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Income Inequality Among Seniors in Canada: The Role of Women's Labour Market Experience

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Income Inequality Among Seniors in Canada: The Role of Women's Labour Market Experience

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ABSTRACT

The distribution of income among seniors in Canada has changed substantially over the past decade, reflecting an overall increase in income and an increase in income inequality. In this study I decompose the distribution of income among senior couples to determine the extent to which changes in the labour market activity and retirement experiences of women and men have contributed to this shift in the income distribution. I use data from the Canadian Survey of Labour and Income Dynamics, 1996 and 2006, and the methods of Firpo, Fortin and Lemieux (2007, 2009). Results suggest increases in women's access to pension income and employment have driven increases in income across the distribution with relatively small disequalizing effects. Increases in women's access to public pensions have had important equalizing effects, while most of the increase in senior income inequality can be attributed to increases in senior men's and women's education levels.

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Keywords: Income distribution, Elderly, Seniors, Women's labour supply, Pensions

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Executive Summary

Income support for the elderly population has long been a priority for policy makers. In Canada, various programs – including Old Age Security, the Guaranteed Income Supplement, and the Canada/Quebec Pension Plans - exist to support the retirement incomes of seniors. These programs are often credited with improving the well-being of elderly Canadians. In this study I examine recent changes in the distribution of income among senior Canadians. The central goal of this paper is to determine which factors are driving recent changes in seniors' incomes and income inequality. The focus is on those factors that reflect historical changes in the nature of women's labour market activity and experience.

Data from the Survey of Labour and Income Dynamics is used to document and analyse the changes in seniors' incomes, focussing on the after-tax incomes of senior married couples. Over the period 1996-2006, there had been a general increase in seniors' income that we would expect to raise the well-being of seniors and further reduce poverty. Seniors in high income groups, however, saw larger increases in income than seniors in low income groups. Thus we have also seen an increase in income inequality among seniors over the last decade, despite reductions in inequality in the years prior to the mid-1990s.

The analysis examines the extent to which various factors have contributed to increases in seniors' income. The following are the key findings:

a. The higher likelihood of women to receive employer-sponsored pensions (by twenty percentage points) led to large increases in income among all senior couples, with those in the middle of the income distribution benefitting the most.

b. The higher likelihood of women to be employed at older ages also largely benefitted those in the middle and upper parts of the income distribution.

c. Increases in women's access to CPP/QPP appears to have benefitted those seniors in the lower end of the income distribution the most. The increase in women's access to CPP/QPP by seventeen percentage points also benefitted seniors in the middle of the income distribution but had no significant effect on upper income senior couples.

d. Increases in the likelihood of men to have an employer sponsored pension appears to have benefitted those seniors in the lower end of the income distribution more than seniors in the top of the distribution. In contrast, any increase in senior men's employment benefitted high income seniors the most.

e. The large increase in educational attainment for senior men and women drove increases in income for high income seniors, with few benefits for low income seniors.

f. Increases in women's labour market experience can explain some increase in seniors' incomes over the 1996-2006 period, but is a relatively small contributor to the increase in income and income inequality.

Overall, the results demonstrate the importance of changes in the nature of women's labour force attachment and retirement for senior's incomes and well-being. We should expect that policies promoting labour force attachment among women, such as Employment Insurance maternity benefits and job protection provisions, or the availability of public child care programs, can lead to higher retirement incomes and elderly well-being in the future. It is important to note the equalizing role played by Canada's public pension programs.

1. Introduction

Income support for the elderly population has long been a priority for policy makers. In many countries, various programs were introduced in the 19th century to support seniors' incomes and have been credited with raising the incomes of the poorest seniors and reducing the incidence of elderly poverty. In Canada, the introduction and expansion of retirement income programs such as Old Age Security (1952), the Guaranteed Income Supplement (1967), and the Canada and Quebec Pension Plans (1966) is often credited with improving the well-being of elderly Canadians. Continued monitoring and evaluation of seniors' incomes and the effectives of these programs is essential to ensure the maintenance of seniors' standard of living.

Policy makers may also be concerned with income inequality among seniors. Although the causal relationship remains a mystery, there is a clear correlation between socioeconomic status and individual health. As such, changes in income inequality among seniors could lead to changes in inequality of health outcomes including life expectancy, perhaps as some seniors gain better access than others to health services not provided through public programs. As long as the population has some preference for redistribution, policies should be formed to redistribute income in response to increases in income inequality. Formulating an effective targeted policy response to changes in inequality or poverty among seniors first requires a solid understanding of how various factors drive changes in the senior income distribution.

In this paper I begin by documenting recent changes in the distribution of income among seniors in Canada, focussing on the period 1996-2006. By all measures, there had been a persistent downward trend in elderly poverty for several decades in Canada. Over the past decade, there was a general increase in seniors' incomes that will generally reflect an improvement in seniors' well-being and a continued decline in the incidence of poverty. Seniors in high-income groups, however, have seen larger increases in incomes than those seniors at the low end of the income distribution. As such, we have also seen a substantial increase in income inequality among seniors over the past decade. This is an interesting

break in trend, as income inequality among seniors had been falling for several decades prior to the mid-1990s.

The central goal of this study is to determine which factors are driving the recent changes in seniors' incomes and income inequality, something not well addressed in existing literature. My focus is on those factors that reflect historical changes in the nature of women's labour market activity and experiences. As the participation rates of women increased dramatically over the last half century, women have become more attached to the labour force, and their labour supply has become less elastic over time. Subsequently, we expect the nature of women's retirement to change. As women have obtained greater work experience and have better access to public and private pensions, their income in retirement is not only increasing but also becoming a more important part of seniors' family income.

Using data from the Survey of Labour and Income Dynamics (SLID) and the decomposition methods developed in Firpo et al. (2007, 2009) I examine the extent to which changes in senior women's employment, access to private and public pensions, work experience and education can explain increases in senior couples' after tax income and income inequality over the period 1996-2006. I also examine the importance of changes in men's employment, pensions, work experience and education. The key advantage to using SLID is the availability of a measure of full-time full-year equivalent experience. SLID has several other characteristics available, allowing me to examine the role played by changes in health, immigration, urban residency, total fertility, women's age when she had her first child, her age of first marriage, whether a woman or her husband have been married more than once, and whether a senior's economic family consists of more than one generation.

The results provide new insights to the changing nature of seniors' income. The results show that changes in the nature of women's retirement are important for explaining the recent changes in the senior income distribution. Increases in women's access to private pensions and a higher likelihood of employment when older have raised senior incomes across the distribution. Increases in women's access to public pensions have had important equalizing

effects, raising the incomes of the poorest seniors. Increases in the educational attainment of men and women have had remarkable effects, as the bulk of the increase in senior income inequality can be attributed to the higher education levels of seniors. Other factors are shown to play a minor role.

In the next section, I begin by providing some context and background by reviewing historical changes to the income distribution of seniors in Canada and the role of retirement income policies in Canada. I also discuss some previous studies and the important changes in nature of women's retirement for recent cohorts of retirees. In section 3 I discuss the data used in this study and the measurement of key variables. I also document changes in the senior income distribution and characteristics. In section 4, I describe the decomposition methodology used here, with results presented in section 5. Robustness of the results is discussed in section 6, followed by some concluding remarks.

2. Context and Background

2.1. Retirement income and Canadian policy

The incidence of elderly poverty and inequality among seniors in Canada declined steadily from the 1970s through to the mid 1990s and several studies have linked these trends to changes in Canada's retirement income security programs. Poverty rates fell most sharply at the end of the 1970s (see Figure 1), as the incidence of low income fell from 23% in 1977 to only 4% in 1982.[1]

[1]Note the series in Figure 1 represents elderly married couples, which are defined by Statistics Canada as married couples whose major earner is over age 65. This differs from the group sampled in the analysis of this study, as I sample married couples whose oldest member is age 65-79. The incidence of low income measures the portion of individuals with incomes below the Low Income Cut-Off, which represents an income below which a family devotes a larger share of its income to food, shelter and clothing than an average family would. Statistics Canada does not refer to this as a measure of poverty.

Fig. 1.— Poverty and Inequality among Elderly Married Couples, 1976-2006
Source: CANSIM II Tables 202-0705 and 202-0804, based on the Survey of Consumer Finances and the Survey of Labour and Income Dynamics. The incidence of low income represents the portion of elderly married couples (in which the major earner is age 65 or older) whose after tax income is below the Statistics Canada Low Income Cut-off (1992 base). The Gini coefficient is also based on after tax income.

Milligan (2008) also finds this sharp decline in his study of elderly income poverty, using survey data from various Canadian sources. He notes this drop coincides with generous increases in the Guaranteed Income Supplement (GIS), an income-tested benefit provided to seniors over age 65 that supplements Old Age Security (OAS) benefits.[2]

[2]OAS provides a maximum monthly benefit, set at $516.96 for June 2009, to individuals over age 65. The benefit is clawed back at a rate of 15% for individual income above a high threshold (set at $66335 in 2009 so that the full OAS benefit is eliminated for incomes above $107,692). The maximum GIS benefit depends on family type, set at $652.51 for a single person over age 65 and $430.90 for each member of a couple over 65 in June 2009. The income test for GIS benefits are based on family income, with a clawback rate of 50%. Earnings exemptions were set at $500 until 2008 when the exemption was raised to $3500.

Since the mid 1990s, the incidence of poverty appears to remain steady. Milligan's (2008) estimates suggest a slight increase in income poverty since the 1990s. He points out, however, that the increase in elderly poverty he finds results from relatively large increases in the incomes of working age families and high income seniors and does not represent a fall in the income of lower-income seniors.

Income inequality declined steadily from the 1970s to the mid 1990s, as the Gini coefficient fell from 0.340 in 1976 to 0.238 in 1994. After 1994, inequality among elderly couples appears to increase slightly as the Gini coefficient rose to 0.262 in 2006. Myles (2000) examined the earlier decline in inequality and found that the Canada/Quebec Pension Plans (C/QPP) played an important role over this period.[3] Over the period studied, C/QPP became a larger share of individuals' income, representing only 8% of income in 1980 and 20% in 1995 (Myles 2000). Although C/QPP benefits are tied to individuals' earnings histories, this source of income is widespread and less concentrated among upper income seniors than previously relied upon sources of income (such as investment income). Myles (2000) also found that private (employer-provided) pensions also increased in importance as a source of income. However, as private pensions are generally enjoyed by those seniors in the middle and upper quintiles of the income distribution, the rise in private pensions did not contribute to a reduction in inequality.

Since the mid 1990s (particularly in the time period covered by the data used in this study) there have been few policy changes that could be expected to substantially change the senior income distribution. The benefit calculation rules and amounts for CPP, OAS and GIS have not changed substantially.[4] Contributions to registered (employer-provided)

[3]Individuals started contributing to C/QPP in 1966. Monthly benefits amounts are based on the individuals' earnings history and are designed to replace up to 25% of their average annual earnings from the age of 18, or 1966, until age 65. In 1984 QPP was expanded to allow for early retirement with reduced benefits. CPP's expansion followed in 1987. Note that Baker and Benjamin (1999) found the introduction of early retirement benefits did not have any effect on older men's labour market attachment.

[4]In 1997 there were some changes to C/QPP in the way average incomes were evaluated to reflect current

pension plans (RPP) are tax deductible in Canada. Withdrawals from RPPs are taxable. A $1000 federal non-refundable tax credit for RPP income was increased to $2000 in 2006.[5] In Canada, most pension plans have been defined-benefit plans although the portion of plans taking the form of defined contribution plans has been rising steadily.[6] Typically, the savings held in a defined contribution plan must eventually be transferred into a Registered Retirement Income Fund for interest to maintain tax-exempt status. Until 2006, this had to be done the year an individual turned 69 years old. The age was increased to 71 in 2007. Once placed in the RRIF, there are minimum and maximum withdrawal limits that must be met for the interest to remain in tax-free status.

In addition to RPPs, Canadians can hold savings in Registered Retirement Savings Plan (RRSP). Contributions to RRSPs are tax deductible in the year of contribution with taxes paid in the year savings are withdrawn. Further, interest accrued remains tax exempt until withdrawn. Similar to RPPs, individuals must convert their RRSP to a RRIF in the year they reach age 69 (until 2006, and age 71 in 2007 and later).

2.2. Changes in the nature of women's retirement

One of the most significant developments in the labour market over the past few decades has been the changing nature of labour market activity among women. Participation rates of Canadian women increased dramatically over the past 50 years, reaching 75% in 2007 (see

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prices that effectively reduced benefit by a small amount. These changes were phased in 1997-1999.

[5]Pension income splitting was introduced in Canada for the 2007 tax year.

[6]In the late 1970s, more than 35% of the Canadian Labour force were covered by defined benefit pension plans while in 2006 only 26% were covered by defined benefit plans Milligan and Schirle (Forthcoming). In contrast, only 2% of the labour force were covered by defined contribution plans in 1976 and 5% were covered in 2006.

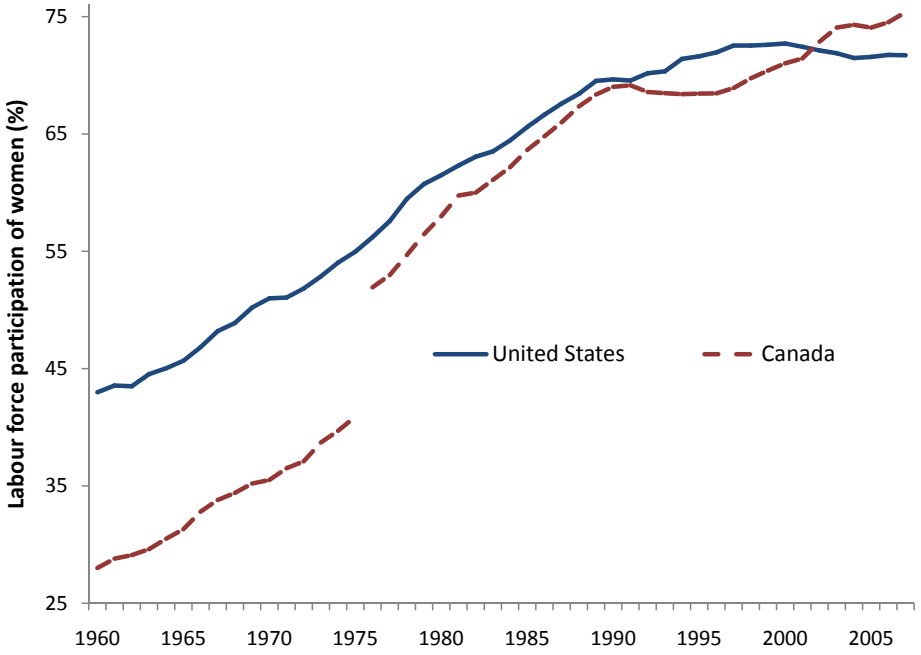

Fig. 2.— Labour Force Participation of Women 1960-2007
Source: OECD Stat. Labour force participation rates, Women, Total, Annual for US and Canada 1976-2007, and Historical Statistics of Canada Series D431-448 for Canada 1960-1975. Major revisions to the Canadian Labour Force Survey were introduced 1976.

figure 2).[7]

As women became more attached to the labour force, their labour supply has also become less elastic over time. For example, Blau and Kahn (2007) use data from the March CPS (1980-2000) and found that women's own-wage elasticities fell by 50-56%. Their cross-wage elasticities also fell, by 38-47% over the period. Morissette and Hou (2008) use the Canadian Census 1980-2000 to examine changes in women's labour elasticities and while their estimates aren't as conclusive, the evidence suggests women's own-wage and cross-wage elasticities have fallen over time in Canada as well.[8]

[7]Trends are similar for the United States, although US women's participation reached a 'plateau' after the mid 1990s not observed in Canada.

