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Pension Coverage and Retirement Savings of Young and Prime-Aged Workers in Canada:1986-1997

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Abstract

In this paper, we assemble data from several household surveys to document how pension coverage of young and prime-aged workers has evolved in Canada between the mid-1980s and the mid-1990s. We show that between 1986 and 1997, pension coverage has fallen significantly for men, has dropped slightly for young women and has increased for prime-aged women. The decline in union density and employment shifts towards low-coverage industries explain most of the decline in pension coverage of men and young women. In contrast, most of the increase in coverage of prime-aged women remains unexplained. While pension coverage has fallen for men and young women, their real average contributions to registered retirement savings plan (RRSPs) have increased substantially. As a result, the sum of the amounts they countributed to registered pension plans (RPPs) and RRSPs has increased markedly.

Key words: Pension plans; Retirement; Young Workers; Job Quality.


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TABLE OF CONTENTS


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1. Introduction

While several Canadian studies (Beach and Slotsve, 1996: Morissette, Myles and Picot, 1994) have now documented the widening earnings differential between young workers and prime-aged workers over the last two decades, very little is known regarding the extent to which this growing differential has been accompanied by an increasing difference in fringe benefits, the most important of which is pension coverage.

The first goal of this paper is to attempt to fill this gap. Using a variety of household surveys containing individual-level information both on registered pension plan (RPP) coverage and on worker/job characteristics, we analyze how pension coverage has evolved over the last fifteen years for men and women of different age groups.

In the United States, previous studies have shown that the percentage of male workers with a pension plan has dropped significantly during the 1980s (Parsons, 1991; Bloom and Freeman, 1992; Even and Macpherson, 1994). The decline has been especially pronounced among young men. In Canada, administrative data from the Pension Plans in Canada database suggests that, between the mid-1980s and the late 1990s, pension coverage has dropped for men but has increased for women. As a result of these two offsetting trends, the fraction of Canadian workers covered has remained relatively stable during the period.

In this study, we show that between the mid-1980s and the mid-1990s, pension coverage has dropped significantly for young and prime-aged men, moderately for young women and has increased for older women. Because we have microdata on worker and job characteristics, we are able to assess the extent to which these changes have been induced by movements in the industrial and occupational structure of employment as well as by changes in the unionization rate. Our results indicate that these movements are important determinants of the changes in coverage rates. Specifically, we find that the decline in union density and employment shifts towards low-coverage industries explain most of the decline in pension coverage of men and young women.

While changes in pension coverage provide useful information on movements in the incidence of pensions, they are silent on the extent to which workers prepare themselves for retirement. Reduced individual retirement savings may lead to less income for future generations of retirees. One way to address this issue is to examine how individual contributions to tax-assisted retirement savings programs have evolved over time. This is the second goal of the paper. Using data from individual tax records, we document the evolution of RPP and RRSP contributions of men and women of different age groups between the mid-1980s and the mid-1990s. Our results show that : 1) average contributions to RRSPs have increased substantially and have offset any decline in RPP contributions but that 2) for each age-gender group, average contributions of workers in the bottom quintile of the earnings distribution are extremely small and have barely risen over the last fifteen years.

In section 2, we discuss potential factors that may affect the RPP coverage of Canadian workers. Next, we examine trends in pension coverage from household surveys and from tax data (Section 3). In Section 4, we apply a variety of decomposition methods to assess the contribution of various factors to changes in pension coverage observed between 1986

and 1997. In section 5, we document worker's contributions to RPPs and RRSPs during the period. Conclusions follow in section 6.

2. Determinants of RPP coverage

Whether or not a worker is covered by an RPP depends, in an accounting sense, on three factors: 1) the **offer rate**, (i.e. the employer's decision to offer a plan to his/her employees) 2) the **eligibility rate**, (i.e. the percentage of workers employed in firms which offer a plan who are *eligible* to the plan) 3) the **participation rate**, (i.e. the percentage of eligible workers who *participate* in a plan). As it is for most RPPs, whenever participation in a plan is compulsory, the coverage rate will be determined solely by the offer rate and the eligibility conditions.

Firms are not required to offer a pension plan to their workers. Firms may choose to offer a pension plan in order to reduce worker turnover - using pensions as a mechanism for deferring pay - or for attracting high-quality workers (Gustman et al., 1994) or even because they feel they have a responsibility to provide their employees part of their retirement income.

Several factors may affect the offer rate. First, the presence of unions may increase workers' chances of being offered a pension plan if unions negotiate both wage offers and the generosity of fringe benefits. Second, small firms may be less prone to offer their workforce a pension plan. If small firms have fewer financial resources or face lower training and hiring costs compared to larger firms, they may be less likely to offer a pension plan as a way to defer compensation and/or to reduce worker turnover. Also, the costs associated with the administration of pension plans may be lower in large firms as a result of economies of scale. Third, pension coverage is likely to be lower in industries engaging low-skilled workers. Because worker turnover is less costly in these industries than in other sectors, firms in industries requiring low-skilled workers may have fewer incentives to use pension plans as a means of keeping employees with the company. Changes in the unionization rate, changes in the relative importance of small and large firms and changes in the composition of employment by industry are all likely to induce changes in the offer rate and, consequently, changes in pension coverage.

Changes in legislative requirements which would increase the costs and/or complexities associated with the administration of a plan may induce some firms to terminate existing plans or prevent them from offering plans (see Appendix 1). Frenken and Maser (1992) provide some evidence that, since the beginning of the 1990s, some employers have terminated their RPPs and replaced them with group RRSPs. Also, increases in employers' contributions to various programs, such as C/QPP or Employment Insurance, may prevent new employers from offering an RPP or may induce existing employers to terminate a plan (Frenken, 1996).

