, and across countries, has implications for economic policy and welfare. In particular, time allocation influences the relative price of goods and services and, in turn, the distribution of income (Juster and Stafford, 1991). Furthermore, differences in time allocation across countries can help us to understand the variations in economic growth and the influence of the institutional environment and public policy on individual and family time allocation decisions.

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[1] This chapter is the outcome of joint research with Lindsay Tedds.
[2] A fifth category is the time spent acquiring human capital, but this time use category is not explored in this paper.

Recently, a detailed and rigorous analysis of trends in time allocation in the United States over the last four decades has become available. Aguiar and Hurst (2007) analyse trends in market work, nonmarket work, and leisure with U.S. time use data spanning 1965 to 2003. Their study is groundbreaking on three fronts. First, they report four different measures of leisure. Second, they report and analyse the time spent on leisure by levels of educational attainment for both men and women. Third, and probably most important, rather than report unconditional means, they report trends in time use controlling for demographic changes based on age, gender, parental status, and level of educational attainment across the entire population.[3] They find that the time allocated to market work has remained relatively stable in the United States, but that the time allocated to leisure increased dramatically. The changing patterns of time use have been such that the time allocated to market work by men decreased to support an increase in time spent on leisure, whereas women allocated more time to both work and leisure supported by a decline in the time they spent on nonmarket work. They also document a growing inequality in the time spent on leisure. Specifically, they find that the least educated (less than high school) increasingly spend more time on leisure compared to individuals who are highly educated (university trained). In addition, they find that changing demographics has had a role in influencing the time allocated to market work, but its impact on other time use categories has been relatively insignificant.

Why is it necessary to control for the impact of demographic changes on trends in time use? Demographic changes in tandem with changes in social and tax policies, economic

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[3]Much of the existing literature on allocation of time report trends in time use without controlling for demographic changes. We refer to such estimates as unconditional time use averages.

conditions, preferences (individual and household), and the opportunity costs of competing activities, among other factors, all influence the allocation of time. Since World War II, significant demographic changes have taken place in advanced capitalist economies including Canada and the United States. These changes include higher levels of educational attainment, the decline in single-earner families, lower levels of fertility, higher levels of immigration, and an aging population. At the same time, there has been economic development and growth. One of the significant results of these changes has been the dramatic rise in the labour force participation of women. In addition, in most of these countries, and in particular Canada, there have been significant changes in the structure and level of taxes, social assistance, childcare benefits, maternity and parental leave benefits, employment insurance, and pension plans. For policy purposes, it is important to disentangle how much of the change in the use of time is linked to changing demographics and how much is because of policy changes and other factors.[4] By controlling for demographic changes, we are taking the first step in disentangling the impact of demographic, policy, preferences, and economic changes on the allocation of time.

The purpose of this essay is to build on the contributions of Aguiar and Hurst (2007) and thereby add to our knowledge of the allocation of time. Specifically, we make two contributions to the literature. First, using Canadian data from 1986 to 2005, we analyse trends in the allocation of time to leisure, market work, and nonmarket work (including

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[4]For example, Fuess (2006) evaluates the success of the Japanese government's 1991policy initiative to increase leisure time spent for leisure. Controlling for age, and labour market variables he finds that from 1986 to 2001 both men and women have not experienced an increase in leisure overall.

childcare). We control for demographic changes across the entire population, report a variety of measures of leisure, and examine the relationship between educational attainment and time spent on leisure. Second, the trends in time use results are compared with those obtained for the U.S. over a similar period, 1985 to 2005. Our sample in both countries is the non-retired and non-student population aged 20 to 64.

Previous studies in Canada have not controlled for demographic changes across the entire Canadian population as we do in this essay. For example, Beaujot and Liu (2005) use the 1986, 1992, and 1998 Canadian time diary data to analyse how paid and unpaid work are affected by marital, parental, and employment status. More recently, Turcotte (2007) examines time workers spend with their families using 1986, 1992, and 1998 Canadian time diary data also. The current essay differs from these Canadian studies, principally because we control for demographic changes over two decades and across the entire population rather than simply across different demographic groups using cross sectional regressions. To our knowledge, the current essay is the first such detailed analysis that has been conducted using Canadian time use data. In addition, we are not aware of any work that compares detailed time use by Canadians to their U.S. counterparts, other than studies that compare time spent on market work.

More broadly, the trends in time use that we document will aid in future research seeking to explain why time has been allocated differently in Canada and the United States and the implications for policy in light issues such as growing time squeeze and the imbalance in work and family life in both countries. The differences in time use across

both countries likely reflect differences in culture, preferences, economic conditions, institutions, policy, and systems of taxation among other factors.

In sum, our main results are as follows. First, we find that in 2005, after controlling for demographic changes, Canadians and Americans spend the same time on core market work activities, though overall Canadians spend more hours per week on all market work activities than Americans (37.29 vs. 33.43 hours per week). In addition, relative to 1986, in 2005, the hours spent on market work increased in Canada (by 3.75 hours per week), but remained relatively stable in the United States (1985 to 2005). The dynamics have been such that, over the sample period, Canadian men have increased the time they spend on market work by 1.57 hours per week, whereas, in contrast, American men decreased the time they spent on market work by an average of 3.32 hours per week. However, Canadian and American women increased the time they spent on market work (by 5.89 and 3.47 hours per week respectively).

Second, in 2005, the time spent on nonmarket work was the same in the U.S. and Canada. However, over the sample period Canadian men increased their nonmarket time by 1.70 hours per week, while the time American men spent on this activity fell marginally (by 0.72 hours per week). Further, while women in both countries reduced the time they spent nonmarket work over the sample period, they still spent about twice the time on this activity as their male counterparts. Third, over the sample period, the time spent on leisure, defined in four ways, has either trended downwards or remained relatively stable in Canada. In contrast, in the United States the time spent on leisure has trended upwards

over the sample period. Fourth, we find that a leisure inequality exists in both countries: the least educated spend more time on leisure compared to the highly educated. This inequality in leisure is growing for women and men in United States. In Canada, the inequality in leisure is growing for Canadian women, but narrowing for Canadian men. Fifth, we find that changing demographics has been a factor causing changes in the allocation of time within demographic groups and the overall unconditional change in market work, nonmarket work, and leisure in Canada.

The rest of this essay is as follows: in section 2.2 we outline the data and the methodology, in section 2.3 we discuss the trends in time use, in section 2.4 we discuss results from the Blinder-Oaxaca decomposition, and in section 2.5 we summarize and suggest lines of inquiry for future research.

2.2 Data and Methodology

2.2.1 Data

The data used in this essay are from time use budget surveys. Time use data are generally well suited for analysing changing patterns of time spent on a wide variety of activities. First, the data contain demographic information such as the sex, age, parental status, marital status, and the level of educational attainment of respondents. Second, other surveys, such as the Survey of Labour and Income Dynamics (SLID) in Canada and the Panel Study of Income Dynamics (PSID) in the United States do not report in detail the time spent on activities outside of market work. Third, surveys like the SLID or PSID do not provide as accurate a measure of time use compared to time diary data (Robinson and

Godbey, 1999). In particular, these non-time use surveys typically ask the respondent to estimate the number of hours spent in an activity in some previous reference period. The problem with recollection based on a reference period is that respondents most often recall the period when the activity in question was most prominent, and thus, on average, overestimate the time spent on the activity (Juster and Stafford, 1991).

In contrast to traditional survey data, with time diary surveys respondent report the start and stop times for various activities throughout a 24 (sometimes 48) hour period. If the respondent was performing multiple activities during any period, they are asked identify the primary activity, and only minutes for the primary activity are recorded as part of their main 24 hour diary. For example, the primary activity could have been cooking and the secondary activity watching television. In some time use surveys, such as the 2005 Canadian time use survey, the time spent in some secondary activities are recorded (e.g., secondary childcare), but this does not form a part of the main time use diary for the respondent. The main advantage of time diary data is that when respondents have to list the time spent on activities, this makes it more probable that they will record the actual time spent on various activities. Therefore, they provide a more accurate measure the true time spent on various activities as compared to non-time use surveys.

The Canadian time use data were obtained from the General Social Surveys (GSS). The GSS is conducted annually and focuses on various aspects of Canadian life; trends in time use were examined in 1986, 1992, 1998, and 2005.[5] The surveys were conducted by

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[5] Two earlier Canadian time use surveys were available; 1971/72 Dimensions of Metropolitan Activity and the 1981 Canadian Time Use Pilot Study. However, these surveys were at a level of aggregation of time

telephone, and the target population in each survey was the non-institutionalized population aged 15 years and over living in one of the ten provinces.[6] The GSS includes survey weights that adjust for the approximately 2% of the target population without a home phone, the age and sex distribution of the population, and so that each day of the week is equally represented The sample sizes in each survey were 9,946 in 1986, 8,996 in 1992, 10,749 in 1998 and 19,597 in 2005.[7]

The U.S. data were obtained from time use surveys conducted in 1985 and 1992-1994 by the Survey Research Centre at the University of Maryland and in 2003 and 2005 by the Bureau of Labour Statistics. Following Aguiar and Hurst (2007), we treat the 1992-1994 survey as year 1993 given that the median survey respondent was in 1993. These surveys were conducted by telephone interview and were nationally representative with respect to households with a phone. Survey sample weights within each U.S. survey ensure that each day of the week was equally represented and that the age and sex distribution of population were taken into account. The sample sizes for the U.S. data were 4,939 in 1985, 9,383 in 1993, 20,720 in 2003 and 13,038 in 2005.[8]

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use categories that would not allow detailed analysis of some time use categories and thus were not suitable for the analysis undertaken in this paper.

[6]The survey excludes residents of the Yukon, the Northwest Territories, and Nunavut.

[7] Prior to 1999, the target sample size for the GSS was approximately 10,000 persons. This was increased in 1999 to 25,000 to allow for analysis on small population groups such as disabled persons, visible minorities and seniors.

[8] Time use surveys from different countries are largely comparable, especially in aggregate categories such as market work, nonmarket work, childcare, and leisure. A well-known compilation of international time use diary data is the Multination Time Use Survey. In documenting the allocation of time, we strove to measure the same activities in both countries by carefully reviewing the data dictionary from each survey in the U.S. and Canada. We generally found that the levels of time use aggregation are largely the same in both Canada and the United States rendering most of our aggregate activity measures the same in both countries. Slight differences exist in some subcategories of activities, but this is unavoidably due to the level of aggregation within each survey across countries and over time. We make note of such differences when necessary.

The sample used for analysis in this essay is the working age population aged 20 to 64 years, excluding retirees and students whose time allocation decisions are likely to be significantly influenced by the acquisition of human capital and intertemporal time allocations decisions. Our sample also excludes individuals who did not report their level of educational attainment, and whose time diary did not sum to a complete day.[9] The working age population has a significant bearing on the determination of economic growth and distribution of national income by virtue that they supply the most labour hours to the market. The study of their time allocation decisions is thus of some importance.

Time diaries are collected in minutes per day, so we first convert to hours per seven-day week by multiplying by seven and dividing by sixty. We thus report the average weekly hours spent on each activity of interest per working age adult. The main results are presented in Tables 2.1 to 2.10. Further, appendix Tables 2.A2 to 2.A4 report the statistical significance of the difference in each major time use category in the U.S. and Canada in 2005.

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[9] In Aguiar and Hurst (2007), the U.S. sample is restricted to individuals aged 21 to 65. The 1986 survey does not allow for a similar age range for Canada. However, the results using age range 20 to 64 for the U.S. are almost identical to those reported in Aguiar and Hurst (2007). In addition, including or excluding students and retirees does not alter the results significantly.

2.2.2 Methodology

To estimate trends in time use conditional on demographics, we apply the fixed weight procedure[10] used by Aguiar and Hurst (2007) for each country separately.[11] First, we pool the time use data and adjust the survey weights so that each day of the week and survey is represented equally. This weighting is necessary since we use subsamples from each survey in our analysis. Second, we create demographic cells for each activity based on age (20-29, 30-39, 40-49, 50-59, 60-64), gender (male or female), parental status (whether at least one child under the age of 19 is present in the home or not) and level of education (less than high school, high school, some college or at least university graduate). This analysis yields 72 demographic cells for each survey year from which we calculate 72 demographic cell means.[12] The demographic weight associated with each demographic cell is the percentage of the pooled sample (compilation of all surveys in a particular country) that is within each demographic cell. From these demographic cells, we calculate the mean weekly hours spent on an activity adjusted for demographics as the demographically weighted average of the cell means for that activity.

We report the conditional mean time spent on market work, nonmarket work, and leisure, including their subcategories, for Canada and the United States for both sexes and with respect to their levels of educational attainment. We report the results for each time use activity by comparing average hours per week controlling for demographics spent in

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[10] Mark Aguiar and Erik Hurst graciously made available their data and STATA do files.
[11] Running the standard OLS with control variables produced similar results to those reported in Tables 2.1 through 2.10. However, OLS does not allow us to obtain demographically adjusted means with respect to the entire population.
[12] Given the small sample size of the age group 60 to 64, no demographic category is created for parental status for this age group.

2005 for Canada and in 2005 in the United States for the entire population and then for men and women. Next, we discuss the differences in the conditional change in the average weekly hours spent on activities over the sample period in each country. We conclude by examining how much of the unconditional change in the average hours per week from 1986 to 2005 can be explained by evolving demographics and the portion explainable by changes in the allocation of time within demographic groups in Canada. We do this analysis by reporting a Blinder-Oaxaca decomposition (Blinder, 1973; Oaxaca, 1973) for market work, nonmarket work, and leisure for the Canadian population as a whole and then for men and women.

Following Aguiar and Hurst (2007), the methodology of the decomposition is as follows. Let Y_{it} be the vector of average hours per week spent on activity i by demographic groups in survey t and W_{it} the demographic weights in survey t. It follows that the unconditional average time spent on an activity adjusted by W_{it} is simply $W_{it}Y_{it}$ and the unconditional mean change in hours per week for an activity from 1986 to 2005 can be written as $W_{i2005}Y_{i2005} - W_{i1986}Y_{i1986}$, which can be decomposed as $(W_{i2005} - W_{i1986})Y_{i2005} + (Y_{i2005} - Y_{i1986})W_{i1986}$. The term $(W_{i2005} - W_{i1986})Y_{i2005}$ is the part of the total unconditional mean change due to changes in the demographic weights between 1986 and 2005 evaluated at the 2005 cell means. The term $(Y_{i2005} - Y_{i1986})W_{i1986}$ is the portion of the unconditional change that is a result of changes within demographic groups between 1986 and 2005 evaluated at the 1986 demographic weights.

Alternatively, the unconditional mean change in hours per week in an activity from 1986 to 2005 can be decomposed as $(W_{i2005} - W_{i1986})Y_{i,1986} + (Y_{i2005} - Y_{i1986})W_{i2005}$. The term $(W_{i2005} - W_{i1986})Y_{i1986}$ is the part of the total unconditional change due to changes in the demographic weights between 1986 and 2005 evaluated at the 1986 cell means. The term $(Y_{i2005} - Y_{i1986})W_{i2005}$ is the portion of the unconditional change that is a result of changes within demographic groups between 1986 and 2005 evaluated at the 2005 demographic weights. We report and discuss both decompositions.

2.3. The Allocation of Time

2.3.1 Market Work

We first discuss the results of total market work: this is the sum of the time spent on all activities related to paid employment. These activities include on the job search, overtime work, and work-related activities such as travelling to and from work, commuting during work, breaks and idle time, eating and snacks, and other uncodeable work activities. Next, we report core market work: this is the sum of time spent at work at the respondent's main job, time spent at other jobs, overtime work, time spent searching for jobs, and time spent waiting before or after work. Finally, we report the time spent travelling to and from work. Table 2.1 reports these results for the population and then by gender for Canada and the United States. Figures 2.1 and 2.2 illustrate the trends in market and core market work for the U.S. and Canada over the sample period for all individuals, men, and women.

In 2005, Canadians spent an average of 37.29 hours per week on market work while Americans spent 33.43 hours per week (Table 2.1, panel A, row 1). Therefore, Canadians spend a statistically significant 4 more hours per week on all market work activities compared to their American counterparts.[13] In 2005, the time spent on core market work (panel A Table 2.1 row 2) was 31.48 and 30.52 hours per week in Canada and the United States respectively. However, the difference in core market work across both countries is not statistically significant. The difference in core market and market work across both countries is due to differences in time spent on work-related activities and time spent travelling to and from work. In 2005, work-related activities accounted for an average of 6.04 hours per week in Canada and 2.85 hours per week in the U.S., a difference that is statistically significant. Further, the time spent travelling to and from work was 3.37 hours per week in Canada in 2005 compared to 2.60 hours in the U.S. (Table 2.1 panel A row 3).[14]

The average hours spent on market work by gender are reported in panels B and C of Table 2.1. Table 2.1 (panel B rows 1 and 2) shows that in 2005, Canadian men spent an average of 45.15 on total market work and 38.12 hours per week on core market work. The comparative figures for American men are 39.67 and 36.11 hours per week. The cross-country differences in total market work and core market work in 2005 are statistically significant at the 1% and 10% levels respectively. While there are significant differences in the average hours spent on market work for men in the U.S. and Canada,

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[13] Appendix tables 2.A2 to 2.A4 reports the cross-country differences in major time use categories in 2005.
[14] The cross-country differences in work-related activities and the time spent travelling to and from work are statistically significant at the 1% level.

the time spent on market work is similar for women in both countries. In 2005, Canadian women spent an average of 29.57 and 24.95 hours per week on market and core market work respectively (Table 2.1 panel C row 1 and 2); whereas American women spent 27.84 and 25.50 hours per week on market and core market work. It should be noted that the differences in the time spent on market work and core market work by American and Canadian women are not statistically significant.

Table 2.1 also allows us to comment on trends in the time spent in market work across both countries. Panel B of this table indicates that in Canada, from 1986 to 2005, men increased core market work by 2.53 hours per week, while market work trended up by 1.57 (not statistically significant). In contrast, American men decreased time spent on market work by 3.32 while core market work fell marginally by 0.62 hours per week. From panel C of Table 2.1, we observe that Canadian women increased market and core market work hours per week by 5.89 and 5.33 respectively. Similarly, American women spent 3.47 hours more per week on market work and 4.75 more hours per week on core market work.

In 2005, men in Canada spent more time in market work and core market work compared to American men. The results also show the end of period cross-country differences in the time women spend on market work to be statistically insignificant. These cross-country trends in hours worked could be driven by cross-country differences in those who report positive market work hours (participants in market work) and those who report zero hours worked (non-participants in market work) on the diary day. For example, we

would expect that if more individuals reported zero hours spent on market work in the U.S. than in Canada then, all else constant, this should contribute to lower average arket work in the U.S. compared to Canada.

Table 2.2 shows the percentage of individuals from the sample used in our analysis, from each survey year and for all survey years, reporting positive number of hours worked in the U.S. and Canada on their diary day. The trends reveal that in all years Canada has a large percentage of individuals reporting a positive number of hours worked on the diary data. For example, in panel A of Table 2.2, participation in market work activities in Canada was 57.4% in 2005 while in the U.S. it was 48.6%. The results in panel B indicate that for men in Canada the participation in 2005 was 65.4%, while in the U.S. it was 56.4%. The comparative figures for Canadian and U.S. women are respectively 51.1% and 42.5%. Differences in participation across both countries thus may be one reason driving the higher market work in Canada relative to the U.S. per working age individual.

To assess more completely the extent to the difference in the participation rate across both countries might be driving differences in market work hours, it is necessary to consider the time spent on market work by those who reported positive hours on their diary day. These time use averages are reported in Table 2.3. From this table, in 2005, Canadians who reported positive hours on their diary day spent on average 62.65 hours per week on market work (panel A row 1). The comparative figure for Americans is 57.47 hours per week, which is 5.18 hours less than in Canada. The results from this table

also reveal that in 2005 Canadian men who reported positive market hours on their diary day spent on average 5.18 more hours than their American counterparts. For American women, those who reported positive hours on their diary on average 4.58 hours less than Canadian women. However, for core market work, in 2005, Americans and Canadians on average spent about the same time number of weekly hours on this activity.

Given the results on market work for the sample of individuals who reported non-zero hours of market work on their diary day, we can conclude that changes higher market hour hours in Canada compared to the U.S. are due to changes in the supply of market work hours at the extensive and intensive margins. Furthermore, it should be noted that because of differences in the level of time use aggregation across both countries, market work in the US includes hobbies done for sale, whereas in Canada it is lumped together with hobbies done for sale or pleasure (leisure). Therefore, the true difference in the time spent on market work by individuals in both countries would be slightly higher.

2.3.2 Nonmarket Work and Childcare

To calculate nonmarket work (home production) we sum the time spent on activities related to unpaid work, but exclude time spent on own medical care and leisure. We examine three subcategories of nonmarket work: time spent on core nonmarket work, shopping for goods and services, and childcare activities. Core nonmarket work primarily involves do-it-yourself activities, which tend to have close substitutes in the formal goods and services market. These activities include time spent on meal preparation, home maintenance, and routine housework (e.g., laundry and ironing). Time spent obtaining

goods and services is the sum of everyday shopping for goods and shopping for personal and professional services (excluding medical care). The time spent on childcare is the sum of time spent on three sub categories—primary, recreational, and educational childcare activities. The results of the time use trends in market work are reported in Table 2.4. We discuss the main differences across both countries in the discussion that follows.

Table 2.4 panel A row 3 shows that the time devoted by all individuals to nonmarket work plus childcare was about the same in 2005 in Canada and the U.S. (23.46 vs. 22.76 hours per week). However, in 2005 Canadians spent 11.34 hours per week on core nonmarket work while Americans spent 8.05 hours per week (panel A Table 2.4 row 6). At the same time, Canadians spent marginally less time shopping for goods and services in 2005 than their U.S. counterparts (4.93 vs. 5.16 hours per week). With respect to childcare, Canadians and Americans spent about the same amount of time in 2005 (4.58 vs. 5.00 hours per week).

The time use trends for men and women are reported in panels B and C of Table 2.4. These results indicate that Canadian and American men spent about the same time on nonmarket work and on shopping for goods and services in 2005 (panel B rows 5 and 7). In 2005, men in Canada spent an average of 3.76 hours per week obtaining goods and services and 13.62 hours per week on nonmarket work activities in total. Men in the U.S. behaved similarly in 2005; they spent 13.16 hours per week on nonmarket work and 4.02 hours obtaining goods and services. Likewise, in 2005 Canadian and American men and

spent about the same time on childcare (2.76 vs. 3.13 hours per week). The key difference in home production activities for men across the two countries is the amount of time spent on core nonmarket work. For example, in 2005, Canadians spent 7.38 hours per week; this is almost double the time spent by men in America.

The results in panel C Table 2.4 show that women in both countries continue to bear most of the burden of labour within the household. Canadian women spent 30.40 hours per week in 2005 on nonmarket work and childcare, which is almost double the time devoted by Canadian men. Similarly, American women spent an average of 28.56 hours per week on nonmarket work and childcare in 2005, which is also about double the time spent by American men. The time spent on core nonmarket work represents the major difference in time use for Canadian and American women. American women in 2005 spent an average of 12.13 hours per week on core nonmarket work; this is approximately 3 hours per week less than their Canadian counterparts.

We now turn our attention to the trends in nonmarket work and childcare. We limit our discussion to differences across men and women. From Table 2.4 panel B, we observe that Canadian men increased nonmarket work by 1.70 hours per week, but decreased time spent obtaining goods and services by 1.19 hours per week. At the same time, they increased the time spent on core nonmarket work by 1.52 hours per week. On the other hand, for American men, the time spent on nonmarket work, core nonmarket work and on shopping for goods and services declined marginally. With respect to time spent on childcare, men in Canada spent 0.97 hours more per week over the period (not

statistically significant). In contrast, American men spent 1.62 hours more per week on childcare in 2005 relative to 1985.

From Table 2.4 panel C, we see that the time spent on nonmarket work fell by 4.77 hours per week for American women and in Canada it trended downwards by -1.25 hours per week (the latter not statistically significant). These trends reflect a reduction in the time spent on core nonmarket work for women in both countries (1.82 in Canada and 4.07 in the U.S.). The time spent shopping for goods and services declined 1.03 hours per week for Canadian women and declined 0.88 hours per week for American women. In contrast, the time spent on childcare trended up by 1.22 and 1.64 hours per week for women in Canada and the U.S. respectively.

2.3.3 Total Work and Childcare

Total work is the sum of nonmarket work and market work. We limit our discussion to trends across gender. The average weekly hours for Canadian and American men and women are shown in Table 2.4 row 2 of panels B and C. Consistent with the results reported so far, in 2005 Canadian men spent more time in total work than American men (58.77 vs. 52.83 hours per week). Similarly, Canadian women spent more time on total work than American women (53.61 vs. 49.71 hours per week). Total work increased by 3.26 and 4.63 hours per week for Canadian men and women respectively. In contrast, total work declined for American men and women by 4.45 and 1.31 hours per week respectively. Adding the time spent on childcare to total work we find that Canadian men

spent 5.58 more hours per week than American men in 2005; whereas Canadian women spent 3.57 hours per week more than American women in that same year.

2.3.4 Leisure

The time spent on leisure is most commonly defined to be the residual of the time available after an individual completes obligatory activities such as market work, nonmarket work and sometimes childcare. A more narrow definition would be to limit leisure to the set of activities that yield direct utility such as gardening and pet care, socializing, entertaining, recreation, and watching television, among other related activities. Leisure can be also be defined as an individual's perception of the quality of the activity experience rather than the duration of the activity itself (see Wilson, 1980).

While we will not be able to take into account the quality of the leisure experience in this essay, we define four different measures of leisure, as in Aguiar and Hurst (2007), to account for differences in what could be thought to be the most appropriate characterisation of leisure activities. Leisure measure 1 is the sum of time spent on entertainment and social activities, sports, hobbies, gardening and pet care, media and communication, and relaxation activities. Leisure measure 2 is the sum of leisure measure 1, private activities and personal care activities such as eating and bathing. Leisure measure 3 is the sum of leisure measure two and time spent on childcare activities. Leisure measure 4 is the time available after time to total work (market work and nonmarket work) has been expended. It should noted that even if people experience an increase in leisure, a lot of it may be of low quality and unwanted leisure if it is as a

result of long term unemployment or other labour market difficulties

The time spent on leisure is reported in Table 2.5 for Canada and the United States. These results indicate that in 2005, Americans spend slightly more time than Canadians on leisure measures 1, 2, and 3. For the narrowest measure, leisure 1, Canadians spent an average of 33.08 hours per week, whereas individuals in the U.S. spent 34.45. However, in the broadest leisure category, leisure 4, Americans spent 116.81 hours per week, which is 5.37 hours more than the time spent by Canadians. The fact that Americans spend more time in leisure 4 than Canadians is not surprising given the trends in the time spent on market and nonmarket work over the sample period documented above.