[8]Morissette and Hou (2008) have focussed on demonstrating some of the problems with using microdata.

We should expect these changes in labour force activity to start appearing as changes in the nature of retirement with the most recent cohort of women entering retirement. Consider that the women born in 1930 would have been 30 years old by 1960 when the birth control pill was introduced and then they reach age 65+ for the mid 1990s. This is the last cohort of women who didn't really have access to the birth control pill. The 1940 birth cohort, on the other hand, was only 20 years old when the pill was introduced, giving them more control over fertility and more choice for the labour market. These women are entering the 65+ group by 2006.[9] Bailey (2006) has linked the legalization of the birth control pill in the United States to higher participation of women in the labour force. Goldin and Katz (2002) have shown that the US introduction of the birth control pill led to later first marriage among college women and greater representation of women in professional occupations. As women have become more attached to the labour force we should expect women's income to become a larger share of the family income - including retirement income as women gain greater access to pensions and savings.

2.3. Previous literature

Previous studies have demonstrated the importance of changes in women's labour market outcomes and other family characteristics for the income distribution. In Canada and the U.S., large increases in family earnings inequality were documented for the 1980s. Using the DiNardo et al. (1996) decomposition methodology, Fortin and Schirle (2006) have shown that increases in female labour force participation in the 1980s and 1990s acted to offset the observed increases in family earnings inequality in Canada. Daly and Valletta (2006) have also found that increases in women's participation (in the U.S.) reduced dispersion in family

[9]The introduction of the birth control pill is not the only change taking place for these cohorts. Fortin (2005) provides evidence that individual attitudes toward the roles of women play an important role. Fernandez (2007) also points to technological changes, changes in divorce law, decreases in discrimination and the greater availability of child care as potentially influencing women's labour market decisions.

equivalent income. This in part reflected the greater tendency for single women to work relative to married women in families with a male earner present. Among married couples, Fortin and Schirle (2006) and Daly and Valletta (2006) found an increase in assortative mating as married women with higher earnings found themselves more likely to have husbands with high earnings. This trend was among the factors driving increases in inequality, as well as changes to men's wage structure and changes in family structure (such as an increase in the portion of families headed by single parents).

Lu et al. (2009) have extended the Fortin and Schirle (2006) study to examine more recent trends in family earnings inequality in Canada (1980-2005). Interestingly, there is some decrease in earnings inequality among families (with heads age 16-64) over the 1995-2005 period. Their results suggest that increases in men's and women's employment, and increases in eduction levels will have an equalizing effect. In contrast, increases in the returns to higher education for men and women, increases in assortative mating and an increase in the portion of lone parent families will lead to increases in inequality.

Few studies have examined which factors drive changes in the senior income distribution. Though Myles (2000) examined the decline in income inequality among seniors into the mid 1990s, the methodology limits the analysis to assessing changes in the composition of seniors' income. Furthermore, the methodology Myles (2000) uses does not allow for an examination of characteristics that might influence income.

A key contribution of this study, then, is to provide new insights into the changing incomes of seniors. Previous studies have not identified the role played by changes in women's labour market experience or the extent to which various changes in the income sources or characteristics of seniors affect incomes across the income distribution.

3. Data and Measurement

3.1. SLID

The primary data source for this project is the Survey of Labour and Income Dynamics, specifically the years 1996 and 2006. I define seniors' income as the sum of after-tax income (based on Statistics Canada's definition) and RRSP withdrawals. After tax income includes all market income (including wages, registered pension plans, registered retirement income funds, investment income and government transfers including OAS, CPP/QPP benefits).[10] RRSP withdrawals are included since they must be converted to RRIFs at age 69 and are thus not easily separated from other forms of retirement income. In section 6 I show the results are robust to the exclusion of RRSP withdrawals as income. Unfortunately, the survey does not report information for other forms of wealth.[11]

Senior married couples are defined as married seniors whose oldest member is between the ages of 65 and 79.[12] The oldest member is chosen rather than the more traditionally

[10] As a definition of after-tax income:

> Market income includes earnings plus other market income, which comprises investment income, pension income, alimony income, and other taxable income. Total income is the sum of market income and government transfer income. Government transfer income includes income from the Child Tax Benefit, Old Age Security and Guaranteed Income Supplement/Spousal Allowance, Social Assistance and Provincial Income Supplements, Employment Insurance Benefits, Worker's Compensation Benefits, Canada/Quebec Pension Plan Benefits, and the Goods and Services Tax Credit. After-tax income is total income minus federal and provincial income taxes paid. – Skuterud et al. (2004)

[11] For example, most seniors hold most of their wealth in their primary residence. Sale of that residence, or drawing down other forms of more liquid wealth, would not count as income although the wealth represents potential consumption.

[12] Note that the economic family has not been chosen as the unit of observation and this could lead to misleading results. If, for instance, it were the case that senior couples' incomes declined dramatically so

defined 'head' based on the major income earner because many income sources for seniors - particularly OAS and GIS - are based on the age of the oldest member. When sampling, I exclude any couples for which key variables and demographic information is missing.[13] I further exclude any couples whose income is greater than $275,000 (2006 dollars)

In this study, I have chosen not to look beyond married couples for practical reasons. In the decomposition methods described in section 4, regressions will require measurement of both men's and women's characteristics in order to evaluate their importance as factors influencing the income distribution. To note, a preliminary investigation of all elderly census families (which would include widows, divorcees, and those never-married) results in similar shifts in the income distribution.[14] We might expect increases in longevity to reduce the portion of widows in this group and in turn this would affect the family income distribution. However, there were not significant effects of changes to family type on the senior income distribution.

One limitation of using SLID is that any individuals over age 69 are asked for only limited labour market information. Thus, measures of income are used to reflect some aspects of labour market activity. Employment is defined as having positive earnings in the year. This will include wage and salary income as well as self-employment income. Note that the results are robust to defining employment using only wage and salary income (see section 6). Access to pensions is defined as having positive pension income which includes income from RPP, RRIF and RRSP withdrawals. Note that the results are robust to defining private pension access using only RPP and RRIF income (see section 6). The measurement of RPP and RRIF income can not be separated in this survey. Similarly, access to CPP/QPP indicates

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that seniors have moved in with their children, we could actually observe an increase in the seniors' economic family incomes.

[13]Exclusions are made for missing employment, pension, CPP/QPP, education, age, FTFY experience, geographic variables, health, immigration status and number of children.

[14]Census families include never married children living with their parents.

positive CPP/QPP income. This is not measured perfectly either, as this could include CPP/QPP survivor benefits paid to former widows.

Education variables are a set of dummy variables indicating the highest level of education completed by the individual. Education is coded into five categories including (i) grade 8 or less, (ii) less than high school completion (iii) high school graduation, (iv) post-secondary less than university degree, and (v) university degree.

One of the main advantages to using SLID is the inclusion of a variable for years of full-time full-year (FTFY) work experience. This is particularly important when measuring changes in labour market activity for women, as potential experience may not capture activity over a lifetime as well as it does for men. Unfortunately, there is some measurement error as individuals are not asked the series of question used to impute this value if they have never worked full time. As such, a woman who has worked every year as a part-time worker would have zero FTFY experience. Further, there are quite a few observations that were unable to provide answers to all the questions required to impute FTFY experience that are dropped from the sample.[15] As noted in section 6, the general results are robust to including those observations.

Several other variables are created based on characteristics reported in SLID. An dummy variable for poor health indicates a person has self-reported their health as poor rather than fair, good, very good or excellent. A dummy variable is created indicating an individual is an immigrant. Dummy variables also indicate province of residence and urban or rural residency. We are also able to measure the number of children born to, adopted by, or raised by the couple. Since this number could differ for each spouse, the maximum number of children reported by the husband or wife is used. In earlier years of the SLID, the age at which a person's first child is born is only recorded for women and is missing for many

[15] In 1996, there are 2407 observations without making the exclusion for FTFY experience. In 2006, there are 1693 observations without making the exclusion for FTFY experience.

observations. I also only measure age of first marriage for women, which is also missing for many observations. Finally, I also create an indicator for whether there is a single generation in the economic family.

3.2. Changes in the distribution of income

It is well known that the distribution of income among seniors tends to be much more narrow than the income distribution of younger families. As high income individuals leave employment and begin collecting pensions, their incomes tend to be lower. As low income individuals become eligible for the income security benefits associated with OAS and GIS, their income may increase.

The kernel density estimates of senior couples's log after tax income in 1996, 2001 and 2006 are provided in Figure 3, with the relevant descriptive statistics and inequality measures provided in Table 1. The density estimates show a gradual shift in the distribution over time as well as a clear widening of the distribution, particularly between 2001 and 2006. From 1996-2006, the 10th percentile of income increased by 11.5% to $26,405 in 2006. The 10th percentile of income is not much more than the level of income guaranteed by the Canadian income security programs. In December of 2006, a married couple over the age of 65 could receive a maximum of $21,299 from OAS and GIS if they had no other income available to them.

Those seniors in the top half of the income distribution saw their incomes increase by much more than those in the bottom half. The median senior couples' after tax income increased by 23% and the 90th percentile increased 20.7%. Given the much larger increase in the top half of the distribution, most measures of inequality also increased. In 2006, the log of the ratio of the 90th percentile to the 10th percentile (the 90-10 differential) was 1.1, an increase of 8 log points since 1996. The 50-10 differential similarly increased, from .395 in 1996 to .495 in 2006 - an increase of more than 25%. The 90-50, on the other hand,

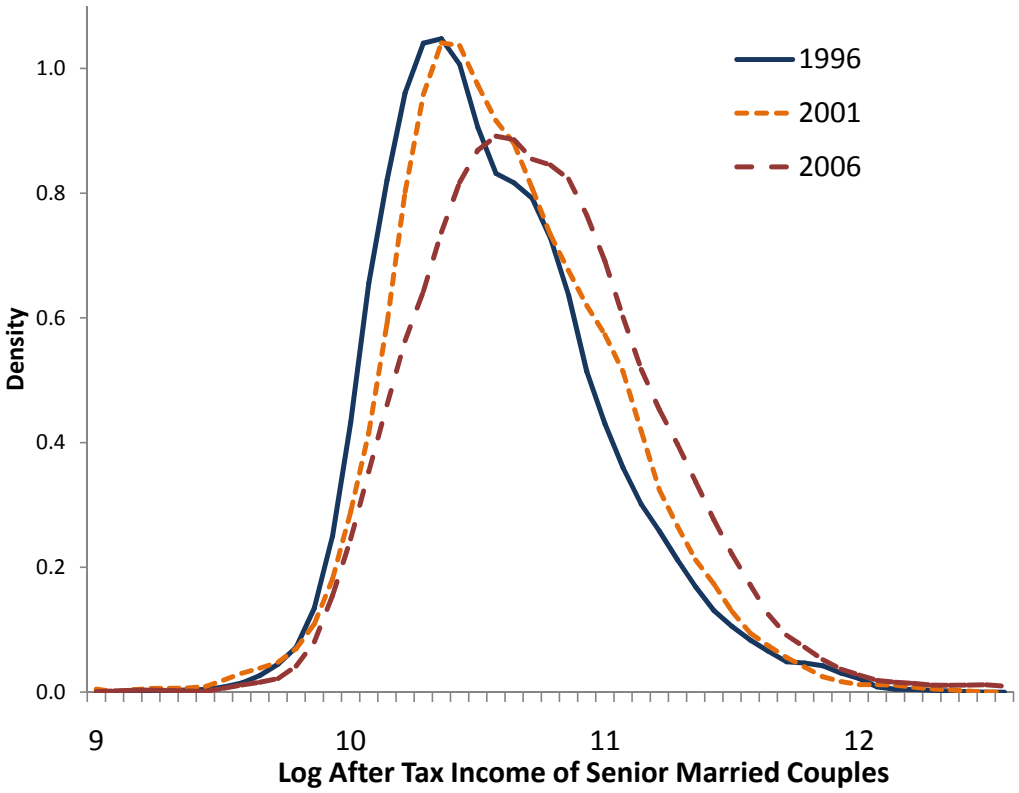

Fig. 3.— Distribution of Elderly Couples' Log After Tax Income
Kernel density estimates of senior couples' after tax income, which includes RRSP withdrawals. The sample includes married couples whose oldest member is age 65-79.

decreased slightly as incomes at the top of the distribution increased a bit less than the middle. Given these different shifts in the distribution, the Gini coefficient increased only slightly, from 0.250 in 1996 to 0.255 in 2006.

3.3. Changes in Seniors' income sources and characteristics

What might explain the changes in the seniors' income distribution? In Tables 2-6, the income sources and characteristics of senior married couples in the baseline sample are summarized, demonstrating how various characteristics have changed across the income distribution.

To begin, there has been a large increase in the employment rates of senior men and

Table 1. Distribution of Senior Couples' After Tax Income

	1996	2006	% Change
Mean	40998	49929	21.8
Std. Dev.	20887	26426	26.5
Percentiles			
5	21298	23416	9.9
10	23678	26405	11.5
25	27686	32649	17.9
50	35141	43301	23.2
75	47676	58801	23.3
90	65866	79477	20.7
95	78608	95323	21.3
Log Difference			
90-10	1.023	1.102	7.7
90-50	0.628	0.607	-3.3
50-10	0.395	0.495	25.3
Gini	0.250	0.255	2.1
Sample size	1719	1409	

Note. — All amounts are in 2006 dollars. After tax income includes RRSP withdrawals. Sample includes married couples whose oldest member is age 65-79. See section 3 for sample details.