Before the mid-1980s, pension legislation imposed no requirement on employers regarding which workers should be eligible to join a pension plan. Eligibility conditions were specific to each plan and were based on the number of years of service, on an age requirement

(minimum age or maximum age) or on a combination of the two.[1] The new legislation introduced by most provinces between 1984 and 1993 now imposes a minimum requirement on employers. It requires that full-time workers with at least two years of continuous service be eligible to join the pension plan, regardless of their age. In most provinces, part-time employees must also have earned 35% of a year's maximum pensionable earnings or worked a sufficiently high number of hours. Other things equal, these legislative changes should have increased the proportion of employees eligible to join pension plans.[2]

Once a pension plan is offered and once an employee satisfies the eligibility conditions, he/she may choose to participate in the plan or may be compelled to do so. The voluntary or compulsory nature of participation is determined by each plan.[3] Unfortunately, there currently exists no Canadian data on the participation rate in RPP's.[4] Workers of different age groups may have different propensities to participate. For instance, as Even and Macpherson (1994) found, young workers may be less likely to participate in voluntary plans than older workers since they have many more years during which to contribute to tax-assisted retirement savings programs.

3. Data

3.1 Conceptual issues

Until recently, administrative data published by the Pensions Section of Statistics Canada have been the main source of information regarding Canadian pension plan coverage. The bulk of these data - henceforth, PPIC data - are obtained from the pension supervisory authorities in various provinces and at the federal level.[5] All pension plans registered with these authorities are included in the database. At the beginning of 1998, these plans

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[1] For instance, of all workers covered by an RPP in 1980, 38% were in plans requiring no eligibility conditions, 62% were in plans requiring some eligibility conditions and 60.5% were in plans where the eligibility conditions were based on an age and/or a seniority requirement.

[2] The new legislation also requires "that eligibility for membership in a pension plan be made available to part-time employees, if membership is available to full-time employees in that class of employment." (Mercer Handbook of Canadian Pension & Benefit Plans, 1996, p. 34)

[3] The only exception to this rule is observed in Manitoba. In this province, participation is compulsory for all plans once eligibility conditions are satisfied.

[4] The participation rate cannot be calculated from either administrative data or household surveys. The participation rate (with respect to RPP's) is the ratio of the total number of RPP members to the total number of eligible workers. The total number of eligible workers is the sum of three components : 1) the total number of workers who are in plans requiring compulsory participation, 2) the total number of workers who are in plans involving voluntary participation and, 3) the total number of eligible workers who decline participation in voluntary plans. Administrative data from the Pension Plans in Canada (PPIC) database measure only the first two components. As discussed below, household surveys may measure either the sum of the first two components or (partly) the sum of the three components.

[5] As of January 1, 1998, no regulatory legislation was in effect in Prince-Edward-Island.

accounted for 99% of all the RPPs in Canada and roughly 77% of all workers covered.[6] In addition, Statistics Canada conducts a survey of a relatively small number of employers that operate pension plans not governed by the aforementioned supervisory authorities.[7] Taken together, these two data sources cover all pension plans operated by employers. To calculate the coverage rate of paid workers, the number of workers covered by all plans is divided by the annual average of the number of paid workers, as obtained from the Labour Force Survey.[8]

One important feature of these administrative data is that they yield a consistent time-series of coverage rates at the aggregate level.[9] Furthermore, they contain a wealth of information on the characteristics of each pension plan (e.g. employee contribution formula, benefit formula, automatic indexing of pension benefits, whether a plan is a defined benefit plan or a defined contribution plan) which cannot be found in other data sets. Unfortunately, they lack information on important worker and job characteristics such as age, education level, occupation, union status and firm size. As a result, it is impossible to calculate coverage rates for workers of different age groups and/or levels of schooling when using these data.[10]

An alternative is to use T1 tax records to calculate, for different age-gender groups, the percentage of tax filers who participate in RPPs. The Longitudinal Administrative Databank (LAD) of Statistics Canada, which is based on T1 tax records, allows us to construct two measures of pension coverage : 1) the percentage of tax filers who participate in a contributory RPP and, 2) the percentage of tax filers who participate in (contributory or non-contributory) RPPs. The first measure is available for the 1986-1997 period while the second measure covers only the 1991-1997 period. While LAD allows us to construct coverage rates for workers of different age groups, it contains very few covariates which can be used to explain the evolution of coverage rates over time. For instance, it contains no information on workers' union status, education level, industry of employment or occupation.

To be able to explain the evolution of pension coverage for different age groups, it is necessary to use microdata that combines information on pension plan coverage, on one

[6] Pension Plans in Canada, January 1, 1998, Catalogue no. 74-401XPB, Statistics Canada.

[7] Certain plans for federal and provincial government public servants are not subject to the legislation of these authorities but have their own acts regulating their operations.

[8] While the estimates of the number of paid workers are based on annual averages, the number of workers covered by an RPP refers to the number of active, employed participants at the various plans' year-end, which could occur at any point during the calendar year. Also, members of Canadian RPPs living on Indian reserves, in the Yukon or in Northwest Territories and those working outside of Canada are included in the pension plan membership but are excluded from the LFS estimates of the number of paid workers.

[9] The classification of plans by sector has been changed for the January 1, 1992 file. Thus, the distinction between the public sector and the private sector is not consistent over time.

[10] Because they contain information on gender, administrative data allow an examination of the coverage rates of men and women.

hand, and worker attributes and job characteristics, on the other hand. The Survey of Union Membership of 1984 (SUM), the Labour Market Activity Surveys of 1986-1990 (LMAS), and the Survey of Labour and Income Dynamics of 1993-1997 (SLID) all satisfy this requirement.[11] These household surveys are all based on the Labour Force Survey sample design and measure pension plan coverage by asking paid workers the following question:

> "Are you covered by a pension plan connected with this job (do not count, CPP/QPP, deferred profit sharing plans or personal savings plans for retirement)?"

It is important to note that the wording of the question is exactly the same across all surveys. One issue is that respondents may answer that they are *covered* by a plan in their job even though they are not *members* of (i.e. do not participate in) this plan. This could happen when participation in a plan is voluntary. Under this scenario, the aforementioned question would measure the percentage of workers who are *offered* a plan, whether or not they are members of the plan. By definition, workers who are offered a plan include : 1) workers in compulsory plans, 2) workers who choose to participate in voluntary plans and, 3) workers who reject participation in voluntary plans. We acknowledge that our measure of pension coverage may include some workers in the third group. There is no information in SUM-LMAS-SLID which allows us to distinguish the third group of workers from the first two. However, we do not believe that this distinction is empirically important when looking at *changes* in coverage over time. The reason is that most RPPs are compulsory and thus do not offer workers the opportunity to choose whether or not to participate in a plan.[12] As a result, we expect that most of the changes in the percentage of workers being offered a plan will reflect changes in the percentage of workers who are members of compulsory plans rather than changes in the percentage of workers who are offered voluntary plans (whether or not they choose to participate).