In Canada, the time spent on leisure measures 1 and 3, remained relatively stable while leisure measure 2 declined by 1.03 hours per week. However, leisure 4, the residual of total work, declined by 3.96 hours per week in Canada. In the U.S., leisure measures 1 to 3 were relatively stable while leisure measure 4 increased by 2.60 hours per week. Similar trends in leisure exist by gender. These results are documented in panels B and C for men and women respectively. For men in Canada, leisure measures 1 to 3 were relatively stable while leisure 4 declined by 3.27 hours per week. In contrast, leisure measures 3 and 4 increased by 2.72 and 4.05 hours per week respectively for American men. Over the sample period of analysis, women in Canada spent 4.63 fewer hours per week on leisure 4, while American women increased the time spent on leisure 4 by 1.31 hours per week.

The trends so far reported potentially mask changes in how time is allocated to various activities within leisure. To assess this we decompose and report some of the major activity subcomponents of leisure 2 and leisure 4 for men and women in Tables 2.6 and 2.7 respectively for Canada.[15] Table 2.6 shows that over the sample period Canadian men and women increased they time spent sleeping and napping by 1.78 and 1.53 hours per week respectively. However, personal care declined by 3.36 hours per week for men and 3.81 hours per week for women. With respect to watching television, men decreased their hours by 1.63 per week while women had a modest decline of 0.49 hours per week (statistically insignificant). However, men do spend more time watching television on average. Both men and women increased the time they spent gardening and taking care of pets (1.3 and 1.42 hours per week respectively). With respect to hobbies, men increased their average weekly hours by 1.61, while women reduced the time they spent on hobbies by 0.74 hours per week. Both men and women spent less time reading per week (decline of 1.91 and 1.27 hours respectively) while the time they spent eating (meals away from market work) declined by 2.65 and 2.70 hours per week respectively.

Time spent on active sports increased by 0.33 hours per week for men and by 0.38 hours per week for women. At the same time, the time spent on all sporting activities increased by 0.93 and 1.29 for men and women respectively. In addition, walking and hiking increased for both men and women (0.38 and 0.54 hours per week respectively). From the 1992 time use survey onwards, respondents were asked to report time spent on the computer for general use and surfing the net and composing e-mails. This time use

[15]A similar decomposition is provided in Aguiar and Hurst (2007) for the U.S. data and is thus not provided here.

category is a subcomponent of the time spent on games. From 1986 to 2005, the time spent on games increased by 1.40 and 0.39 hours per week for men and women respectively. However, part of this change is because from 1992 to 2005 time spent on computer usage increased by an average of 1.51 hours per week for men and 1.01 hours per week for women.

Turning now to leisure measure 4, we noted that the time spent on this measure declined dramatically over the sample period in Canada. Leisure 4 is the residual of total work and includes leisure 3 (entertainment and recreational activities, sports active and passive, personal care and childcare) and what we call civic and medical care (civic oriented, voluntary and religious activities, own medical care, care to other adults, education and other uncodeable non-work activities including time gaps). We separate out and add together subcomponents of civic and medical care and report trends in Table 2.7 for Canada. From Table 2.7 we observe that civic and medical care activities declined by 2.38 and 2.93 hours per week for men and women respectively. These changes represent over fifty percent of the overall decline in leisure 4 for men and women in Canada over the sample period.

2.3.5 Education and Market Work

Trends in market work by gender and educational attainment are shown in Tables 2.8 and 2.9 for Canada and the U.S. respectively. From Table 2.8 panel A, for men in Canada, we observe that hours worked is positively related to the level of educational attainment. For example, the least educated men in 1986 worked 10.25 hours less than the most highly

educated (row 1 column 5). However, over the last two decades the gap in hours worked between the least educated and the most highly educated men in Canada has declined. In 2005, men with the lowest level of educational attainment worked only 3.75 hours per week less than men with the highest level of educational attainment (row 4 column 5). Because of this trend, over the two decades the change in market work hours is negatively related to level of educational attainment. In 2005, the least educated increased market hours by 4.73 hours per week (row 5 column 1), while the most highly educated decreased time spent in market work by only 1.77 hours per week (row 5 column 4).

In the U.S., for men, the relationship between educational attainment and hours worked is not as clear as in Canada. From Table 2.9, in 1985, highly educated men spent the least time on market work, 41.81 hours per week (row 1 column), while those men who had some college level education worked the highest number of hours, 45.58 hours per week (Table 2.9). However, by 2005 this trend was reversed with the highly educated men working 45.30 hours per week (row 5 column 4) and the least educated men working 35.01 hours per week (row 1 column 1). We also see that from 1985 to 2005 hours worked decreased with level of educational attainment for men in the United States. Therefore, while highly educated men increased their weekly market hours by 3.48 hours per week (row5 column 4), the least educated men reduced their market work hours by 7.37 hours per week (row 5 column 1).

We now turn our attention to how the time spent on market work has evolved for women with different levels of educational attainment in both countries. In Canada, market work

increases with educational attainment for women (Table 2.8 panel D). Specifically, women of all educational attainment levels increased market work hours from 1986 to 2005, with the least educated having the smallest increase, 3.58 hours per week (row 5 column 1), and women with a high school diploma having the largest increase, 8.15 hours per week (row 5 column 2). While this has occurred, the gap between the hours worked by the least educated and the most highly educated has not narrowed. In 1986, women who were university graduates worked 12.05 more hours per week (row 1 column 5) than those who did not complete high school while in 2005 they worked 13.74 more hours per week (row 4 column 5) than this group of least educated women.

Similar to the results for Canada, the time devoted to market work increases with the level of educational attainment among American women (Table 2.9 panel D). In addition, over the sample period the least educated increased their hours worked less than the most highly educated. For example, for the least educated women, market work hours increased by 0.25 hours per week over the sample period, while highly educated women increased market work hours by 6.38 hours per week (row 5 column 4). This change in hours worked by educational attainment is also evidenced by the fact that the difference in market work hours between the most highly educated and least educated women in the U.S. increased from 8.69 (row 4 column 5) in 1985 to 14.82 (row 4 column 5) hours per week in 2005.

2.3.6 Education and Non- Market Work

In Canada, men of all educational attainments increased their weekly hours spent on non-market work (Table 2.8 panel B). In 1986, the least educated men spent 0.44 hours fewer per week than highly educated men (row 1 column 5) on nonmarket work. However, by 2005 the least educated men spent 15.03 hours per week on nonmarket work, which is 1.76 more hours than the most highly educated men (row 1 columns 1 and 5 respectively). In the U.S., there is no clear linear relationship between nonmarket work and educational attainment of men (Table 2.9 panel B,). However, on average, the most highly educated American men spent more time on nonmarket work than least educated American men. For example in 2005, the least educated men spent 11.65 hours per week on nonmarket work while the most highly educated men spent 12.92 hours per week (row 4 columns 1 and 4 respectively).

We report trends in nonmarket for women in Canada in Table 2.8 panel E. The results indicate that nonmarket work decreases with educational attainment for each survey year. In 1986, the least educated women spent 10.04 more hours per week on nonmarket work than the most highly educated women did, but by 2005, this difference was 7.04 hours per week (panel E rows 1 and 4 column 5 respectively). In all educational categories, the time devoted to nonmarket work fell except for university-educated women who increased their time spent on nonmarket work by 0.45 hours per week (row 5 column 4). The trends in the U.S. are similar to those in Canada. These trends are documented in panel E of Table 2.9. For American women, nonmarket work generally diminishes with educational attainment. In 2005, the most highly educated American women spent 20.70

hours in nonmarket work, which is 4.86 hours less than the time devoted by the least educated women (row 1 column 4 and 5 respectively). However, as in Canada, American women of all educational levels devoted less time to nonmarket work in 2005 compared to 1986 (row 5 columns 1 to 4).

2.3.7 Education and Leisure

In this section, we characterize how educational attainment has evolved with respect to our second leisure measure, which encompasses time spent on gardening and pet care, social and recreational activities, and personal care. For men in Canada (Table 2.8 panel C), leisure decreases with educational attainment (row 1 to 4 and column 5). The most highly educated men spent 10.06 hours per week less on leisure than the least educated men in 1986 (row 1 column 5). However, by 2005 this difference was reduced to 6.47 hours per week (row 4 column 5). In fact, of the four educational groups, highly educated men increased leisure by 2.62 hours per week, while leisure declined for all other educational categories. Noteworthy, is the relatively large decline in the time spent in leisure by men with some college training. The time these men spent on leisure decreased by 2.02 hours per week over the sample period (row 5 column 3). Overall, these results for Canadian men indicate that while there is an inequality in leisure to the extent that the least educated spend more time on leisure, this gap is narrowing. In the U.S., leisure time spent by men also decreases with educational attainment (Table 2.9 panel C). In addition, leisure increases over time and is negatively related to educational attainment. We observe that by 2005 the least educated had increased leisure by 6.68 hours per week while the most highly educated had, in fact, decreased time spent in leisure by 4.88 hours

per week (row 5 column 1 and 4 respectively). In contrast to the results for Canada, there is an inequality in leisure for men in U.S. but the inequality is increasing over time.[16]

For women in Canada, the time spent on leisure decreases with the level of educational attainment (Table 2.8 panel F). In 1986, the least educated women enjoyed 8.14 more leisure hours than the most highly educated women did, but by 2005 that difference was 10.05 hours per week (rows 1 and 4 column 5 respectively). Over time, the least educated women increased leisure time by 1.88 hours per week (row 5 column 1). High school and college-trained women saw their leisure time fall by 2.57 (row 5 column 2) and 3.37 (row 5 column 3) hours per week, while leisure time for university educated women remained stable. The net result of these trends in that there is an inequality in leisure and this has grown over time for women in Canada.

Similar to trends reported so far, the time spent by American women in leisure generally increases with educational attainment (Table 2.9 panel F). In 1985, the least educated women spent 7.44 more hours on leisure than the most highly educated women (row 1 column 5). Over time, this gap has widened even though women of all levels of educational attainment have decreased time spent on leisure; the largest decline has been among university women (decline of 4.03 hours per week). Thus, similar to the trends for American men and Canadian women, there is an inequality in the time spent on leisure by American women and this inequality is increasing over time.

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[16]This result mirrors the findings of Aguiar and Hurst (2007).

2.4. Blinder-Oaxaca Decomposition of the Unconditional Change

In this section, we analyse the extent to which changes in demographics contribute to mean unconditional changes in market work, nonmarket work, and leisure time (measure 2) in Canada. We use the Blinder-Oaxaca decomposition using the methodology outlined in section 2.2.2 and report the two decompositions of the change in the unconditional mean weekly hours between 1986 and 2005. Table 2.10 reports these results.

2.4.1 All Individuals

Panel A of Table 2.10 shows the decomposition for all individuals evaluated at 2005 cell means and 1986 demographic weights, while panel B is the decomposition evaluated at the 2005 demographic weights and 1986 cell means. The first column is the total unconditional change, the second is the change due to changes in demographics, and the third column is the change due to shifts in time allocation within demographic groups. The results indicate that for market work changes in demographics account for 2 to 2.26 hours per week of the overall unconditional change of 5.84 hours per week (row 1 column 2 of panels A and B). This leaves 3.84 to 3.58 hours per week of the unconditional change explainable by changes in the allocation of time within demographic groups. These changes are consistent with a more educated and older workforce in addition to the fact people are choosing to spend more time on market work. The unconditional change in nonmarket work has changed modestly and there is relatively little role for changing demographics and the allocation of time within demographic groups. On the hand, the unconditional change in leisure 2 over the period fell by 2.04 hours per week, with evolving demographics accounting for -0.97 to -1.07

hours of this change (row 3, column 2 of panels A and B). At the same time, changes in the time allocation to leisure activities within demographic groups ranged from -1.07 to -0.77 hours per week.

2.4.2 Men

In panel C of Table 2.10 we report the decomposition for men evaluated at 2005 cell means and 1986 demographic weights while panel D shows the decomposition evaluated at the 2005 demographic weights and 1986 cell means. From panels C and D the unconditional change in market work increased by 2.75 hours per week from 1986 to 2005. Of this change, 0.29 to 2.12 is because of changing demographics (panels C and D column 2 and row 1 respectively). The change of 0.29 is the effect of evolving demographics on the unconditional change evaluated at 2005 cell means. On the other hand, the change of 2.12 represents how much of the unconditional change between 1986 and 2005 using 1986 cell means is a result of shifts in demographics over time. The fact that unconditional change evaluated at the 1986 cell means is 2.12 compared to 0.29 at 2005 cell means shows that the differences in the time allocated to market work across demographic groups were larger in 1986 compared in 2005 (see discussion on education and market work above for men in Canada). These changes also reflect the fact that the population is becoming more educated, older, and having fewer children.

In panels C and D (column 3 and row 1), we observe that market work increased by 2.46 to 0.63 hours per week because of increases in the time allocated to market work within each demographic cell. The 2.46 hours per week indicates that within demographic

groups, more time is allocated to market work in 2005 compared to 1986, which accounted for 0.63 hours per week of the unconditional change due to time allocation. Thus, in addition to the increase in the relative weight of a more educated and older population, these individuals are also working more hours per week. With respect to nonmarket work for men, changing demographics add 0.39 to 0.22 hours per week, whereas time allocations within demographic groups add 1.66 to 1.83 to the unconditional change that was 2.05 hours per week. Shifts in demographics have thus had a very modest role in explaining trends in nonmarket work. The time spent on leisure 2 for men declined by 1.66 hours per week. Of this decline -0.65 to -1.71 hours per week is the result of changing demographics, while -1.01 to 0.05 is the result of decreases in the allocation of time to leisure 2 within demographic cells. The -1.01 represents that all demographic groups allocated less time to leisure in 2005 compared to 1986, which represented 0.05 of the unconditional change due to time allocation.

2.4.3 Women

Turning our attention now to women, we note that demographic changes are relatively more significant in explaining the overall unconditional change in time use from 1986 to 2005 than they are for men. The unconditional change in average weekly hours spent on market work increased by 8.47 hours per week for women. Of this unconditional change, changing demographics contributes 3.32 to 1.93 is hours per week (row 1 column 2 of panels E and F). The value of 3.32 is the evaluation at the 2005 cell means and 1986 demographic weights and the 1.93 at the 1986 cell means and 2005 demographic weights. The 3.32 reflects that the fact that the differences between demographic groups in the

time allocated to market work is larger in 2005 compared to 1986 (see education and market work for women above). Changes in the allocation within demographic groups contributed 6.54 to 5.15 hours per week to the overall unconditional change.

The unconditional change in nonmarket work for women was -2.41 hours per week (panel E row 2 column 1). The portion of this change due to changing demographics over time ranged from -3.39 to -0.67 hours per week. The relatively larger change of -3.39 reflects that in 1986 the difference in the time devoted to nonmarket work among demographic groups was larger compared to 2005. These numbers are consistent with the trends documented on educational attainment and market work for women in Canada above. At the same time, the portion of the unconditional change resulting from changes in the allocation of time ranged from -1.74 to 0.98 hours per week. The figure of -1.74 reflects a decrease in time allocated to nonmarket work in 2005 by women in each demographic group.

In 2005, women spent an average of 2.4 fewer hours per week in leisure 2 compared to 1986(panel E row 3 column 1). Of this unconditional change, -1.27 to -0.81 is a result of changing demographics. The contribution of changes in time allocation within demographic groups to the overall unconditional change increased from -1.59 hours per week when evaluated at the 2005 cell means and 1986 demographic weights to -1.13 hours per week at the 1986 cell means and 2005 demographic weights.

2.5 Conclusion

In this essay, we document the allocation of time in Canada (1986 to 2005) and contrast it with the situation in the United States over a similar period (1985 to 2005). We discuss time use trends at the end of the period in each country and then analyse trends over time. We depart from most of the existing literature by reporting how market work, nonmarket work, and leisure have evolved, adjusting for demographic changes based on age, gender, level of educational attainment, and fertility. To the best of our knowledge, our essay is the first that we are aware of that compares trends in the allocation of time in Canada and the U.S. in this manner. Our approach mirrors that of a recent study on the U.S. by Aguiar and Hurst (2007).

A number of interesting facts emerge in trends in the average weekly hours across market work, nonmarket work, and leisure per working age adult in Canada and the United States. First Canadians have increased the time devoted to market work whereas the time allocated in the United States has remained relatively stable. However, while the time spent by Canadian men on market work has risen by 1.57 hours per week, the time spent by American men has decreased by 3.32 hours per week. At the same time, by 2005 Canadian men worked more hours per week than American men (45.15 vs. 39.67). Admittedly, core market work activities are roughly the same in both countries. Both Canadian women and American women increased the time they spent on market work over the sample period (by 5.89 vs. 3.47 hours per week). In regards to Canadian and American women, we find that, on average, they spend same number of hours per week on market work. When we restrict our sample in both countries to women who reported

positive market work hours on the diary day, we find that Canadian women spend more hours per week on market and core market work than America women. Second, women and men in Canada spent about the same time on nonmarket work and childcare in 2005 as their counterparts in the United States. In addition, the time allocated by women to nonmarket work is about double that of men in each country. At the end of the sample period in both countries in 2005, American women spent less time on core nonmarket work than their counterparts in Canada did in that year.

Third, compared to Canadians, individuals in the United States devote more time to non-obligatory work, that is, leisure measure 4 is higher by almost 4 hours in the U.S. compared to Canada at the end of the two decades. These dynamics have been such that leisure measure 4 has declined for Canadian men and women while it has increased for their counterparts in the United States. Furthermore, we find that the trends in leisure measures in Canada mask changes in the allocation of time within activities over the two decades. For example from 1986 to 2005, Canadian men and women spent less time on personal care and reading but slept more and increased time spent walking and hiking. In addition, Canadians devoted less time in 2005 to civic, voluntary, own medical care, care of other adults and religious activities in compared to 1986.

Fourth, we find that an inequality in leisure exists in Canada and the United States, whereby the least educated in each country spent the most time in leisure. This inequality is growing for American men and women while it is narrowing for men in Canada but growing for Canadian women. Fifth, the Blinder-Oaxaca decomposition of market work,

nonmarket work and leisure reveals that there is a role for changing demographics and changes in the allocation of time within demographic groups in explaining overall unconditional change in average weekly hours spent on these activities in Canada.

The main limitation of our analysis is that we have not attempted to explain the trends in the allocation of time that we document for Canada and the United States—but rather the purpose was to document main time use patterns across both countries controlling for demographic changes. The five main results from our analysis are a starting point to just such an analysis. Two research issues that could be investigated are: (1) what are the factors that have led to differences, after controlling for demographics, in the allocation of time in Canada and the United States, and (2) what policy prescriptions can follow in light of concerns that Canadians are struggling to maintain a healthy balance of work and life? How time is allocated has a direct bearing on every aspect of human life and thus on the welfare of society as a whole. Therefore, future research could be directed at examining more closely particular aspects of time use of Canadian men or women and linking time allocation to other time use activities (e.g., gifts of money).

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Table 2.1: Hours Per Week Market Work

	CANADA					UNITED STATES				
	Panel A: All Individuals									
Activity	1986	1992	1998	2005	Difference 2005-1986	1985	1993	2003	2005	Difference 2005-1985
Market Work	33.54	34.31	35.56	37.29	3.75**	33.17	33.95	33.07	33.43	0.26
Core Market Work	27.54	28.49	29.74	31.48	3.94***	28.31	30.72	30.12	30.52	2.21
Work-Related	6.29	6.07	6.47	6.04	-0.25	4.87	3.23	2.62	2.85	-2.02***
Commute to/from work	2.88	2.75	2.98	3.37	0.48***	N/A	3.14	2.31	2.60	-0.55***
Sample Size	7,013	6,137	7,021	12,902		3,187	5,373	15,119	9,575	
	Panel B: Men									
Activity	1986	1992	1998	2005	Difference 2005-1986	1985	1993	2003	2005	difference 2005-1985
Market Work	43.58	42.58	44.09	45.15	1.57	42.99	42.42	40.13	39.67	-3.32**
Core Market Work	35.59	35.46	36.53	38.12	2.53**	36.73	38.39	36.36	36.11	-0.62
Work-Related	8.34	7.45	8.08	7.31	-1.08***	6.26	4.04	3.31	3.48	-2.78***
Commute to/from Work	3.80	3.39	3.65	4.08	0.28	N/A	3.93	2.96	3.20	-0.73***
Sample Size	3,148	2,821	3,283	5,737		1,430	2,493	6,706	4,215	
	Panel C: Women									
Activity	1986	1992	1998	2005	Difference 2005-1986	1985	1993	2003	2005	Difference 2005-1985
Market Work	23.68	26.19	27.76	29.57	5.89***	24.36	26.35	26.74	27.84	3.47**
Core Market Work	19.62	21.62	23.07	24.95	5.33***	20.75	23.85	24.52	25.50	4.75***
Work-Related	4.21	4.68	4.88	4.79	0.58	3.61	2.51	2.00	2.29	-1.32***
Commute to/from work	1.98	2.1	2.32	2.67	0.69	N/A	2.43	1.73	2.05	-0.38**
Sample Size	3,865	3,316	3,738	7,165		1,757	2,880	8,413	5,360	

Notes for Table 2.1 follow on the next page

Notes for Table 2.1

Notes: (1) *** p<0.01, ** p<0.05, * p<0.1,

(2) **Canada**: *Market work*: total time spent in employed work and work-related activities. *Core Market Work*: work for pay at main job/other jobs, job search, overtime work unpaid work in business or farm, & waiting delays at work. *Commute to/from work*: travel to and from work. *Work-Related*: idle time before/after work, job search, eating at work, breaks, travel to/from work, commute during work & other uncodeable work activities.

(3) **US**: *Market Work*: total of all work activities. *Core Market Work*: work for pay at main job, other jobs, looking for work, unpaid work in a business or farm, applying for unemployment benefits, other income generating activities & waiting delays at work. *Commute to/from work*: travel to and from work. *Work-Related*: idle time before/after work, job search, eating at work, breaks, travel to/from work, commute during work & other uncodeable work activities. **NA** not recorded as a separate category in 1985 survey so change in commute time calculated as 2005-1993 for U.S.

Table 2.2: Percent of the Sample Used in Analysis Participating in Market Work

Panel A: All Individuals				
CANADA				
1986	1992	1998	2005	Pooled 1986 to 2005
55.00	54.00	57.41	57.44	56.28
UNITED STATES				
1985	1993	2003	2005	Pooled 1985 to 2005
56.82	53.86	48.47	48.58	50.17
Panel B: Men				
CANADA				
1986	1992	1998	2005	Pooled 1986 to 2005
68.42	64.73	66.07	65.38	66.05
UNITED STATES				
1985	1993	2003	2005	Pooled 1985 to 2005
69.93	62.08	56.83	56.35	58.82
Panel C: Women				
CANADA				
1986	1992	1998	2005	Pooled 1986 to 2005
44.06	44.87	49.81	51.08	48.18
UNITED STATES				
1985	1993	2003	2005	Pooled 1985 to 2005
46.16	46.85	41.80	42.48	43.20

Notes: (1) An individual is designated a participant of an activity if a positive number of market hours is reported on the diary day. (2) Our sample is the non-retired non-student population aged 20 to 64. (3) Pooled indicates the combined sample over the period indicated after which the participation rate is determined.

Table 2.3: Hours Per Week: Market Work- Participants Only

	CANADA					UNITED STATES				
	Panel A All Individuals									
Activity	1986	1992	1998	2005	Difference 2005-1986	1985	1993	2003	2005	Difference 2005-1985
Market Work	56.62	58.84	60.27	62.65	6.03***	58.28	62.68	57.28	57.47	-0.81
Core Market Work	46.60	48.42	50.06	52.94	6.34***	49.76	56.36	52.16	52.46	2.70***
Work-Related	10.59	10.81	10.89	10.12	-0.47	N/A	5.74	4.01	4.46	-1.28***
Commute to/from work	4.83	4.57	4.95	5.55	0.72***	8.52	5.90	4.55	4.90	-3.62***
Sample Size	3,857	3,314	4,031	7,411		1,811	2,851	7,328	4,652	
	Panel B: Men									
Activity	1986	1992	1998	2005	Difference 2005-1986	1985	1993	2003	2005	Difference 2005-1985
Market Work	59.83	61.94	63.35	65.80	5.97***	61.78	65.43	60.76	60.62	-1.16
Core Market Work	48.89	51.27	52.63	55.54	6.65***	52.77	59.22	55.06	55.18	2.41***
Work-Related	11.60	11.17	11.58	10.67	-0.93*	N/A	6.05	4.49	4.99	-1.64***
Commute to/from Work	5.18	4.73	5.16	5.84	0.66***	9.00	6.22	5.02	5.31	-3.69***
Sample Size	2,154	1,826	2,169	3,751		1,000	1,513	3,811	2,375	
	Panel C: Women									
Activity	1986	1992	1998	2005	Difference 2005-1986	1985	1993	2003	2005	Difference 2005-1985
Market Work	52.07	54.40	55.87	58.17	6.10***	53.92	58.39	52.98	53.59	-0.34
Core Market Work	43.33	44.37	46.40	49.23	5.90***	46.02	52.89	48.58	49.11	3.09***
Work-Related	9.15	10.28	9.12	9.34	0.19	N/A	5.35	3.42	3.93	-1.42***
Commute to/from work	4.32	4.35	4.65	5.13	0.81***	7.91	5.50	3.97	4.39	-3.52***
Sample Size	1,703	1,488	1,862	3,660		8,11	1,388	3,517	2,277	

Notes for Table 2.3 follow on the next page

Notes for Table 2.3

Notes: (1) *** $p<0.01$, ** $p<0.05$, * $p<0.1$, (2) **Canada**: *Market work*: total time spent in employed work and work-related activities. *Core Market Work*: work for pay at main job/other jobs, job search, overtime work unpaid work in business or farm, & waiting delays at work. *Commute to/from work*: travel to and from work. *Work-Related*: idle time before/after work, job search, eating at work, breaks, travel to/from work, commute during work & other uncodeable work activities. (3) **US**: *Market Work*: total of all work activities. *Core Market Work*: work for pay at main job, other jobs, looking for work, unpaid work in a business or farm, applying for unemployment benefits, other income generating activities & waiting delays at work.
Commute to/from work: travel to and from work. *Work-Related*: idle time before/after work, job search, eating at work, breaks, travel to/from work, commute during work & other uncodeable work activities. **N/A** not recorded as a separate category in 1985 survey so change in commute time calculated as 2005-1993 for U.S.