Table 2. Senior Couples' After Tax Income: Portion of families receiving each source

	All	< 25th P.	25th-75th P.	> 75th P.
1996				
Sample size	1719	446	868	405
Wives' Income Sources:				
Earnings	0.17	0.06	0.17	0.29
Wages and Salary	0.13	0.02	0.13	0.24
RPP, RRIF	0.25	0.05	0.27	0.41
RPP, RRIF, RRSP	0.28	0.06	0.31	0.43
CPP/QPP	0.56	0.38	0.60	0.65
Husbands' Income Sources:				
Earnings	0.21	0.10	0.20	0.31
Wages and Salary	0.11	0.03	0.11	0.19
RPP, RRIF	0.66	0.30	0.75	0.83
RPP, RRIF, RRSP	0.66	0.30	0.75	0.83
CPP/QPP	0.94	0.86	0.99	0.95
2006				
Sample size	1409	370	687	352
Wives' Income Sources:				
Earnings	0.28	0.17	0.23	0.48
Wages and Salary	0.22	0.12	0.18	0.40
RPP, RRIF	0.43	0.18	0.50	0.53
RPP, RRIF, RRSP	0.47	0.20	0.54	0.58
CPP/QPP	0.73	0.62	0.82	0.67
Husbands' Income Sources:				
Earnings	0.35	0.21	0.33	0.52
Wages and Salary	0.25	0.13	0.24	0.41
RPP, RRIF	0.74	0.46	0.84	0.80
RPP, RRIF, RRSP	0.74	0.48	0.84	0.80
CPP/QPP	0.95	0.91	0.97	0.94

Note. — Sample includes married couples whose oldest member is age 65-79. See section 3 for sample details.

women. The increase is most pronounced for senior men and women in the very top and bottom ends of the income distribution. In 1996, 29% of women in families with income above the 75th percentile reported positive earnings, increasing to 48% in 2006. Women in lower income families (below the 25th percentile) also became more likely to be employed, with 17% of women reporting positive earnings in 2006, an increase of 11 percentage points. Slightly larger increases in employment are observed for high income men, with the portion reporting positive earnings increasing by up to 21 percentage points over the period. The difference between the portion of families reporting earnings vs. wages would indicate there has not been a large increase in self-employment over this period and the self-employed are fairly evenly distribution across the senior income distribution with only slightly more in the top of the distribution.

There have been very large increases in individuals' access to employer-provided pensions, as the portion of wives and husbands reporting positive RPP, RRIF and RRSP income increased from 1996-2006. Middle income senior women saw the most remarkable increase in pension access, as 54% of middle income women had pensions up from 31% in 1996. Note that RRSPs were not driving this increase. For men, the largest increases in pension access were found in lower income families. In 2006, 48% of men had access to pension income, up from 30% in 1996.

For men, there has been no substantial change in access to CPP/QPP benefits over the decade. For women, however, large gains in access were made for those in the poorest families. In 2006, 62% of low income senior wives reported CPP/QPP income, up from only 38% in 1996. Women in middle income families had the greatest access to CPP/QPP, as 82% reported positive CPP/QPP in 2006 up 22 percentage points from 1996.

The education levels of husbands and wives have increased substantially for the seniors studied here, and we should expect this to play an important role as this is a key factor in determining earnings and activity over an individual's lifetime. All married men and women have seen increased educational attainment, with increases most noticeable for low income

Table 3. Senior Couples' Characteristics, 1996

	All	< 25th P.	25th-75th P.	> 75th P.
Wives				
Education				
Grade 8 or less	0.34	0.52	0.35	0.14
Some high school	0.21	0.20	0.23	0.18
High school graduate	0.17	0.14	0.16	0.22
Post-secondary	0.24	0.11	0.24	0.36
University degree	0.04	0.03	0.02	0.11
Age	65.96	65.08	66.48	65.80
Years FTFY experience	15.96	10.47	15.70	21.95
Poor health	0.07	0.05	0.09	0.05
Immigrant	0.29	0.35	0.26	0.29
Age - first birth[a]	24.43	22.96	24.70	25.45
Age - first married[a]	23.35	21.90	23.28	24.90
Married more than once[a]	0.10	0.07	0.08	0.17

Note. — (*a*) These variables were not reported for the full sample used here. Sample (N=1719) includes married couples whose oldest member is age 65-79. See section 3 for sample details.

Table 4. Senior Couples' Characteristics, 1996

	All	< 25th P.	25th-75th P.	> 75th P.
Husbands				
Education				
Grade 8 or less	0.39	0.62	0.39	0.14
Some high school	0.19	0.17	0.20	0.19
High school graduate	0.12	0.08	0.11	0.19
Post-secondary	0.21	0.10	0.24	0.26
University degree	0.09	0.03	0.06	0.21
Age	69.70	69.73	69.86	69.36
Years FTFY experience	42.25	38.34	43.84	42.97
Poor health	0.07	0.09	0.08	0.03
Immigrant	0.29	0.34	0.24	0.34
Married more than once	0.11	0.08	0.09	0.18
Family				
Number of children	3.61	4.29	3.49	3.17
Urban	0.81	0.71	0.82	0.88
Single generation[a]	0.78	0.70	0.79	0.83

Note. — (*a*) These variables were not reported for the full sample used here. Sample (N=1719) includes married couples whose oldest member is age 65-79. See section 3 for sample details.

men and women (for whom the portion with grade or less fell by 23 and 13 percentage points respectively) and high income men and women (for whom the portion with a university degree increased by 13 and 15 percentage points). The completion of university for lower income senior men is also notable, increasing from 3% in 1996 to 8% in 2006.

The full-time full-year work experience of men has not changed much over time. There has actually been a slight decrease in experience - from 42 years in 1996 to 39 years in 2006 - that reflects increases in educational attainment. For women, there has been a clear increase in full time work experience - increasing from 16 years in 1996 to 19 years in 2006. That increase appears slightly larger for women in the lower half of the income distribution.

On average, the health of seniors appears to have improved slightly as fewer report being in poor health. There is, however, a increased likelihood of reporting poor health among lower income men and women. In 1996, 9% of lower income men and 5% of lower income women reported poor health. By 2006 this had increased to 12% of men and 8% of women reporting poor health. There is a well-documented relationship between income and health and this difference across the senior income distribution may reflect a cumulative effect of income on individual health (see Buckley et al. 2004). Although the mechanism driving the relationship between income and health is not clear, we might expect these changes in health status to hurt incomes at the bottom of the income distribution.

There has been little change in the portion of senior couples represented by immigrants, with some decrease over the 1996-2006 period. The interesting change for immigrants is that they are more evenly distributed across the income distribution by 2006.

Perhaps surprisingly, there is actually a small reduction in the age at which women are first married and the age at which they have their first child. Total fertility, however, had fallen as families had fewer children. In 1996, senior families reported having 3.6 children. In 2006, this fell to 3.12 children with the largest decrease in fertility occurring for the lowest income seniors. We might expect that having fewer children would raise senior incomes as more of their income could be saved. With fewer children, there are more senior couples living

Table 5. Senior Couples' Characteristics, 2006

	All	< 25th P.	25th-75th P.	> 75th P.
Wives				
Education				
Grade 8 or less	0.21	0.39	0.19	0.05
Some high school	0.18	0.23	0.22	0.07
High school graduate	0.18	0.15	0.18	0.20
Post-secondary	0.34	0.19	0.36	0.45
University degree	0.10	0.04	0.05	0.24
Age	66.00	65.95	66.93	64.19
Years FTFY experience	18.96	14.44	19.17	23.06
Poor health	0.05	0.08	0.06	0.03
Immigrant	0.24	0.23	0.25	0.23
Age - first birth[a]	24.09	23.32	24.10	24.90
Age - first married[a]	22.73	21.80	22.64	23.81
Married more than once[a]	0.14	0.14	0.13	0.17

Note. — (*a*) These variables were not reported for the full sample used here. Sample (N=1409) includes married couples whose oldest member is age 65-79. See section 3 for sample details.

Table 6. Senior Couples' Characteristics, 2006

	All	< 25th P.	25th-75th P.	> 75th P.
Husbands				
Education				
Grade 8 or less	0.21	0.39	0.21	0.05
Some high school	0.15	0.17	0.17	0.10
High school graduate	0.13	0.12	0.13	0.13
Post-secondary	0.34	0.24	0.37	0.36
University degree	0.17	0.08	0.13	0.36
Age	69.70	69.52	70.14	69.00
Years FTFY experience	39.24	37.21	40.03	39.65
Poor health	0.06	0.12	0.05	0.04
Immigrant	0.27	0.28	0.29	0.24
Married more than once[a]	0.15	0.12	0.12	0.22
Family				
Number of children	3.12	3.67	3.06	2.72
Urban	0.75	0.63	0.78	0.79
Single generation[a]	0.84	0.82	0.84	0.87

Note. — (*a*) These variables were not reported for the full sample used here. Sample (N=1409) includes married couples whose oldest member is age 65-79. See section 3 for sample details.

without relatives. In 2006, 84% of senior couples lived in an economic family representing a single generation, up from 78% in 1996. We would expect this to be a result of high incomes generally - either seniors plan for higher incomes in retirement as they may be expected culturally to fend for themselves, or they are simply able to fend for themselves as a result of having higher incomes and would prefer not to live with their children.

4. Decomposition Methodology

I use the decomposition procedure recently proposed by Firpo et al. (2007). Closely following their description of the procedure and notation, in this section I briefly outline these methods as it is applied to the distribution of seniors' income. The decomposition has two stages. In the first stage, changes in the income distribution are divided into a composition effect (reflecting how changes in employment rates, pension access and characteristics affect the income distribution) and an income structure effect (reflecting changes in the way that employment, pension access, and characteristics translate into income for the married couples). These are comparable to the total effect of endowments and coefficients in a standard Oaxaca-Blinder decomposition, respectively. In the second stage, composition effects are further divided into the separate contributions of each spouse's employment, pension access, and characteristics.

4.1. Total Composition and Income Structure Effects

The first stage of the decomposition requires estimating weighting functions that will be used to create various distributional statistics. Denote the distributional statistics for 1996 and 2006 as ν_0 and ν_1 respectively. The counterfactual distributional statistics ν_C represent the income distribution that would have prevailed under the income structure of 1996, but with the characteristics of couples in 2006.

Estimation of these distributional statistics requires appropriate weight be placed on

observations in each sample. Following the work of DiNardo et al. (1996), these weights are found by multiplying the following functions by the sample weights provided in the survey data:

$$\hat{\omega}_0(T) = \frac{1-T}{1-\hat{p}}, \qquad \hat{\omega}_1(T) = \frac{T}{\hat{p}} \tag{1}$$

$$\hat{\omega}_C(T,X) = \frac{1-T}{\hat{p}} \cdot \frac{\hat{p}(X)}{1-\hat{p}(X)} \tag{2}$$

where $T = 1$ for observations in 2006, $T = 0$ for observations in 1996, $\hat{p}$ is the estimator of unconditional probability that $T = 1$, and $\hat{p}(X)$ is the estimator of the probability of $T = 1$ given X.[16] In this case, where the use of SLID requires that sample weights ω_s must be used, $\hat{p}$ is simply estimated as

$$\hat{p} = \frac{\sum_{i=1}^{N} \omega_{si} T_i}{\sum_{i=1}^{N} \omega_{si}}. \tag{3}$$

For the conditional probability $\hat{p}(X)$, a logit model is used. In the baseline specification, covariates include husbands' and wives' education, age, years experience, and indicators for employment income (earnings), pension income (RPP, RRIF, RRSP), and CPP/QPP income. The resulting weights, obtained by multiplying the above weighting functions by the sample weights, are then normalized to sum up to one.[17] Denote the normalized weights as $\hat{\omega}_0^*$, $\hat{\omega}_1^*$ and $\hat{\omega}_C^*$.

The distributional statistics can then be estimated and used to estimate income structure and composition effects. The overall change in the estimated distributional statistic $\hat{\Delta}_O^{\nu}$ may be written

$$\hat{\Delta}_O^{\nu} = \hat{\nu_1} - \hat{\nu_0} \tag{4}$$

$$= (\hat{\nu_1} - \hat{\nu_C}) + (\hat{\nu_C} - \hat{\nu_0}) = \hat{\Delta}_S^{\nu} + \hat{\Delta}_X^{\nu}. \tag{5}$$

[16] The cross-section weights provided by SLID (icswt26) are used in this study.

[17] Prior to normalizing the weights, I 'winsorize' the counterfactual weights (ω_C) by replacing large values with the maximum of the 1996 weights.

The first term in (5) represents income structure effects and the second term in (5) represents composition effects.

4.2. RIF regressions and the contribution of covariates

The second stage of the decomposition further divides the composition effects into the contributions of each factor.[18] Just as a Oaxaca-Blinder decomposition provides a procedure to decompose changes in the mean into the contributions of each factor to composition and income structure effects, the innovations in Firpo et al. (2007) allow us to do the same for any distributional statistic. Central to this method, rather than estimating the effect of each covariate on senior couples' income directly, I estimate the effect of each covariate on the distributional statistic of interest.

To begin, I estimate recentered influence function (RIF) regressions for each decile describing the income distribution (ν_0 and ν_1).[19] This unconditional quantile regression method was proposed in Firpo et al. (2009). First, an estimate of the influence function for each decile is found and then rescaled (recentered). This recentered influence function (RIF) - which has an expected value equal to the distributional statistic of interest - then becomes the dependent variable in a regression of RIF on the covariates. Denote the resulting regression coefficient estimates as $\hat{\gamma}_0^\nu, \hat{\gamma}_1^\nu$ and $\hat{\gamma}_C^\nu$.

We can then decompose the effect of changes in the characteristics from 1996 to 2006

[18]While it is possible to also decompose the income structure effects, I have not done so here as the resulting structure effect presented in the next section is close to zero as is the contribution of each factor. Further, decomposition of structure effects faces the same identification problems as the standard Oaxaca-Blinder decomposition.

[19]The RIF-Regression Stata ado file used for this study has been made publicly available by Nicole Fortin at http://www.econ.ubc.ca/nfortin/rifreg.zip.

(composition effects) on the distributional statistic as

$$\hat{\Delta}_X^{\nu} = \left(\sum_{i=1}^{N} \hat{\omega}_1^*(T_i) \cdot X_i\right) \cdot \hat{\gamma}_C^{\nu} - \left(\sum_{i=1}^{N} \hat{\omega}_0^*(T_i) \cdot X_i\right) \cdot \hat{\gamma}_0^{\nu} \quad (6)$$

In theory, the coefficients γ_C and γ_0 are the same. In practice, of course, they are not. Here, I have used an average estimated coefficient over the two groups (counterfactual and 1996) as an estimate in the decomposition of composition effects (see, for example, Jann (2008) for a more detailed discussion of choosing a coefficient).[20]

5. Decomposition Results

I begin by presenting the overall composition and structure effects that result from the first stage of the decomposition. Results show that composition effects are driving nearly the entire change in the distribution of senior income. I then further examine the composition effects and present the contribution of each factor to changes in the income distribution.

5.1. Baseline - First Stage Results

The resulting log after tax income distributions for 1996, 2006 and the counterfactual are presented in Figure 4, with distribution statistics reported in Table 7. A graphical representation of the results for income deciles is provided in Figure 5.

In figure 4, the difference between the 1996 distribution and the counterfactual distribution represents the overall composition effect. The difference between the 2006 distribution and the counterfactual distribution represents the income structure effect. Graphically, the greater importance of composition effects for the 1996-2006 changes in the income distribution is obvious.

[20]In studies of discrimination, it is recommended that researchers choose coefficients for the 'nondiscriminating' group when evaluating composition (endowment) effects. It not clear that the 1996 coefficients should be used to represent the 'nondiscriminatory' parameter vector.