A second issue is that some respondents may have little understanding of group RRSPs and may consider them to be registered pension plans. Other individuals who are covered by a group RRSP may correctly report that they are not covered by a RPP. If so, the aforementioned question would measure both the percentage of employees covered by a RPP and part of the percentage of employees covered by group RRSPs. As a result, part of the changes in the measure of pension coverage derived from SUM-LMAS-SLID could reflect changes in the incidence of workers who are members of group RRSPs. While we acknowledge this possibility, we use tax data to provide compelling evidence that the percentage of workers *participating in RPPs* has declined among men and young women and has risen among prime-aged women since the mid-1980s. The same trends are observed in SUM-LMAS-SLID. Given these facts, if we assume that the measure of pension coverage obtained from SUM-LMAS-SLID includes only workers who are RPP members, then we must keep in mind that the decline in RPP coverage observed among

[11] Note that these surveys allow us to measure the coverage rate but contain no information on the offer rate, the eligibility rate and the participation rate.

[12] PPIC data indicate that members of compulsory plans represented roughly 90% of all RPP members (i.e. the first two groups of workers defined above) between 1985 and 1994 (Special tabulations from the Pensions Section of Statistics Canada).

men and young women may have been partly offset by the potential growth in group RRSP membership, for which no Canadian data currently exists. If so, the decline in RPP coverage does not necessarily imply a decline in workers' total compensation. At the other end of the spectrum, if we assume that our measure of pension coverage obtained from SUM-LMAS-SLID includes *all* members of group RRSPs as well as members of RPPs, then the decline in pension coverage observed in our survey data necessarily implies a decline in total compensation for those groups of workers experiencing the drop in coverage. In any event, our results suggest that, unless the decline in RPP coverage is *totally* offset by the growth in group RRSPs (with equivalent employer contributions), many Canadian workers may have to accept jobs providing lower fringe benefits than those received by their counterparts at the beginning of the 1980s. [13]

In the remainder of the paper, we interpret the changes in pension coverage obtained from SUM-LMAS-SLID as reflecting changes in the percentage of workers participating in RPPs. However, when we discuss the implications of our results, we will keep in mind the two possible interpretations identified in the previous paragraph.

We focus our analysis on the two following age groups: 1) individuals aged 25-34 (young workers) and, 2) individuals aged 35-54 (prime-aged workers). We do not analyze trends in pension coverage for workers aged 17-24 since potential changes in their coverage may have little impact on their retirement income, given their high probability of changing jobs in subsequent years. Likewise, we exclude individuals aged 55-64 since many may benefit from early retirement provisions and those still working may not be representative of the whole population of individuals aged 55-64.

Like PPIC data, LMAS and SLID allow us to measure pension coverage in all jobs held by paid workers. In contrast, SUM measures pension coverage only for the main job held in December.[14] For this reason, the sample we select in this paper (when using SUM-LMAS-SLID) consists of cross-sections of paid workers aged 25 to 54 employed in December in their main job. All industries are considered. Observations with missing data are deleted. The data cover the period 1984-1997.

[13] The few studies available on the accuracy of pension data obtained from employees (Duncan and Hill, 1985; Mitchell, 1987) suggest that workers' responses to pension coverage are quite accurate but that responses to more complex questions contain substantial measurement error. Using a sample of roughly 400 workers employed in a large U.S. manufacturing firm, Duncan and Hill (1985) find that workers' responses about pension coverage are excellent: compared to the company records, only 3% of workers' answers are invalid. However, responses to the more demanding questions related to the right of vesting and to early retirement provisions are less accurate: they yield invalid answers in 11% and 28% of the cases, respectively. Mitchell (1987) uses a sample of 637 workers from the 1983 U.S. Survey of Consumer Finances. Two main findings emerge. First, misinformation about pension *provisions* (e.g. type of plan, early retirement provisions, contribution information) is widespread. Second, highly educated employees who have long seniority and who have well-paid jobs in large firms or in the unionized sector are better informed about the characteristics of their pension plan.

[14] The main job is the job with the greatest number of weekly hours.

3.2 Trends in RPP coverage : 1984-1997

Columns 1-4 of Table 1 present trends in RPP coverage, as derived from SUM-LMAS-SLID, for men and women aged 25 to 34 and for those aged 35 to 54. The numbers suggest a decline in pension coverage for three of the four demographic groups during the 1984-1997 period. Between 1984 and 1997, pension coverage dropped by more than 10 percentage points among young men : it fell from 54% in 1984 to 43% in 1997. A more moderate yet substantial decline is observed for older men : the proportion covered by a RPP dropped from 69% in 1984 to 63% in 1997.[15] In contrast, women aged 35 to 54 experience an increase in coverage during the period. Their RPP coverage was 46% in 1984, reached a peak at 56% in 1994 and then stood at 51% in 1997. Young women's coverage ranged from 43% to 46% between 1984 and 1993 and then decreased by 6 percentage points between 1993 and 1997.

Columns 5-8 of Table 1 confirm that the qualitative changes in RPP coverage documented with SUM-LMAS-SLID are also found in tax data. The numbers presented show the percentage of tax filers who make positive contributions to a contributory RPP in a given year. Members of contributory RPPs represent about 70% of all RPP members.[16] The data come from the Longitudinal Administrative Databank of Statistics Canada (LAD) and are based on a 10% sample of tax filers aged 25 to 54 who have at least $1,000 of annual earnings in 1994 constant dollars. [17] Between 1986 and 1997, the percentage of tax filers who participated in a contributory RPP fell 7 percentage points among young men, 6 percentage points among older men and 4 percentage points among young women. In contrast, this percentage rose 3 percentage points among prime-aged women. As for survey data, the growth in coverage observed among prime-aged women is not uniform : the percentage of women aged 35-54 making positive contributions to a contributory RPP rose 5 percentage points between 1986 and 1993 and then fell 2 percentage points between 1993 and 1997.