Table 2.4: Hours Per Week: Nonmarket Work ,Childcare, and Total Work (nonmarket + market)

	CANADA					UNITED STATES				
					Panel A: All Individuals					
Activity	1986	1992	1998	2005	Difference 2005-1986	1985	1993	2003	2005	Difference 2005-1985
Market +Nonmarket Work+ Childcare	55.69	57.56	60.06	60.75	5.06***	57.16	54.96	55.89	56.19	-0.97
Market +Nonmarket Work	52.22	53.8	55.75	56.17	3.95***	53.79	52.00	50.89	51.19	-2.60**
Nonmarket Work+ Childcare	22.15	23.27	24.2	23.46	1.31	23.99	21.00	22.81	22.76	-1.23
Childcare	3.48	3.78	4.31	4.58	1.10	3.37	2.96	5.00	5.00	1.63**
Nonmarket Work	18.67	19.49	19.9	18.88	0.21	20.62	18.05	17.82	17.76	-2.86**
Core Nonmarket Work	11.5	11.77	11.84	11.34	-0.16	10.37	8.31	7.93	8.05	-2.32**
Shopping for Goods/Services	6.04	5.03	5.37	4.93	-1.11***	5.92	5.23	5.33	5.16	-0.76**
Sample Size	7,013	6,137	7,021	12,902		3,187	5,373	15,119	9,575	7,013
					Panel B: Men					
Activity	1986	1992	1998	2005	Difference 2005-1986	1985	1993	2003	2005	Difference 2005-1985
Market +Nonmarket Work+ Childcare	57.3	58.28	61.17	61.54	4.24**	58.38	56.36	56.39	55.96	-2.42
Market +Nonmarket Work	55.51	56.03	58.39	58.77	3.26**	56.88	54.93	53.45	52.83	-4.45***
Nonmarket Work+ Childcare	13.72	15.7	17.08	16.39	2.67**	15.39	13.93	16.26	16.29	0.90
Childcare	1.79	2.25	2.78	2.76	0.97	1.50	1.43	2.94	3.13	1.62***
Nonmarket Work	11.92	13.45	14.30	13.62	1.70**	13.88	12.51	13.32	13.16	-0.72
Core Nonmarket work	5.86	6.29	7.32	7.38	1.52***	3.88	2.91	3.34	3.51	-0.37
Shopping for Goods/Services	4.95	4.02	4.34	3.76	-1.19**	4.64	3.84	4.37	4.02	-0.03
Sample Size	3,148	2,821	3,283	5,737		1,430	2,493	6,706	4,215	

Notes: (1) *** p<0.01, ** p<0.05, * p<0.1, (2) *Core nonmarket work*: domestic work, meal preparation home maintenance etc. (3) *Shopping for Goods/Services*: everyday shopping for goods, personal and professional services, (4) *Nonmarket work*: sum of all nonmarket work activities. (5) *Total work*: sum of nonmarket work and market work, (6) *Childcare*: sum of primary childcare recreational childcare and educational childcare.

Table 2.4 (continued) : Hours Per Week: Nonmarket Work, Childcare, and Total Work (nonmarket + market)

	CANADA					UNITED STATES				
					Panel C: Women					
Activity	1986	1992	1998	2005	Difference 2005-1986	1985	1993	2003	2005	Difference 2005-1985
Market +Nonmarket Work+ Childcare	54.11	56.9	58.97	59.97	5.86***	56.06	53.70	55.42	56.40	0.34
Market +Nonmarket Work	48.98	51.61	53.16	53.61	4.63***	51.02	49.37	48.59	49.71	-1.31
Nonmarket Work+ Childcare	30.43	30.71	31.21	30.40	-0.03	31.69	27.34	28.70	28.56	-3.13*
Childcare	5.13	5.29	5.80	6.35	1.22	5.04	4.3	6.85	6.68	1.64
Nonmarket Work	25.3	25.42	25.4	24.05	-1.25	26.65	23.02	21.84	21.88	-4.77***
Core Nonmarket work	17.05	17.17	16.29	15.23	-1.82	16.20	13.16	12.05	12.13	-4.07**
Shopping for goods/Services	7.12	6.02	3.38	6.09	-1.03**	7.06	6.48	6.17	6.18	-0.88***
Sample Size	3,865	3,316	3,738	7,165		1,757	2,880	8,413	5,360	

Notes: (1) *** p<0.01, ** p<0.05, * p<0.1, (2) *Core nonmarket work*: domestic work, meal preparation home maintenance etc. (3) *Shopping for Goods/Services*: everyday shopping for goods, personal and professional services, (4) *Nonmarket work*: sum of all nonmarket work activities, (5) *Total work*: sum of nonmarket work and market work, (6) *Childcare*: sum of primary childcare recreational childcare and educational childcare.

Table 2.5: Hours Per Week— Leisure

	CANADA					UNITED STATES				
	Panel A: All Individuals									
Activity	1986	1992	1998	2005	Difference 2005-1986	1985	1993	2003	2005	Difference 2005-1985
Leisure 1	32.98	35.58	35.31	33.08	0.10	35.02	37.26	35.01	34.45	-0.57
Leisure 2	106.82	107.99	106.42	105.79	-1.03**	107.80	109.60	107.17	107.28	-0.52
Leisure 3	110.3	111.78	110.72	110.37	0.07*	111.17	112.56	112.17	112.27	1.10
Leisure 4	115.78	114.2	112.25	111.82	-3.96***	114.21	116.00	117.11	116.81	2.60**
Sample Size	7,013	6,137	7,021	12,902		3,187	5,373	15,119	9,575	
	Panel B: Men									
Activity	1986	1992	1998	2005	Difference 2005-1986	1985	1993	2003	2005	Difference 2005-1985
Leisure 1	33.97	37.57	36.51	34.23	0.26	35.67	37.97	37.09	36.51	0.84
Leisure 2	106.04	108.24	105.97	105.49	-0.55	107.34	108.53	107.42	108.44	1.10
Leisure 3	107.84	110.49	108.75	108.26	0.42	108.85	109.96	110.36	11.57	2.72*
Leisure 4	112.49	111.97	109.61	109.22	-3.27***	111.12	113.07	114.54	115.17	4.05***
Sample Size	3,148	2,821	3,283	5737		1,430	2,493	6,706	4,215	
	Panel C: Women									
Activity	1986	1992	1998	2005	Difference 2005-1986	1985	1993	2003	2005	Difference 2005-1985
Leisure 1	32.01	33.63	34.11	31.94	-0.07	34.44	36.62	33.15	32.60	-1.84
Leisure 2	107.59	107.75	106.85	106.08	-1.51	108.21	110.56	106.93	106.22	-1.99
Leisure 3	112.72	113.04	112.66	112.44	-0.28	113.26	114.88	113.79	112.91	-0.35
Leisure 4	119.02	116.39	114.84	114.39	-4.63***	116.98	118.62	119.41	118.29	1.31*
Sample Size	3,865	3,316	3,738	7,165		1,757	2,880	8,413	5,360	

Notes: (1) *** $p<0.01$, ** $p<0.05$, * $p<0.1$, (2) *Leisure 1*: entertainment social activities, sports and hobbies, media and communication relaxation activities gardening and pet care, (3) *Leisure 2*: leisure 1 & personal care activities including sleep but excluding own medical care and care to other adults, (4) *Leisure 3: Leisure 2* & childcare, (5) *Leisure 4:* complement of time spent on market and non-mark work.

Table 2.6: Hours Per Week— Leisure 2 by Major Activity Categories-Canada

Activity	Panel A: Men					Panel B: Women				
	1986	1992	1998	2005	Difference 2005−1986	1986	1992	1998	2005	Difference 2005−1986
Leisure 2	106.04	108.23	105.97	105.49	-0.55	107.59	107.74	106.85	106.08	-1.51
Active Sports	1.40	1.59	1.89	1.73	0.33*	0.72	0.82	1.03	1.10	0.38***
All Sports	2.15	3.08	3.35	3.08	0.93***	1.18	1.95	2.44	2.47	1.29***
Computer Use	N/A	0.20	0.79	1.71	1.51***	N/A	0.07	0.37	1.08	1.01***
Eating	9.83	8.83	7.40	7.18	-2.65***	10.03	8.82	7.37	7.33	-2.70***
Entertainment	0.88	0.72	0.79	0.93	0.05	0.75	0.70	0.86	0.85	0.10
Games	0.60	1.03	1.43	2.00	1.40***	0.65	1.13	0.97	1.04	0.39***
Garden pet care	0.29	2.00	1.64	1.59	1.30***	0.24	1.01	1.56	1.66	1.42***
Hobbies	1.90	2.35	2.51	3.51	1.61***	3.16	3.06	2.47	2.42	-0.74**
Personal care &Night Sleep& Naps	72.25	69.97	69.30	70.77	-1.48***	76.08	73.44	72.08	73.74	-2.34***
Personal care	17.07	15.10	13.76	13.44	-3.63***	18.61	16.25	1.64	14.80	-3.81***
Night sleep & Naps	55.55	54.87	55.29	57.33	1.78***	57.41	57.19	57.43	58.94	1.53***
Night sleep	54.40	53.92	54.11	56.47	2.07***	56.29	56.63	56.2	57.69	1.40***
Reading	3.19	2.76	1.96	1.28	-1.91***	3.12	3.21	2.52	1.85	-1.27***
Socializing	6.19	6.69	7.43	6.83	0.64	6.92	7.57	8.10	7.31	0.39
Television watching	15.52	15.62	14.47	13.89	-1.63*	12.65	12.00	12.00	12.16	-0.49
Walk, Hiking, Running & Jogging	0.37	0.87	0.88	0.75	0.38***	0.41	0.86	0.97	0.95	0.54***

Notes: (1) *** $p<0.01$, ** $p<0.05$, * $p<0.1$, (2) *Active Sports*: physical exercise, golf, swimming, skiing, rowing, and other sports. *All Sports*: active sports, hunting, fishing camping, walking, jogging, (3) *Hobbies*: hobbies done mainly for pleasure sale or exchange, domestic home crafts etc. *Games:* computer use, puzzle board, arcade games, video games, compute games. (4) **N/A**: not recorded in 1986 survey so change in computer use calculated as 2005-1992.

Table 2.7:
Hours Per Week— Civic and Medical Care (subcomponent of leisure 4)-Canada

	1986	1992	1998	2005	Difference 2005−1986
Men	4.94	3.49	2.50	2.56	-2.38***
Women	6.54	4.36	3.74	3.61	-2.93***

Notes: (1) *** p<0.01, ** p<0.05, * p<0.1, (2) *Civic and Medical Care*: time spent on civic, religious, voluntary and activities own medical care, care to other adults, and education. Included in this aggregation is a residual activity code, which includes uncodeable time gaps and missing, or refused time. Excluding residual time does not alter the trends reported.

Table 2.8:
Hours Per Week: Market Nonmarket Work & Leisure By Educational Attainment Canada

	(1) Not High School	(2) High School	(3) Some College	(4) University	(5) difference (4) − (1)
Men					
Panel A: Market Work					
1986	38.13	42.53	44.38	48.38	10.25
1992	38.92	43.83	43.14	44.20	5.28
1998	40.33	46.37	43.93	46.33	6.00
2005	42.86	45.29	45.54	46.61	3.75
Difference 2005-1986	4.73	2.76	1.16	-1.77	
Panel B: Nonmarket Work					
1986	11.99	11.22	11.92	12.43	0.44
1992	13.75	13.31	13.78	12.66	-1.09
1998	14.93	13.97	14.08	14.31	-0.62
2005	15.03	11.33	14.04	13.27	-1.76
Difference 2005-1986	3.04	0.11	2.12	0.84	
Panel C: Leisure 2					
1986	110.20	108.85	105.79	100.14	-10.06
1992	112.63	108.38	107.22	105.58	-7.05
1998	110.87	105.23	105.84	101.92	-8.95
2005	109.23	108.16	103.77	102.76	-6.47
Difference 2005-1986	-0.97	-0.69	-2.02	2.62	
Women					
Panel D: Market Work					
1986	17.48	20.46	25.58	29.53	12.05
1992	17.52	24.23	28.43	32.77	15.25
1998	20.62	28.01	28.80	33.07	12.45
2005	21.06	28.61	31.88	34.80	13.74
Difference 2005-1986	3.58	8.15	6.30	5.27	
Panel E: Nonmarket Work					
1986	30.36	27.60	23.99	20.32	-10.04
1992	28.62	27.07	24.69	21.81	-6.81
1998	28.42	26.47	25.02	21.81	-6.61
2005	27.81	23.84	23.74	20.77	-7.04
Difference 2005-1986	-2.55	-3.76	-0.25	0.45	
Panel F: Leisure 2					
1986	111.17	109.31	107.08	103.03	-8.14
1992	115.11	109.04	105.19	103.99	-11.12
1998	113.16	105.94	105.75	103.24	-9.92
2005	113.05	106.74	103.71	103.00	-10.05
Difference 2005-1986	1.88	-2.57	-3.37	-0.03	

Notes: (1) *Not High School*: did not complete high school, (2) *High School*: Completed Secondary education. (3) *Some college*: community college, some university and other category, (4) *University*: Completed at least a bachelor's degree.

Table 2.9:
Hours Per Week: Market Nonmarket Work & Leisure By Educational Attainment- US

	(1) Not High School	(2) High School	(3) Some College	(4) University	(5) difference (4) − (1)
Men					
Panel A: Market Work					
1985	42.38	42.48	45.58	41.81	-0.57
1993	42.13	41.77	36.55	45.52	3.39
2003	32.37	39.10	39.25	44.88	12.51
2005	35.01	37.24	38.28	45.30	10.29
Difference 2005-1985	-7.37	-5.24	-7.29	3.48	
Panel B: Nonmarket Work					
1985	13.09	13.21	13.98	14.89	1.80
1993	11.92	12.95	13.91	11.13	-0.79
2003	12.33	13.35	13.10	13.84	1.51
2005	11.65	13.21	14.14	12.92	1.27
Difference 2005-1985	-1.44	0.00	0.14	-1.97	
Panel C: Leisure 2					
1985	109.38	108.20	105.62	106.92	-2.46
1993	112.55	109.40	108.50	106.05	-6.50
2003	117.34	109.70	106.30	101.93	-15.41
2005	116.06	112.25	107.33	102.04	-14.02
Difference 2003-1985	6.68	4.05	1.71	-4.88	
Women					
Panel D: Market Work					
1985	17.71	23.97	25.45	26.40	8.69
1993	18.24	23.21	27.64	32.41	14.17
2003	16.10	25.05	28.53	31.36	15.26
2005	17.96	25.90	29.32	32.78	14.82
Difference 2005-1985	0.25	1.93	3.87	6.38	
Panel E: Nonmarket Work					
1985	29.09	27.36	26.66	24.78	-4.31
1993	24.93	25.05	22.73	19.86	-5.07
2003	25.76	22.66	20.21	20.80	-4.96
2005	25.56	22.58	20.64	20.70	-4.86
Difference 2005-1985	-3.53	-4.78	-6.02	-4.08	
Panel F: Leisure 2					
1985	113.34	109.18	107.21	105.90	-7.44
1993	117.55	11215	107.25	108.90	-8.65
2003	113.48	109.06	105.35	103.09	-9.58
2005	112.22	108.65	104.98	101.87	-10.35
Difference 2005-1985	-1.12	0.10	-2.23	-4.03	

Notes: (1) *Not High School*: did not complete high school, (2) *High School*: Completed Secondary education. (3) *Some college*: community college, some university and other category, (4)*University*: Completed at least a bachelor's degree

Table 2.10: Decomposition of Unconditional Changes in Hours Per week-Canada

All Individuals

Panel A: Decomposition Evaluated at 1986 Demographic Weights and 2005 Cell Means

	unconditional change 2005 −1986	change due to demographics	change due to difference in cell means
Market Work	5.84	2.00	3.84
Nonmarket Work	-0.34	-0.26	-0.08
Leisure Measure 2	-2.04	-0.97	-1.07

Panel B: Decomposition Evaluated at 2005 Demographic Weights and 1986 Cell Means

	unconditional change 2005 −1986	change due to demographics	change due to difference in cell means
Market Work	5.84	2.26	3.58
Nonmarket Work	-0.34	-0.77	0.43
Leisure Measure 2	-2.04	-1.27	-0.77

Men

Panel C: Decomposition Evaluated at 1986 Demographic Weights and 2005 Cell Means

	unconditional change 2005 −1986	change due to demographics	change due to difference in cell means
Market Work	2.75	0.29	2.46
Nonmarket Work	2.05	0.39	1.66
Leisure Measure 2	-1.66	-0.65	-1.01

Panel D: Decomposition Evaluated at 2005 Demographic Weights and 1986 Cell Means

	unconditional change 2005 −1986	change due to demographics	change due to difference in cell means
Market Work	2.75	2.12	0.63
Nonmarket Work	2.05	0.22	1.83
Leisure Measure 2	-1.66	-1.71	0.05

Women

Panel E: Decomposition Evaluated at 1986 Demographic Weights and 2005 Cell Means

	unconditional change 2005 −1986	change due to demographics	change due to difference in cell means
Market Work	8.47	3.32	5.15
Nonmarket Work	-2.41	-0.67	-1.74
Leisure Measure 2	-2.40	-1.27	-1.13

Panel F: Decomposition Evaluated at 2005 Demographic Weights and 1986 cell means

	unconditional change 2005 −1986	change due to demographics	change due to difference in cell means
Market Work	8.47	1.93	6.54
Nonmarket Work	-2.41	-3.39	0.98
Leisure Measure 2	-2.40	-0.81	-1.59

Notes: (1) Blinder-Oaxaca decomposition of unconditional change in hours per week. The first column reports the unconditional change. (2) The second column reported the change due to demographics changes over time evaluated at 2005 and 1986 cell means. (3) The third column reports changes in the unconditional men due to changes within demographic groups evaluated at the 1986 and 2005 demographic composition respectively. (4) Leisure 2: leisure 1 & personal care activities including sleep but excluding own medical care and care to other adults

Appendix Table 2.A1: Time Use Category Descriptions

Activity	Description/Composition of Some Activities Included
Market Work	Total time spent in employed work and work-related activities such as job search, overtime work unpaid work in business or farm, & waiting delays at work. travel to and from work, idle time before/after work, job search, eating at work, breaks, commute during work & other uncodeable work activities.
Core Market Work	Core Market Work: work for pay at main job, other jobs, looking for work, unpaid work in a business or farm, applying for unemployment benefits, other income generating activities & waiting delays at work.
Nonmarket Work	Cooking and washing up, housekeeping, maintenance and repair (indoor and outdoor), shopping for goods and services (excluding medical care), gardening and pet care, household administration, other household work
Core Nonmarket Work	cooking and washing up, housekeeping, maintenance and repair (indoor and outdoor)
Obtaining goods	Everyday shopping for goods, personal and professional services (excluding medical care)
Childcare	Baby care, putting children to bed, unpaid babysitting, medical care of children, play with children, reading and talking, teaching and reprimanding
Total work	Nonmarket work & market work
Leisure 1	Entertainment, social activities, sports and hobbies, play, media and communication relaxation activities, reading, garden and pet care, computer use, hunting fishing, walking hiking, coaching (coaching excluded for the U.S.)
Leisure 2	Leisure 1 & personal care activities such as washing dressing night sleep, incidental sleep, relaxing, thinking, resting etc.
Leisure 3	Leisure_2 & childcare activities
Leisure 4	Total time available in a day- total work
Personal care	Sex, eating, essential sleeps, naps, meals at home or restaurant
Civic and voluntary activities	Professional union meetings, religious meetings, political activities, child youth and family organisations, medical care of household adults, personal care household adults, care for disabled or ill, travel related to civic & voluntary activities
Education	Full time classes other classes, leisure and special interest classes, special lectures occasional

Appendix Table 2.A2: Difference in Average Market Hours Per week in the United Sates and Canada in 2005

	Participants and Non-Participants		Participants Only	
	All Individuals		**All Individuals**	
Activity	U.S. *minus* Canada in 2005	p-value of difference	U.S. *minus* Canada in 2005	p-value of difference
Market Work	-3.860	0.020	-5.181	<0.01
Core Market Work	-0.965	0.501	-0.476	0.541
Work-Related	-3.189	<0.01	-5.225	<0.01
Commute to/from work	-0.772	<0.01	-1.086	<0.01
	Men		**Men**	
Activity	U.S. *minus* Canada in 2005	p-value of difference	U.S. *minus* Canada in 2005	p-value of difference
Market Work	-5.481	<0.01	-5.184	<0.01
Core Market Work	-2.014	0.092	-0.362	0.657
Work-Related	-3.830	<0.01	-5.361	<0.01
Commute to/from work	-0.881	<0.01	-0.955	<0.01
	Women		**Women**	
Activity	U.S. *minus* Canada in 2005	p-value of difference	U.S. *minus* Canada in 2005	p-value of difference
Market Work	-1.728	0.375	-4.582	<0.01
Core Market Work	0.547	0.740	-0.122	<0.01
Work-Related	-2.498	<0.01	-4.952	<0.01
Commute to/from work	-0.614	<0.01	-1.193	<0.01

Notes: (1) Participants are defined as those individuals reported positive market work hours and their diary day. Non-participants are those who reported zero hours on their diary day. (2) **Canada**: *Market work*: total time spent in employed work and work-related activities. *Core Market Work*: work for pay at main job/other jobs, job search, overtime work unpaid work in business or farm, & waiting delays at work. *Commute to/from work*: travel to and from work. *Work-Related*: idle time before/after work, job search, eating at work, breaks, travel to/from work, commute during work & other uncodeable work activities.
(3) **US**: *Market Work*: total of all work activities. *Core Market Work*: work for pay at main job, other jobs, looking for work, unpaid work in a business or farm, applying for unemployment benefits, other income generating activities & waiting delays at work. *Commute to/from work*: travel to and from work. *Work-Related*: idle time before/after work, job search, eating at work, breaks, travel to/from work, commute during work & other uncodeable work activities.

Appendix Table 2.A3:
Difference in Average Hours Per week Nonmarket Work Childcare and Total Work (nonmarket + market) in the United Sates and Canada in 2005

|	All Individuals	
Activity	U.S. *minus* Canada in 2005	p-value of difference
Market +Nonmarket Work+ Childcare	-4.559	<0.01
Market +Nonmarket Work	-4.982	<0.01
Nonmarket Work+ Childcare	-0.699	0.679
Childcare	0.423	0.674
Nonmarket Work	-1.122	0.274
Core Nonmarket Work	-3.280	<0.01
Shopping for Goods/Services	0.227	0.381
	Men	
Activity	U.S. *minus* Canada in 2005	p-value of difference
Market +Nonmarket Work+ Childcare	-5.581	<0.01
Market +Nonmarket Work	-5.940	<0.01
Nonmarket Work+ Childcare	-0.990	0.926
Childcare	0.360	0.666
Nonmarket Work	-0.459	0.480
Core Nonmarket Work	-3.869	<0.01
Shopping for Goods/Services	0.264	0.253
	Women	
Activity	U.S. *minus* Canada in 2005	p-value of difference
Market +Nonmarket Work+ Childcare	-3.575	0.034
Market +Nonmarket Work	-3.899	<0.01
Nonmarket Work+ Childcare	-1.846	0.427
Childcare	0.324	0.851
Nonmarket Work	-2.170	0.049
Core Nonmarket Work	-3.105	<0.01
Shopping for Goods/Services	0.092	0.734

Notes: (1) *Core nonmarket work*: domestic work, meal preparation home maintenance etc, (2) *Shopping for Goods/Services*: everyday shopping for goods, personal and professional services, (3) *Nonmarket work*: sum of all nonmarket work activities, (4) *Total work*: sum of nonmarket work and market work, (5) *Childcare*: sum of primary childcare recreational childcare and educational childcare.

Appendix Table 2.A4:
Difference in Average Leisure Hours Per week in the United Sates and Canada in 2005

	All Individuals	
Activity	U.S. *minus* Canada in 2005	p-value of difference
Leisure 1	1.368	0.157
Leisure 2	1.487	0.210
Leisure 3	1.910	0.061
Leisure 4	4.982	<0.01
	Men	
Activity	U.S. *minus* Canada in 2005	p-value of difference
Leisure 1	2.279	0.117
Leisure 2	2.960	0.112
Leisure 3	3.319	0.019
Leisure 4	5.940	<0.01
	Women	
Activity	U.S. *minus* Canada in 2005	p-value of difference
Leisure 1	0.651	0.586
Leisure 2	0.140	0.929
Leisure 3	0.464	0.740
Leisure 4	3.898	<0.01

Notes: (1) *Leisure 1*: entertainment social activities, sports and hobbies, media and communication relaxation activities gardening and pet care, (2)*Leisure 2*: leisure 1 & personal care activities including sleep but excluding own medical care and care to other adults, (3) *Leisure 3: Leisure 2* & childcare, (4)*Leisure 4:* complement of time spent on market and non-mark work.