Table 7. Decomposition Results: Log After Tax Income of Senior Couples

	1996	2006	Counter.	Total	Structure	Composition
Percentiles						
10	10.072	10.181	10.152	0.109	0.030	0.079
20	10.180	10.336	10.306	0.156	0.030	0.127
30	10.284	10.467	10.425	0.183	0.042	0.141
40	10.371	10.557	10.545	0.187	0.012	0.174
50	10.467	10.676	10.658	0.209	0.018	0.191
60	10.593	10.797	10.742	0.204	0.056	0.149
70	10.715	10.914	10.897	0.199	0.016	0.183
80	10.858	11.073	11.052	0.215	0.020	0.195
90	11.095	11.283	11.249	0.188	0.034	0.154
Inequality Measures						
Log Difference						
90-10	1.023	1.102	1.098	0.079	0.030	0.075
90-50	0.628	0.607	0.591	-0.021	0.030	-0.037
50-10	0.395	0.495	0.507	0.100	0.042	0.112
Gini	0.250	0.255	0.257	0.005	0.012	0.007

Note. — The counterfactual distribution statistics represent the 1996 distribution of income that would have prevailed had couples' characteristics looked as they did in 2006. Structure effects are the difference between the 2006 statistics and the counterfactual statistics. Composition effects are the difference between the 1996 statistics and the counterfactual statistics. See equation 5. Results are for the baseline sample, see section 3 for details.

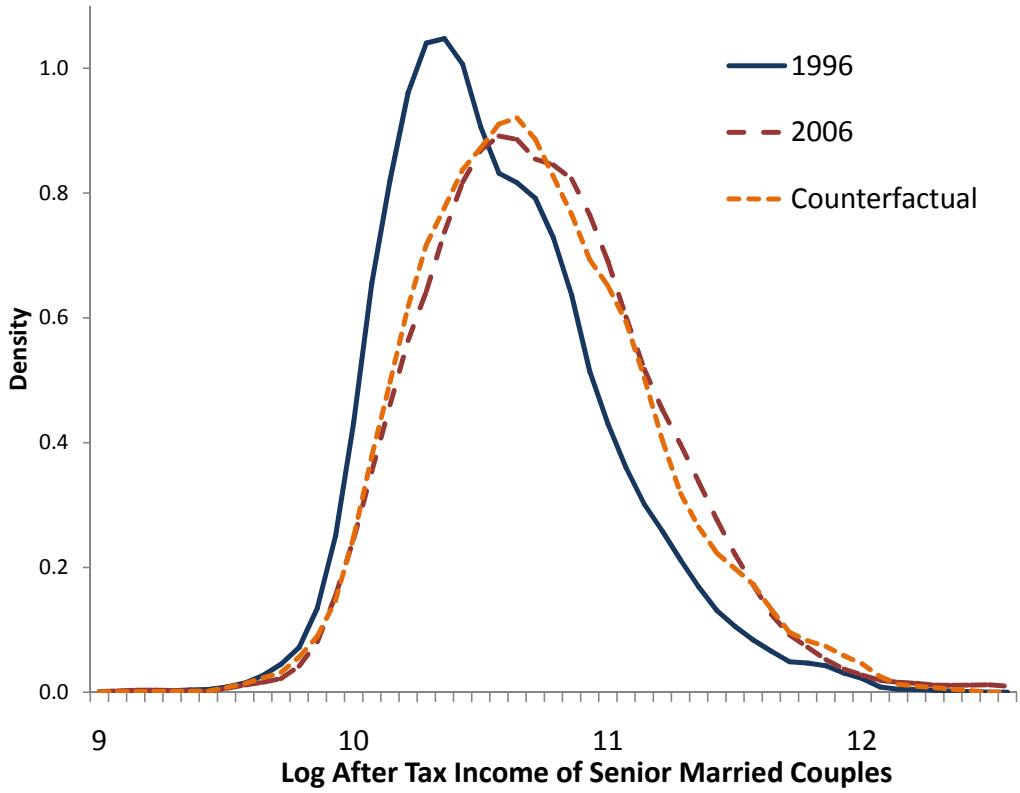

Fig. 4.— Decomposition of 1996-2006 Changes in Elderly Couples' Log After Tax Income
Kernel density estimates of senior couples' after tax income, which includes RRSP withdrawals. The sample includes married couples whose oldest member is age 65-79. The counterfactual density represents what the 1996 distribution of income would be if the characteristics of older couples were as in 2006. The difference between the counterfactual distribution and the 2006 distribution reflects how the parameters describing the structure of income have changed over time.

The composition effects on each decile are reported in Figure 5. The results show that 82% of the total change in log after tax income at the 90th percentile can be attributed changes in the characteristics of seniors (ie. 0.154/0.188, recall the baseline specification presented here includes employment, pension access, CPP/QPP access, education, age and FTFY experience as covariates). Similarly, 72% of the total change in log after tax income at the 10th percentile can be attributed to composition effects. At the median, 92% of the change in log after tax income is attributed to composition effects.

Overall income structure effects, on the other hand, are small and do not increase with each decile as we might expect. As is discussed more in section 6, the small income structure

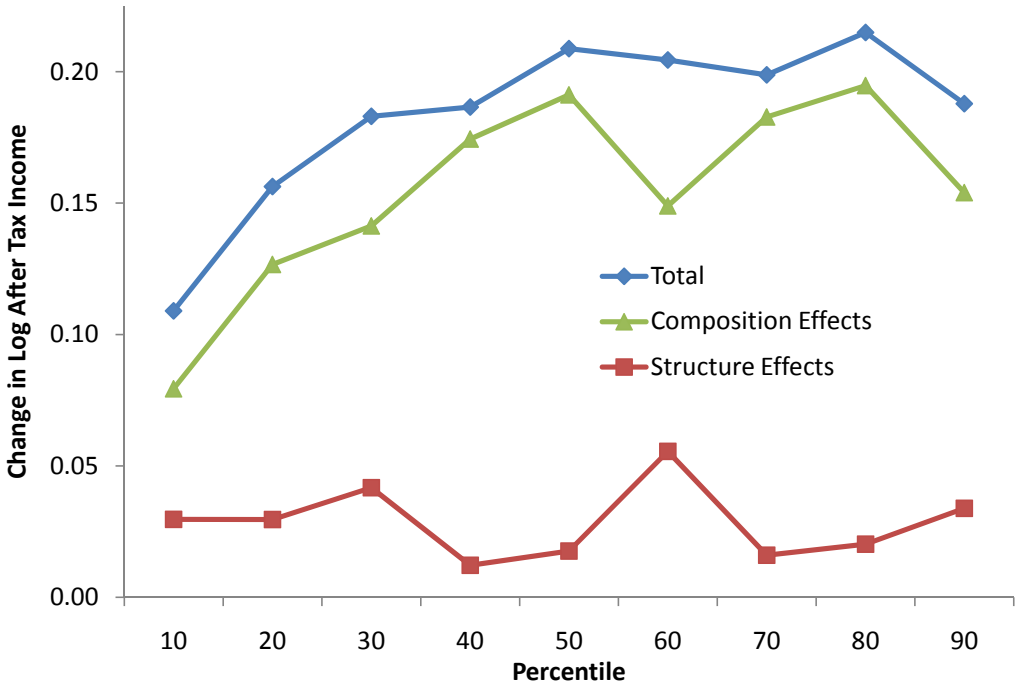

Fig. 5.— Decomposition of 1996-2006 Changes in Elderly Couples' Log After Tax Income
Alternate representation of the results presented in Figure 4 and Table 7

effects found here are robust to specification. As further investigation of the income structure effects would be complicated by the identification problems mentioned in the previous section, and the income structure effects are so small, I do not further decompose these effects in the following section. Rather, I have chosen to focus on further decomposing the composition effects.[21]

[21] A decomposition of income structure effects was conducted and the effect of each covariate is insignificant. Results are available from the author upon request.

5.2. Baseline - Second Stage Results

The RIF (unconditional quantile) regression results for the 10th, 50th, and 90th percentiles are presented in Table 8.[22] The decomposition results based on these regressions are provided in Table 9 and Figure 6. A decomposition of the composition effects for inequality measures is then provided, with regression results in the last two columns of Table 8 and decomposition results in Table 10 and Figure 9.

Consider first the importance of women's employment for senior couples' after tax income. The unconditional quantile regression results in Table 8 tell us that if we increased the proportion of women working (receiving earnings) by ten percentage points, the 10th percentile of income would increase by 1.2-1.5 percent. For the same increase in women's employment rates (10 percentage points), the 90th percentile of income would increase by 2.2-2.6 percent. As such, a general increase in women's employment should result in an increase in incomes and income inequality. Recall from Table 2 that the overall likelihood of women to be employed rose by 11 percentage points, with the largest increases among women in high income families. The decomposition results in Table 9 and Figure 6 show that increased women's employment drove increases in senior couples' incomes, driving larger increases in the middle of the income distribution and having the smallest effect on the bottom. The decomposition of inequality measures corresponds to this, with women's employment driving an increase in the 90-10 and 50-10 differentials and a small increase in the Gini coefficient.

When interpreting this result, it is important to recognize that the increase in wives' employment in part captures an increase in the employment among near-retiree women (under 65). In the sample of senior couples, 36% of wives are under age 65 and their employment rate increased from 34% to 49% over the 1996-2006 period. The older wives

[22]RIF regression results for other deciles are omitted here for space considerations, and are available from the author upon request.

also saw large increases in employment, however, as the employment rate of wives age 65-69 increased from 12 to 20% and the employment rate of wives age 70-79 increased from 3 to 9%. To note, when the decomposition is repeated for each subsample (couples where wives are under 65 and couples where wives are 65 or older), changes in employment remains an important factor for explaining increases in income across the senior income distribution.[23]

A larger part of increases in income and inequality can be attributed to women's greater access to private pensions. As women's pension access increased by nearly twenty percentage points, the unconditional quantile regression results suggest this increase should lead to fairly large increases in median senior couples' incomes (of roughly 4%). The decomposition results suggest that increased pension access had the largest effect on the middle of the income distribution, driving .03 of the increase in log income at the 50th percentile and having similar effects on the 30th and 40th percentiles. This, in turn, implies that a large part of the increase in the 50-10 differential can be attributed to increases in women's access to pensions. Women's pension access also explains some of the increase in the 90-10 and Gini coefficient. Increased pension access also helped drive the decrease in the 90-50 differential.

Increases in women's access to CPP/QPP can be expected to benefit those at the bottom of the income distribution the most. The unconditional quantile regression results suggest a 10 percentage point increase in women's access to CPP will raise the 10th percentile of senior incomes by roughly one percent. There is no significant effect, however, on the 90th percentile of senior income. As women's access to CPP/QPP rose by 17 percentage points, the decomposition shows how this increase raised incomes at the bottom and middle of the distribution with no effect on high income seniors. As such, women's access to CPP/QPP acted as an equalizing factor by reducing the 90-10, 50-10 and 90-50 differentials. Despite

[23]Full results are not presented here, but are available from the author upon request. In the younger wives sample, changes in employment had large effects except at the 90th percentile. For older wives, employment had the smallest effects at the 10th and 20th percentiles, and otherwise drove large increases in income at higher percentiles.

this, increases in women's access to CPP/QPP drove a small increase in the Gini coefficient as the benefits of CPP/QPP are not evenly distributed to each of the income distribution's tails.

Changes to husbands' employment and pension access have had slightly different effects from women. Increases in senior husbands' employment drove larger increases in the top of the income distribution than in the middle or bottom. As such, a large part of the increase in the 90-10 differential can be attributed to increases in men's employment. Increases in men's private pension access largely benefitted those in the bottom of the income distribution, driving a reduction in the 90-10 and 90-50 differentials. As there was almost no changes to men's access to CPP/QPP, none of the increase in seniors' incomes can be attributed to men's CPP/QPP access.

The education of husbands and wives plays an important role in explaining the widening of the senior income distribution. The unconditional quantile regressions show that having a university degree (relative to completing high school) will raise income at the 90th percentile by 52-71%. Men's university completion raises income at the 90th percentile more modestly, by 12-30%. University completion has more modest and even negligible effects on seniors' incomes at other points of the distribution. The decomposition results show a clear education gradient, with education driving large increases in seniors' incomes at the top of the distribution and more modest increases in the middle. As such, increases in women's educational attainment was the most important factor driving increases in the 90-10 and 90-50 differentials. Men's educational attainment was also very important, and more important in explaining changes in the 50-10 differential.

The disequalizing effect of education changes is somewhat puzzling in light of other studies that suggest an increase in education had an equalizing effect on family earnings inequality among younger families (Fortin and Schirle 2006; Lu et al. 2009). It may be the case that changes in education proxy for other important changes we are not able to observe here. For example, there is a clear relationship between education and family wealth or

savings. As Morissette and Zhang (2006) demonstrate, wealth inequality rose for elderly couples between 1999 and 2005. They report that most of the increase in wealth dispersion could be attributed to larger increases in home equity and holdings in RRSPs and locked-in retirement accounts (LIRAs) for those at the top of the wealth distribution. Changes in education may also proxy for changes in occupational structure. We know that seniors with higher education are more likely to have held management and other professional positions, while lower education seniors were more likely hold occupations specific to primary industries or in sales and service.[24] Unfortunately, it is difficult to measure whether changes occurred in the occupational structure for this sample of seniors.

Changes to women's years of full time full year experience played a more modest role, driving small increases in income across the entire distribution of senior couples' income. On average, women's work experience increased by three years and this factor explained roughly 6% of all composition effects for the 10th percentile. As the estimated effect on the 90th percentile is actually negative, increases in women's FTFY experience actually had an equalizing effect, driving decreases in the 90-10 and 90-50 differentials.[25] Changes to men's FTFY experience (decreasing on average by three years) drove a slight decrease in incomes at the bottom of the distribution while having no effect on the median, and a slight positive effect on the 60th-80th percentiles. Overall, reduction in men's FTFY experience are driving

[24]In SLID, only recently employed individuals under age 69 will be asked their occupation. Using the Labour Force Survey, we are able to observe occupation for all individuals that held a job in the previous year. The occupational structure of a sample of men and women with a University degree or with grade 8 or less, age 55-59 in 1996 and 2006, were compared to similarly educated men and women age 65-69 and there were no substantive differences when comparing the occupational structure across education groups. Unfortunately, the occupational classification system changes over time making it difficult to assess whether changes in occupational structure occurred, particularly in small sample sizes.

[25]Standard errors have not been presented here for space considerations. Though small, the composition effect of women's (and men's) FTFY experience on the 10th percentile is significantly different from zero at the 5% level. It is not significant for the 90th percentile.

modest increases in the 90-10 and 90-50 differentials.

Other factors such as poor health, immigration, geography, or family formation choices are not found to be very important for explaining the increase in senior couples' incomes or inequality. Results that account for these and other factors are discussed in the following section.