Further evidence that RPP coverage is, in the 1990s, declining for men and young women but slightly rising for prime-aged women is provided in Table 2. This table shows the percentage of tax filers participating in non-contributory RPPs as well as contributory RPPs (as proxied by the percentage of tax filers who have a positive pension adjustment

[15] The drop in pension coverage of young men and prime-aged men is consistent with PPIC data, which shows that the percentage of men who are members of RPPs have fallen from 48% in 1987 to 42% in 1997.

[16] Pension Plans in Canada, January 1, 1998, Catalogue no. 74-401-XPB, Statistics Canada.

[17] The restriction on earnings is imposed to ensure that the changes in the Canadian tax system which occurred in the 1980s - and which may have modified the proportion of low earners filing tax returns – will not spuriously affect the trends observed.

on their T1 tax return).[18] The numbers are available for the 1991-1997 period and still come from the LAD. They show that between 1991 and 1997, the percentage of workers participating in a RPP fell 5 percentage points among young men, 5 percentage points among older men and 3 percentage points among young women. In contrast, this percentage rose marginally (1 percentage point) among prime-aged women. Taken together, Tables 1 and 2 provide compelling evidence that since the mid-1980s, RPP coverage has fallen among men and young women and has risen among prime-aged women.[19]

In the subsequent sections, we compare coverage rates for the years 1986 and 1997. The justification for this choice is twofold. First, we want to select years which are fairly similar in terms of labour market conditions. If the percentage of new employees, many of whom are not eligible to join an RPP, rises when labour markets become tighter, the coverage rates will fall whenever (un)employment rates (fall) rise. We want to minimize this effect.[20] Second, we want to select years for which we can benefit from relatively large sample sizes. Under the first criteria, at least two pairs of years can be considered : 1) 1984 and 1993 (or 1994) and 2) 1986 and 1997. We select the latter pair of years because sample sizes are much larger in 1997 than they are in 1993. [21]

3.3 Overview

Table 3 shows pension coverage of young and prime-aged workers in 1986 and 1997. The drop in young men's coverage did not occur in all sectors of the economy. While young men employed in non-unionized jobs or full-time jobs experienced a decline in coverage, RPP coverage did not drop for those who were unionized or working part-time. The decline was observed in construction, manufacturing, in all service industries, in almost all occupational groups and both for university graduates and non-university graduates.

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[18] The pension adjustment is the sum of credits for the year, if any, from deferred profit sharing plans or benefit provisions of registered pension plans sponsored by the taxfiler's employer. Memebership in deferred profit sharing plans is a very small proportion of membership in RPPs : in 1993, the former represented only 7% of the latter (Frenken, 1993). As a result, changes in the percentage of taxfilers with positive pension adjustment should reflect mainly changes in the percentage of taxfilers who are members of RPPs.

[19] The reader may note that the percentages shown in Table 2 are smaller than those shown in columns 1-4 of Table 1. This is mainly due to the fact that the denominator used in the calculation of these percentages (i.e. the number of tax filers with annual earnings of at least $1,000 in 1994 constant dollars, in the tax data, and the number of paid workers employed in December in their main job, in SLID) is bigger in the tax data than it is in SLID.

[20] One could argue that changes in the percentage of new employees could be taken into account by controlling for seniority in the multivariate analysis. While this is certainly true, we show below that the seniority variable available in the various surveys used in this paper does not produce reliable trends and thus, cannot be used as a regressor.

[21] This choice also allows us to examine the most recent trends in pension coverage. The employment rates of men aged 25-54 are very similar in 1986 and 1997 : data from the Labour Force Survey shows that they equal 86.5% in 1986 and 83.9% in 1997. Sample sizes are twice as large in SLID 1997 as they are in SLID 1993. This is due to the inclusion of a second panel in the survey, starting in 1996.

At least two factors can potentially explain the drop in young men's coverage. First, the unionization rate for this group fell substantially during the period: it dropped from 39% in 1986 to 26% in 1997 (Table 4). Since young men's coverage rates are twice as high in unionized jobs as they are in non-unionized jobs (Table 3), the decrease in the unionization rate is likely to have lowered their coverage rate. Second, employment of young males has shifted away from distributive services (-5 percentage points) and public services (-2 percentage points) towards business services (+4 percentage points), consumer services (+3 percentage points) and construction (+3 points). Since coverage rates in the first two sectors are much higher than they are in the last two sectors (Table 3), this inter-industrial shift is a second potential explanation.

Similar to young men, the drop in coverage of prime-aged men was limited to non-unionized jobs. However, it occurred in all major industrial groups except construction but was not observed in all occupations. It affected both university and non-university graduates and both full-time and part-time jobs. As for young men, the decline in union density (from 48% in 1986 vs 41% in 1997) and inter-industrial shifts (away from public services; -5 percentage points, towards consumer services; +3 percentage points, business services; +2 percentage points, and distributive services; +2 percentage points) of employment are two potential explanations of the decline in coverage of prime-aged men.

However, the decline in unionization rate should have a more limited impact among prime-aged men because : 1) it is less pronounced among prime-aged men than among young men and, 2) the union/non-union differential in pension coverage is, in relative terms, lower among the former than among the latter.

The slight drop in coverage of young women was far from being widespread : it was limited to unionized jobs, full-time jobs, distributive and consumer services, clerical and sales-related occupations. Interestingly, coverage rose in part-time jobs.[22] Once again, the decline in the unionization rate of these women (from 34% in 1986 to 28% in 1997) and intersectoral shifts of employment (away from public services; -4 percentage points, towards consumer services; +5 percentage points) are likely to have played in the drop in their RPP coverage. The impact of occupational shifts away from clerical jobs (-11 percentage points) is unclear since it is accompanied by movements of employment towards both better-covered jobs (professional and managerial occupations; +3 percentage points) and jobs that tend to have relatively low coverage (services-related occupations; +5 percentage points).