Figure 2.1 Market and Core Market Work-Deviations from 1986 Hours per Week
Canada
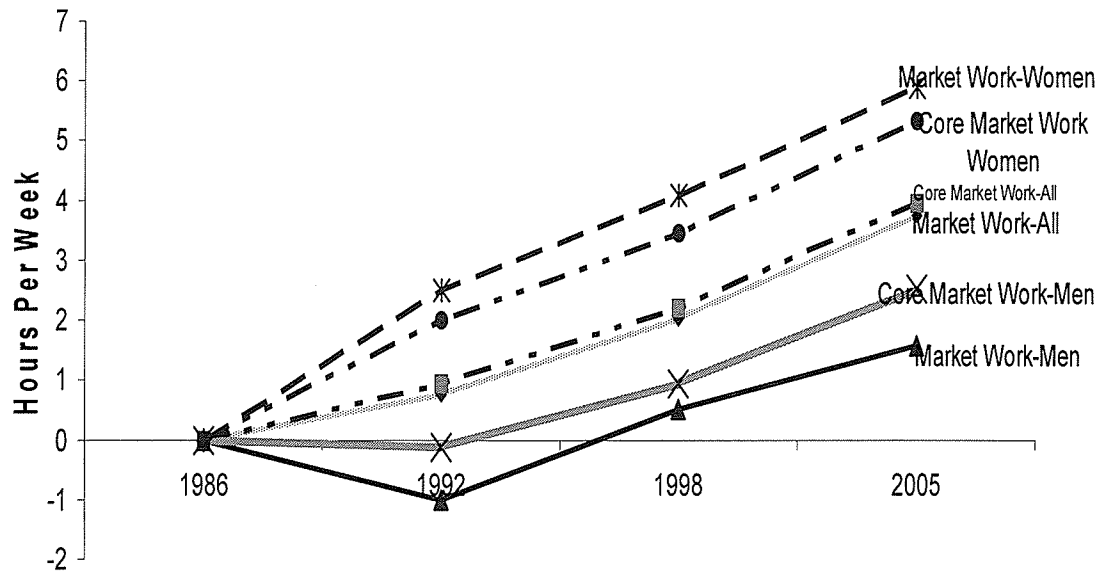
Figure 2.2 Market and Core Market Work-Deviations from 1985 Hours per Week
United States
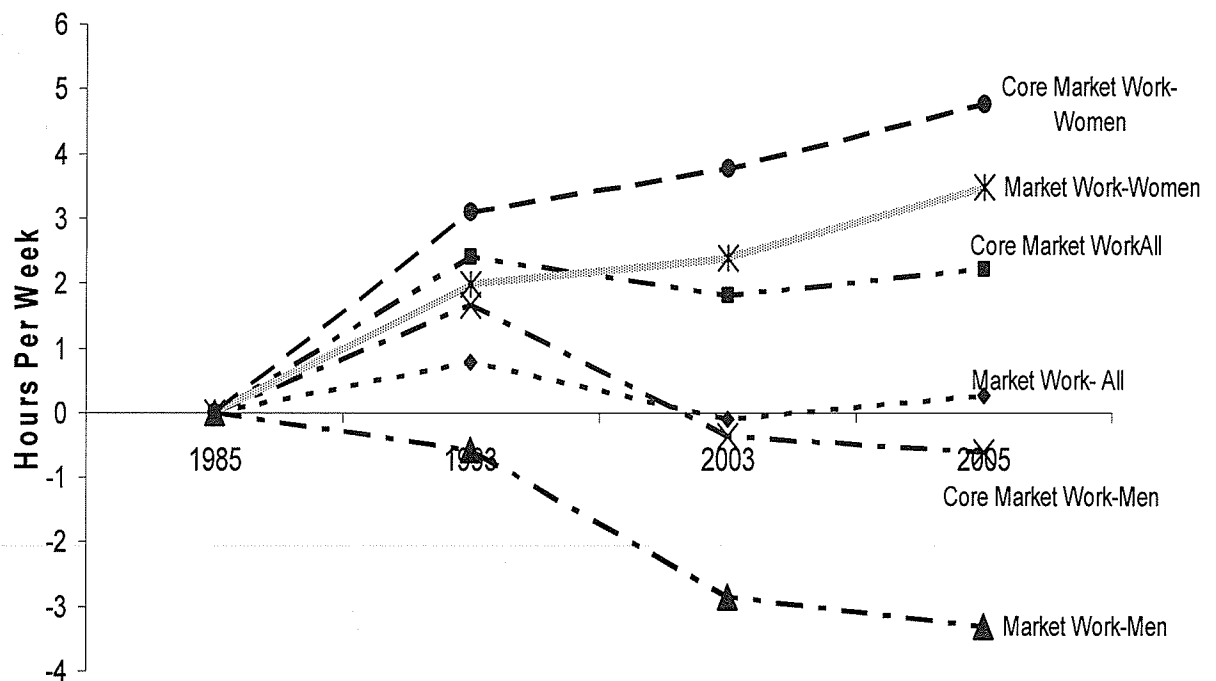
CHAPTER 3

THE TIME ALLOCATED TO MARKET WORK AND CHILDCARE BY MEN IN CANADA

3.1 Introduction

Since the 1950s, the time allocated to the acquisition of human capital, market work, childcare, nonmarket work (home production/housework), and leisure have changed dramatically. There are more dual-earner families, men and women spend more time on educational attainment, and men spend more time doing housework. Scholars have examined these changes in the allocation of time from different perspectives, most by relating the relationship between time allocation and an individual's family circumstances (e.g., parental status, age and number of children, household size, marital status, etc.). For example, some scholars have examined the impact of time allocation changes on the gendered divisions of labour within the household (Cooke, 2004; Haveman and Wolfe; 1983). Other scholars have examined changes in the time allocated to market work, nonmarket work, and childcare resulting from changes in fertility decisions or parental leave polices (e.g., Averett and Whittington, 2001; Baum, 2003; Marshall, 1999; and Phipps, 2000). Most of these studies, however, have focussed mainly on women's time allocation choices and their family circumstances. This focus on women is attributable in part to the fact that women's time allocation changed dramatically since the 1950s when their labour force participation rose sharply leading to a secular rise in the average number of weekly hours they devote to market work.

Few scholars, however, have examined the time fathers allocate to childcare and how fathers and non-fathers differ in their average weekly market work hours. These time allocation choices are important given their potential impact on family welfare outcomes. Such outcomes include the prevalence and occurrence of childhood obesity, the likelihood of high economic and educational achievement of children, and the risk of marital instability (Allen and Daly, 2007). This essay focuses not on these consequences but on men's parental status and the time apportioned to childcare and market work.

There are three main findings in the literature on the time fathers and non-fathers spend on market work, which in turn has on bearing on the time they allocate to childcare. First, fatherhood encourages men to seek stable and long-term employment, and fathers tend to increase their market work hours relative to non-fathers. The results generally indicate that the difference in work hours of fathers and non-fathers is greatest for fathers with children less than 5 years of age (e.g., Kaufman and Uhlenberg, 2000; Lundberg, 1988; Lundberg and Rose, 2002; Pencavel, 1986). Those fathers who increase their work hours relative to non-fathers are often referred to as "good providers" (Bernard, 1981). Second, other authors find that fatherhood reduces the time devoted to market work relative to non-fathers (e.g., Carlin and Flood 1997; Charles and James, 2003; Wilkie, 1993). These fathers are described as being active or involved. Involved fathers may still seek out stable long-term employment, but they tend to reduce the intensity of their work involvement (Eggebeen and Knoester, 2001). Third, other authors find that fatherhood does not affect the time men allocate to market work (e.g., Blomquist and Hanson-

Brusewitz, 1990; Bourguinon and Magnac, 1990; Presser, 1995; Triest, 1992). The explanation is that some men consider their role as fathers and their labour market choices as independent—fatherhood responsibilities and market work commitments are not treated as substitutes. Therefore, men do not attenuate their work hours when they make the transition to parenthood.

In this essay, I contribute to the literature on time allocation choices of men in Canada using the 1998 and 2005 time use surveys to shed light on the time they allocate to market work and childcare when they become fathers. The focus of this essay is on residential fathers, given the available data. Furthermore, in this essay particular attention is paid to discussing fathers' time allocation choices to market work and childcare with respect to their education (income) profile. Analysing the relationship between parents' education and their parental time is one way to determine the inequality that exists between low and high-income individuals. This sort of analysis has been the subject of three recent studies using U.S. time diary data.

Chalasani (2007), using the 1985 and 2003 U.S. time use surveys, finds that higher educated parents spent more time on childcare and that this trend has increased over time. Guryan, Hurst, and Kearney (2008) extend the analysis of Chalasani (2007) by using the 2003, 2004, 2005, and 2006 U.S. time use surveys. In addition to finding results similar to Chalasani (2007), they also find that individuals in higher income countries, including Canada, on average devote more time to childcare. Ramey and Ramey (2009) document the increase in the time higher educated Americans spend on childcare relative to lower

educated Americans over time with a view to testing competing explanations for this trend. They also compare aggregate trends in U.S. and Canadian childcare time to support their preferred explanation.

The current essay differs from the three aforementioned U.S. studies in six ways. First, the focus is on Canada and on Canadian men in particular. Second, an assessment is made with respect to whether fatherhood influences the time Canadian men allocate to market work using weighted time use averages and Cragg's double hurdle model—after controlling for a number of family-type variables such as household size and marital status. Third, I determine whether the age of children, number of children, and the educational attainment of fathers and non-fathers affects the time they allocate to market work. The analysis in this essay builds on Dommarmuth, Kitterod, and Nymoen (2007) who examined differences in the work hours of fathers and non-fathers in Sweden.

Fourth, the time fathers spend on childcare in Canada is examined using weighted time use averages and the tobit model and with a sample that is likely to provide a better indication of changes in the time fathers spend on childcare. Guryan, Hurst, and Kearney (2008) examined the time allocated to childcare for individuals with at least one child age 18 years or less using Canadian time use surveys. However, in the 1998 and 2005 Canadian time use survey childcare diary data is collected for individuals with at least one child age 14 years or less living in the household. Therefore, the results Hurst, and Kearney (2008) with respect to Canada are potentially biased. Ramey and Ramey (2009) also analyse trends in the time Canadians spend on childcare controlling for age and

number of children, but their sample is restricted to English-speaking parents only. Further, their analysis is based on a linear regression that does not account for the underlying latent desire to spend time on childcare, which can be accounted for using the tobit model.

Fifth, unlike the aforementioned U.S. studies, this essay also determines the impact of a father's educational attainment, his spouse's educational attainment, and his spouse's hours of work on the time he devotes to childcare for fathers with their oldest child 14 years of age or younger. Sixth, because the 2005 survey data reports the time spent on secondary childcare activities, I am able to assess the relationship between educational attainment and these activities. In contrast to primary childcare activities, secondary childcare activities involve the care of children simultaneously with other activities (e.g., watching television, cooking etc.), but where the care of children is not the main (primary) activity of the respondent. The time men spend in secondary childcare also has a bearing on the attainment positive child development outcomes (Zick and Bryant, 1996) An assessment of secondary childcare activities in Canada for men along their educational profile has not been reported on elsewhere for Canada.

Overall, the analysis in this essay also builds on recent studies that examine time allocation trends in Canada from 1971 to 2005: Gauthier, Smeeding, and Furstenberg (2004), Pronovost (2007), and Turcotte (2007). With respect to the time devoted to childcare and market work, the main findings from these studies are that the former has fallen while the latter has increased.

In this essay, there are five main results. First, while fathers spend more time in market work compared to non-fathers, as non-fathers educational attainment increases they spend more time spend engaged in market work. Second, among men with the same level of education, fathers spend more time on market work than non-fathers. Third, the results reveal that after conditioning on socioeconomic and demographic factors, fatherhood increases the probability of men choosing to participate in the labour market, but that the time spent in market work increases only for fathers with one child age 0-1 year old living in their household consistent with other studies. Fourth, fathers with higher levels of education spend, on average, more hours per week on childcare. This latter result is in contrast to what one would expect based on the standard economic comparative advantage argument, but it is consistent with the U.S. studies mentioned above and other scholars (e.g., Bianchi, Cohen, Raley, and Nomaguchi, 2004; Bianchi, and Raley, 2005; Davis-Kean, Hofferth, Sandberg, and Yeung, 2001).

Fifth, the time a father spends on childcare increases with the educational attainment of his spouse and the weekly hours she spends on market work. This latter result is in contrast to most of the results from U.S. cross-sectional studies that find no relationship between mothers' employment status and work hours and the time fathers spend on childcare among cohabitating parents (e.g., Kingston and Nock, 1988; Marsiglio, 1991). One exception is Bianchi and Wang (2009); they find a positive association between maternal employment and fathers' childcare time after controlling for the children's ages and considering different dimensions of fathers' childcare time. In the current essay, the results show that in Canada there is a positive, though small, relationship between the

time a father spends on childcare and the time his spouse spends on market work.

Overall, the results in this essay suggest Canadian fathers are "good providers" when it comes to market work. At the same time, higher educated Canadian fathers are more "involved" in childcare relative to less educated fathers. The rest of this essay is organized as follows: I outline the theoretical framework in section 3.2, summarize the data and empirical methods in section 3.3, and outline and discuss the results in section 3.4. In this latter section, a few reasons that might explain trends in father's childcare time are discussed. Section 3.5 concludes.

3.2 Theoretical Framework

In this section, linkages between fatherhood and the time fathers allocate to market work and childcare are explored. While this essay's contribution is primarily empirical, it is instructive to discus the theoretical underpinnings of time allocation choices that have been developed in the literature. The framework for examining individual and family time allocation choices at the extensive and intensive margins is summarized in Becker (1991). A simplified version of this time allocation framework applied to decisions over how much time to spend on childcare can be formalized in terms of a two parent household utility function as follows:

$$\max U^h = U(X, C, t_w^1, t_w^2, t_C^1, t_C^2, t_L^1, t_L^2) \qquad [3.0]$$

subject to

$$w^1 t_w^1 + w^2 t_w^2 + m = p_X X \qquad [3.1]$$

$$T = t_w^1 + t_w^2 + t_C^1 + t_C^2 + t_L^1 + t_L^2 \qquad [3.2]$$

Where $U_i > 0$, $U_{ii} < 0$ for all $i = (X, C, t_w^1, t_w^2, t_C^1, t_C^2, t_L^1, t_L^2)$ and $C = f(t_C^1, t_C^2)$ with $C_{t_C^1} > 0$ and $C_{t_C^2} > 0$. Here, X represents the goods purchased in the market with p_X an index for the price of these goods, and C is the number and quality of children present in the household. The time the father spends on market work is t_w^1 and the mother t_w^2, and childcare time is t_C^1 for the father and t_C^2 for the mother. Similarly, the time spent on leisure is t_L^1 for the father and t_L^2 for the father. For simplicity, leisure lumps together home production and includes time spent on other activities such as volunteering and personal care. Further, the number of children is treated as given, but child quality can be altered through the function $C = f(t_C^1, t_C^2)$. Treating childcare as exogenous simplifies empirical analysis and is common in the literature with several scholars failing to reject exogeneity (e.g., Carlin and Flood, 1997; Hotz and Miller, 1988; Mroz, 1987). Non-labour income is m and the father's wage rate is w^1 and the mother's w^2.

Within this framework, the time spent at work yields a direct benefit through the time spent on market work and from the income it generates that is used to finance expenditure on consumption goods. The time spent by either parent on market work is influenced in part by differences in their comparative advantage, as determined by their respective wage rates. Both the presence of children and the time spent with them yield direct benefits. These direct benefits are manifested not only in the form of the immediate gratification that each parent receives, but yields future benefits to the child and each parent (Becker, 1991). In equilibrium, the marginal benefit associated with childcare,

market work, and leisure are all equal. The standard result follows: an increase in the marginal utility associated with any one of these activities leads to an increase in the time spent on that activity, all else constant. For example, if the substitution effect dominates the income effect, and the father is not hours constrained, a rise in his wage rate relative to his spouse increases the time he spends on market work and thus reduces the time that he can spend on childcare and leisure, all else constant.

Socioeconomic and demographic factors not explicitly accounted for within this simple framework also determine the relative time that each parent will spend on market work, childcare, and leisure. Such factors include age, educational attainment, health status, health, household size, and religious beliefs. One socioeconomic variable of interest in this essay is educational attainment. By the standard comparative advantage argument, the time fathers (mothers) spend on childcare should decrease as their relative educational attainment compared to with the education level of their spouse increases, all else constant. This follows from the positive correlation between educational attainment and higher wage offers and wage rates, and the fact that higher educated individuals tend to be able to self-select into jobs they enjoy, thus raising the marginal benefit to them from the time they spend engaged in market work.

The basic household production framework outlined above assumes fathers are married (legal or common law). However, there are also single fathers facing the decision concerning how much time to allocate to childcare, leisure, and market work. The magnitude of the difference in the time single and married fathers spend on childcare is a

priori ambiguous. This difference will depend in part on the relative educational attainment of married parents, their employment status, and their joint time allocation preferences. For example, a married father may work more than a single father if for the married father his spouse is unable to contribute sufficiently to the household income, and vice versa. At the same time, being married may raise a father's valuation of his leisure time, some of which is now spent with his spouse, thus reducing the relative benefit he receives from allocating more time to activities such as market work and raising the benefit from spending time at home on childcare activities. In this case the married father could in fact spend more time on childcare than the single father.

To characterize completely the time allocation of fathers who are married necessitates not only the formulation of a joint household production model, but the specification of both parents' preferences over various time use activities. This sort of analysis is beyond the scope of this essay. This is in part because a completed 24-hour time diary time for spouses is not available from the Canadian time use surveys and as such, a complete bargaining analysis is not possible based on the data available. However, the time diary data does allow for an assessment of the impact of the spouse's educational attainment and work hours on the time married fathers allocate to childcare.

As noted earlier, from a theoretical perspective, relatively higher educated, presumably higher income, mothers would spend less time on childcare compared to less educated spouses, all else constant. How a mother's educational attainment will affect the time a father spends on childcare depends on family preferences and of course his level of

educational attainment. In terms of a mother's work hours and the time a father spends on childcare, an increase in her work hours could increase the time he spends on childcare. However as mentioned earlier, several cross-sectional studies, particularly in the U.S., have found no association between the time a father spends on childcare and the work hours of his spouse.

Policies such as parental leave, day-care subsidies, and family related tax credits (e.g., Canada Child Tax Benefit) will also affect men's time allocation decisions. [17] One recent study in this area is Evans (2006). She finds that the 2001 reform of parental leave in Canada, which expanded coverage and benefits for both parents, increased the percentage of new claimants who were men (5.3% in 2000 to 14.2% 2004). However, a careful reading of her study leads one to conclude that the effect of this change on fathers' work hours is ambiguous. On the one hand, more men were first time claimants, but at the same time, the participation and length of time women stayed on benefits increased. The net effect could be to push men to work more hours. The time use data do not allow for an analysis of the impact on time allocation from changes in parental leave or other policies over the sample period. In this essay, such changes are treated as given and the results should be viewed with this in mind.

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[17] A detailed summary of the possible effects of these social and public polices on men can be found in Ashnourne, Lero, and Whitehead (2006).

3.3 Data and Methods

3.3.1 Data

The data used for analysis were extracted from Statistics Canada's Public Use Microdata File based on the 1998 and 2005 General Social Surveys (GSS) on time use. These surveys target Canadians 15 years of age and older excluding residents of the Yukon, Northwest Territories, Nunavut, and full-time residents of institutions. Households were chosen by random digit dialling, and one member of each household selected. The 1998 survey was conducted from February 1998 through to January 1999; the response rate was 77.6%, and the sample size was 10,759. The 2005 survey was conducted from January through December 2005; the response rate was 58.6% and the sample size was 19,597. The samples for both surveys were distributed evenly over the year to offset as much as possible seasonal variation in time use.

The time diary data is well known to provide a more reliable measure of time spent on various activities compared to traditional survey data (e.g., Budig and Folbre, 2004; Juster and Stafford, 1991; Zick, 2002). One limitation of traditional surveys, for example Statistics Canada's Labour Force Survey, is that they ask respondents to estimate the number of hours spent on an activity in some previous reference period. When respondents must choose a reference period, they tend to provide a measure of the time they usually spend on an activity. The implication is that they often tend to recall the period when the activity in question was most prominent and therefore are more likely overestimate the actual amount of time spent performing the activity. Further, traditional survey data tend not to pick up actual changes in time allocation behaviour, since usual

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hours are often reported instead of actual hours. For example, in a traditional survey, a father may report his usual market work hours in the reference period as being positive, although in the reference period he took the day off from work to care for a sick child (Carlin and Flood, 1997).

Respondents reported on the interview day the time spent in minutes on various activities over the previous 24-hour period starting at 4:00 a.m. If respondents were performing more than one activity, they were asked to determine the main activity. The time spent on market work and childcare are the time use categories of interest. These time use categories were converted from minutes to average hours per week by multiplying by 7 and dividing by 60. Market work is the sum of the time spent in employed work, work-related activities (e.g., waiting delays at work, travel to and from work, etc.), unpaid work in a business or farm, and commuting during work. The estimation sample for the analysis of market work is restricted to men age 20 to 54 years of age who are not enrolled in an educational institution. The sample sizes for the 1998 and 2005 samples are 3,384 and 6,168 respectively. For the market work regressions, fathers are defined as those men having at least one child age 0 to 18 years of age residing in their households. The surveys do not allow for a determination of the time allocation choices of non-residential fathers.

The time spent with household children by the male respondent, when designated as the main activity, is the primary measure of childcare examined in this essay. It is the sum of basic care (e.g., baby care), recreational childcare (e.g., playing with children) and educational childcare (e.g., reading to children) when designated the main activity by the

respondent. These measures of childcare involve the active or physical care of children. However, the time spent with children is also recorded when it is a secondary activity for resident fathers in the 2005 time use survey. Secondary childcare is the time spent caring for children when not designated as the main activity of the respondent. In this case, the main activity is usually meal preparation, reading, watching television or otherwise. For the 2005 survey, time use measures for both the total time spent in primary and secondary childcare are used in the empirical analysis.

The childcare diary data is collected for respondents who reported having at least one child age 0-14 years of age living in their household in the 1998 and 2005 surveys. Therefore, for the analysis of childcare the sample is restricted to men whose youngest child is age 14 years old younger. I exploit information on the work hours of a father's spouse and her educational attainment in the analysis of childcare by restricting the sample to only fathers who reported their marital status as married (common law or legal). In particular, cohabitating men were asked to report their spouse's work hours and educational attainment.[18]

The sample sizes used in the analysis for the childcare regressions are 1,029 in 1998 and 1,567 in 2005. Both time use surveys provide survey weights to match the provincial age and sex distribution of the Canadian population based on census estimates, accounting for the approximately 2% of the target population without a home phone, and so that each

[18] Men who were single and residential fathers with youngest child age 14 years or younger accounted for only 6.37% of the sample. Further, the results on childcare that included single fathers were not significantly different from those with married fathers save for the informational content that the latter provided on the impact of spouse's educational attainment and work hours.

day of the week was equally represented. However, because subsamples are from each survey each day of the week will not be equally represented. Therefore, for the subsamples used in the analysis of market work and childcare the survey weights are adjusted so that each day of the week was equally represented. This weighting ensures that time use means represent averages over a seven day week.

Respondents also report several socioeconomic and demographic variables, some of which are used as control variables in the empirical analysis. These are age, marital status (legal or common law),[19] respondent's educational attainment, respondent's spouse's educational attainment, occupational category, self-assessed health, household size, religious attendance, full-time or part-time work status, region where the respondent lives, number of children, and the age of the youngest child living in the household. In appendix Table 3.A1, some key summary statistics and descriptions of these variables are reported.

3.3.2 Methods

I report and discuss weighted time use averages of the time spent in market work and childcare by educational attainment and parental status. For the childcare time use averages, the time spent in primary childcare (including sub-categories) for the 1998 and 2005 surveys are reported. In addition, for the 2005 survey, the time spent in total, primary, and secondary childcare are analysed.

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[19] The data does allow same sex couples to be distinguished, but a reading of the survey questions indicate that they might be included, given respondents are not asked to identify the gender of their partner (legal or common law).

In view of the fact that only the hours supplied of those who engage in market work are observed and not the entire distribution of hours, there is an inherent selection bias in the linear regression model. Further, using time use diary data over the full sample of men (working and non-working) means that there too many zero observations. Some of these zeros represent true non-participation in market work and others represent measurement errors arising from some respondents being interviewed on a day when they just happened not to be working because of some random circumstance, though they otherwise would have been working. To address the selection problem and the tobit type censoring, Cragg's double hurdle model is used to analyse the average weekly hours spent on market work, controlling for socioeconomic and demographic factors. This model decomposes labour supply into the decision to work (participation) and the choice of how many hours to work (behavioural).

Market Work—Cragg's Double Hurdle

Cragg (1971) formulated the double hurdle model as a more general and less restrictive alternate to the Heckman and tobit models. Without loss of generality, the double hurdle model can be specified as:[20]

$$HOURS_i^* = Z_i'\beta_1 + u_i \qquad\qquad [3.3]$$

$$HRS_i^* = X_i'\beta_2 + e_i \qquad\qquad [3.4]$$

$$HRS_i = 1 \text{ if } HRS_i^* > 0, \text{ otherwise } HRS_i = 0 \qquad\qquad [3.5]$$

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[20] The formulation of the models presented follows Carlin and Flood (1997), Jones (1989), and Wodjao (2007).

$$HOURS_i = d_i \max(HOURS_i^*, 0) \qquad \text{[3.6]}$$

$$\begin{pmatrix} e_i \\ u_i \end{pmatrix} \sim N\left[\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & 0 \\ 0 & \sigma_e^2 \end{pmatrix} \right] \qquad \text{[3.7]}$$

where, $HOURS_i^*$ is the desired latent number of market work hours, $HOURS_i$ is the actual reported number of hours spent on an activity, HRS_i indicates whether the individual participated in market work on the dairy day (positive hours observed), HRS_i^* is binary variable for latent censoring, Z is a set of variables that influence how many hours are supplied, and X is a set of variables influencing the participation outcome.

The double hurdle model does require that once the decision is made to work positive hours will be observed, and it allows different processes to govern the decision to join the labour force and level of hours to work. Therefore, two hurdles must be passed before positive hours are reported. The first is that the respondent must choose to participate in the labour market and the second is that they are able to secure employment. The double hurdle model takes into account features that are peculiar to time diary data and thus is more appealing on theoretical grounds. As noted above, the double hurdle model accounts for the fact that zero market hours could be reported and the male respondent has a job, but was not working on the diary day or that zero hours are reported on the diary day, and the respondent did not have a job. The model as formulated assumes independence between the participation decision and the behaviour decision—how many market work hours to supply. This yields the following log likelihood function:

$$\ell\ell = \sum\nolimits_0 \ln\left[(1-\phi(X_i'\beta_2)\phi(Z_i'\beta_1\sigma_e^{-1})\right] +$$

$$\sum\nolimits_+ \ln\left[\sigma_e^{-1}\phi(X_i'\beta_2)\varphi\left(\frac{HOURS_i - Z_i'\beta_1}{\sigma_e}\right)\right] \qquad [3.8]$$

Here subscripts 0 and + on Σ denote those male respondents reporting zero and positive hours respectively.

Implementation

In the selection equations of the double hurdle model, a variable to indicate whether a child age 18 years or younger is present in the home is included, and in the behavioural equation, I include a categorical variable for the age distribution of the youngest child present in the home. The categories are: (1) youngest child age 0-1, one child; (2) youngest child age 0-1, two or more children; (3) youngest child age 2-5, one child; (4) youngest child age 2-5, two or more children; (5) youngest child age 6-14, one or more children; and (6) youngest child age 15-18, one or more children. The descriptions of all variables are reported appendix Table 3.A1. To estimate the parameters (in order to achieve convergence) of the double hurdle models, it is preferable to have at least one variable that is in the selection equation that is not in the behavioural equation. The literature offers very little guidance in this respect, and the choice is often guided by the data on hand. Moreover, the consensus and convention seems to be to include economic variables in the behavioural equation and non-economic variables in the participation equation.