Table 8. Recentered Influence Function Regression Results: Log After Tax Income of Senior Couples

	1996 10th	2006 10th	1996 50th	2006 50th	1996 90th	2006 90th	1996 Gini	2006 Gini
Wives								
Employment	0.118	0.153	0.287	0.196	0.260	0.218	-0.014	0.043
	(.035)	(.041)	(.047)	(.048)	(.105)	(.072)	(.015)	(.015)
Pension	0.043	0.128	0.206	0.247	0.101	0.041	-0.013	-0.035
	(.019)	(.028)	(.039)	(.039)	(.088)	(.054)	(.012)	(.013)
CPP/QPP	0.085	0.132	0.122	0.024	-0.022	0.014	-0.011	-0.031
	(.030)	(.052)	(.037)	(.047)	(.075)	(.074)	(.011)	(.017)
<= Grade 8	-0.012	-0.115	-0.058	-0.223	-0.093	-0.017	-0.009	0.009
	(.038)	(.062)	(.051)	(.062)	(.116)	(.062)	(.016)	(.021)
< HS Grad.	0.016	-0.117	0.009	-0.107	-0.079	-0.062	-0.019	-0.012
	(.035)	(.060)	(.050)	(.063)	(.136)	(.072)	(.016)	(.020)
Post-Sec.	0.041	0.031	0.064	0.062	0.098	0.098	0.016	-0.008
	(.028)	(.045)	(.046)	(.056)	(.140)	(.076)	(.016)	(.018)
University	-0.128	-0.022	0.017	0.074	0.524	0.710	0.205	0.086
	(.065)	(.074)	(.092)	(.079)	(.273)	(.179)	(.029)	(.029)
Age	0.012	0.004	0.004	-0.007	0.001	-0.012	-0.003	0.000
	(.003)	(.004)	(.003)	(.004)	(.006)	(.008)	(.001)	(.001)
FTFY Exp.	0.002	0.004	0.002	0.003	0.003	0.004	-0.001	0.000
	(.001)	(.001)	(.001)	(.001)	(.003)	(.002)	(.000)	(.001)

Table 8—Continued

	1996 10th	2006 10th	1996 50th	2006 50th	1996 90th	2006 90th	1996 Gini	2006 Gini
Husbands								
Employment	0.071	0.097	0.137	0.217	0.305	0.229	0.049	0.005
	(.029)	(.035)	(.040)	(.039)	(.089)	(.061)	(.013)	(.013)
Pension	0.220	0.440	0.344	0.204	0.165	-0.122	-0.050	-0.111
	(.031)	(.058)	(.033)	(.043)	(.053)	(.067)	(.011)	(.015)
CPP/QPP	0.491	0.135	-0.074	-0.049	-0.255	-0.166	-0.267	-0.036
	(.099)	(.127)	(.055)	(.083)	(.150)	(.185)	(.023)	(.030)
<= Grade 8	-0.036	-0.020	-0.215	-0.102	-0.308	-0.126	-0.045	-0.007
	(.034)	(.071)	(.053)	(.063)	(.128)	(.078)	(.017)	(.022)
< HS Grad.	-0.077	0.053	-0.129	-0.082	-0.130	-0.089	-0.007	-0.021
	(.036)	(.063)	(.057)	(.071)	(.161)	(.092)	(.018)	(.023)
Post-Sec.	-0.028	0.029	-0.050	0.031	-0.234	-0.037	-0.043	-0.007
	(.032)	(.058)	(.052)	(.062)	(.146)	(.094)	(.017)	(.020)
University	0.042	-0.004	0.068	0.170	0.301	0.124	0.115	0.053
	(.035)	(.077)	(.067)	(.078)	(.225)	(.141)	(.024)	(.026)
Age	-0.007	-0.002	-0.005	0.004	0.008	0.013	0.003	0.001
	(.004)	(.005)	(.004)	(.005)	(.008)	(.008)	(.001)	(.002)
FTFY Exp.	0.001	0.002	-0.001	0.000	0.000	0.001	0.000	0.000
	(.002)	(.002)	(.001)	(.002)	(.002)	(.003)	(.000)	(.001)
Constant	9.017	9.266	10.273	10.406	10.656	11.097	0.527	0.370
	(.245)	(.296)	(.270)	(.268)	(.596)	(.436)	(.087)	(.108)

Note. — Results are for the baseline sample, see section 3 for details.

Table 9. Decomposition of Composition Effects: Change in Log After Tax Income of Senior Couples

	10	20	30	40	50	60	70	80	90
Wives									
Employment	0.011	0.020	0.024	0.024	0.022	0.021	0.016	0.019	0.017
Pension	0.012	0.023	0.030	0.030	0.029	0.026	0.026	0.021	0.015
CPP/QPP	0.020	0.013	0.011	0.012	0.016	0.009	0.007	0.002	0.000
Education	0.003	0.007	0.012	0.018	0.020	0.028	0.032	0.038	0.053
Age	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000
FTFY Experience	0.005	0.004	0.003	0.005	0.005	0.010	0.008	0.006	-0.003
Husbands									
Employment	0.013	0.011	0.011	0.012	0.014	0.017	0.018	0.024	0.034
Pension	0.024	0.028	0.027	0.025	0.022	0.019	0.014	0.011	0.006
CPP/QPP	-0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Education	0.012	0.024	0.030	0.032	0.038	0.043	0.051	0.050	0.047
Age	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FTFY Experience	-0.010	-0.009	-0.004	0.001	0.000	0.005	0.005	0.007	-0.005
Total	0.090	0.121	0.144	0.160	0.168	0.177	0.177	0.178	0.165

Note. — Results are for the baseline sample, see section 3 for details.

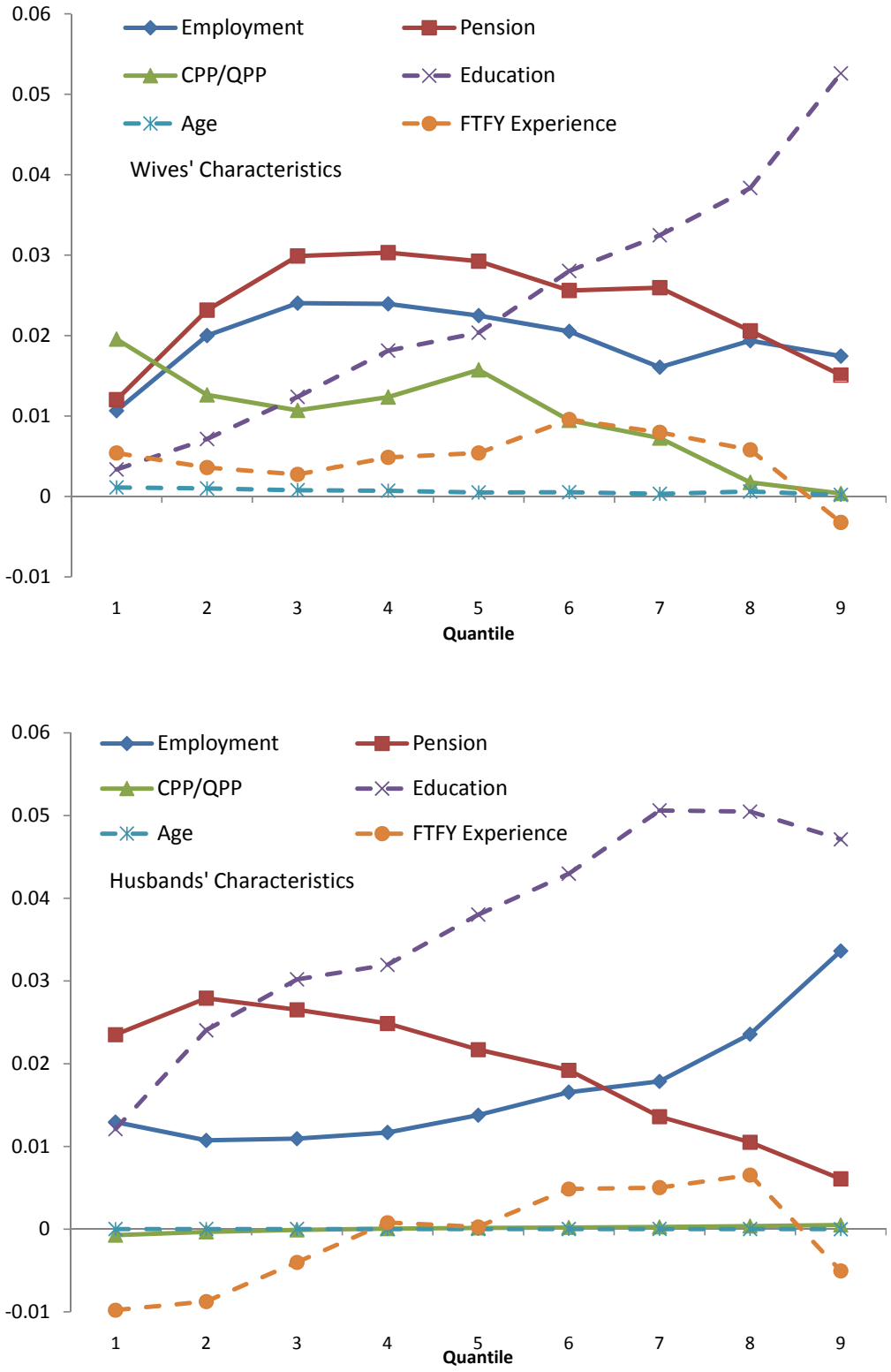

Fig. 6.— Decomposition of Composition Effects: Changes in Log After Tax Income

Alternate representation of the results presented in Table 9

Table 10. Decomposition of Composition Effects: Inequality Measure

	90-10	50-10	90-50	Gini
Wives				
Employment	0.0068	0.0118	-0.0050	0.0020
Pension	0.0031	0.0172	-0.0142	0.0033
CPP/QPP	-0.0192	-0.0038	-0.0154	0.0022
Education	0.0492	0.0170	0.0322	-0.0096
Age	-0.0009	-0.0006	-0.0003	0.0003
FTFY Experience	-0.0086	0.0000	-0.0086	0.0025
Husbands				
Employment	0.0207	0.0008	0.0199	-0.0051
Pension	-0.0174	-0.0018	-0.0156	0.0049
CPP/QPP	0.0012	0.0009	0.0004	-0.0004
Education	0.0350	0.0259	0.0091	-0.0088
Age	0.0000	0.0000	0.0000	0.0000
FTFY Experience	0.0047	0.0101	-0.0053	0.0013
Total	0.0746	0.0775	-0.0029	-0.0075

Note. — Results are for the baseline sample, see section 3 for sample details.

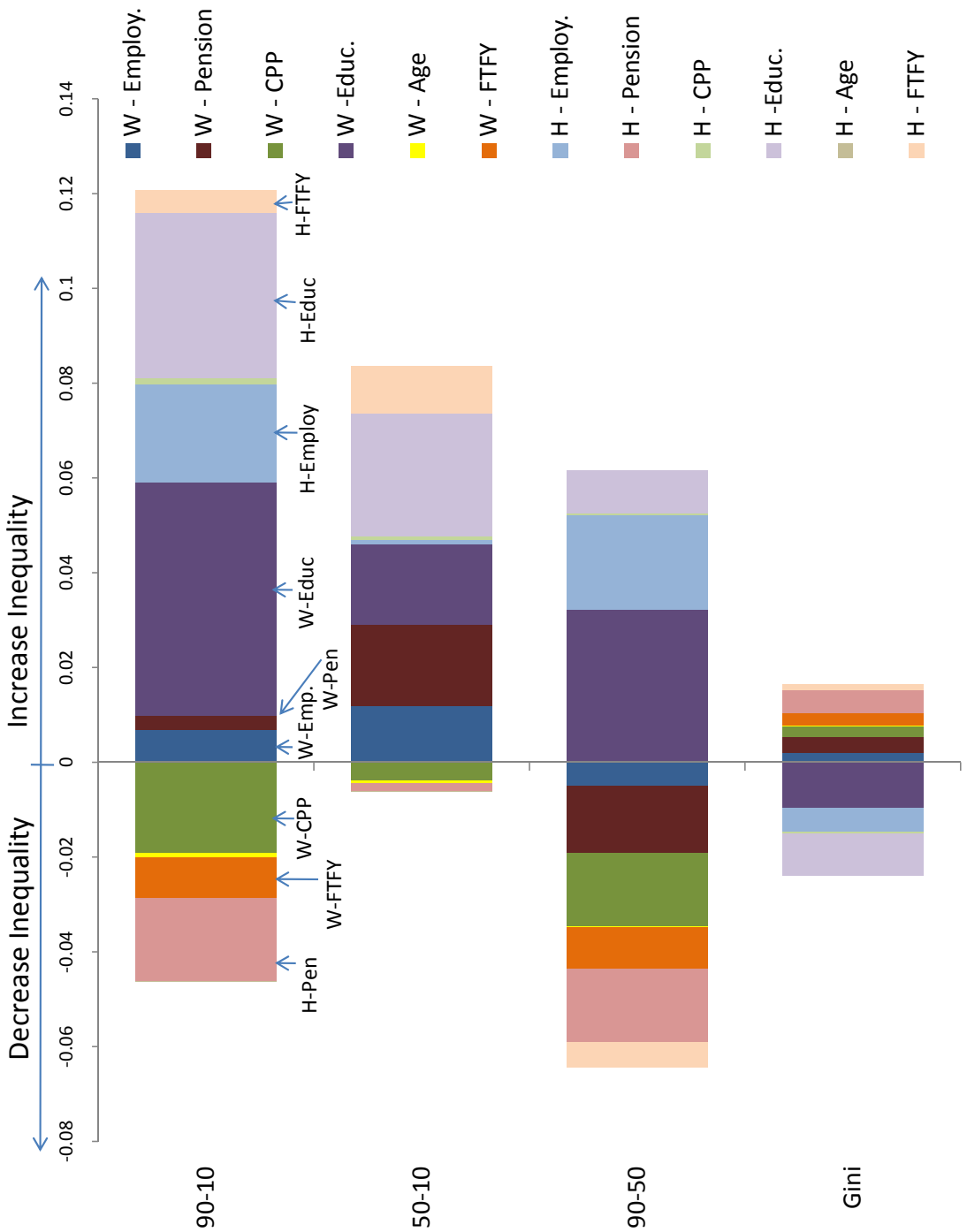

Fig. 7.— Decomposition of Composition Effects: Inequality Measures
Alternate representation of the results presented in Table 10

6. Robustness

To check the robustness of the results presented in the previous section, I have conducted several specification checks. For each of the robustness checks, the resulting overall decomposition results (densities of log incomes) are presented in Figure 8. The decomposition of composition effects into the contribution of each factor is presented graphically, with Figures 9-17 provided in the appendix.

First, we want to ensure that the inclusion of RRSP income in after-tax income and the definition of private pension access is not driving results. In Figure 8B, we can see that the overall decomposition results do not differ much from the baseline results. Only slight differences can be observed at the mode of the counterfactual distribution. With respect to the effects of each factor, when the definition of wives' pension access excludes access to RRSP income we can see wives' pension having a slightly larger effect on the senior median income. Otherwise, the extent to which changes in income can be attributed to each factor are nearly identical to the baseline case.