The increase in coverage of prime-aged women is found both in unionized and non-unionized jobs and both in part-time and full-time jobs. It is the most pronounced in sales-related occupations (+13 percentage points). Contrary to what is observed for the three other demographic groups, union density dropped marginally for prime-aged women and thus cannot have exerted significant downward pressures on their coverage rate. Interindustrial shifts of employment are also expected to play a minor role since they involve industrial groups with fairly similar coverage rates (manufacturing; -4 percentage points, business services; +3 percentage points). In contrast, occupational shifts of

[22] This may be related to the new legislation, introduced in the 1980s and early 1990s, which required coverage to be made available to part-time workers when full-time workers were covered by a plan.

employment towards professional and managerial positions (+5 percentage points) and away from clerical and services-related occupations (-2 percentage points each) are likely to explain part of the increase in coverage of prime-aged women.

4. Estimation Results

In this section, we assess the extent to which changes in coverage rates among age groups are due to either compositional effects (e.g. de-unionization, inter-industrial shifts in employment) or to structural changes in pension coverage (i.e. changes in coverage within cells). We estimate a logit model of the probability of being covered by a pension plan.[23] Our set of controls consists of union status, industry (2-digit), occupation (8 groups), province, education (2 groups), age (2 groups) and a part-time indicator. As mentioned above, unions may negotiate with employers on fringe benefits as well as on wages. This may affect a firm's decision to offer and maintain an RPP. The industry variable is meant to capture sectoral differences in coverage. Controls for broad occupational groups are intended to take into account the fact that different pension plans may be offered to different groups of workers within the firm. Provincial controls encompass any differences in provincial legislation that may affect the coverage rate. Education is included to control for worker skills : firms employing highly-skilled workers may have relatively high costs of turnover and thus may have greater incentives to offer a pension plan as a means of keeping their employees.[24] For the sample of workers aged 25-34 (35-54), we include the age categories 25-29 and 30-34 (35-44 and 45-54). This inclusion attempts to highlight differences in the eligibility conditions related to age prior to the introduction of the new legislation in the mid-1980s as well as potential age differences in the tendency to participate in voluntary plans. Since coverage rates are higher for highly paid jobs than for low-paid jobs (Frenken and Maser, 1992), we also include real hourly wages as a regressor in a second specification. Because the endogeneity of wages may bias coefficient estimates, we also present results for a model without wages.

Ideally, we would like to include two additional regressors. First, one would like to include tenure with the employer as a regressor because eligibility conditions are based on the number of years of seniority. While this variable is available in both 1986 and 1997, it provides a misleading picture of changes in seniority. Data from the Labour Force Survey - which provides a consistent time series on tenure with the employer - shows a slight increase in the proportion of young men with less than one year of seniority between 1986 (24%) and 1997 (26%). In contrast, LMAS 1986 and SLID 1997 show a decrease in this proportion (from 24% in 1986 to 19% in 1997). Consequently, using tenure with the employer as a regressor is likely to bias our results. As long as new employees are less likely to be covered by an RPP than those with more seniority, including tenure could lead

[23] The logit models are estimated separately for each age-gender group and for each of the two years 1986 and 1997.

[24] Changes in the coding of the educational categories between 1986 and 1997 imply that the two following educational categories are consistent over time : 1) individuals with less than a university degree, 2) university graduates. We use these two categories to define our education variable.

us to infer that a (spurious) decline in the percentage of young men with less than one year of seniority has tended to *increase* the coverage for young men.[25]

Second, controls for firm size should be included since RPP coverage varies with firm size (Morissette, 1993). However, LMAS and SLID have widely different proportions of observations for which firm size is unknown. In LMAS 1986, firm size is unknown for 12% of observations whereas the comparable percentage is only 2% in SLID 1997. Restricting our sample to observations for which firm size is known would likely introduce a selection bias in our results. For this reason, we do not include controls for firm size in our logit models.

To determine the sources of change in coverage rates, we use three methods. First, we apply the Oaxaca-Blinder decomposition method to a linear probability model (LPM). Second, we follow the approach of Even and Macpherson (1994) (E-M). For each of the four demographic groups, we estimate the aforementioned logit model for the 1986 and 1997 samples. We then calculate the hypothetical (or predicted) coverage rate that would have been observed in 1997 if the 1997 sample characteristics had been combined with the 1986 logit coefficients.[26] [27] The difference between the 1997 coverage rate and this hypothetical rate is due to changes in logit coefficients - which reflect changes in coverage within cells - and is called the "unexplained" change in coverage rates. The difference between the hypothetical rate and the 1986 coverage rate measures the "explained" change in coverage rates. This "explained" component can be further broken down to assess the impact of each regressor (e.g. union status, industry) on the changes in coverage. Third, we use the Doiron-Riddell's (1993) method (D-R). This decomposition is based on a first-order Taylor series approximation of the probability of being covered by an RPP. Like the two previous methods, it allows us to assess the impact of each regressor on the changes in coverage (see Appendix 2 for details on the E-M and D-R methods). The results are presented in Table 5.

The parameter estimates of the logit models imply that the probability of being covered by a pension plan increases with unionization and wages, is higher in full-time jobs than in part-time jobs and is higher among clerical workers than among those involved in

[25] This is exactly the result we obtained for young males, in previous experiments, after estimating a logit model which included a dummy variable for employees with less than one year of seniority.

[26] This is done by calculating individual probabilities based on 1997 sample characteristics and 1986 logit coefficients and then by taking the average of these individual probabilities. For more details, see Appendix 2.