In the behavioural equation, region, religious attendance, and self-assessed health are excluded. Region is excluded on the basis that differences in labour market conditions across Canada would be more strongly associated with the participation decision because of differences in employment insurance that are linked to unemployment rates. Religious attendance is a variable that directly affects the allocation of time. It is included in the participation equation only on the basis that attendance at religious meetings is likely to have less of a bearing on the number of hours worked. On the other hand, religious attendance is one avenue through which a job seeker may raise his or her employment prospects through networking and therefore increasing the likelihood that he or she would participate in the labour force. Health is excluded on the basis that there are ambiguous results on the impact of health on hours of work and participation. Some studies find it important in participation, but not hours worked, and others find the opposite to be true (Currie and Madrian, 1999). Given this ambiguity, the health variable is excluded from the behavioural equation. However, it should be noted that main results were in general robust to the choice of identifying variables.

Childcare—Tobit Model

In the analysis of the time spent on childcare, the sample of interest is residential fathers, not men in general. Therefore, there are no sample selection concerns. However, there is an issue with respect to the fact that there will be many respondents who report zero hours on the diary data (censoring). The method used in this essay to address the censoring due to the large number of zero childcare hours is the tobit model. Admittedly, there is an argument that ordinary least squares (OLS) might be preferred if zeros do not

represent non-participation in the activity, but rather measurement error (Foster and Kalenkoski, 2008).[21] Moreover, it is also reasonable to assume that a residential father will eventually spend positive hours on childcare, even if he happened to report spending zero childcare hours on the diary day. Therefore, the coefficients are interpretable if the interest is in the time spent on childcare as if it were observed for all residential fathers in the sample used in the analysis. However, as is convention in the literature, marginal effects with respect to those fathers who reported positive childcare hours on the diary day are discussed and coefficients will be reported in the appendix.

For the tobit regressions, time spent in primary childcare in the 1998 and 2005 surveys are used. The formulation of the tobit is as follows:

$$CCARE_i^* = W_i'\beta + \varepsilon_i \ , \quad \varepsilon_i \sim N(0, \sigma_\varepsilon^2) \qquad\qquad [3.9]$$

$$CCARE_i = \max(0, CCARE_i^*)$$

Here $CCARE_i^*$ is a latent variable indicating the desired average number of hours per week to spend on childcare, $CCARE_i$ is the reported average number of hours per week spent on childcare, and W is a vector of demographic and socioeconomic factors that affect the time spent on childcare. The log likelihood for this model is:

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[21] Foster and Kalenkoski, (2008) investigate this issue and found no quantitative distance between OLS and tobit regression estimates, but are able to conclude that the censored regression model, tobit, to be more appropriate than OLS. The additional data necessary to make that determination in this study is not available.

$$\ell\ell = \sum_{CCARE_i=0} \ln\left[1-\phi\left(W_i'\beta\sigma_\varepsilon^{-1}\right)\right] + \sum_{CCARE_i>0} \ln\left[\sigma_\varepsilon^{-1}\varphi\left((CCARE_i - W_i'\beta)\rho\sigma_\varepsilon^{-1}\right)\right] \qquad [3.10]$$

Two models are estimated. The first includes a variable for the number of children age 14 years old or younger present in the home and the second includes a categorical variable for age distribution of the youngest child present in the household. Childcare diary data is collected for respondents with at least one child age 0 to 14 years old. Therefore, the age distribution of the youngest child present in the household has the following categories: (1) youngest child age 0-1, one child; (2) youngest child age 0-1, two or more children; (3) youngest child age 2-5, one child; (4) youngest child age 2-5, two or more children; and (5) youngest child age 6-14, one or more children. Further details on these and all other variables used in the analysis are provided in Appendix Table 3.A1.

3.4 Results

3.4.1 Market Work: Time Use Trends

Trends in the average weekly hours spent on market work by educational attainment and parental status for each survey year are reported in Table 3.1. In panel A, the average weekly hours worked for all men in 1998 and 2005 are reported. These results indicate that the average weekly hours men spent on market work was relatively stable across the two surveys (average of 37.04 hours per week in 1998 and 36.32 hours per week in 2005). However, from 1998 to 2005 fathers and non-fathers did not change their average weekly hours spent on market work. At the same time, fathers do spend more time on market work per week than non-fathers (panel B). Specifically, in 1998 fathers worked 6.58 hours per week more than non-fathers, and in 2005, fathers worked 8.27 hours more

than non-fathers (panel B). These results suggest that Canadian men take on the role of being the good providers when they become fathers insofar as they increase their average weekly market work hours.

With respect to educational attainment, higher educated non-fathers spend more hours per week on market work than lower educated non-fathers in each survey year. Panels C and D show that the difference in market work hours between the least educated (not completed high school) and most educated (university) non-fathers are 7.73 hours per week in 1998 and 6.01 hours per week in 2005. On the other hand, among fathers, there is no statistically significant difference between the time the least and most educated spend on market work in each survey year (panels C and D). In addition, compared to fathers with the same level of educational attainment in 1998, fathers in 2005 spent about the same average weekly hours on market work. Similarly, non-fathers in 1998 and 2005 worked, on average, the same number of weekly hours by educational attainment (panels E and F). However, the results from this table indicate differences by educational attainment in the time fathers and non-fathers spend on market work. In particular, among men with the same level of educational attainment, fathers spend more hours per week than non-fathers do on market work. For example, in 2005 fathers with some college level education worked on average 8.14 hours more per week than non-fathers of the same educational attainment level.

3.4.2 Market Work: Double Hurdle Models

In this subsection, the econometric results on the time men allocate to market work, controlling for socioeconomic and demographic factors as reported in Table 3.2 are discussed.[22] The control variables reported are age distribution of the youngest child, father (presence of a child age 18 years of age or less), age group of the respondent, education of the respondent, and the survey year of the respondent. The details of the control variables not reported for the behavioural and selection equations are provided in the notes accompanying Table 3.2. The first column of Table 3.2 reports the coefficients from the participation equation. These results indicate that being a father has a positive impact on the participation decision (probability index increases by 0.27). Further, men with less than high school education are less likely to make the decision to engage in market work relative to men with university level education (probability index decreases by 0.18). Men in the 2005 survey increased their likelihood of choosing participation relative to men in the 1998 survey (probability index increases by 0.13), but age had an insignificant impact on the labour market participation decision.

The results on the impact of the control variables of interest on the number of hours worked by men are reported in the second column of Table 3.2. There are a few interesting findings. First, only men with one child age 0-1 years increase their work hours relative to non-fathers (coefficient is 4.06); this is significant at the 10% level. Men between the ages of 30 and 39 years work more hours per week than men between the ages of 20 and 29 years. At the same time, men in 2005 spend more hours per week in

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[22] The double hurdle model with dependence and the Heckman sample selection models were also estimated. The results from that model were not significantly different.

market work than men in 1998 (coefficient 1.60).

The double hurdle results are generally consistent with the weighted time use average trends in market work documented for fathers and non-fathers in the previous subsection. Therefore, even after conditioning on socioeconomic and demographic factors, fathers work more than non-fathers. The results also reveal that the fact that fathers work more than non-fathers is linked to the impact of a higher probability of participation for fathers and a greater number of hours supplied by fathers with one child age 0-1 year old.

3.4.3 Childcare: Time Use Trends

In Table 3.3, the average weekly hours spent on childcare, by childcare type, and by the educational attainment of fathers are reported. To be consistent with the tobit regressions to follow, only fathers who were married with at least one child age 14 years or younger are considered.[23] Panel A reports the time spent on childcare and its subcomponents— basic, educational, and recreational. These results indicate that fathers did not change the time they spent on childcare or its subcomponents from 1998 to 2005. Further, fathers spend approximately 7.5 hours per week on childcare. The bulk of childcare time is devoted to basic childcare followed by recreational and then educational childcare. Panels B through E report the time spent on primary childcare and subcomponents by fathers with various levels of educational attainment. From these panels, fathers spent the same time on childcare and their subcomponents in 1998 and 2005 by educational attainment. However, fathers with higher education spend the most time on childcare. For example,

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[23] The childcare time use averages discussed were not significantly different when the sample was expanded to include all fathers.

in 1998, fathers with university-level education spent an average of 4.51 hours more per week on childcare than fathers who had not completed high school (panel B). In 2005, this difference fell to an average of 3.40 hours per week.

The results on the subcomponents of childcare are similar to those for aggregate childcare for both survey years. These results also reveal that the time fathers devote to basic childcare is driving most of the difference in the time spent on childcare by educational attainment. For example, in 1998, fathers with university level education spent 2.45 more hours per week in basic childcare than fathers who had not completed high school (panel C). On the other hand, in 1998 fathers with university level education, spent 0.87 hours more on educational childcare than fathers who had not completed high school (panel D). Similarly, in 1998, fathers with university level education spent on average 1.18 hours more per week on recreational childcare than fathers who had not completed high school (panel E).

The 2005 survey includes a measure of the time spent on secondary childcare activities. In Table 3.4, I report the time spent in total childcare, primary childcare, and secondary childcare in 2005 by fathers. Panel A reports average weekly hours spent on childcare and panels B to D report the average weekly hours spent on childcare by educational attainment. In 2005, the time spent in total childcare was 16.55 hours per week, in primary childcare it was 7.34 hours per week, and in secondary childcare, it was 9.21 hours per week (panel A). The time spent on secondary childcare is approximately half the total time spent on childcare. The results show that by educational attainment,

university educated fathers spent on average 6.40 more hours per week on total childcare than fathers who had not completed high school (panel B). The relationship between education and secondary childcare is the similar to the results reported so far on education and primary childcare. Specifically, in 2005, university-educated fathers spent on average 3 hours more per week on secondary childcare activities than fathers with at most high school level education.

3.4.4 Childcare: Tobit Model

In this subsection, the relationship between the time fathers spend on childcare and their socioeconomic and demographic variables are examined using two tobit regression models. Model 1 includes a variable for the number of children age 0-14 years, and model 2 includes a variable for the age distribution of the youngest child. These marginal effects are reported in Table 3.5 and the coefficient estimates in Appendix Table 3.A2. For each model, the control variables age group, respondent's education, spouse's education and work hours, father's full-time work status, and survey year of the respondent are reported. Details on the other control variables not reported are provided in the notes below Table 3.5. It should also be noted that the numbers in Table 3.5 are the tobit marginal effects on the independent variables of interest.

The results from models 1 and 2 reported in Table 3.5 are similar. In model 1, the number of children increases the time spent on childcare by an average of 1.14 hours per week. From model 2, relative to fathers with one child age 0-1 years, most of the increase in the time spent on childcare is attributable to fathers with at least one child age 0-1 year, but

with two or more children. A father of this family type increases his weekly childcare time by an average of 2.37 hours per week. The results from both models indicate that the time use results on childcare are robust even after controlling for socioeconomic and demographic factors. In model 1, I find that relative to fathers with university-level education fathers with less than high school education decrease the time they spend on childcare by an average of 2.53 hours per week. Similarly, the results from model 2 indicate that relative to fathers with university level-education, fathers with less than high school decrease the time spent on childcare by 2.25 hours per week.

The educational attainment of a father's spouse has a similar effect on the time he spends on childcare as the effect of his educational attainment on the weekly hours he devotes to childcare. Model 1 shows that relative to fathers with spouses with university-level education, fathers with spouses who had not completed high school reduce the time they spend on childcare by an average 2.23 hours per week. From model 2, the comparative figure is 1.53 hours per week. In addition to her educational attainment, the work hours of a father's spouse also has an impact on the time he spends on childcare. The impact turns out be positive though slight, 0.02 hours per week for model 1 and 0.03 hours per week for model 2. The impact of the other control variables reported are: older fathers spent less time on childcare, working full-time reduces the time spent on childcare, and fathers in 1998 and 2005 spend the same time on childcare.

3.4.5 Discussion

The results on market work indicate that the recent trends in the time allocation of Canadian men are such that when they transition to fatherhood they become more attached to the labour market. In particular, fatherhood has a positive impact on the labour force participation of men. Further, fathers on average spend more time engaged in market work than non-fathers. Not surprisingly, the descriptive statistics in appendix Table 3.A1 indicate that a higher proportion of fathers report being engaged in market work full-time compared to non-fathers. Time use trends indicate that fathers' hours of market are the same regardless of educational attainment and that they spend more time on market work than non-fathers by educational attainment, although education increases non-fathers hours of market work. This result implies that the least educated men increase their work hours more when they become fathers relative to the increase among higher educated men when they become fathers. At the same time, lower educated fathers spend the least time on childcare. Taken together these results provide a scope for policy intervention to redress the fact that lower educated, and presumably low income, fathers spend less time on childcare and yet experience a greater increase in their work hours relative to higher educated fathers. These time use results are consistent with evidence that it has become increasingly more difficult for Canadians, in this case low income Canadians, to maintain a healthy mix of work and family life (Duxbury and Higgins, 2005).

The fact that fathers have a stronger attachment to the labour market, in terms of participation and work hours than no-fathers, suggests that the "good provider" cultural

expectation among men is well entrenched in Canada, despite father-friendly polices such as the reform and expansion of parental leave in 2001. In fact, the results from the Heckman model indicate that for first time fathers (one child age 0-1 years) the number of hours spent on market work actually increases relative to non-fathers. The impact of fatherhood on the time men allocate to market work reflects the personal preferences of families, but it also suggests that existing policy incentives might not be strong enough to encourage men to curtail their work hours when they become fathers.

Higher educated fathers spend more time on childcare, and the time fathers spend on childcare increases with the educational attainment of their spouse. The positive relationship between educational attainment and the time allocated to childcare has also been documented in the U.S., and a number of reasons have been suggested to explain this relationship. For example, Guryan, Hurst, and Kearney (2008) suggest that higher educated parents view market-purchased childcare as a poor substitute for their own childcare time. This explanation may have some merit in explaining the relationship between men's education and the time they spend on childcare in Canada, given the chronic shortage of suitable qualified childcare workers and regulated childcare spaces licensed and monitored by the government in Canada. In particular, Beach, Doherty, and Friendly, (2003) find that childcare spaces that are regulated and staffed with competent childcare workers are generally of higher quality than unregulated childcare spaces. Of course, parents of all levels of educational attainment can share this negative view of market childcare relative to own childcare time. However, the presumption is that

compared to lower educated parents, higher educated parents confer higher human capital to their children and that children's human capital is positively associated with the time parents spend on childcare.

Guryan, Hurst, and Kearney (2008) also suggest that the time spent in childcare is viewed as a luxury good by parents. Therefore as education, which is positively correlated with income, increases leads to more time being devoted to childcare. If this is true then the policy prescription is clear: existing subsidies that support low-income families with children in Canada should be increased. Not only will such a policy change decrease the level of child poverty, which has been an issue on the social agenda in Canada for some time, it would also enhance the socioemotional development of children, given this is partly determined by the time fathers spend with their children (Allan and Daly, 2007). The suggestion that the time spent in childcare is similar to the consumption of a luxury good in Canada seems reasonable given the results show that the time a father spends on childcare increases with the educational attainment of his spouse and her work hours. Higher educated spouses would presumably earn a higher income compared to lower educated spouses, which would increase household income, all else constant. In addition, an increase in his spouse's work hours increases household income, all else constant.

There is a caveat to any policy recommendation that seeks to redress the differences in the time spent on childcare by higher educated fathers compared to lower educated fathers by simply providing subsidies to the latter group. In particular, such a policy may not have the desired impact if there are institutional and social constraints that prevent

lower educated (income) fathers from spending more time with their children. For example, lower educated fathers will tend to live in lower income neighbourhoods. The implication of this being that they may not have the community institutions that facilitate parent child interactions that tend to pervade higher income neighbourhoods. Therefore, subsidies alone will not necessarily change the time allocation behaviour of lower educated fathers in such a way that they spend more time with their children. Further, if it is the case that low-income fathers simply have a taste for spending less time on childcare, subsidies will not work either.

Guryan, Hurst, and Kearney (2008) follow up on this point of whether there are differences in the taste of fathers by their level of educational attainment for the time they spend on childcare. They argue that parents with lower levels of education have a greater preference for the time they spend in leisure (and home production) relative to the time they spend in childcare when compared to higher educated parents. Therefore, parents with different levels of education value the time spent with their children differently because of differences in their valuation of leisure.

The Canadian time use data allows for a limited assessment of the relative importance of leisure among fathers by educational attainment in Canada. The time fathers spend on leisure by educational attainment is reported in Table 3.6. In this table, fathers are defined more broadly as men having at least one child age 18 years or younger living in their household and leisure as the time available after spending time in nonmarket work, market work and primary childcare. This measure of leisure includes entertainment and

recreational activities (e.g., hobbies, socializing with friends), civic and voluntary activities, personal care activities (e.g., dressing, sleeping), and own medical care activities.

Overall, the results from Table 3.6 indicate that the time men spend in leisure decreases with their level of educational attainment. By parental status, non-fathers spend more time on leisure than fathers by educational attainment. This time allocation pattern is not surprising given that fathers spend more hours engaged in market work by educational attainment. In 1998, the time fathers spent on leisure decreased with their level of educational attainment (panel B). These results support the explanation that fathers with less education (lower income) might prefer spending more time in leisure than childcare relative to fathers with more education. However, the time use averages from the 2005 survey indicate that the time spent in leisure was roughly the same by educational attainment (panel C). In Canada, at least, lower educated fathers have no greater preference for leisure, and thus this might not be the reason why they spent less time on childcare.[24]

3.5 Conclusion

In this essay, the relationship between men's status as fathers and the time they spend on market work and childcare are examined in Canada using 1998 and 2005 time diary data. The main results are as follows. First, fathers, on average, spend more time on market

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[24] Ramey and Ramey (2009) argue that the greater time care time allocated by higher educated parents in America is best explained by the increased competition for U.S. college spaces. As they document the competition for college spaces is less in severe and is more likely to be part of the explanation of why the time spent on childcare in Canada has trended downwards over the past few decades.

work than non-fathers and the time non-fathers spend on market work increases with their level of educational attainment. Second, among men with same level of educational attainment, fathers spend more time working than non-fathers. Third, after controlling for socioeconomic and demographic factors, the results show that fathers are more likely to participate in the labour market than non-fathers and that the number of market hours worked increases for fathers with one child age 0-1 years old. Fourth, higher educated fathers spend more time on childcare, even after controlling for socioeconomic and demographic factors. Fifth, the time a father spends on childcare increases somewhat with his spouse's market work hours. In addition, fathers with higher educated spouses spend more time on childcare.

These results indicate the standard opportunity cost argument that higher educated fathers would spend more time on market work and less time on childcare does not hold in Canada. Canadian men are "good providers" in market work and are more "involved or active" in caring for their children the higher their level of educational attainment. The social, institutional, and economic frameworks in Canada could be factors that are limiting the ability of least educated (low-income) fathers to spend more time on childcare relative to higher educated (high-income) fathers, although fathers of all educational attainment work the same number of market hours. Social policy makers should seek to enact policies increase the time low-income fathers spend with their children.

This essay can be extended by considering changes in policy with changes in the time

allocation of fathers and non-fathers; this sort of analysis would require better data. A joint household production model analysis would better inform us of the time allocation choices made with respect to leisure, market work, household work, and childcare. Further, a panel data analysis controlling individual specific or random effects across households could provide additional insights into the time men allocate to market work and childcare across space and time. In regards to the explanations for the childcare-education profile of fathers, a quantitative analysis would be necessary to assess their validity. Finally, examining the extent to which the work hours of fathers differ by other observable characteristics would be another fruitful line of inquiry.

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Table 3.1:
Average Hours Per Week Spent on Market Work by Parental Status and Educational Attainment

Panel A: All Men			
	[1] 1998 (*N=3,384*)	[2] 2005 (*N=6,168*)	Difference [2]-[1]
All Men	37.04	36.32	-0.71

Panel B: Parental Status			
	[1] 1998 (*N=3,384*)	[2] 2005 (*N=6,168*)	Difference [2]-[1]
Fathers	40.24	42.21	1.97
Non Fathers	33.66	33.93	0.27
Fathers *minus* Non-Fathers	6.58***	8.27***	

Panel C: Educational Attainment Fathers and Non-Fathers 1998			
	[1] 1998-Non-Fathers (*N=2,143*)	[2] 1998 Fathers (*N=1,241*)	Difference [2]-[1]
Not high school	28.92	34.99	6.07*
High school	34.53	44.51	9.98***
Some college	34.04	41.40	7.37***
University	36.64	39.19	2.54
University *minus* Not high school	7.73***	4.20	

Panel D: Educational Attainment Fathers and Non-Fathers 2005			
	[1] 2005 Non-Fathers (*N=4,212*)	[2] 2005 Fathers (*N=1,956*)	Difference [2]-[1]
Not high school	28.95	41.18	12.23***
High school	34.36	42.23	7.87***
Some college	34.68	42.82	8.14***
University	34.96	41.69	6.73***
University *minus* Not high school	6.01***	0.51	

Panel E: Educational Attainment: Fathers 1998 and 2005			
	[1] 1998 Fathers (*N=1,241*)	[2] 2005 Fathers (*N=1,956*)	Difference [2]-[1]
Not high school	34.99	41.18	5.40
High school	44.51	42.23	-5.71
Some college	41.40	42.82	0.12
University	39.19	41.69	0.02
University *minus* Not high school	4.20	0.51	

Panel F: Educational Attainment: Non Fathers 1998 and 2005			
	[1] 1998-Non-Fathers (*N=2,143*)	[2] 2005 Non-Fathers (*N=4,212*)	Difference [2]-[1]
Not High school	28.92	28.95	0.03
High school	34.53	34.36	-0.17
Some College	34.04	34.68	0.64
University	36.64	34.96	-1.68
University *minus* Not high school	7.73***	6.01***	

Notes: (1) *** p<0.01, ** p<0.05, * p<0.1, (2) Fathers are defined as those men with at least one child age 0 to 18 living in their household.

Table 3.2: Market Work –Cragg's Double Hurdle Model *(N=9,552, Censored=3,823)*

	Selection coefficients	Behavioural coefficients
Age distribution of the youngest child		
Youngest child age 0-1, 1 child		4.06*
		(2.45)
Youngest child age 0-1, 2 or more children		-0.58
		(1.91)
Youngest child age 2-5, 1 child		-0.87
		(2.06)
Youngest child age 2-5, 2 or more children		-0.25
		(1.29)
Youngest child age 6-14, 1 or more children		-0.51
		(0.98)
Youngest child age 15-18, 1 or more children		0.75
		(1.50)
Father	0.27***	
	(0.06)	
Age 30-39	0.07	2.67***
	(0.06)	(0.99)
Age 40-49	0.04	1.51
	(0.06)	(1.00)
Age 50-54	-0.002	-0.99
	(0.07)	(1.03)
Education: Less than High School	-0.18***	1.96*
	(0.07)	(1.24)
Education: High School	0.0005	2.84***
	(0.07)	(1.04)
Education: Some College	-0.08	1.19
	(0.05)	(0.83)
Year 2005	0.13***	1.60***
	(0.04)	(0.64)
Log Likelihood		-44.53

Notes: (1) *** p<0.01, ** p<0.05, * p<0.1, (2) standard errors in parentheses, (3) *Control variables not reported* region, religiosity, age group, self-assessed health, household size, diary weekday or weekend, occupation, and marital status, (4) *Base categories*: Selection-non-father, single, 1998 survey, age 20-29, respondent university educated, religious and attendance in previous year, diary day weekend, Atlantic region, work part-time and health below good. Behavioural-non-father, single, 1998 survey, age 20-29, respondent university educated, spouse university educated, and diary completed on weekend. For the behavioural equation, self-assessed health, region and religiosity are excluded, (5) Fathers are defined as men with at least one child age 0 to 18 years old.

Table 3.3: Average Hours Per Week Spent on Primary Childcare

Panel A: Average Hours Per Week Spent on Childcare-Type

	[1] 1998-Fathers *(N=1,029)*	[2] 2005-Fathers *(N=1,567)*	Difference [2]-[1]
Primary Childcare	7.56	7.34	-0.22
Basic Childcare	4.21	3.78	-0.43
Educational Childcare	1.09	1.28	0.19
Recreational Childcare	2.26	2.28	0.02

Panel B: Average Hours Per Week Spent on Primary Childcare by Educational Attainment

	[1] 1998-Fathers *(N=1,029)*	[2] 2005-Fathers *(N=1,567)*	Difference [2]-[1]
Not High school	4.83	4.69	-0.14
High school	6.17	5.35	-0.82
Some College	8.10	8.06	-0.04
University	<u>9.34</u>	<u>8.09</u>	-1.25
University *minus* Not high school	4.51***	3.40***	

Panel C: Average Hours Per Week Spent on Basic Childcare by Educational Attainment

	[1] 1998-Fathers *(N=1,029)*	[2] 2005-Fathers *(N=1,567)*	Difference [2]-[1]
Not High school	2.51	2.02	-0.49
High school	3.85	2.89	-0.96
Some College	4.57	3.92	-0.65
University	<u>4.96</u>	<u>4.53</u>	-0.43
University *minus* Not high school	2.45***	2.51***	

Panel D: Average Hours Per Week Spent on Educational Childcare by Educational Attainment

	[1] 1998-Fathers *(N=1,029)*	[2] 2005-Fathers *(N=1,567)*	Difference [2]-[1]
Not High school	0.66	0.55	-0.10
High school	0.84	1.19	0.35
Some College	1.10	1.53	0.43
University	<u>1.53</u>	<u>1.20</u>	-0.33
University *minus* Not high school	0.87***	0.65***	

Panel E: Average Hours Per Week Spent on Recreational Childcare by Educational Attainment

	[1] 1998-Fathers *(N=1,029)*	[2] 2005-Fathers *(N=1,567)*	Difference [2]-[1]
Not High school	1.67	2.11	0.44
High school	1.49	1.30	-0.20
Some College	2.43	2.61	-0.19
University	<u>2.85</u>	<u>2.35</u>	-0.50
University *minus* Not high school	1.18*	0.24	

Notes: (1) *** $p<0.01$, ** $p<0.05$, * $p<0.1$, (2) standard errors in parentheses, (3) *Primary Childcare = Basic Childcare* (e.g., baby care, putting children to bed, etc.) + *Recreational Childcare* (play with children, etc.) +*Educational Childcare* (e.g., reading and talking, teaching and reprimanding, etc.). Primary childcare is associated with time spent with children when designated the main activity by the respondent.
(4) Fathers restricted to those married and with children age 0 to 14 living in their household.