Second, we want to ensure that including self-employment income in earnings to reflect employment is not driving the effect we see. By defining employment as indicating positive wages and salary, we see almost no difference in results particularly for inequality measures. Changes to employment among men have only a slightly larger effect on seniors' incomes.

As was noted in section 3, a large number of observations had to be dropped to make use of the FTFY experience variable in SLID. In the robustness check represented by Figure 8D, the decomposition is repeated with those observations included. The income distributions for 1996 and 2006 take on the same shape although incomes are, on average, slightly lower as seniors with less stable lifetime employment are now included in the sample. With the exclusion of FTFY experience as an explanatory variable, there appears to be a slightly larger income structure effect around the mode of the distribution. The contribution of factors to the composition effects are presented in Figure 11. Although wives' and husbands

pensions appear to drive smaller increases in each quantile than in the baseline specification, the relative importance of pensions and other variables at each quantile are the same.

In the fourth and fifth robustness checks (Figure 8 E and F) I check how results differ if I include only the variables for income sources or only the variables for education, age and experience. The results correspond to those in the baseline results. Considering the difference between the 1996 and counterfactual distribution in Figure 8E, changes to income sources shifted up incomes across the entire distribution, creating only a slight widening of the distribution. Comparing the 1996 and counterfactual distributions in Figure 8F, however, we can see that changes to education, age and FTFY experience worked to widen the distribution without driving a general shift in the distribution. The results in Figure 13 confirm that changes to education are the most important factor driving increases in senior income inequality.

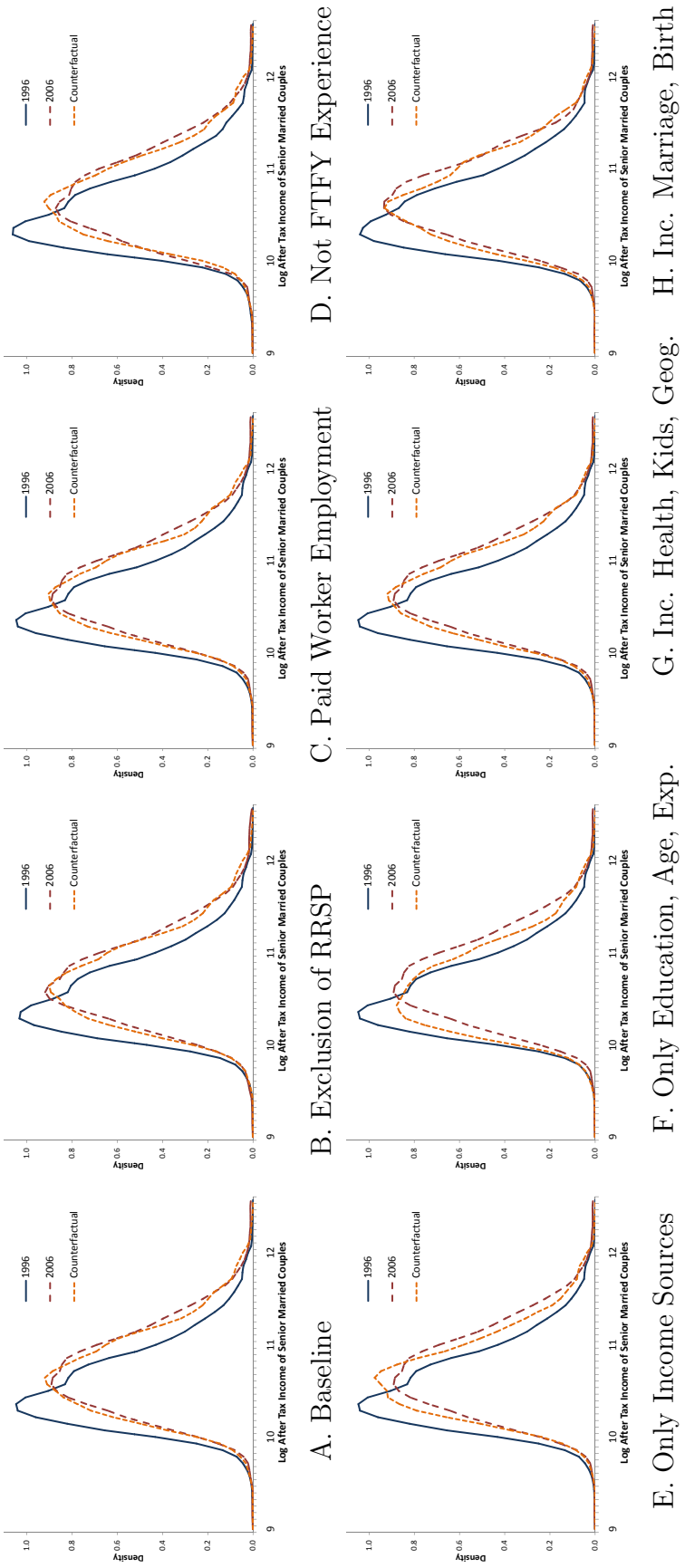

Fig. 8.— Decomposition of 1996-2006 Changes in Elderly Couples' Log After Tax Income - Robustness to specification
Kernel density estimates of senior couples' after tax income, each figure represents slight variations of the baseline case presented in Figure 4. The sample includes married couples whose oldest member is age 65-79. The counterfactual density represents what the 1996 distribution of income would be if the characteristics of older couples were as in 2006.

In the sixth and seventh robustness checks, I include several other variables that we might expect to contribute to changes in income over the 1996-2006 period. I begin by including variables for poor health, immigrant status, number of children, urban vs. rural residency, and province of residence, with results in Figure 8G. Again, there is no noticeable difference between these distributions and the baseline case. In Figure 15 I have plotted the contribution of changes in these variables to the composition effects (noting the different scale used for the vertical axis). The effects of each are small and, with few exceptions, are not significantly different from zero. (For example, the effect of changes in the number of children is significant at the 5% level for the second quantile.)

I then add variables for women's age of first marriage, women's age of first birth, whether each spouse has been married more than once, and whether the economic family consists of a single generation. The resulting counterfactual distribution in Figure 8H is slightly different than in the baseline case, however we should consider that several observations must be dropped to include these variables.[26] The contributions of these additional covariates are provided in Figure 17. As with the previous set of variables added, the effects of each are very small and, with few exceptions, are not significantly different from zero. (For example, the effects of age of first marriage on the 10th percentile are significant at the 6% level and significant at the 4% level for the 90th percentile. The effect of wives' second marriage is significant at the 6% level for the 70th percentile.)

Overall, the results of the baseline specification appear quite robust. Increases in women's employment and access to pensions has driven large increases in income across the distribution, and mostly for those in the middle. Increases in men's employment has largely benefitted seniors at the top of the distribution. Increases in men's private pension access and women's access to CPP/QPP have acted as an equalizing force. Increases in women's and men's education levels have been the most important factors for explaining

[26]Only 1522 observations in 1996 and 1214 observations in 2006 provide full information for all these variables.

increases in senior income inequality.

7. Concluding Remarks

Over the past decade there have been substantial increases in the incomes of seniors. One of the largest contributors to the general increase in seniors incomes has been the increase in women's access to private pensions. Higher rates of employment among senior women have also driven general increases in seniors' income. Increases in women's access to CPP/QPP have had important equalizing effects, working to increase the incomes of the lowest income seniors and reduce senior income inequality.

The effects of increases in men's and women's education levels are remarkable. The results here suggest that most of the increase in senior income inequality can be attributed to changes in education, which appear to have benefitted most those families at the top of the income distribution. This is particularly interesting in light of the research examining family earnings inequality among younger families that suggests education is an equalizing force. The evidence here may support the notion that education (considering the types of occupations that on average require higher education) may allow for higher employment income when older given the physical limitations associated with aging.

The importance of these results for policy makers is worth noting. As women's greater labour force attachment has led to improved access to employer-provided pensions, increases in employment at older ages, and increases in access to public pensions, the incomes of senior couples have increased. Policies that continue to promote labour force attachment among women (such as Canada's maternity leave benefits under the Employment Insurance program or public child care programs, see Baker and Milligan (2008) and Lefebvre and Merrigan (2008)) should be encouraged. Public pensions continue to play an important equalizing role, raising the incomes of the poorest seniors. Further expansion of the public pension system could act to reduce income inequality.

REFERENCES

Bailey, Martha J. (2006) 'More power to the pill: The impact of contraceptive freedom on women's life cycle labor supply.' *Quarterly Journal of Economics* 121(1), 289–320

Baker, Michael, and Dwayne Benjamin (1999) 'Early retirement provisions and the labor force behavior of older men: Evidence from Canada.' *Journal of Labor Economics* Part 1, 17(4), 724–56

Baker, Michael, and Kevin Milligan (2008) 'Does job-protected maternity leave affect mothers' employment and infant health?' *Journal of Labor Economics*

Blau, Francine D., and Lawrence M. Kahn (2007) 'Changes in the labor supply behavior of married women: 1980-2000.' *Journal of Labor Economics* 25(3), 393–438

Buckley, Neil J., Frank T. Denton, A. Leslie Robb, and Byron G. Spencer (2004) 'The transition from good to poor health: an econometric study of the older population.' *Journal of Health Economics* 23, 1013–1034

Daly, Mary C., and Robert G. Valletta (2006) 'Inequality and poverty in United States: The effects of rising dispersion of men's earnings and changing family behaviour.' *Economica* 73, 75–89

DiNardo, John, Nicole M. Fortin, and Thomas Lemieux (1996) 'Labor market institutions and the distribution of wages, 1973-1992: A semiparametric approach.' *Econometrica* 64(5), 1001–44

Fernandez, Raquel (2007) 'Culture as learning: The evolution of female labor force participation over a century.' *NBER Working Paper No. 13373*

Firpo, Sergio, Nicole Fortin, and Thomas Lemieux (2007) 'Decomposing wage distributions using recentered influence function regressions.' Manuscript, University of British Columbia

——— (2009) 'Unconditional quantile regressions.' *Econometrica* 77(3), 953–973

Fortin, Nicole M. (2005) 'Gender role attitudes and the labour-market outcomes of women across oecd countries.' *Oxford Review of Economic Policy* 21(3), 416–438

Fortin, Nicole M., and Tammy D. Schirle (2006) 'Gender dimensions of changes in earnings inequality in canada.' In *Dimensions of Inequality in Canada,* ed. David A. Green and Jonathan R. Kesselman (UBC Press: Vancouver) pp. 307–346

Goldin, Claudia, and Lawrence Katz (2002) 'The power of the pill: Oral contraceptives and women's career and marriage decisions.' *Journal of Political Economy* 110(4), 730–770

Jann, Ben (2008) 'A Stata implementation of the Blinder-Oaxaca decomposition.' *ETH Zurich Sociology Working Paper No. 5*

Lefebvre, Pierre, and Philip Merrigan (2008) 'Child-care policy and the labor supply of mothers with young children: A natural experiment from Canada.' *Journal of Labor Economics* 26(3), 519–548

Lu, Yuqian, Rene Morissette, and Tammy Schirle (2009) 'The growth of family earnings inequality in canada, 1980-2005.' Manuscript, Wilfrid Laurier University

Milligan, Kevin (2008) 'The evolution of elderly poverty in canada.' *Canadian Public Policy* 34(Supplement), S79–S94

Milligan, Kevin, and Tammy Schirle (Forthcoming) 'Working while receiving a pension: Will double dipping change the elderly labour market?' In *Retirement policy issues in Canada,* ed. Robin W. Boadway Michael G. Abbot, Charles M. Beach and James G. MacKinnon (John Deutsch Institute)

Morissette, René, and Feng Hou (2008) 'Does the labour supply of wives respond to husbands' wages? canadian evidence from micro data and grouped data.' *Canadian Journal of Economics* 41(4), 1185–1210

Morissette, René, and Xuelin Zhang (2006) 'Revisiting wealth inequality.' *Perspectives on Labour and Income* (Statistics Canada 75-001-XIE) 7(1), 5–16

Myles, John (2000) 'The maturation of Canada's retirement income system: Income levels, income inequality and low-income among the elderly.' Statistics Canada, Catalogue no. 11F0019MPE No. 147

Skuterud, Mikal, Marc Frenette, and Preston Poon (2004) 'Describing the distribution of income: Guidelines for effective analysis.' *Statistic Canada, Income Statistics Division, Income Research Paper Series*

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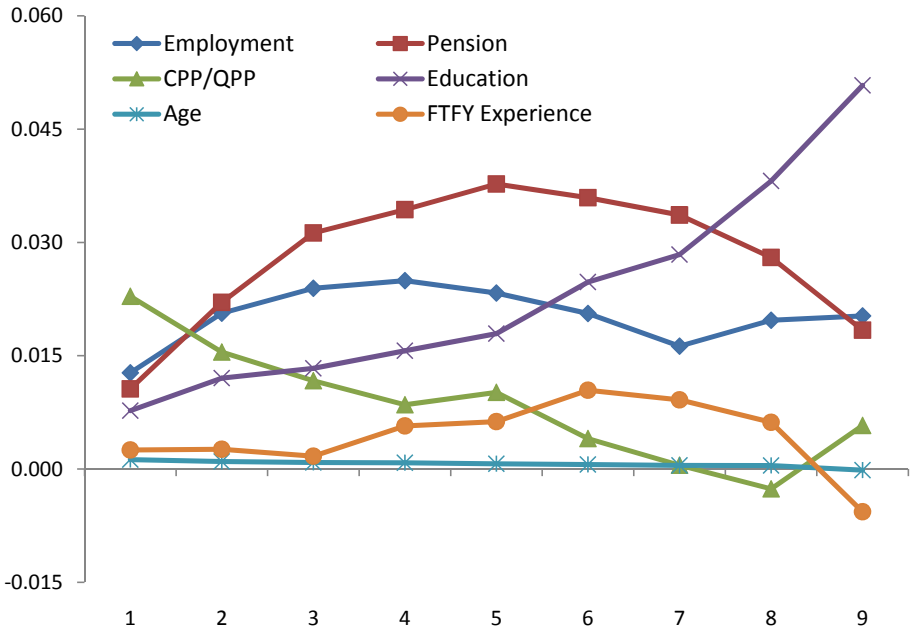
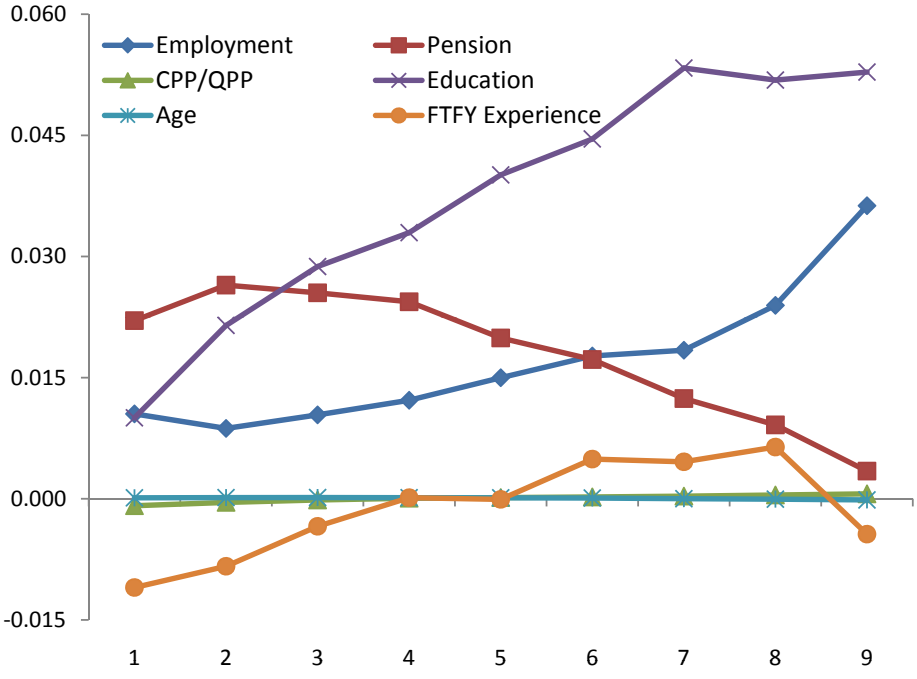
A. Robustness Checks - Composition effects