[27] The results of likelihood ratio tests confirm that for all four demographic groups, separate regression models should be estimated for 1986 and 1997. The hypothesis that there is no significant difference between estimating separate logit models for each year and estimating a pooled model is rejected at the 5% level of significance for all specifications and demographic groups except for the specification with wages for men aged 25-34. In that case, the null hypothesis is rejected at the 10% level.

primary/processing occupations.[28] Among men, the probability of being covered is also higher in clerical than sales occupations.[29]

4.1 Men aged 25-34

For both specifications (i.e. with and without real wages) and for all three methods (i.e. LPM, E-M and D-R), the numbers show that de-unionization and inter-industrial shifts in employment were the main factors behind the drop in young men's coverage. Depending on the type of model and specification used, the decline in unionization decreased young men's coverage by 4.3 to 6.3 percentage points.[30] Movements of employment across industries caused an additional decrease ranging between 2.8 and 4.0 percentage points. Taken together, de-unionization and inter-industrial shifts explain at least 90% of the decline in young men's coverage. Consequently, employment shifts towards low-coverage jobs, rather than a decline in coverage rates within industry-union cells, explain the bulk of the decline in the coverage rate for young men.[31]

4.2 Men aged 35-54

The same story applies to prime-aged men. The decline in their unionization rate decreased their pension coverage by 1.9 to 2.3 percentage points. As expected, this impact is smaller than the one observed among young men. Shifts of employment towards low-coverage industries caused an additional drop of 1.6 to 1.9 percentage points. All other explanatory variables had a negligible impact. When combined, the decline in union density and intersectoral shifts of employment explain at least 75% of the drop in coverage of prime-aged men.

[28] The parameter estimates of the logit models and of the linear probability models are available on request from the authors.

[29] Since the new legislation introduced in the 1980s and at the beginning of the 1990s required that coverage be made available to part-time workers when full-time workers were covered by a plan, one would expect the probability of being covered to be uncorrelated with the full-time variable in 1997. There may be at least two reasons why this is not the case. First, our controls for industry remain fairly broad and the positive effect observed for the full-time variable may reflect the possibility that full-time workers are concentrated in (more detailed) industries with high coverage. Second, within industries, full-time workers could be concentrated in firms which offer high pension coverage.

[30] When using the Doiron-Riddell's method, we choose to linearize at the mean values of the explanatory variables (e.g. Riddell (1993). We do so because, for all four demographic groups, pension coverage is fairly close to 50% : this allows us to use the mean values as our "representative agent" each year. As a result, we are decomposing the *predicted* change in coverage when using the D-R method. With the Even-Macpherson's method, we are decomposing the observed change in coverage.

[31] The growth of part-time employment had a limited impact, causing a drop of 0.8 to 1.5 percentage points in the coverage rate.

4.3 Women aged 25-34

As was the case for men, changes in unionization rate and inter-industrial shifts in employment tended to decrease the coverage rate for young women. Depending on the specification and model used, the decrease in young women's unionization rate (from 34% in 1986 to 28% in 1997) caused a drop in their coverage ranging from 2.0 to 2.8 percentage points. Changes in the composition of employment by industry had a slightly bigger impact, ranging between 2.4 and 3.5 percentage points. Unsurprisingly, occupational shifts away from clerical jobs and towards both professional/managerial occupations and services-related occupations had virtually no impact on the coverage rate. For all three methods and for both specifications, we find an unexplained increase in young women's coverage which range from 2.1 to 3.5 percentage points. This means that the slight decrease in young women's coverage resulted from two offsetting forces : 1) movements of employment towards non-unionized jobs and low-coverage industries, which tended to decrease coverage and, 2) structural changes in coverage which tended to increase coverage within cells.

4.4 Women aged 35-54

As expected, changes in union density and interindustrial shifts of employment had no significant impact on the increase in coverage of prime-aged women. In contrast, occupational shifts of employment towards professional/managerial positions and away from clerical and services-related occupations explain part of the increase in coverage of prime-aged women : they tended to raise coverage by 0.7 to 1.4 percentage points. When real wages are omitted, these occupational shifts are the only factor which matters : they account for 15%-22% of the (observed or predicted) increase in coverage. The growth of real wages of women aged 35-54 (8% between 1986 and 1997) also explains part of the increase. When real wages are included, the increase in real wages (which may reflect a growing tendency to hold highly skilled jobs, for which turnover costs are high) account for 12% to 35% of the increase in coverage. Nevertheless, for all three methods and for both specifications, at least 60% of the increase in coverage remains unexplained. Thus, while the decreases in pension coverage observed among men and young women appear to be caused primarily by movements of employment towards non-unionized jobs and low-coverage industries, the increase in coverage found among prime-aged women results mainly from increases in coverage within sectors defined jointly in terms of industry, occupation, union status and other variables.

5. Retirement savings : 1986-1997

While changes in pension coverage provide useful information on an important component of workers' total compensation, they are silent on the extent to which workers prepare themselves for retirement. One way to address this issue is to examine how the amounts individuals contribute to tax-assisted retirement savings programs have evolved over time. In this section, we use data from the LAD to document the evolution of workers' contributions to two major tax-assisted retirement savings programs : RPPs and RRSPs. Our results cover the 1986-1997 period.

Table 6 shows the real average contributions made to RPPs and RRSPs by young and prime-aged workers.[32] The denominator used in the calculation of these average contributions consists of all workers in a given age-gender group, rather than only workers who have made positive contributions. For instance, the average contributions to RPPs which are presented in this table capture both changes in the percentage of workers who are members of RPPs and average contributions of those who make positive contributions.

Four findings emerge from Table 6. First, consistent with the decline in RPP coverage documented among men and young women in columns 1-4 of Table 1, average contributions to RPPs have fallen susbtantially among young and prime-aged men and have dropped slightly among young women between 1986 and 1997. Similarly, average RPP contributions of prime-aged women have risen. Second, RRSP contributions have grown dramatically during the period : for each of the four age-gender groups, they have risen by at least 70%. Third, for all three groups which have experienced a decline in RPP coverage during the period (young men, prime-aged men and young women), the growth in RRSP contributions offsets any decline in average RPP contributions. As a result, the sum of RPP and RRSP contributions has risen substantially for these three groups. Put simply, even though workers in these three groups may have experienced a decline in their total compensation (through the decline in their pension coverage), they appear to prepare themselves for retirement better in the late 1990s than they did in the mid-1980s. Fourth, prime-aged women have also increased their RRSP contributions markedly during the period. Combined with the increase in their RPP contributions, this has produced an increase in the sum of both contributions of about 70%.