Table 3.4:
Average Hours Per Week Spent in Total Childcare (Primary Activities + Secondary Activities)

Panel A: Average Hours Per Week Spent on Total Childcare	
	2005-Fathers *(N=1,567)*
Total Childcare	16.55
Primary Childcare	7.34
Secondary Childcare	9.21

Panel B: Average Hours Per Week Spent on Total Childcare by Educational Attainment	
	2005-Fathers *(N=1,567)*
Not High school	11.65
High school	11.37
Some College	18.32
University	<u>18.05</u>
University *minus* Not high school	6.40***

Panel C: Average Hours Per Week Spent on Primary Childcare by Educational Attainment	
	2005-Fathers *(N=1,567)*
Not High school	4.69
High school	5.35
Some College	8.06
University	<u>8.09</u>
University *minus* Not high school	3.40***

Panel D: Average Hours Per Week Spent on Secondary Childcare by Educational Attainment	
	2005-Fathers *(N=1,567)*
Not High school	6.96
High school	6.02
Some College	10.27
University	<u>9.96</u>
University *minus* Not high school	3.00*

Notes: (1) *** $p<0.01$, ** $p<0.05$, * $p<0.1$, (2) *Total childcare = Primary Childcare + Secondary Childcare*, (3) *Primary Childcare = Basic Childcare* (baby care, putting children to bed, etc.) + *Recreational Childcare* (play with children etc.) +*Educational Childcare* (reading and talking, teaching and reprimanding, etc.). Primary childcare is associated with time spent with children when designated the main activity by the respondent. (4)*Secondary Childcare* = time spent on childcare when it was not the main activity of the respondent. For example cooking and supervising household children. Secondary childcare diary data information is only available for the 2005 survey. (5)Fathers restricted to those married and with children age 0 to 14 living in their household.

Table 3.5:
Average Hours Per Week Spent on Childcare Tobit Equation
(N=2,596, left censored=1,547)

	Marginal effects	
	Model 1	Model 2
Number of Children	1.14***	
	(0.46)	
Age distribution of the youngest child		
Youngest child age 0-1, 2 or more children		2.37***
		(0.96)
Youngest child age 2-5, 1 child		-0.30
		(0.66)
Youngest child age 2-5, 2 or more children		0.32
		(0.74)
Youngest child age 6-14, 1 or more children		-3.20***
		(0.70)
Age 30-39	-1.32**	-0.22
	(0.57)	(0.56)
Age 40-49	-3.67***	-0.89
	(0.56)	(0.61)
Age 50-54	-4.69***	-2.27***
	(0.53)	(0.70)
Respondent education: Less than High School	-2.53***	-2.25***
	(0.50)	(0.49)
Respondent education: High School	-1.61***	-1.49***
	(0.50)	(0.49)
Respondent education: Some College	-0.62*	-0.50
	(0.37)	(0.37)
Respondent's spouse education: Less than High School	-2.23***	-1.53**
	(0.58)	(0.59)
Respondent's spouse education: High School	-1.37***	-0.64
	(0.43)	(0.43)
Respondent's spouse education: Some College	-0.40	-0.04
	(0.40)	(0.39)
Spouse work hours	0.02***	0.03***
	(0.01)	(0.01)
Full Time	-3.61***	-3.53***
	(0.69)	(0.67)
Year 2005	-0.44	-0.37
	(0.33)	(0.32)
Log Likelihood	-37.59	-37.12
Sigma	15.15	14.58

Notes: (1) *** p<0.01, ** p<0.05, * p<0.1, (2) marginal effects reported with standard errors in parentheses, (3) *Control variables not reported* Models 1 & 2-region, religiosity, self-assessed health, diary weekday or weekend, and household size, (4) *Base categories*: Model 2-1998 survey, age 20-29, respondent university educated, spouse university educated, religious and attendance in previous year, diary day weekend, Atlantic region, work part-time and health below good. Model 1-youngest child age 0-1-1 child, 1998 survey, age 20-29, respondent university educated, spouse university educated, religious and attendance in previous year, diary day weekend, Atlantic region, work part-time and health below good.

Table 3.6:
Average Hours Per Week Spent on Leisure by Parental Status and Educational Attainment

Panel A: All Men			
	[1] 1998- *All Men* (*N=3,384*)	[2] 2005- *All Men* (*N=6,168*)	Difference [2]-[1]
Not high school	119.79	117.79	-2.00
High school	112.54	116.08	3.54**
Some college	113.38	112.92	-0.46
University	112.19	113.21	1.02
University *minus* Not high school	-7.60***	-4.58***	

Panel B: Educational Attainment Fathers and Non-Fathers 1998			
	[1] 1998-Non-Fathers (*N=2,143*)	[2] 1998 Fathers (*N=1,241*)	Difference [2]-[1]
Not high school	123.37	113.20	-10.17***
High school	117.49	104.63	-12.86***
Some college	119.79	104.44	-15.35***
University	117.36	105.57	-11.79***
University *minus* Not high school	-6.01***	-7.63***	

Panel C: Educational Attainment Fathers and Non-Fathers 2005			
	[1] 2005 Non-Fathers (*N=4,212*)	[2] 2005 Fathers (*N=1,956*)	Difference [2]-[1]
Not high school	123.86	105.12	-18.74***
High school	120.02	109.19	-10.83***
Some college	118.67	103.20	-15.47***
University	118.70	105.34	-13.36***
University *minus* Not high school	-5.16***	0.22	

Panel D: Educational Attainment: Fathers 1998 and 2005			
	[1] 1998 Fathers (*N=1,241*)	[2] 2005 Fathers (*N=1,956*)	Difference [2]-[1]
Not high school	113.20	105.12	-8.08***
High school	104.63	109.19	4.56*
Some college	104.44	103.20	-1.24
University	105.57	105.34	-0.23
University *minus* Not high school	-7.63***	0.22	

Panel E: Educational Attainment: Non Fathers 1998 and 2005			
	[1] 1998-Non-Fathers (*N=2,143*)	[2] 2005 Non-Fathers (*N=4,212*)	Difference [2]-[1]
Not High school	123.37	123.86	0.48
High school	117.49	120.02	2.53
Some College	119.79	118.67	-1.12
University	117.36	118.70	1.34
University *minus* Not high school	-6.01***	-5.16***	

Notes: (1) *** p<0.01, ** p<0.05, * p<0.1, (2) standard errors in parentheses, (3) *Leisure*: residual of non-obligatory work and childcare, calculated as the total time spent on all activities in a seven-day week (168 hours) minus time spent in market work, nonmarket work, and childcare, (4) Fathers are defined as those men with at least one child age 0 to 18 living in their household.

Appendix Table 3.A1 : Selected Descriptive Statistics of Some Variables and Variable Descriptions

Panel A: Selected Descriptive Statistics

	Fathers (N=3,197)		Non Fathers (N=6,355)	
	Mean	Std. Dev	Mean	Std. Dev
Number of Children (capped at 4)	1.93	0.82	-	-
Age distribution of the youngest child				
Youngest child 0-1 years, 1 child	0.06	0.25	-	-
Youngest child 0-1 years, 2 children+	0.10	0.31	-	
Youngest child 2-5 years, 1 child	0.07	0.26	-	-
Youngest child 2-5 years, 2 children+	0.17	0.31	-	-
Youngest child 6-14 years, 1 child +	0.43	0.26	-	-
Youngest child 15-18 years, 1 child+	0.16	0.37	-	-
Married (legal or common law)	0.95	0.20	0.55	0.49
Age Group				
Age 20-29	0.07	0.48	0.27	0.44
Age 30-39	0.37	0.48	0.19	0.39
Age 40-49	0.43	0.50	0.17	0.37
Age 50-54	0.11	0.31	0.26	0.44
Respondent's Education				
Less Than High School	0.14	0.34	0.17	0.37
High School	0.17	0.37	0.18	0.38
Education Some College	0.42	0.49	0.41	0.49
University	0.28	0.45	0.24	0.43
Respondent's Spouse's Education				
Less Than High School	0.09	0.30	0.16	0.37
High School	0.34	0.47	0.32	0.47
Education Some College	0.29	0.45	0.28	0.45
University	0.27	0.44	0.23	0.42
Working on diary day	0.69	0.46	0.57	0.49
Working-Full-time on diary day (30hrs or more)	0.88	0.32	0.75	0.43

Panel B: Description of Variables

Spouse hours work	Average weekly hours spent on market work by spouse as reported by married fathers
Health	0=fair or poor, 1=excellent, good or very good
Household size	Number of household members (capped at 6 by survey)
Religiosity	0= religious & attendance in previous year,1= religious & no attendance, 2=agnostic/atheists
Weekday	0=diary completed on weekend, 1=diary completed on weekday
Region	0=Atlantic, 1=Quebec, 2= British Columbia, 3= Ontario Prairie
Year 2005	0= 1998 survey, 1 = 2005 survey
Occupation	0=management, 1= business, finance, administrative, 2= natural and applied science, 3= health, 4= social science, and education,5= artistic, culture, recreation &sports, 6= sales & service, 7= trades, transports and equipment, 8= primary industry, 9= processing and manufacturing, 10= other (not stated/don't know, retired etc)

Note: '0' is the designated base category used in the analysis.

Average Hours Per Week Spent on Childcare Tobit Equation (*N=2,596, left censored=1,547*)

	Model 1 coefficients	Model 2 coefficients
Number of Children	2.88***	
	(1.18)	
Age distribution of the youngest child		
Youngest child age 0-1, 2 or more children		5.47***
		(2.05)
Youngest child age 2-5, 1 child		-0.77
		(1.69)
Youngest child age 2-5, 2 or more children		0.80
		(1.82)
Youngest child age 6-14, 1 or more children		-8.00***
		(1.72)
Age 30-39	-3.34**	-0.56
	(1.44)	(1.42)
Age 40-49	-9.55***	-2.26
	(1.51)	(1.56)
Age 50-54	-15.07***	-6.36***
	(2.19)	(2.21)
Respondent education: Less than High School	-7.05***	-6.19***
	(1.55)	(1.48)
Respondent education: High School	-4.29***	-3.96***
	(1.41)	(1.36)
Respondent education: Some College	-1.58*	-1.27
	(0..95)	(0.93)
Respondent's spouse education: Less than High School	-6.19***	-4.09**
	(1.78)	(1.68)
Respondent's spouse education: High School	-3.54***	-1.61
	(1.12)	(1.10)
Respondent's spouse education: Some College	-1.00	-0.11
	(1.00)	(0.99)
Spouse work hours	0.05***	0.07***
	(0.12)	(0.02)
Full Time	-8.03***	-7.82***
	(1.37)	(1.32)
Year 2005	-1.11	-0.92
	(0.83)	(0.80)
Log Likelihood	-37.59	-37.12
Sigma	15.15	14.58

Notes: (1) *** $p<0.01$, ** $p<0.05$, * $p<0.1$, (2) standard errors in parentheses, (3) *Control variable not reported* Models 1 & 2-region, religiosity, self-assessed health, diary weekday or weekend, and household size, (4) *Base categories*: Model 2-1998 survey, age 20-29, respondent university educated, spouse university educated, religious and attendance in previous year, diary day weekend, Atlantic region, work part-time and health below good. Model 1-youngest child age 0-1-1 child, 1998 survey, age 20-29, respondent university educated, spouse university educated, religious and attendance in previous year, diary day weekend, Atlantic region, work part-time and health below good..

CHAPTER 4

PEOPLE WHO CARE: PEOPLE WHO SHARE [25]

4.1 Introduction

In this essay, we contribute to the literature on philanthropy by investigating the presence and exploring the nature of the interdependency between the decisions to gift time and money in Canada. These decisions share a common set of motivating moral factors (e.g., Andreoni and Scholz, 1998; Ellingsen and Johannesson, 2009) and are both influenced by the actions of governments and charities (e.g., Khanna and Sandler, 2000; Schiff, 1985; Stienberg 1990). In addition, the decisions to donate time and money, situated within a time allocation framework, are decided upon to some extent by a similar set of economic variables (e.g., Andreoni, 2005; Bergstrom, Blume, and Varian 1986; Cappellari, Ghinetti and Turati, 2007). Despite these common factors that affect donations of time and money, one limitation of most of the existing empirical scholarly work on philanthropy is the failure to control for the interdependency that might exist between both forms of philanthropic donations. In particular, gifts of time and money are often examined on their own without regard to whether they are important determinants of each other, or if they are treated as determinants of each other, the fact that each might be an endogenous determinant of the other is usually ignored.

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[25] This chapter is the outcome of joint research with Lindsay Tedds.

The result of failing to consider the possible existence of interdependency between gifts of time and money is that estimates of the impact of socioeconomic and other variables of interest on philanthropic behaviour might be biased and inconsistent. Further, policy recommendations aimed at affecting philanthropic outcomes that rely on these estimates could have unintended negative consequences. For example, if donating time decreases the probability that money will be donated, policies targeted at increasing the rate of volunteering would also decrease the participation rate in monetary giving, ceteris paribus.

In the sparse literature that explores the existence and nature of the interdependency between time and monetary donations, the focus has been on the complementarity or substitutability of both forms of philanthropic donations. Carlin (2001) uses U.S. data from 1975 and 1976 to examine the philanthropic activities of married women. He finds that the level of their time and monetary donations are substitutes. Freeman (1997) uses 1990 U.S. data and finds that the level of time and monetary donations are substitutes across the population as a whole. For Duncan (1999), the level of donations of time are gross complements to donations of money, but the value of time and level of monetary donations are substitutes; he used 1974 U.S. data. In contrast to these findings, Brown and Lankford (1992) using 1984 U.S. data find that level of gifts of time is a gross complement to gifts of money. In Canada, Apinunmahakul, Barham, and Devlin (2008) use the 1997 National Survey of Giving and Participating (NSGVP) to model the joint determination of time and money using a bivariate tobit model. Their analysis focuses on the role of employment status in affecting both forms of philanthropic outcomes. They

find that the level of donations of time and money are complementary especially among employed individuals.

As the above studies reveal, the nature of interdependency between time and monetary donations has been explored primarily from three perspectives related to complementarity and substitutability. The first is whether the decisions to donate time and money are related (without taking into account the possible endogeneity and simultaneity of the decisions). The second is whether the level of time and monetary donations are substitutes or complements. The third concerns the substitutability or complementary between the value of time donations and the level of monetary donations. One common methodological limitation of scholars working from these perspectives is the little attention paid to selection effects. That is, they do not consider the participation decisions before modelling the intensity of donations of time and money.

The analysis of the participation decisions is important. Such an analysis furthers our understanding of how best to model the intensity or level of philanthropic donations. For example, the dynamics of the participation decisions of time and monetary donations may imply selection effects, which if not taken into account when analysing the level of charitable contributions could lead to biased results and wrong policy prescriptions. What is of interest, therefore, is an analysis of the possible interdependency of the decisions to donate time and money in such a way that the decision to donate time depends on the decision to donate money, and vice versa, with both decisions being simultaneously and endogenously determined. Matsunga (2007) is the only study we know of that contributes

to the literature from this perspective. He uses a simultaneous bivariate probit model on philanthropic data for Japan and finds that individuals who donate time are likely to have donated money, but that those who donate money do not necessarily also donate time.

In this essay, we use the 2004 Canadian Survey of Giving, Volunteering, and Participating (CSGVP) [26] to address the dearth of empirical evidence on the relationship between the decisions to gift time and money. This essay is in the spirit of Matsunga (2007). First, we estimate single equation and bivariate probit models of the decisions to donate time and money and contrast these results with the simultaneous bivariate and recursive probit models. Our objective is to determine how the decision to donate time affects, and is affected by, the decision to donate money. Therefore, we do not evaluate substitutability or complementarity of both forms of philanthropic behaviour in the classical sense, which would be to examine the relationship between the levels of time and money monetary donations. Second, we discuss the marginal effects estimates of socioeconomic and demographic variables, such as the respondent's language spoken at home and place of birth, on philanthropic behaviour.

Our essay contributes to understanding who donates time and/or money and therefore the policy prescriptions suitable for effecting changes in philanthropic behaviour. This understanding is important given the magnitude of philanthropic contributions to economic and social welfare. In particular, data from the 2004 Canadian Survey of

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[26]The 1997 and 2000 National Survey of Giving and Participating (NSGVP) are two other surveys with similar content to the CSGVP that were considered for use in the empirical analysis. However, the CSGVP has been redesigned in a number of ways, making meaningful comparisons with earlier surveys on volunteering and charitable donations impossible.

Giving, Volunteering, and Participation (CSGVP) indicate that gifts of time amounted to the equivalent of almost 1 million full-time time jobs and that gifts of money totalled $8.9 billion (Hall, Lasby, Gumulka, and Tryon, 2006). More specifically, our contribution is towards the clarification the relationship between the decisions to donate time and money in Canada, testing for any potential endogeneity and simultaneity. The approach in this essay is in contrast to the only Canadian study we know of that examines the joint determination time and monetary gifts, Apinunmahakul, Barham, and Devlin (2008); they focussed on the level of charitable donations. In this essay, we focus on the participation decisions relating to gifts of time and monetary donations

The main results from the simultaneous bivariate probit estimations indicate that the probability of donating time conditional on donating money is positive and statistically significant, while the probability of donating money conditional on donating time is statistically insignificant. Therefore, those who donate money are highly likely to be volunteers, while those who are volunteers do not necessarily also donate money. Our results also indicate that the decision to donate money is affected most by the decision to donate time. In section 4.2, we discuss the theoretical framework that links decisions to donate time and money. This discussion is followed by a summary of the econometric method. We describe the data in section 4.3. We discuss the results in section 4.4 and conclude with policy implications and lines of inquiry for future research in section 4.5. Henceforth, we will refer to those who participate in philanthropy as donors; to those who donate money as givers, the act being giving; and to those who donate time as volunteers, the act being volunteering.

4.2 Theoretical Framework and Econometric Method

4.2.1 Theoretical Framework

Following from standard time allocation arguments, the level of time and money donations are functions of socioeconomic and demographic factors, the prices of donating time and money, unobserved preferences and other factors. Formally, we can write the reduced form generic functions of the hours spent volunteering, v, and the amount of monetary donations, g, made as:

$$v = v(\Pi_1', g \mid \Pi_2', e_1) \qquad\qquad [4.1]$$

$$g = g(v \mid \Pi_1', \Pi_2', e_2) \qquad\qquad [4.2]$$

Where:

Π_1' vector of personal socioeconomic and demographic variables that affect time donations

Π_2' vector personal socioeconomic and demographic variables that affect monetary donations

e_1 unobserved factors that influence time donations (e.g., tastes)

e_2 unobserved factors that influence monetary donations

These reduces form explicitly show that time and money donations are potentially related to each other. They are clearly related through preferences, which depend at least in part, or are influenced by, socioeconomic and demographic factors. It is the nature and presence of this interdependency with respect to the decisions to give time and money

that is the focus of this essay. In the philanthropic literature, the standard practice is to model the decision to donate (time or money) using a similar set of factors to those used to model the decision regarding how much to donate (e.g., Caroll, McCarthy and Newman, 2005; Menchik and Weisbrod, 1987; Vallincourt, 1994). Therefore, without loss of generality, we can re-write equations [4.1] and [4.2] in terms of the probability to donate time and money as shown in equations [4.3] and [4.4] below:

$$\Pr(V^* > 0) = F(\Pi_1', G^* \mid \Pi_2', e_1) \qquad [4.3]$$

$$\Pr(G^* > 0) = F(\Pi_2', V^* \mid \Pi_1', e_2) \qquad [4.4]$$

Here $F(\cdot)$ is the standard normal cumulative distribution function with V^* and G^* the latent structural variables for volunteering and giving such that the levels of volunteering and giving are positive when V^* and G^* are greater than zero. The latent variables correspond to the desire to donate time and money. Equations [4.3] and [4.4] are the key equations of interest.

From the theoretical literature on philanthropy, one explanation for gift of money and time is the donors are motivated by feelings of "warm glow". When motivated by warm glow, the act of donating itself is utility increasing for the donor; donors care about their supply of volunteer hours and the amount of monetary donations they make. More realistically, however, as noted by Andreoni (2005), donors are also motivated by altruism. When motivated by altruism, donors are concerned about the value of their time

and monetary donations to the charitable organisation.[27] Further, in general a donor's market wage rate will be at least equal to the imputed value of their volunteer wage rate. For example, doctors can volunteer to be painters, but painters cannot volunteer to be doctors. From the standard comparative advantage argument, it follows that individuals should choose to either to donate time or money, but not both, if their concern is altruism. Therefore volunteering should be rare. However, gifts of time and money are the rule rather than the exception.

We observe donations of money and time in part because the utility derived from time spent volunteering, the value of volunteering, and monetary donations made to the chartable organisations are all important considerations for the donor (Andreoni, Gale, and Scholz, 1996).[28] Therefore, the action of donating time is important to the donor, in addition, so is the value of the donated time to the charity. However, the opportunity cost argument and the role altruism means that on average the participation rate in volunteering will generally be less than that associated with monetary giving. Therefore, more people will donate money than time—the probability of being giver will be greater than the probability of being a volunteer. In addition, we expect to find that the probability of donating time conditional on donating money will be greater than the probability of donating time conditional on not donating money. In summary, the dominance of altruism implies:

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[27] Lazear, Malmendier, and Weber (2005) suggest that donors are motivated in part by guilt rather than purely altruism.

[28] Handy and Katz (2008) suggest that individuals might choose to give time although they have the comparative advantage in giving money. Consider the case of a potential donor who is a carpenter. The carpenter will view giving time to in the form of carpentry services as potential disutility because carpentry is what they do in market work. At the same time, there is a point when the donor will not favour working extra hours and donating money instead of giving time—because market work entails disutility as well.

$$\Pr(G^* > 0) > \Pr(V^* > 0) \qquad\qquad [4.5]$$

$$\Pr(V^* > 0 \mid G^* > 1) > \Pr(V^* > 0 \mid G^* = 0) \qquad\qquad [4.6]$$

4.2.2 Econometric Method

Following from equations [4.3] and [4.4] we begin by estimating single equation probit models for time and monetary donations by assuming that e_1 and e_2 are independent—unobserved factors governing the decisions to donate time and money are unrelated. The single equation probit models are as shown below in equations [4.7] and [4.8].

$$V^* = \Pi_1' \beta_1 + \gamma_1 G^* + e_1 \qquad V = \begin{cases} 1 & \text{if } V^* > 0 \text{ (volunteer)} \\ 0 & \text{if otherwise} \end{cases} \qquad [4.7]$$

$$G^* = \Pi_2' \beta_2 + \gamma_2 V^* + e_2 \qquad G = \begin{cases} 1 & \text{if } G^* > 0 \text{ (donate money)} \\ 0 & \text{if otherwise} \end{cases} \qquad [4.8]$$

$$\text{cov}(e_1, e_2) = \rho = 0$$

Here, as previously defined, Π_1' and Π_2' represent the vector of socioeconomic and demographic variables that influence the propensity to donate time and money. The vectors β_1 and β_2 contain the parameters to be estimated, and e_1 and e_2 are stochastic error terms pertaining to unobserved factors. Each equation is estimated separately by maximum likelihood. In equations [4.7] and [4.8], the dependence between the choices to be a volunteer or a giver is accounted for by each appearing as independent variable in the probit equation of the other. However, the decisions to donate time and money are

potentially related through common unobserved factors not captured by the inclusion of various personal socioeconomic and demographic variables. Therefore, we next estimate the bivariate probit model shown below in equations [4.9] and [4.10]. These follow from equations [4.7] and [4.8] with the restriction that the decisions to donate time and money do not explain each other $(\gamma_1 = \gamma_2 = 0)$. We estimate the equations [4.9] and [4.10] jointly by maximum likelihood.

$$V^* = \Pi_1' \beta_1 + e_1 \qquad\qquad [4.9]$$

$$G^* = \Pi_2' \beta_2 + e_2 \qquad\qquad [4.10]$$

$$\begin{pmatrix} e_1 \\ e_2 \end{pmatrix} \sim N \left[\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix} \right]$$

If $\rho = 0$, equations [4.9] and [4.10] are independent. In the bivariate probit model, the decisions to donate time and money influence each other through their error terms. The extension to [4.9] and [4.10] is to model both interdependence and endogeneity; this provides us with more information about how the decisions to donate are related, which has not been previously estimated for Canada using this methodology. The basis for this estimation follows from the unrestricted estimation of equations [4.7] and [4.8] using the simultaneous bivariate probit framework. We estimate the simultaneous bivariate probit model using the two-step consistent estimator approach first proposed by Maddala (1983). It involves the estimation of equations [4.11] and [4.12] below by maximum likelihood.

$$V* = \Pi_1'\beta_1 + \gamma_1 G* + e_1 \qquad\qquad [4.11]$$

$$G* = \Pi_2'\beta_2 + \gamma_2 V* + e_2 \qquad\qquad [4.12]$$

$$\begin{pmatrix} e_1 \\ e_2 \end{pmatrix} \sim N\left[\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix} \right]$$

The first step of the two-step consistent estimator is specification and estimation of the reduced forms of equations [4.11] and [4.12]. These reduced form equations are [4.13] and [4.14] below.

$$V* = \Psi'\Omega_1 + \varepsilon_1 \qquad\qquad [4.13]$$

$$G* = \Psi'\Omega_2 + \varepsilon_2 \qquad\qquad [4.14]$$

Here Ψ is the matrix of all the explanatory variables ($\Pi_1' \cup \Pi_2'$), Ω_1 and Ω_1 are the reduced form coefficients, and ε_1 and ε_2 are the reduced form error terms for the decisions to donate time and money respectively. When we estimate equations [4.13] and [4.14] separately by maximum likelihood, the fitted values of $V*$ and $G*$, say $\hat{V}*$ and $\hat{G}*$, are saved. The second step is the substitution of $\hat{G}*$ and $\hat{V}*$ on the right hand side of equations [4.13] and [4.14] respectively, and then estimating separately by maximum likelihood equations [4.13]' and [4.14]' below.

$$V* = \Pi_1'\beta_1 + \gamma_1\hat{G}* + e_1 \qquad\qquad [4.13]'$$

$$G* = \Pi_2'\beta_2 + \gamma_2\hat{V}* + e_2 \qquad\qquad [4.14]'$$

Since the fitted values of $V*$ and $G*$ used in the estimation of the simultaneous probit system are generated regressors, we correct the standard errors of the estimates of $\beta_1, \beta_2, \gamma_1$, and γ_2 by bootstrapping before assessing their statistical significance.[29] There are two requirements for identification of the simultaneous bivariate system, equations [4.13] and [4.14]. First, there must be at least one variable in Π_1', but not in Π_2' that has explanatory power in the volunteer decision, equation [4.13] of the system. Second, there must be one variable in Π_2', but not in Π_1' that has explanatory power in the decision to donate money, equation [4.14] of the system (Mallar, 1977).