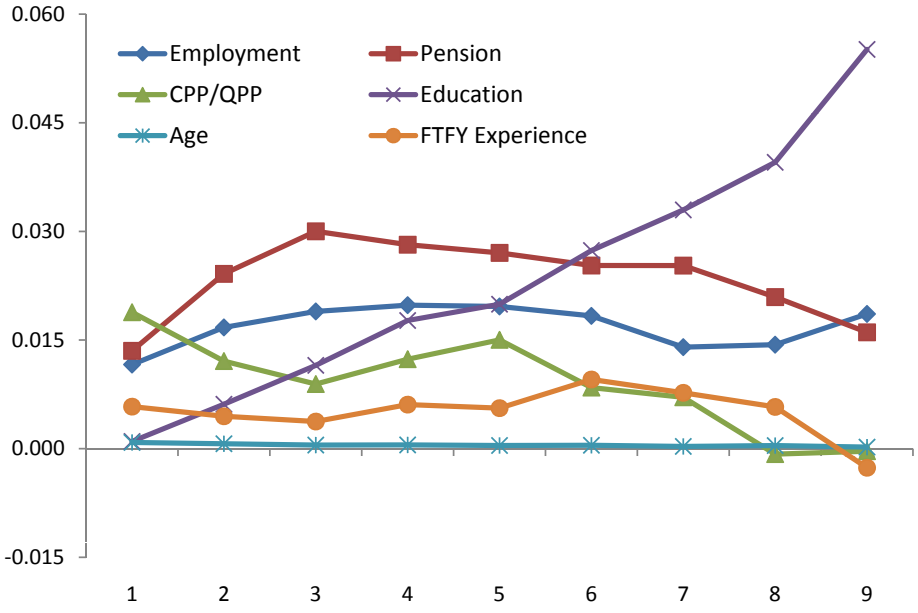


A. Wives Income and Characteristics

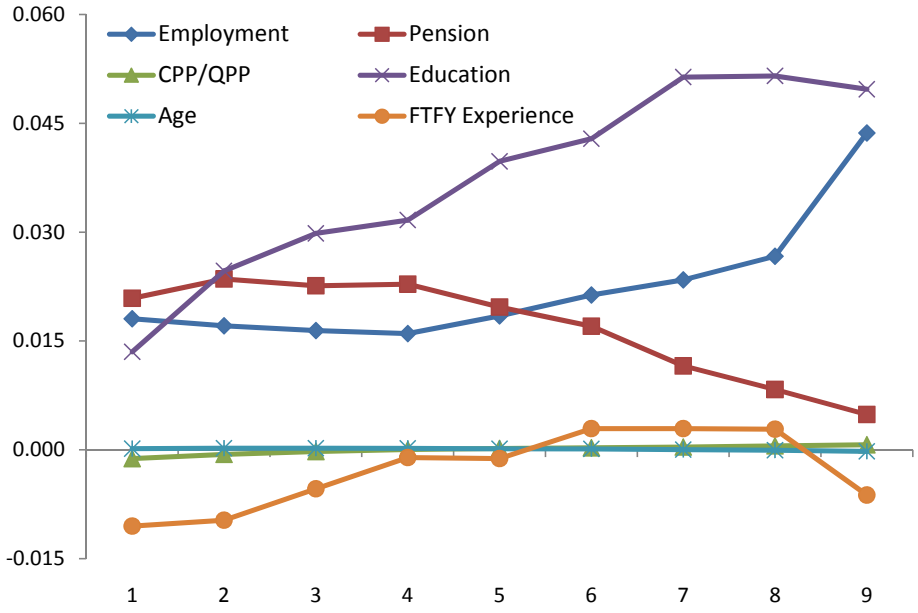


B. Husbands' Income and Characteristics

Fig. 9.— Composition Effects: Changes in Log After Tax Income at each Quantile
In this specification RRSP withdrawals are excluded from the definition of after-tax income and pension receipt.

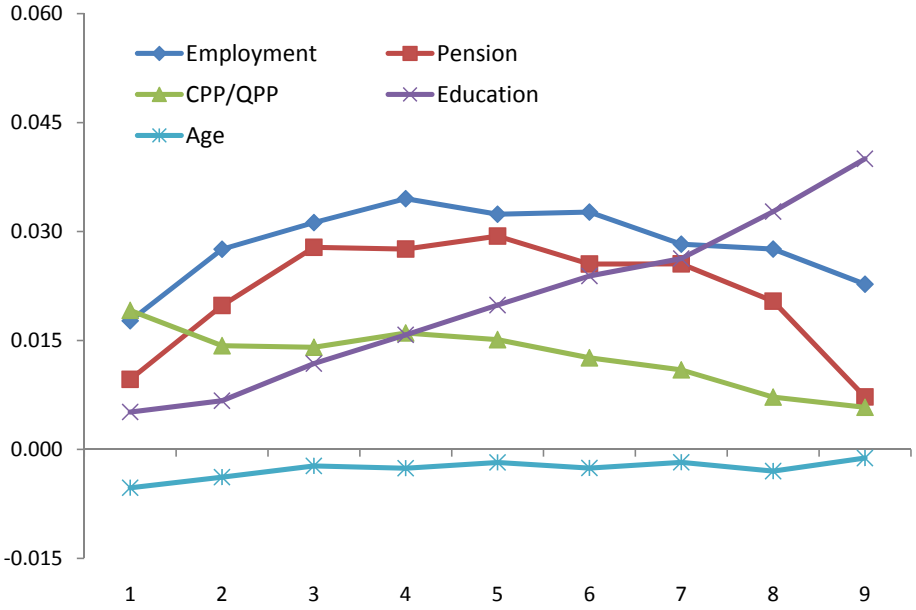


A. Wives Income and Characteristics

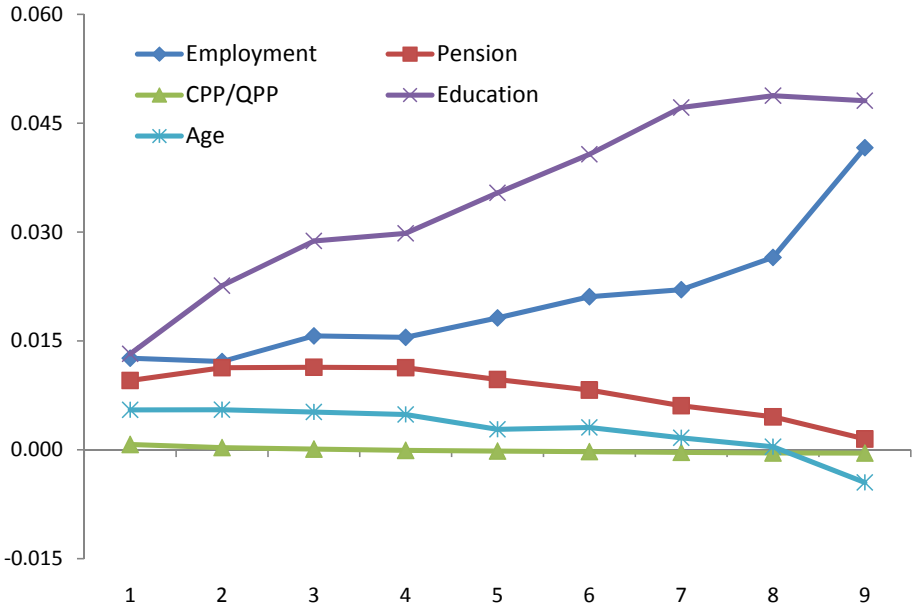


B. Husbands' Income and Characteristics

Fig. 10.— Composition Effects: Changes in Log After Tax Income at each Quantile
In this specification employment indicates positive wages and salary rather than positive earnings.

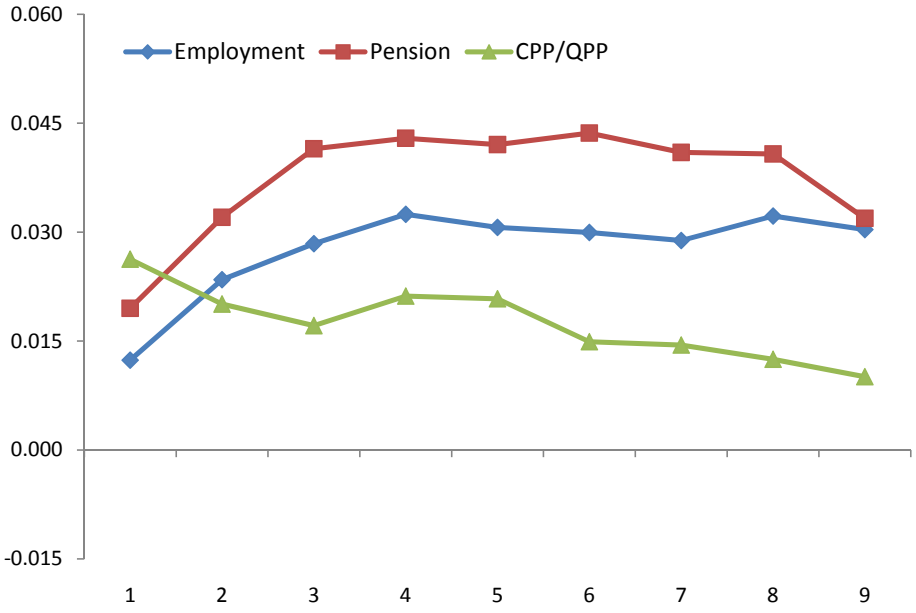


A. Wives Income and Characteristics

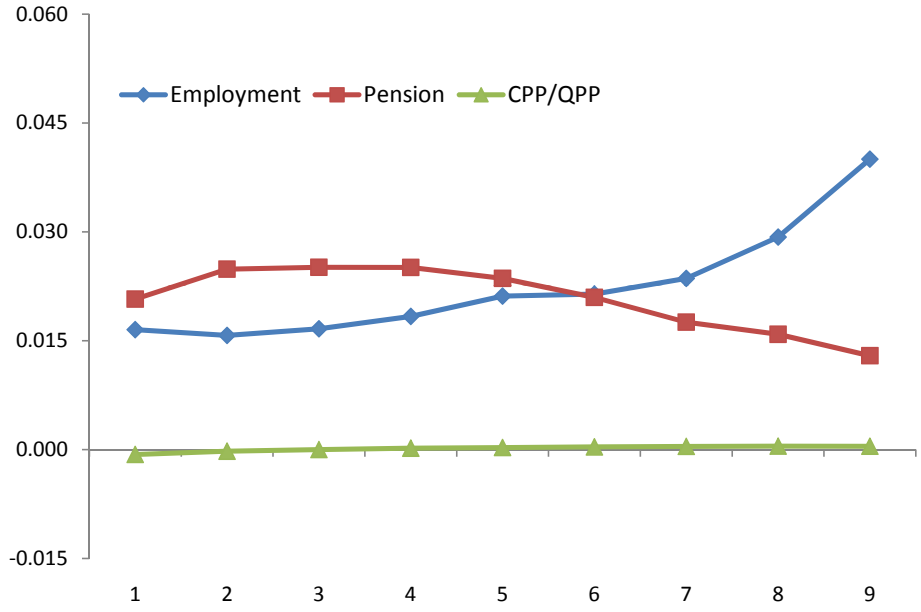


B. Husbands' Income and Characteristics

Fig. 11.— Composition Effects: Changes in Log After Tax Income at each Quantile
In this specification observations are not excluded from the sample for missing FTFY Experience information and this variable is not included.

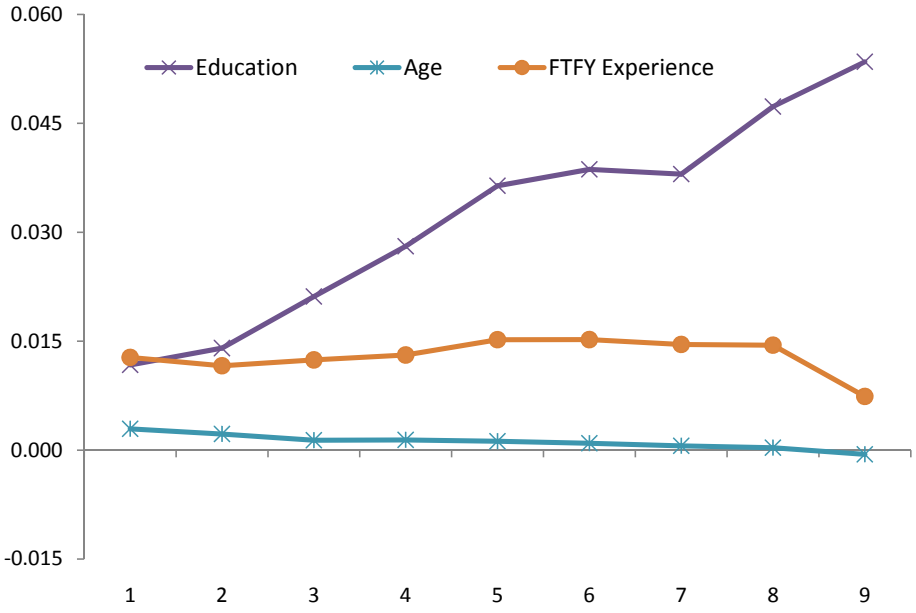


A. Wives Income and Characteristics

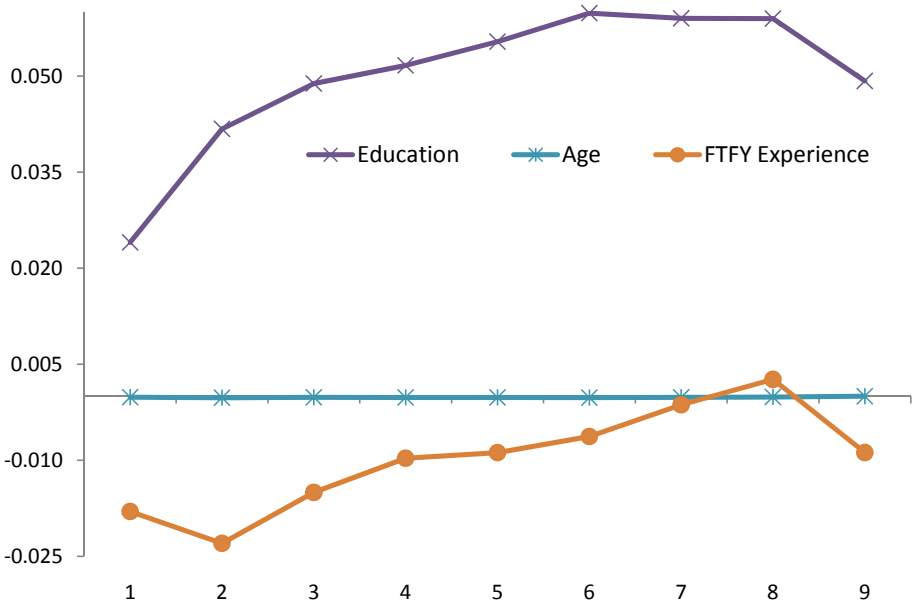


B. Husbands' Income and Characteristics

Fig. 12.— Composition Effects: Changes in Log After Tax Income at each Quantile
In this specification only income sources are included as covariates.