The conclusions drawn in the previous paragraph refer to the "average' worker. In Table 7, we examine the extent to which these conclusions hold for workers located in different quintiles of the earnings distribution. Specifically, the numbers presented in this table show the sum of average RPP and RRSP contributions within each quintile of age-gender specific earnings distributions.

The main message of Table 7 is that the averages presented in Table 6 mask considerable heterogeneity among workers in different quintiles. There are drastic differences in average contributions to RPPs and RRSPs between the bottom (first) and the top (fifth) quintile. Contributions to RPPs and RRSPs made by workers in the top quintile are between 11 times and 35 times greater than those made by workers in the bottom quintile. Contributions made by workers in the bottom quintile are very small : they never exceed $200 per year for young men and young women and equal at most $630 per year among prime-aged men and prime-aged women. In contrast, contributions made by workers in the top quintile are substantial, averaging between $2,900 and $5,800 per year during the period, depending on the age-gender group considered.

For all demographic groups and all quintiles, real contributions to RPPs and RRSPs have grown over the 1986-1997 period. However, in absolute terms, the magnitude of the increase is negligible among workers in the bottom quintile : it varies between $60 among young women and $170 among prime-aged women. On the other hand, the magnitude of

[32] Due to confidentiality rules, numbers (for RPP contributions and RRSP contributions separately) which are below $1,000 are rounded to the nearest $10 while numbers above $1,000 are rounded to the nearest $100.

the increase is substantial among workers in the top quintile, ranging from $1,700 among young women to $2,300 among prime-aged men.

In sum, even though Canadian workers appear to prepare themselves for retirement better than they did in the mid-1980s, the extent to which they do so differs markedly between low earners and high earners. While low earners have increased their contributions to two major tax-assisted retirement savings programs during the period considered, they still contribute very small amounts to these two programs.

6. Conclusions

In this paper, we used survey data and tax data to document trends in pension coverage among men and women of different age groups. Both data sources produce consistent results : they show that, between 1986 and 1997, pension coverage has fallen among men and young women but has risen among prime-aged women.

Because we had microdata on worker and job characteristics, we were able to assess the extent to which these changes in coverage have been induced by movements in the industrial and occupational structure of employment as well as by changes in union density. Our results indicate that these movements are important determinants of the changes in coverage rates. Specifically, we find that the decline in unionism and employment shifts towards low-coverage industries explain most of the decline in pension coverage observed among men and young women.

Several other explanations can be put forward to justify a possible decrease in RPP coverage. First, increases in competition - from abroad or within industries - may induce Canadian firms to cut labour costs and perhaps terminate some pension plans. New firms entering a market may avoid offering plans to maximize their chances of survival during the first few years after entry. Second, as mentioned previously, increases in employers' contributions to various programs, such as C/QPP or Employment Insurance, may lead new firms not to offer an RPP or induce existing firms to terminate a plan (Frenken, 1996). Third, any increase in administrative costs (e.g. an increase in hourly fees for actuarial services in defined-benefit plans) could reduce firms' incentives to provide RPPs and lead them to either move to group RRSPs or to offer no retirement plans at all. Lastly, the legislative changes introduced during the 1980s and early 1990s regarding vesting requirements, locking-in requirements and cost sharing - which we documented in Appendix 1 - may have increased the costs of providing pension plans and may have prevented some new employers from offering RPPs or may have induced existing employers to terminate plans.

It is worth noting that the decline in unionization may not be purely exogenous : it could be caused - at least partly - by increases in competitive pressures which could induce employers to be more aggressive vis-à-vis unions. Thus, increases in competition - which could in turn originate from technological changes - could be a major factor behind the decline in coverage observed among three demographic groups.

Our results raise some concern about job quality for young men. Several studies (Morissette, Myles and Picot, 1994; Beach and Slotsve, 1996) have documented a decline

in real annual earnings of young men during the 1980s. [33] Unless the decline in young men's pension coverage is totally offset by the growth in group RRSPs (with equivalent employer contributions), the drop in their *total compensation* is underestimated. Second, our results suggest that, unless the trends regarding unionization and inter-industrial shifts reverse and unless the growth in group RRSPs offsets the decrease in RPP coverage, new cohorts of young men may have to accept jobs providing lower fringe benefits than those received by previous cohorts. Recent work by Beaudry and Green (1996) and Morissette (1997) has shown that young males experienced a downward shift in their age-earnings profile during the 1980s. Our results raise a related question: will the drop in RPP coverage observed among young men have long-term effects, i.e. affect their retirement income?

Our results from section 5 provide a partial answer to this question. They show that the dramatic growth in RRSP contributions observed among young men has tended to offset any decline of their RPP contributions. The extent to which young men prepare themselves for retirement – as measured by their contributions to RPPs and RRSPs - appears to have improved over the last fifteen years. While these calculations do not take into account the impact of the loss of employer RPP contributions (resulting from the decline in pension coverage) on young workers' retirement income, at the very least, they provide some evidence that young workers' contributions to RRSPs have evolved in a way which tends to increase their retirement income (abstracting from potential future changes to C/QPP programs).

This conclusion must be put into perspective since it may not apply to all young men. Contributions to RPPs and RRSPs made by young men in the bottom quintile are extremely small and, in absolute terms, have barely risen over the last fifteen years. This suggests that increases in future retirement income may be marginal or nonexistent for this group.

A priori, one should keep in mind that decreases in RPP benefits do not necessarily imply that workers are worse off. There may be a certain degree of substitution between direct and indirect payroll benefits. Also, even though pension coverage of young women fell between 1986 and 1997, the real annual earnings of young female full year full-time workers rose by 5% during the period.[34] However, decreases in RPP benefits of young men and prime-aged men suggest that they are worse off since - abstracting from the potential effect of group RRSPs - the decline in their RPP coverage observed between 1986 and 1997 took place in a period where their real earnings did not increase.[35]

Our conclusion that Canadian workers appear to prepare themselves for retirement better in the late 1990s than their counterparts in the mid 1980s must be put into context. The

[33] Between 1975 and 1986, real annual earnings of men aged 25-34 employed full year full-time dropped 6.5%. Between 1986 and 1997, they fell an additional 2.5% (Authors' calculations from the Survey of Consumer Finances).