Based on the results from the simultaneous bivariate probit model we estimate the recursive probit model if necessary. Specifically, we estimate jointly equations [4.15] and [4.16] if donating time significantly affects the decision to volunteer, but not vice versa, or jointly equations [4.17] and [4.18] if the decision to volunteering affects the decision to donate money, but not vice versa.

$$V* = \Pi_1'\beta_1 + \gamma_1 G + e_1 \qquad\qquad [4.15]$$

$$G* = \Pi_2'\beta_2 + e_2 \qquad\qquad [4.16]$$

$$V* = \Pi_1'\beta_1 + e_1 \qquad\qquad [4.17]$$

$$G* = \Pi_2'\beta_2 + \gamma_2 V + e_2 \qquad\qquad [4.18]$$

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[29] To do this, we repeat the two-step approach with 199 random samples, as suggested by MacKinnon (2002), drawn with replacement. We then report the corrected standard errors of the estimates of the coefficients as the estimated standard deviation of the estimated standard errors of the estimated coefficients from the 199 bootstrap resamples.

4.3 Data

We use data from the CSGVP collected by Statistics Canada in 2004 from mid September to December. The survey targets individuals age 15 years or older living in one of the 10 provinces. Households were selected by random digit dialling and one individual was sampled from each. The sample size and response rate of the survey were 20,832 and 56.6%. The survey provides standard weights to adjust for the age, gender, and population distribution in such a way as to be representative of the Canadian population. The results presented and discussed are based on weighted estimates.

In the CSGVP, a distinction is made between formal and informal volunteering. Formal volunteering is the donation of labour services to an organisation, usually non-profit, in the 12-month period preceding the survey. Informal volunteering involves donation of labour services to friends or family members. Following the convention in the literature, the analysis in the current essay will be on formal volunteering activities because the unstructured nature of informal volunteering does not make it amenable to data analysis in a consistent way across individuals.

In the philanthropic literature, it is customary when possible to include the price of donating. In the case of volunteering, the price or opportunity cost is the net wage rate. The CSGVP does not facilitate the inclusion of the price of volunteering because estimates of the net wage rates are not provided. In the case of monetary gifts made in Canada, the price of monetary gifts is strictly speaking not the net of tax rate (one minus the marginal tax rate) on income. This is because, unlike in the U.S. and some other

countries, monetary gifts by individuals in Canada are recognized in the form of a tax credit rather than a deduction. At the federal level, the credit is calculated at the lowest marginal tax rate for the first $200 of total gifts claimed in the tax year and the highest marginal tax rate for amounts exceeding $200. Specifically, the giver receives 15% on the first $200 donated and 29% on the remainder thereafter. Most provinces have a similar two-tiered rate structure for their credits.[30] This means that the price of donating money in Canada would have to be derived from provincial and federal tax credits. It should also be noted that only 20% of Canadians stated that claiming a tax credit was their primary reason for giving and approximately 47% stated that a better tax credit would not prompt them to give or give more (see Table 4.2). Therefore, the price of giving is not an important consideration for the typical giver. Nonetheless, the inclusion of provincial dummies partially controls for the variation in the price of giving across at the provincial level.[31]

The CSGVP provides detailed information on the time spent volunteering (annual hours per year), type of volunteer organisations donated to, and reasons for volunteering. The survey provides similar information for charitable donations of money. Canadians donated to areas such as health, community and youth development, religious organisations, and the arts. The survey also provides detailed information on socioeconomic, demographic, personal, and labour market characteristics of respondents;

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[30] For example, in Alberta the first $200 is computed at 10% and 12.75% on the remainder. In Quebec, the credit is computed at a rate of 20% on the first $2000 claimed and 24% on amounts over $2000.
[31] Yen (2002) also notes that "with a single cross section regression prices are assumed to constant and therefore subsumed in the constant term" (p. 838).

we use a number of these as control variables.[32] Specifically, in our analysis, we include the following: gender, age group, marital status, educational attainment, language spoken at home, membership in organisations/groups, province of residence, religious attendance, health status, household income,[33] student status, employment status, presence of children by age group, and country of birth. The inclusion of these variables follows the standard convention used in the literature (e.g., Carroll, McCarthy, and Newman, 2005; Dalton and Kitchen 1990; Day and Devlin, 1996).

We use three samples for the estimation. First, for the descriptive analysis we report statistics based on the full survey sample, 20,832, excluding missing values for variables as necessary. Second, for the single equation, bivariate, simultaneous, and recursive probit models we use a subsample of size 18,864 that excludes individuals who had missing values for any of our control variables. Third, we estimate the simultaneous and recursive probit models excluding individuals who donated time or money to religious organisations—the sample size for this analysis is 10,205. We carry out estimation on this restricted sample to check the robustness of our results in light of the fact that individuals who donate to religious organisations tend to donate more (and more frequently), on average, to charities compared to those who make no religious donations (Independent Sector, 2002). Religions donations might therefore be governed by a different set of dynamics, which could be driving our results.

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[32] Please see appendix Table 4.A1 for a full description of the control variables used in the analysis.

[33] Admittedly, although standard in the philanthropic literature (especially when data limitations exist), the inclusion of household income as a perfect proxy for ability to donate money is not ideal. Household income provides a crude measure of ability to give, setting aside considerations of who has control over how the income is spent and family composition, though the latter is to some extent accounted for by the inclusion of the respondent's marital, parental, and student status.

4.4 Results

4.4.1 Descriptive Analysis

In this subsection, we highlight what we believe to be some of the interesting statistics, some of which point to links between the gifts of time and money, on philanthropic behaviour and other variables of interest from the CSGVP. In Tables 4.1 to 4.3, we report the participation rate for givers and volunteers, annual contributions of time and money, reasons for donating time and money, why individuals do not donate or donate more, and how monetary donations are made.

From Table 4.1, individuals age 65 or older have the lowest rate of volunteer participation (32.4%), but they also have the highest annual average volunteer hours. The youngest group of our sample, age 15 to 24 years, have the lowest participation rate among givers (71%) and the lowest average annual donation ($130.71). Men participate less in volunteer work than women do (43.7% vs. 46.8%), but both supply the same average number of annual volunteer hours per year (168). On the other hand, while rates of participation for monetary donations are higher for women than men (87.7% vs. 82.4%), on average men donate more money per year ($431.34 vs. $371.83); this result is not surprising given men earn more than women on average.[34] We find that individuals who are employed have a higher rate of volunteer participation, but lower annual volunteer hours compared to individuals who are not employed (unemployed or not in labour force). Individuals who are members of organisations participate more in donating

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[34]In the case of married (legal or common law) couples we are not able to rule out entirely that married men include monetary donations that were made in their spouse's name. However, based on the survey questions for giving, which were of the form "what was the donation [money] **you** made," it does seem more likely that each respondent reported only monetary donations made in their name.

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time and money, and they donate more to these activities.

From Table 4.2, givers and volunteers stated that contributing to the community was their number one motivating factor (92.1% and 78.9% respectively). Examining the reasons why individuals did not donate more time and money, we find that the level of time and monetary donations were important. These results are suggestive that money donations tend to precede time donations. Specifically, when individuals were asked why not donate time or donate more time, 26.2% felt they had donated enough time and 38.8% preferred to donate money. On the other hand, when asked why not donate money or donate more money 64%, felt they had donated enough money and 30.5%, reported that they preferred to donate time instead.

Turning to Table 4.3, we document how donations are made. From this table, we observe that door to door canvassing was the number one method for soliciting givers (66.7%), but it had the lowest average annual donation ($284.15). In contrast, only 7.6% of givers made their donation because of telephone request, but on average, they made the highest annual monetary contribution ($686.26). One statistic that is particularly noteworthy from this table is the difference between the average annual donations of those who reported making a donation at place of worship and those who did not. Those who reported donating at a religious place of worship at least once gave on average $516.16 more than those who did not ($634.15 vs. $117.19). Furthermore, those who made donations at a place of worship, on average, made the third highest annual donation ($634.15). These statistics on religious donations reaffirm why, in the analysis to follow, we carry out

estimations on a sample that excludes religious giving as a robustness check of our results.

In Figures 4.1 to 4.4, we present the participation rates, average annual hours of volunteer labour supplied and average annual monetary donation. These statistics are also suggestive of the interdependency between gifts of time and money at the extensive and intensive margins. In particular, they suggest that, on average, more people will donate money then time, implying that gifts of money will tend to precede gifts of time. Figure 4.1 shows that 45% of the population donate time compared to the 85% that donate money. Further, while 42% of individuals donate time and money, almost the same proportion, 43%, donate money and not time with only 3% donating time and not money (Figure 4.2). We also note from these figures that when gifts of time and money occur together the levels of these donations are greater than the donations of those who donate either time or money, but not both. Figure 4.3 shows that those who donate only time supplied on average 147.8 annual volunteer labour hours compared to the 169.6 annual volunteer hours supplied by those who donated time and money. Figure 4.3 reveals similar dynamics for monetary donations. On average, those who only donate money contributed $267.51 annually to charities compared to the $537.27 annual contribution for those who donate time and money.

4.4.2 Single Equation and Bivariate Probit

We report the results from the estimations in Tables 4.4, 4.5, and 4.6. The coefficients from the single equation probit for giving and volunteering, not controlling for any potential endogeneity or simultaneity, are reported in panel A of Table 4.4. The results in Table 4.4 indicate that the decision to donate money has a positive and statistically significant impact on volunteering. Specifically, being a giver increases the predicted probability index of being a volunteer by 0.489 standard deviations (p-value <0.001). Similarly, the decision to volunteer has a positive and statistically significant impact on the decision to donate money: donating time increases the predicted probability index of being a giver by 0.419 standard deviations (p-value <0.001). The single equation estimates reflect the impact of giving on volunteering and volunteering on giving without regard to the possible dual causation that might exist between both or the existence of a third unobserved factor that causes both volunteering and giving.

To assess the possibility that the decisions to donate time and money are related through their error terms, we report the bivariate probit results in panel B of Table 4.4. The parameter of interest is the correlation between the disturbances in the volunteering and giving equation. This parameter tells us if the decisions to donate time and money are potentially related through unobserved factors, as measured by the correlation of their error terms. The parameter of interest is reported at the bottom of Table 4.4 as rho (ρ); its value is 0.248 with standard error 0.025 (t-value 9.92). Therefore, the null hypothesis that $\rho = 0$ is rejected based on the t-value and from the Wald test statistic of 95.59 (p-value < 0.001) as reported.

4.4.3 Simultaneous Bivariate and Recursive Probit

The single equation results indicate that the decision to gift time affects the decision to gift money, and vice versa. The bivariate results suggest interrelatedness between both decisions with the statistically significant relationship between the error terms of the giving and volunteer equations. The simultaneous probit model is a generalisation of the single equation and bivariate models. From a preliminary analysis with single equation probits with all the explanatory variables of interest, we exclude from the volunteer equation household income and province of residence to satisfy the identification requirements. We find that both variables do not significantly explain gifts of time, but explain gifts of money. For the giving equation, we exclude number of children present at home and whether the respondent was born in Canada. We find that both of these variables have little explanatory power in the giving equation, but do explain the propensity to donate time. Our results are generally robust to various specifications of the control variables of interest.[35]

We report the coefficient results from the simultaneous bivariate for the full sample in panel C of Table 4.4. In contrast to the results from the separate single equation probit results, giving impacts volunteering but volunteering does not influence giving. The simultaneous equation results for the full sample show that being a giver increases the probability index of being a volunteer by 0.909 standard deviations (p-value < 0.001). In Table 4.5 panel A, we report the simultaneous equation bivariate results excluding those individuals who donated time or money to religious organisations. These results are

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[35] Such specifications include excluding membership in organisations as a control variable in the giving and volunteering equation. We did this because it is most often the case that membership in an organisation is structurally related to donating, especially donating gifts of time.

similar to the full sample, and therefore, the absence or presence of religious donors from the sample leaves the main results of interest unchanged. In particular, the simultaneous probit results on non-religious donations also indicate that being a giver increases the predicted probably index of being a volunteer by 0.909 standard deviations (p-value < 0.001), while volunteering has no statistically significant impact on the predicted probability index of being a giver.

Given the simultaneous equation results, we estimate the recursive bivariate probit model in volunteering (equations [4.18] and [4.19]), which is the simultaneous probit model with the coefficient on giving constrained to zero. These results are reported in Table 4.5, panel B for the full sample, and panel C for the sample that excludes individuals who donated to religious organisations. The recursive bivariate results on both samples indicate that we cannot reject that the giving and volunteering equations are independent based on the value of the Wald test statistics (in panel B 2.058 with p-value = 0.151 and in panel C 1.989 with p-value 0.159). The results on both samples also indicate that donating money increases probability of donating time. The coefficient on giving over the full sample on the sample that excludes religious donations indicate that the predicted probability index of donating time increases by about 0.76 for those who donate money, all else constant.

4.4.4 Marginal Effects

In Table 4.6, we report the marginal effects estimates of the decision to donate time on the decision to donate money, and vice versa, across selected models. From the single equation probit models, the decision to donate money increases the probability being a volunteer time by 18.7%, while the decision to donate time increases the probability of donating money by 6.3%. On the other hand, the simultaneous probit results reveal that the donating money increases the probability of donating time by 36.2%. For the sample that excludes individuals who donated time or money to religious organisations, the marginal effect of donating money on donating time in the simultaneous probability model is 29.7%. The marginal effects of donating time on donating money are 5.5% for the full sample simultaneous probit model and 13.1% for the simultaneous probit model that excludes individuals that made religious donations.

The recursive probit models in donating time are the preferred specifications, given the results from the single equation, bivariate, and simultaneous probit models. The recursive bivariate probit model on the full sample and the sample that excludes individuals who donate time or money to religious organisations reveals that the impact of being a giver increases the probability of donating time by about 21%. In view of all our results so far, we can conclude that the probability of donating time conditional on donating money is greater than the probability of donating money conditional on donating time—the latter being statistically insignificant in the simultaneous probit model. Therefore giving acts as selection for volunteering. In addition, giving is the single greatest determinant of the decision to volunteer.

In Table 4.7, we report the marginal effects across all control variables for the single equation probit volunteering model (with giving) and the single probit equation giving model (without volunteering)—given the findings from the recursive estimation on the full sample. Table 4.7 shows that men are less likely to be a volunteer or giver when compared to women. The marginal effects are, respectively, -4.4% and -5.1%. These results reaffirm the results from the descriptive analysis. Being married increases the probability of donating time and of donating money (3.8% and 4.1% respectively). Turning to age, the results show that compared to individuals age 15-24, being in any older age group reduces the probability of being a volunteer. The largest reduction in the likelihood of being a volunteer is for individuals age 65 years or older; this marginal effect is 17.8%. In contrast, the probability of donating money increases with age; it is 8.2% higher for those individuals age 65 years or older compared to those age 15-24 years. These results imply that current trends in Canadian demographics, particularly towards an older population, will have a negative impact on the volunteer participation rate and a positive impact on the rate of participation in the donating of money.

The education marginal effects indicate that higher educated individuals are more likely to be volunteers and givers. For example, university education increases the probability of being a volunteer by 13.5%. With respect to an individual's province of residence, there is substantial variation in the marginal effects estimates on propensity to donate money reflecting cultural, demographic, and provincial tax credit differences. Noticeably, relative to respondents living in Newfoundland and Labrador all respondents from all other provinces had a lower probability of donating money. With respect to a

respondent's household income, the results indicate that when it increases, the respondent's probably of donating money also increases relative to individuals at a lower level of household income. This result is consistent with Canadian studies on philanthropy such as Kitchen (1992) and suggests that Canadian economic growth will have a positive impact on the rate of participation in monetary giving. For student status, the results indicate that being a student has a positive impact on volunteering, but it has a negative impact on the decision to donate money. This result is consistent with students' likely low-income level and the benefits to them from using volunteering to gain work experience and build networks to achieve favourable future labour market outcomes.

In contrast to the results from the descriptive analysis, our estimation results show that after controlling for other socioeconomic and demographic factors, employment status does not affect the decision to donate time. In contrast, being employed increases the probability of being a giver by 5.6%. With respect to health status, healthy individuals are more likely to be volunteers or givers. The results also show that the presence of school age children (children age greater than 5) increases the probability of being a volunteer.

In terms of indicators of cultural heterogeneity, we find that individuals born outside of Canada are less likely to be volunteers than individuals born in Canada. Further individuals who speak English as their main language at home are more likely to be volunteers than those who do not. Further, those who report speaking French or English as their main language at home are more likely to donate money than those who do not. These results are consistent with the participation rates reported in Table 4.1. In

particular, those who report English as their main language at home had a volunteer participation rate of 52.1%, while those who reported French or another language as the main one spoken at home had volunteer participation rates of 36.1% and 30.2%. Similarly, those who reported English and French as their main language spoken at home had giving participation rates of 87.2 and 86.2%. If we take language spoken and place of birth as reasonable indicators of cultural heterogeneity, then these results are similar to those documented by other authors in the literature (e.g., Alesina and Ferrara, 2002). The continued shift towards immigration as the source of population growth in Canada, all else constant, will have a negative impact on the participation in volunteering and giving. Further, if we assume that the results from the descriptive analysis on the level of giving and volunteering would be robust to controls for socioeconomic and demographic factors, then the level of philanthropic activity will also likely be negatively affected.

The marginal effects from Table 4.7 also show that encouraging and facilitating membership in organisations and groups will increase participation in philanthropy. Across all the various organisations and groups that individuals join, we find the impact on decisions to donate time or money is generally positive and statistically significant. Noticeably, the marginal effects estimates of being a member of various organisations or groups are, on average, greater on the decision to donate time than on the decision to donate money. The argument could be made that membership in organisations necessarily leads to volunteering. In light of this, we re-estimated our regressions omitting the dummy variables for membership in organisations and found that this

change did not significantly affect the results on the main variables of interest, volunteering and giving.

4.5 Conclusion

The donations of time and money by Canadians that charitable organisations receive allow them to make significant and positive contributions to economic and social welfare. In this essay, we analyse the nature of the interdependency between the decisions to donate time and money in Canada using a simultaneous bivariate probit model. To our knowledge, the analysis of philanthropy from this perspective is the first for Canada. We also discuss the marginal effects of socioeconomic and demographic variables on donating behaviour.

The results from our estimations reveal that failing to control for the possible existence of simultaneity and endogeneity between the decisions to donate time and money in Canada would lead one to conclude that the decision to donate time increases the probability of making the decision to donate money, and vice versa. In contrast to the single equation probit results, our estimation results from the simultaneous bivariate probit model reveal that the probability of being a giver is unaffected by volunteer status, volunteer or non-volunteer. In addition, these results indicate that the probability of being a volunteer conditional on being a giver is higher than the probability being a volunteer conditional on not being a giver by about 36%. Therefore, those who donated money are more likely to have donated time, while those who donated time would not have necessarily donated money; it is the decision to donate money that increases the probability of donating time.

This implies that giving money acts as a selection for volunteering. Moreover, the decision to donate money is the single greatest determinant of the decision to donate time. These results are also supported by our descriptive analysis of the CSGVP.

From a theoretical perspective, these results are consistent with the opportunity cost of an hour of volunteer labour being greater than the value of that hour to the charitable organisation, with altruism (concern for the value of the contribution to the charity) being a more a dominant factor than warm glow motivating donors. There are, of course, other reasons that could underlie the pattern of the relationship between the decisions to donate time and money. For example, it could be that the behaviour and preponderance of charities "self-select" a greater proportion of the Canadian population to donate money first and then donate time.

The results from our analysis of the impact of socioeconomic and demographic variables on donating behaviour are similar to those documented by other authors. For example, we find that membership in groups and organisations increase the likelihood that an individual will donate time or money. We also find that cultural heterogeneity has a negative impact on philanthropic participation. Specifically, individuals who do not speak English as their main language at home are less likely to be volunteers. Consistent with this result, we also find that individuals born outside Canada are less likely to be volunteers. In addition, we find that individuals who do not speak either French or English as their main language at home are less likely to donate money.

Our analysis is a static analysis of volunteering in Canada. A dynamic analysis whereby individual philanthropic behaviour is tracked over time might shed additional insights into the nature of the interdependency between the decisions to donate time and money as well of the levels of these donations taking into account our result that giving acts as selection for volunteering. Further, in our analysis, we have only analysed the interdependency between the decision to donate time and money not the intensity of donating associated with each. One way to examine the intensity of donating is to use a simultaneous tobit model, although it suffers from the drawback that the participation and behavioural decisions are assumed to be governed by the same process and no account is made for possible sample selection bias. Another alternative is to use Heckman model to account for participation, intensity and sample selection issues, thought that would require modelling giving and volunteering separately.

The extension of most interest and more in line with the spirit of this essay is to model the interdependency among the decisions to donate time or money and the level of each supplied. This assessment would require using a simultaneous double hurdle model. In the first hurdle, the decisions to donate time and money are functions of each other and are jointly determined. In the second hurdle, the levels of time and money donations are jointly determined, are functions of each other, and are dependent on the outcomes from the first hurdle. While this sort of analysis has not been undertaken on philanthropic data because of computational difficulties in estimating the parameters of interest, we set this as a task for our future research agenda.

4.6 References

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Table 4.1: Participation Rate and Level of Donations

	Volunteer (%)	Volunteer Annual mean Hrs	Giving (%)	Giving Annual mean $
Age				
Age 15-24	54.82	139.22	70.99	130.71
Age 25-34	41.58	137.39	84.08	309.78
Age 35-44	50.67	152.10	88.68	373.95
Age 45-64	46.65	176.28	90.15	492.18
Age 55-64	42.42	201.76	89.53	492.58
Age 65+	32.41	245.32	86.82	575.71
Country of Birth				
Canadian born	48.26	166.25	86.51	388.62
Foreign born	40.91	173.81	54.20	481.06
Education				
University	58.91	179.71	92.73	691.38
Post Secondary	46.48	171.51	90.62	380.19
Some Post Secondary	49.97	166.08	84.13	316.04
High School or Less	39.51	151.36	78.33	261.78
Fertility				
No child age <18	39.70	191.16	85.01	435.00
Child age 0-5	42.71	125.47	87.58	285.51
Children age 0-5 & 6-17	53.37	140.66	88.01	440.54
Children age 6-17	58.62	141.76	83.89	333.80
Gender				
Male	43.69	167.74	82.37	431.34
Female	46.75	168.25	87.72	371.83
Household Income				
< $20,000	29.72	177.40	69.14	189.92
$20,000 to < $40,000	36.83	175.07	82.23	308.26
$40,000 to < $60,000	45.34	183.87	86.45	345.97
$60,000 to < $100,000	49.34	161.36	89.52	368.74
$100,000+	59.87	155.11	91.76	700.82
Labour Force				
Employed (age<76)	50.10	151.59	89.32	417.03
Not employed	40.04	204.57	80.24	393.95
Language				
English	52.07	174.45	87.20	485.03
French	36.14	148.51	86.19	178.25
Other	30.21	136.10	75.15	339.36
Member of Organisation				
Yes	57.84	181.55	90.78	495.94
No	23.89	112.31	75.44	204.97

Notes: (1) volunteer (%) and giving (%) are calculated over the population.

(2) volunteer and giver mean annual donations are average donation across participants in each respective category.

Table 4.1(cont'd): Participation Rate and Level of Donations

	Volunteer (%)	Volunteer Annual mean Hrs	Giving (%)	Giving Annual mean $
Marital Status				
Married/common-law	46.05	172.22	89.91	442.35
Not married/common-law	44.32	161.51	77.78	323.12
Organisations Donated to				
Culture & recreation	30.67	125.48	23.43	76.81
Education & research	27.28	78.05	25.50	72.64
Environmental	5.60	98.17	8.76	113.75
Health	17.78	71.98	72.78	101.59
Housing & Development	10.00	97.01	3.21	98.32
International	1.34	155.59	8.18	188.21
Politics, law & advocacy	5.21	121.92	6.95	77.62
Religion	21.85	126.47	45.23	373.16
Social Services	24.89	117.08	50.76	72.12
Unions bus/prof. assn	3.39	106.40	0.55	139.83
Volunt. Phil. Intermediaries	3.34	45.62	15.52	135.83
Other	1.29	101.72	4.07	144.00
Religiosity				
Regular (≥ 1 time a week)	62.28	229.59	93.16	888.89
Sometimes	48.10	135.02	90.56	322.00
Not at all	35.84	154.40	82.79	218.06
No religious affiliation	44.08	159.84	76.33	294.55
Region				
Atlantic	45.45	188.69	90.17	351.78
Quebec	34.03	146.00	83.27	176.44
Ontario	50.40	161.52	89.81	488.43
Prairie	49.33	173.34	80.88	476.81
British Columbia	45.17	199.30	77.02	466.75
Self Assessed Health				
Fair-Poor	28.17	196.63	81.42	343.86
Good-very good	47.07	164.62	85.84	412.20
Excellent	53.46	166.18	87.32	414.60
Student				
Yes	60.29	145.64	74.12	195.44
No	43.96	170.49	88.22	443.44

Notes: (1) volunteer (%) and giving (%) are calculated over the population.

(2) volunteer and giver mean annual donations are average donation across participants in each respective category.