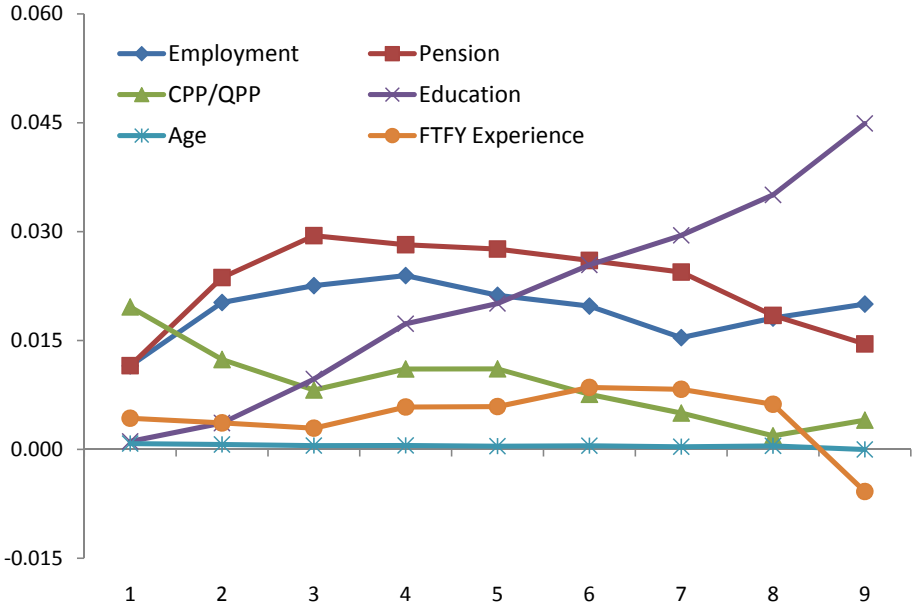


A. Wives Income and Characteristics

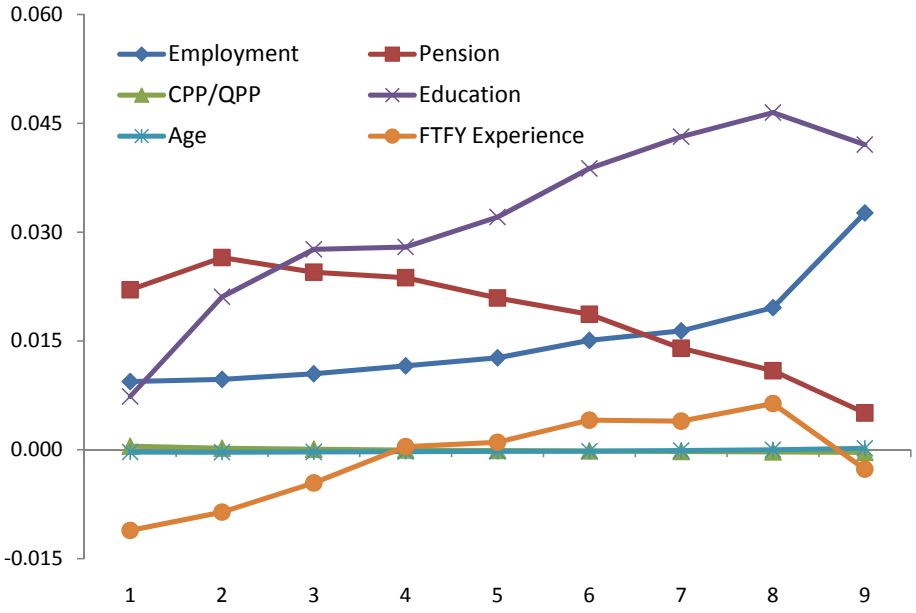


B. Husbands' Income and Characteristics

Fig. 13.— Composition Effects: Changes in Log After Tax Income at each Quantile
In this specification only education, age and experience are included as covariates.

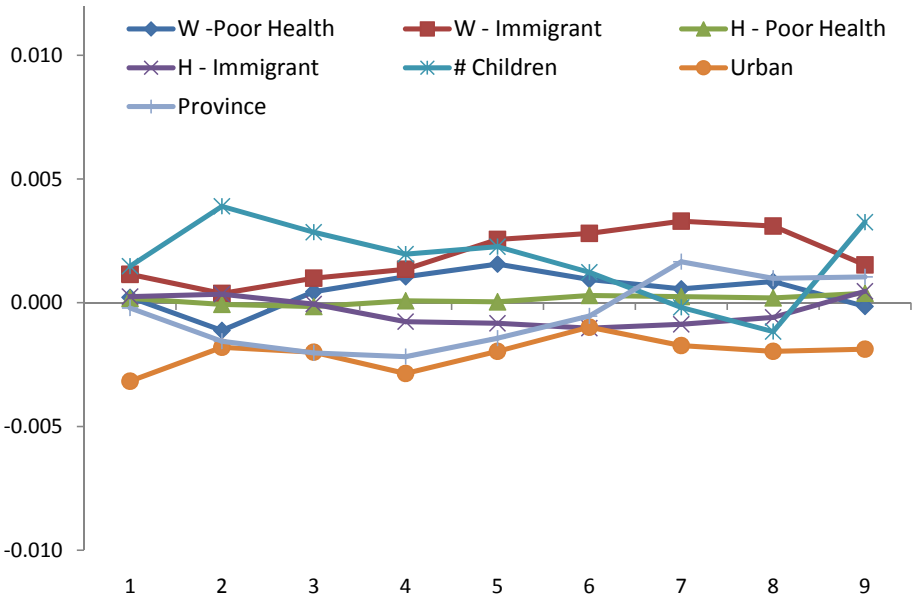


A. Wives Income and Characteristics



B. Husbands' Income and Characteristics

Fig. 14.— Composition Effects: Changes in Log After Tax Income at each Quantile
In this specification health, immigrant status, number of children, urban, and province are added as covariates.



C. Other Family Characteristics

Fig. 15.— Composition Effects: Changes in Log After Tax Income at each Quantile
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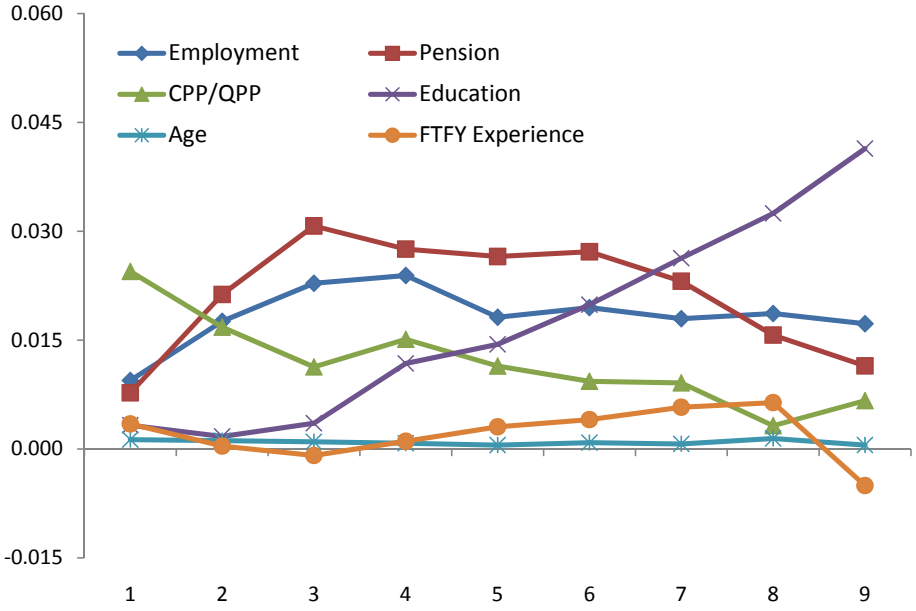
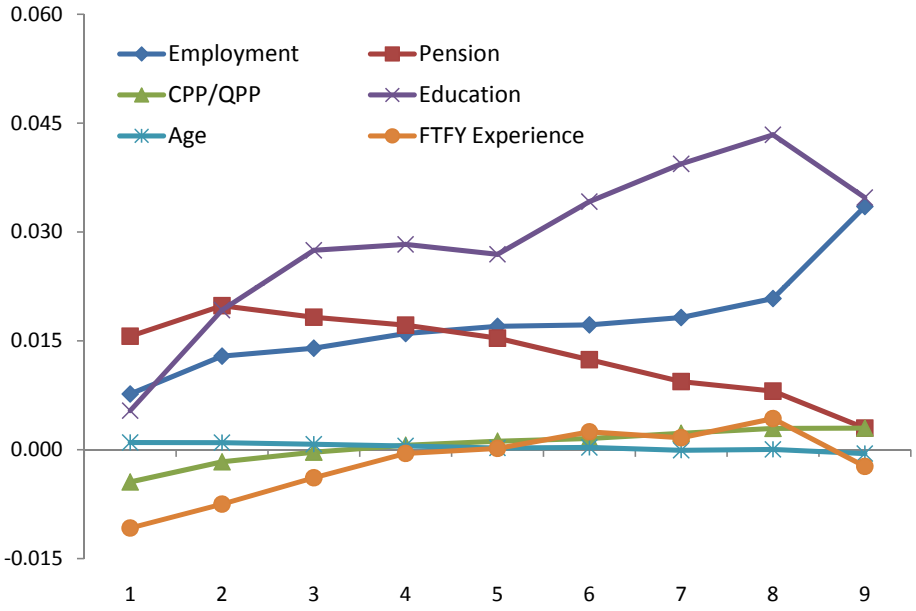
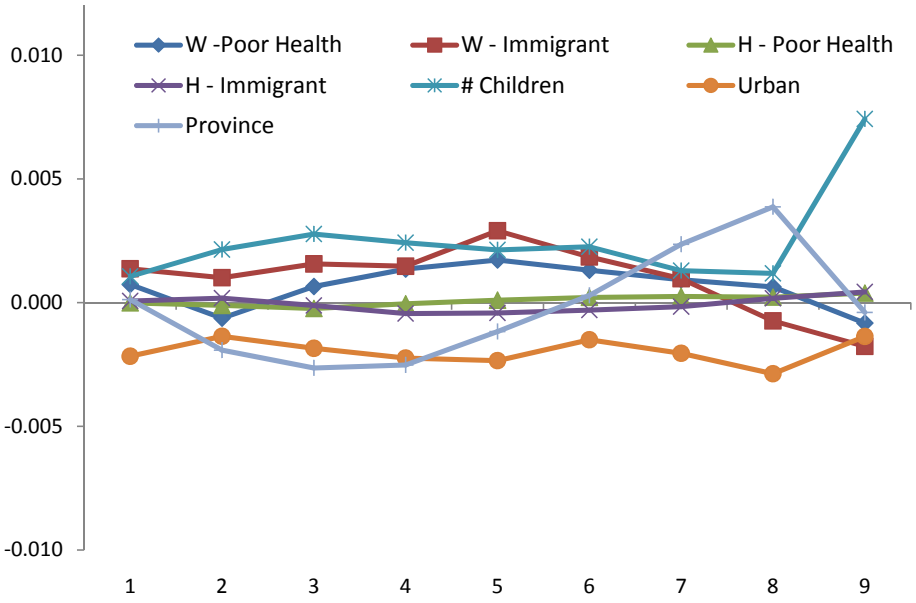


A. Wives Income and Characteristics

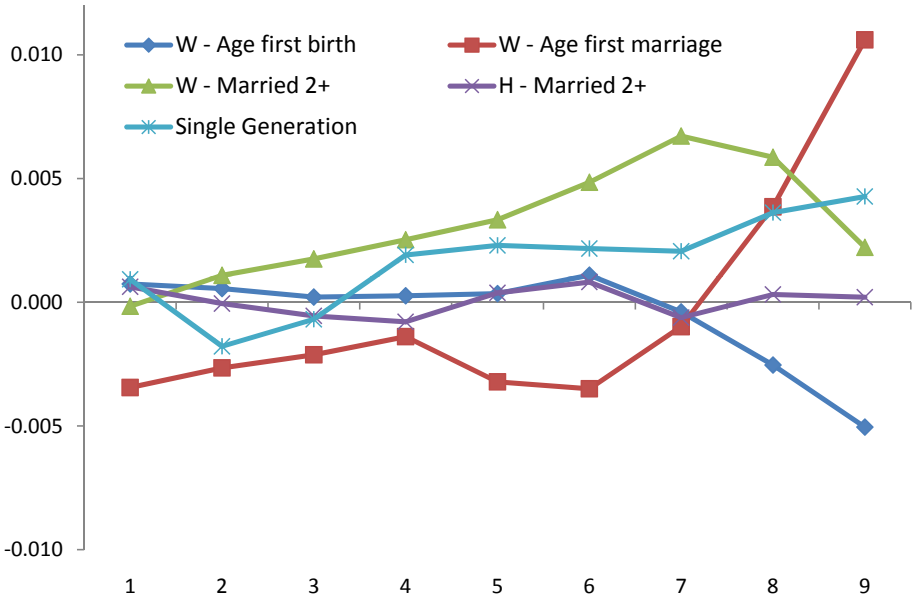


B. Husbands' Income and Characteristics

Fig. 16.— Composition Effects: Changes in Log After Tax Income at each Quantile
In this specification health, immigrant status, number of children, urban, province, wives' age of first marriage, wives' age of first birth, whether each spouse has been married more than once, and whether there is a single generation in the economic family are added as covariates.



C. Other Family Characteristics



D. Other Family Characteristics

Fig. 17.— Composition Effects: Changes in Log After Tax Income at each Quantile
Continuation of previous figure's (16) results. In this specification health, immigrant status, number of children, urban, province, wives' age of first marriage, wives' age of first birth, whether each spouse has been married more than once, and whether there is a single generation in the economic family are added as covariates.