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Table 4.2: Reasons for Donating and Not Donating or Donating more

	Volunteer: (%)	Volunteer: Annual mean Hrs	Giving (%)	Giving: Annual mean $
Reason for Donating				
Contribution to the community				
Yes	92.12	170.49	78.86	438.00
No	7.88	128.28	21.14	270.50
Credit on income taxes				
Yes	-	-	19.65	740.69
No	-	-	80.35	318.10
Friends volunteered				
Yes	43.41	169.91	-	-
No	56.59	164.92	-	-
Received monetary compensation				
Yes	3.89	318.68	-	-
No	96.11	161.21	-	-
Religions Obligations				
Yes	22.02	208.95	31.54	712.21
No	77.98	155.26	68.46	258.00
To improve job prospects				
Yes	21.91	179.12	-	-
No	78.09	163.72	-	-
To Network with/meet people				
Yes	47.00	194.11	-	-
No	53.00	143.05	-	-
Why Not Donate or Donate More				
Financial Cost				
Yes	13.09	84.73	70.77	310.96
No	86.91	75.65	29.23	416.03
Gave enough time/money				
Yes	26.17	167.91	64.00	457.94
No	73.83	43.92	36.00	304.56
Prefer to give money/time				
Yes	38.76	30.15	30.49	331.19
No	61.24	106.25	69.51	248.98
Need better tax credit				
Yes	-	-	53.40	434.65
No	-	-	46.60	378.42
Not asked				
Yes	33.90	39.62	22.72	254.29
No	66.10	95.31	77.28	396.28

Notes: (1) Reason for Donating includes only participants in the respective volunteering and giving columns.
(2) Why Not Donate or Donate More calculated over the entire population

Table 4.3: How Donations of Money are Made

	Giving (%)	Giving: Annual mean $ CDN
At least one from		
Request work		
Yes	23.52	449.39
No	76.48	307.01
Door to door canvassing		
Yes	66.67	284.15
No	33.33	453.26
Mail		
Yes	26.74	659.04
No	73.26	224.23
Collection at place of worship		
Yes	35.63	634.15
No	64.37	117.99
Shopping centre or street		
Yes	30.54	352.44
No	69.46	335.26
Telephone request		
Yes	7.62	686.26
No	92.38	311.98
Television/radio		
Yes	7.06	485.78
No	92.06	327.98

Notes: (1) giving (%) those who reported positive monetary donation.

(2) annual mean $CDN is average monetary contribution across all charities.

Table 4.4: Single Equation, Bivariate and Simultaneous Bivariate Probit Coefficients

VARIABLES	Panel (A) Single Equation Probit		Panel (B) Bivariate Probit		Panel (C) Simultaneous Bivariate Probit	
	Volunteer	Giver	Volunteer	Giver	Volunteer	Giver
Giver	0.489***				0.909***	
	(0.0470)				(0.209)	
Volunteer		0.419***				0.351
		(0.044)				(0.357)
Male	-0.110***	-0.327***	-0.136***	-0.341***	-0.084***	-0.328***
	(0.030)	(0.042)	(0.0300)	(0.041)	(0.031)	(0.046)
Married	0.096***	0.241***	0.124***	0.256***	0.066*	0.240***
	(0.033)	(0.047)	(0.0324)	(0.046)	(0.035)	(0.048)
University	0.339***	0.266***	0.364***	0.297***	0.308***	0.267***
	(0.045)	(0.063)	(0.0448)	(0.061)	(0.042)	(0.070)
Postsecondary	0.116***	0.249***	0.142***	0.256***	0.088**	0.248***
	(0.036)	(0.051)	(0.0361)	(0.050)	(0.039)	(0.048)
Some postsecondary	0.175***	0.198**	0.195***	0.212***	0.152***	0.197**
	(0.061)	(0.082)	(0.0600)	(0.081)	(0.063)	(0.082)
Language French	-0.314***	0.131	-0.307***	0.091	-0.314***	0.128
	(0.035)	(0.102)	(0.0349)	(0.100)	(0.036)	(0.102)
Language Other	-0.429***	-0.291***	-0.462***	-0.355***	-0.384***	-0.289***
	(0.071)	(0.079)	(0.0703)	(0.078)	(0.074)	(0.101)
Regular Relig. Attend.	0.312***	0.265***	0.332***	0.310***	0.286***	0.264***
	(0.047)	(0.069)	(0.0466)	(0.067)	(0.045)	(0.081)
Health: good/excellent	0.270***	0.066	0.276***	0.097**	0.256***	0.063
	(0.042)	(0.058)	(0.0416)	(0.057)	(0.040)	(0.063)
children aged 0-5	-0.0002		0.003		0.004	
	(0.058)		(0.058)		(0.054)	
children aged 0-5 & 6-17	0.303***		0.299***		0.290***	
	(0.067)		(0.067)		(0.061)	
children aged 6-17	0.399***		0.390***		0.398***	
	(0.042)		(0.041)		(0.042)	
Foreign born	-0.145***		-0.140***		-0.141***	
	(0.051)		(0.051)		(0.050)	
Fulltime Student	0.337***	-0.167**	0.322***	-0.010	0.339***	-0.149*
	(0.070)	(0.081)	(0.070)	(0.080)	(0.067)	(0.088)
Part-time Student	0.196**	-0.272**	0.169**	-0.243*	0.216**	-0.266**
	(0.083)	(0.114)	(0.085)	(0.115)	(0.079)	(0.122)
Employed	0.063	0.271***	0.102***	0.279***	0.027	0.269***
	(0.039)	(0.051)	(0.039)	(0.050)	(0.045)	(0.053)
Rho (ρ)			0.248***			
			(0.025)			
Wald test ρ =0			92.588 (p-value <0.001)			

Notes: (1) *** p<0.01, ** p<0.05, * p<0.1, (2) Observations =18,864 for all regressions, (3) Robust and bootstrap standard errors in parentheses, (4) Additional controls not reported for volunteering: age, membership in clubs, (5) Additional controls not reported for giving: age, household income, province of residence, membership in clubs, (6) Appendix Table 4.A1 list base categories for all variables used in the analysis.

Table 4.5:
Simultaneous Bivariate Nonreligious Donations and Recursive Probit Coefficients

VARIABLES	Panel (A) Simultaneous – Nonreligious Donations		Panel (B) Recursive Bivariate Probit		Panel (C) Recursive Bivariate– Nonreligious Donations	
	Volunteer	Giver	Volunteer	Giver	Volunteer	Giver
Giver	0.909***		0.757***		0.760***	
	(0.229)		(0.219)		(0.207)	
Volunteer		0.351				
		(0.419)				
Male	-0.084**	-0.328***	-0.093***	-0.347***	-0.135***	-0.340***
	(0.041)	(0.055)	(0.033)	(0.042)	(0.043)	(0.047)
Married	0.240***	0.240***	0.079**	0.249***	0.033	0.216***
	(0.048)	(0.053)	(0.035)	(0.047)	(0.046)	(0.052)
University	0.267***	0.267***	0.321***	0.296***	0.261***	0.346***
	(0.070)	(0.073)	(0.048)	(0.063)	(0.065)	(0.071)
Postsecondary	0.248**	0.248***	0.099***	0.259***	0.060**	0.288***
	(0.048)	(0.058)	(0.039)	(0.051)	(0.053)	(0.057)
Some postsecondary	0.197**	0.197**	0.162***	0.216***	0.130**	0.193**
	(0.082)	(0.094)	(0.062)	(0.082)	(0.078)	(0.092)
Language French	0.128	0.128	-0.314***	0.106	-0.297***	-0.003
	(0.102)	(0.104)	(0.035)	(0.102)	(0.050)	(0.117)
Language Other	-0.289***	-0.289***	-0.405***	-0.342***	-0.360***	-0.486***
	(0.101)	(0.110)	(0.074)	(0.079)	(0.102)	(0.092)
Regular Relig. Attend.	0.264	0.264***	0.297***	0.301***	0.026	-0.378***
	(0.081)	(0.098)	(0.047)	(0.069)	(0.104)	(0.100)
Health: good/excellent	0.063	0.063	0.263***	0.084	0.257***	0.094**
	(0.063)	(0.069)	(0.043)	(0.057)	(0.058)	(0.062)
children aged 0-5	0.004		-0.003		-0.061	
	(0.072)		(0.058)		(0.072)	
children aged 0-5 & 6-17	0.290***		0.302***		0.388***	
	(0.072)		(0.067)		(0.084)	
children aged 6-17	0.398***		0.397***		0.400***	
	(0.053)		(0.042)		(0.053)	
Foreign born	-0.141**		-0.145***		-0.073***	
	(0.065)		(0.050)		(0.064)	
Fulltime Student	0.339***	-0.149	0.340***	-0.094	0.378***	-0.035
	(0.075)	(0.111)	(0.070)	(0.082)	(0.084)	(0.090)
Part-time Student	0.216**	-0.266**	0.209**	-0.245*	0.242**	-0.270**
	(0.088)	(0.133)	(0.082)	(0.115)	(0.100)	(0.132)
Employed	0.027	0.269***	0.040	0.272***	0.018	0.233***
	(0.056)	(0.057)	(0.042)	(0.051)	(0.055)	(0.057)
Rho (ρ)			-0.158		-0.184	
			(0.108)		(0.107)	
Wald test ρ =0			2.058 (p-value=0.151)		1.989 (p-value =0.159)	

Notes: (1) *** p<0.01, ** p<0.05, * p<0.1, (2) Observations=10,205 for nonreligious donations and = 18,864 for all others, (3) Robust and bootstrap standard errors in parentheses, (4) Additional controls not reported for volunteer: age, membership in clubs, (5) Additional controls not reported for giving: age household income, province of residence, membership in clubs, (6) Appendix Table 4.A1 lists base categories for all variables used in the analysis.

Table 4.6:
Marginal Effects Across Selected Models—Volunteering and Giving Coefficients

	Marginal Effects on:	
Models	Panel (A) Volunteer	Panel (B) Giver
Single Equation Probit—Volunteer		0.187
Single Equation Probit—Giving	0.063	
Simultaneous Probit— Volunteer		0.362
Simultaneous Probit— Giving	0.055	
Simultaneous Probit— Volunteer nonreligious donations only		0.297
Simultaneous Probit— Giving nonreligious donations only	0.131	
Recursive Bivariate Probit— Volunteer		0.216
Recursive Bivariate Probit— Volunteer nonreligious donations only		0.211

Note (1) marginal effects reported with corresponding probit model and variable of interest as denoted.

Table 4.7: Marginal Effects of Volunteering and Giving

	Single Equation Volunteer	Single Equation Giver
Giver	0.187***	
Male	-0.0436***	-0.051***
Age 25-34 years	-0.0991***	0.032***
Age 35-44 years	-0.0500*	0.057***
Age 45-54 years	-0.075***	0.063***
Age 54-64 years	-0.070**	0.072***
Age 65+ years	-0.178***	0.082***
Married	0.038***	0.041***
University	0.135***	0.042***
Postsecondary	0.046***	0.038***
Some postsecondary	0.070***	0.030***
Member of religious group	0.198***	0.058***
Member of sports group	0.123***	0.046***
Member of union	0.022	0.028***
Member of political organisation	0.162***	0.026*
Member of service organisation	0.199***	0.027**
Member of cultural organisation	0.118***	0.030***
Member of youth organisation	0.184***	0.036***
Member of self help organisation	0.130***	0.019
Member of environmental group	0.125***	0.023
Member of civic group	0.186***	0.034***
Member of other group	0.170***	0.055***
Prince Edward Island		-0.047*
Nova Scotia		-0.083***
New Brunswick		-0.103***
Quebec		-0.147***
Ontario		-0.0731***
Manitoba		-0.157***
Saskatchewan		-0.202***
Alberta		-0.233***
British Columbia		-0.231***
Regular religious attendance	0.124***	0.042***
Household income: $20,000 to <$40,000		0.035***
Household income: $40,000 to <$60,000		0.058***
Household income: $60,000 to <$100,000		0.072***
Household income: $100,000+		0.071***
Fulltime Student	0.134***	-0.015
Part-time Student	0.078**	-0.038*
Employed	0.025	0.056***
Health: good/excellent	0.106***	0.022**
Children aged 0-5	-8.70e-05	
Children aged 0-5 & 6-17	0.120***	
Children aged 6-17	0.158***	
Language French	-0.123***	0.015
Language Other	-0.165***	-0.066***
Foreign born	-0.057***	

Notes: (1) *** p<0.01, ** p<0.05, * p<0.1,

(2) Appendix Table 4.A1 lists base categories for all variables used in the analysis

Appendix Table 4.A1: Description of Variables Used In Estimations

Giver	0= did not donate money, 1= donated money
Volunteer	0= did not donate time, 1= donated time
Male	0= female, 1=male
Age	0= Age 15-24, 1=Age 25-34 years, 2= Age 35-44 years, 3=Age 45-54 years, 4=Age 54-64 years, 5=Age 65+ years
Marital status	0=not married, 1= married
Educational Attainment	0=high school or less, 1= university, 2=Postsecondary, 3=some postsecondary
Language spoken at home	0=English, 1=French, 3=other language
Membership in Organisations/groups	0= no membership in organisations, 1= member of religious group, 2=member of sports group, 3= member of union, 4= member of political organisation, 5= member of service organisation, 6= member of cultural organisation, 7=member of youth organisation 8=member of self help organisation, 9=member of environmental group, 10= member of civic group, 11=member of other group
Providence of Residence	0=Newfoundland and Labrador, 1=Prince Edward Island, 2=Nova Scotia, 3=New Brunswick, 4=Quebec, 5= Ontario, 6=Manitoba, 7=Saskatchewan, 8=Alberta, 9=British Columbia
Religious attendance	0= none or less than once a week, 1= once a week
Health	0=fair or poor, 1= good or excellent
Household Income	0 = household income < $20,000, 1= household income $20,000 to <$40,000, 2= household income $40,000 to <$60,000, 3= household income $60,000 to <$100,000, 4= household income $100,000+
Student Status	0= not a student, 1= fulltime student, 2= part-time student
Employment Status	0= not employed, 1= employed
Presence of Children	0= no child age <18 years living in the household, 1=children age 0-5 years, 2= children age 0-5 & 6-17 years, 3=children age 6-17 years
Country of Birth	0= Canadian born, 1= foreign born

Note: '0' is the designated base category used in the regression analyses.

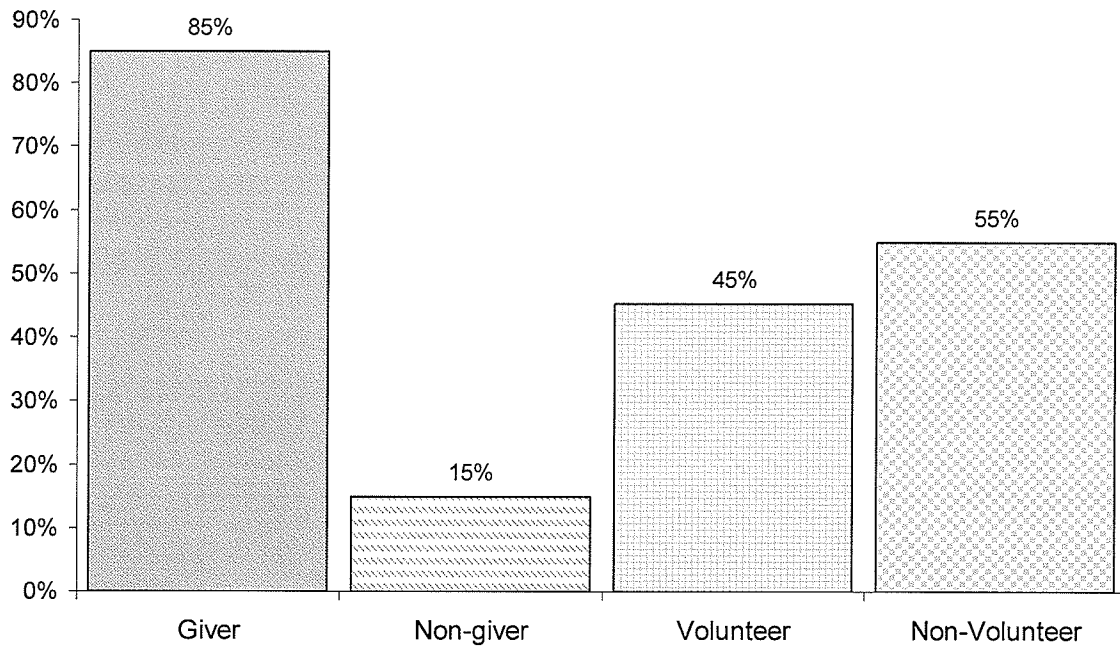**Figure 4.1 Participation rate: giver, non-giver, volunteer, non-volunteer**

Figure 4.2 Participation rate: giver & non-volunteer, non-giver &non-volunteer, volunteer & giver, volunteer & non- giver
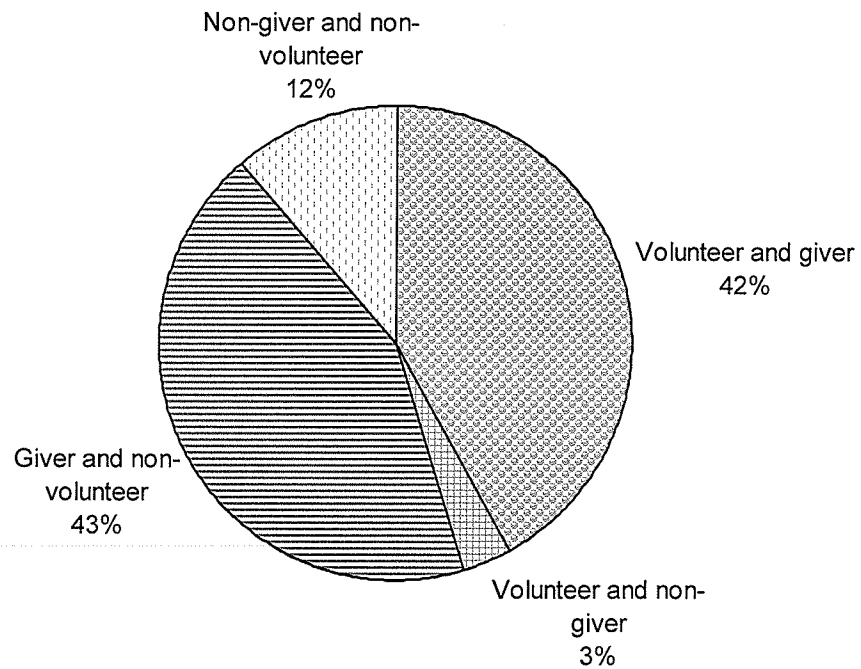
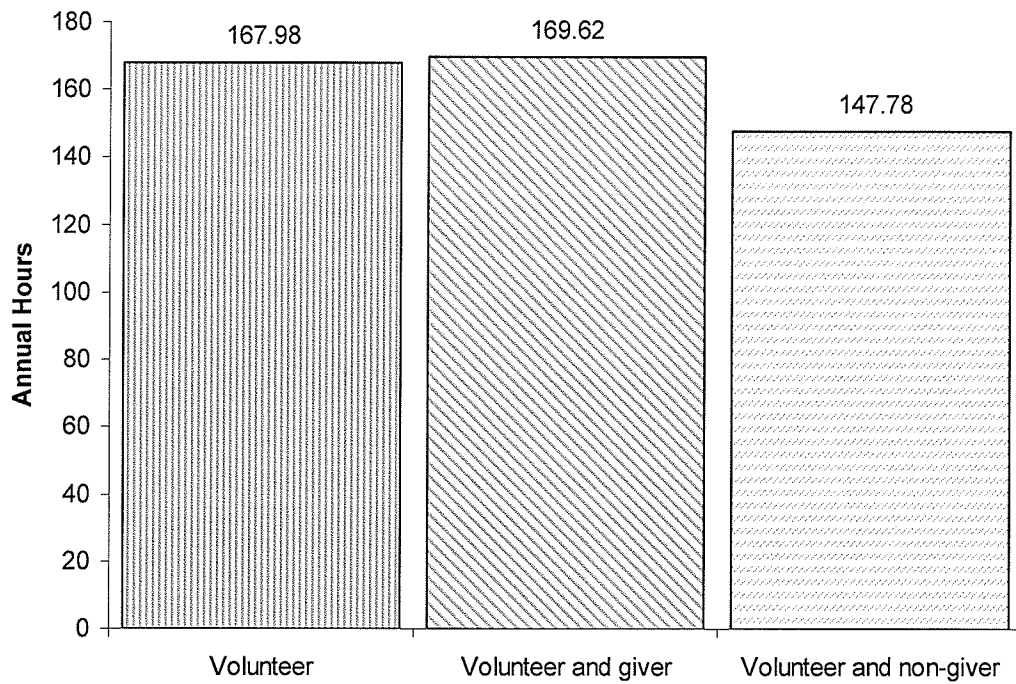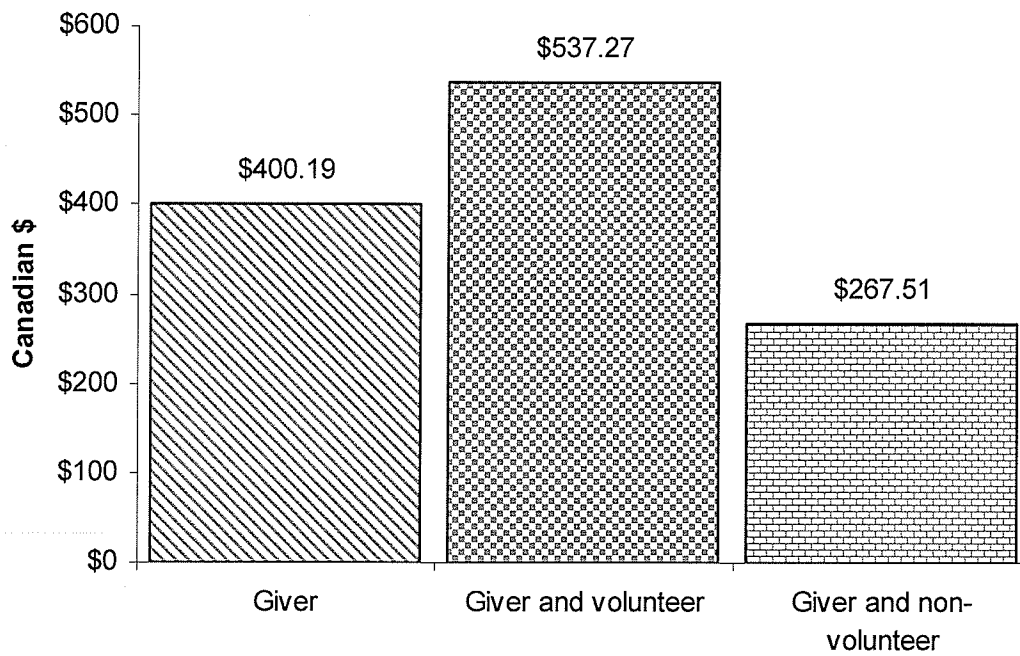## Figure 4.3 Volunteering: mean annual hours

167.98 Volunteer
169.62 Volunteer and giver
147.78 Volunteer and non-giver

Figure 4.4 Giver: mean annual giving (Canadian $)

$400.19 Giver
$537.27 Giver and volunteer
$267.51 Giver and non-volunteer

CHAPTER 5

CONCLUSION

How time is allocated across various activities influences individual and family welfare, the relative prices of goods and services, and the effectiveness of pubic policy. This dissertation consists of three essays with the common theme being the allocation of time. Each essay of this dissertation makes an empirical contribution to the time allocation literature. The first essay is a broad overview of time allocation in Canada and the second and the third examine particular aspects of time use in Canada.

In the first essay, we control for demographic changes and undertake the first, to our knowledge, a cross-country comparison of the allocation of time in Canada (1985 to 2005) and the United States (1986 to 2005). We find an increase in the time spent on market work in Canada and a decline in the time spent on market work in United States. The trends have resulted in the time allocated to leisure, measured in a variety of ways, increasing in the U.S., but declining in Canada. In 2005, the level of time spent in all market was lower in the U.S. when compared to Canada, although time spent in core market work activities was about the same in both countries. The decrease in the time Canadians spent on leisure is a consequence of a reduction in the time allocated to activities such as personal care, reading, and own medical care. However, despite the overall decline in leisure, Canadians do spend more time walking and hiking. Two other

noteworthy findings from the first essay are that the least educated spend more time on leisure than the most educated, and this is true in both countries. In addition, women continue to bear the lion's share of household work, although the time men spent on nonmarket work has trended upwards. These results suggest that measures of welfare evaluation based labour market outcomes might be misleading.

In the second essay of this dissertation, I examine the time men allocate to market work and childcare using the two most recent Canadian time use surveys. I focus on the difference in the time fathers and non-fathers spend on market work, and the time fathers spend on primary and secondary childcare along their educational (income) profile. I find that Canadian men who are fathers spend more time on market work compared to those who are not. At the same time, while over the period being examined non-fathers increased the time they spend on market work as their level of education increases, fathers' market work time was relatively stable.

In regards to the time spent on childcare in the second essay, the results from the weighted time use averages and tobit regressions reveal that higher educated fathers spend more time on childcare compared to lower-educated fathers. This is true for the time fathers spend in primary childcare, when childcare is the main activity, and secondary childcare, when childcare is not the main activity (e.g., the main activity might be watching television). Therefore, lower-educated fathers spend less time on childcare and about the same time on market compared to their higher educated counterparts. The time fathers spend on childcare has a significant bearing on their children's

socioemotional development and life outcomes. Therefore, these results highlight another source of inequality among men with lower education, and presumably lower income, that disadvantages their children. While a number of possible reasons for the education-childcare gradient are discussed, further study is needed to validate any of the competing explanations.

The third essay is an examination of the link between the decision to volunteer and the decision to donate money to charitable organisation. . The study of philanthropic behaviour is important, given the magnitude of the contribution of time and monetary donations to the Canadian economy. Among the scholars who have examined philanthropic behaviour, few have examined the joint determination of donations of time and money. However, a dependency is likely to exist between both forms of philanthropic behaviour given, they are influenced by a similar set of moral, socioeconomic, and demographic factors. In this third essay, we assess the nature and presence of the interdependency between the decisions to donate time and money. In particular, we use the simultaneous bivariate probit model to test for the dual endogeneity between the decisions to donate time and money.

The few scholars who have examined the donations of time and money have tended to focus on the level of donations made. However, the decisions to donate time and money in the first place can inform us on the appropriateness of the econometric strategies employed to characterise the level of monetary and time donations. To our knowledge, the analysis of philanthropy from this perspective is the first to be done using Canadian

philanthropic data. Further, we know of only one scholarly researcher who uses the same methodology as we do to analyse both forms of philanthropic behaviour. Our results reveal that being a volunteer conditional on being a giver is higher than the probability being a volunteer conditional on not being a giver by about 36%. Further, we find that the decision to donate time has the greatest impact on the decision to donate money and that cultural heterogeneity has a negative impact on the propensity to donate either time or money.

This dissertation contributes to the empirical literature on the allocation of time in Canada. In the three essays, issues such as changes in social and economic position, transmission of social advantage or disadvantage, and of gender differentiation underlie many of the results. While the contributions are primarily empirical, this dissertation also demonstrates that the analysis of time use data can enrich our understanding of the linkages of economic and non-economic activities, an understanding that, in turn, can serve to improve the formulation of public policies aimed at increasing welfare.