[34] Authors' calculations from the Survey of Consumer Finances.

[35] As mentioned in footnote 33, real annual earnings of men aged 25-34 employed full year full-time dropped 2.5% between 1986 and 1997. A corresponding drop of 1% is found for prime-aged men.

increase in RRSP contributions may not represent a net increase in savings. As pointed out in previous studies (e.g. Gale 1998), it is unclear whether tax-assisted retirement savings programs (such as RPPs and RRSPs) encourage new savings or simply induce a shift of savings from one source to another.

The growth in pension coverage observed among prime-aged women must be interpreted with caution. The reason is that it is not monotonic between 1986 and 1997. Both survey data and tax data indicate that coverage rose between 1986 and 1993 but then fell between 1993 and 1997. These trends are consistent with PPIC data, which shows that pension coverage among women rose from 36% to 42% between 1987 and 1993 and then fell to 40% in 1997.[36] The fact that pension coverage of prime-aged women has started to fall in the more recent past may signal subsequent declines in coverage in the near future for this group.

We have acknowledged the possibility that part of the changes in pension coverage measured in our survey data could reflect changes in the incidence of workers who are members of group RRSPs. Whether or not this is the case, our results suggest that, unless the decline in RPP coverage is *totally* offset by the growth in group RRSPs (with equivalent employer contributions), many Canadian workers may have to accept jobs providing lower fringe benefits than those received by their counterparts at the beginning of the 1980s.

Finally, it should be kept in mind that the trends observed at the individual level may be different than those observed at the family level. For instance, the susbstantial drop in pension coverage of young men could be partly offset by the growth in labour market participation of spouses in today's young dual-earner couples. Whether or not this is the case is a question for future research.

[36] Pension Plans in Canada, January 1, 1998, Catalogue no. 74-401-XPB, Statistics Canada.

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Appendix 1 : Legislative changes implemented in the 1980s and the early 1990s

During the 1980s and early 1990s, legislative changes took place in most provinces and affected at least three pension provisions : 1) vesting requirements, 2) locking-in requirements, and 3) cost sharing. These three changes tend to reduce the offer rate.

First, vesting requirements have been made more stringent for employers. The new laws require that employees terminating employment be entitled to their employer contributions if they have at least 2 years of plan membership, regardless of age. The previous legislation required that employees terminating employment be entitled to their employer contributions only if they were at least 45 years old *and* had at least 10 years of continuous service. This legislative change increases the costs of pension plans and, as a result, is likely to reduce firms' incentives to offer plans.

Second, the previous legislation required that benefits be locked-in only if individuals were at least 45 years old *and* had at least 10 years of continuous service. The new legislation now requires that benefits be locked-in as long as a worker has 2 years of plan membership. This reduces workers' opportunity to take a refund of their own contributions, which may imply forfeiting the employer contributions paid on their behalf. In other words, the option of taking a refund, which may imply lower costs for employers, is now available to fewer workers: this is likely to result in higher costs for some firms.

Third, there have been changes to the minimum contributions required from employers in contributory defined benefit plans. Prior to the new legislation, employer contributions simply had to be sufficient to provide the benefits to which employees were entitled. Other things equal, higher rates of return on funds originating from employee contributions necessitate lower employer contributions. As a result, employer contributions could, in some cases, amount to less than half of the employee's pension entitlement. The new legislation now imposes cost sharing, i.e. requires that employers pay 50% of an employee's pension entitlement. This is likely to increase costs for at least some employers.

Another factor that may have increased employer costs when the legislation was revised is that coverage had to be made available to part-time workers when full-time workers were covered by a plan. The immediate effect should be to increase employer costs and to increase pension coverage. In the longer run, however, coverage could decrease since the inclusion of part-time workers may reduce firms' incentives to offer plans.

Appendix 2

I. Even - MacPherson's method:

(i) Consider $\bar{m}_{86}$ and $\bar{m}_{97}$, the average probability of pension coverage for 1986 and 1997, respectively:

$$\bar{m}_{86} = \frac{1}{N_{86}} \sum_{i=1}^{N_{86}} F\left(C_{i_{86}}, B_{86}\right) \qquad (1)$$

$$\bar{m}_{97} = \frac{1}{N_{97}} \sum_{i=1}^{N_{97}} F\left(C_{i_{97}}, B_{97}\right) \qquad (2)$$

Where: N_{86} *and* N_{97} are the sample sizes of 1986 and 1997, respectively

F is the cumulative density function of a logistic distribution

Xi_{86} and Xi_{97} are vectors of explanatory variables for individual *i* in year 1986 and 1997, respectively

B_{86} *and* B_{97} are vectors of coefficients for the years 1986 and 1997, respectively

(ii) Define

$$\bar{m}_{0} = \frac{1}{N_{97}} \sum_{i=1}^{N_{97}} F\left(C_{i_{97}}, B_{86}\right) \qquad (3)$$

As the average probability that one would have obtained if the sample of 1997 had the 1986 coefficients

(iii) Then it follows from equations (1) - (3) that:

$$\bar{m}_{97} - \bar{m}_{86} = \left(\bar{m}_{97} - \bar{m}_{0} \right) + \left(\bar{m}_{0} - \bar{m}_{86} \right) \qquad (4)$$

$$\bar{m}_{97} - \bar{m}_{86} = \left[\frac{1}{N_{97}} \sum_{i=1}^{N_{97}} F\left(C_{i_{97}}, B_{97}\right) - \frac{1}{N_{97}} \sum_{i=1}^{N_{97}} F\left(C_{i_{97}}, B_{86}\right) \right]$$

$$+$$

$$\left[\frac{1}{N_{97}} \sum_{i=1}^{N_{97}} F\left(C_{i_{97}}, B_{86}\right) - \frac{1}{N_{86}} \sum_{i=1}^{N_{86}} F\left(C_{i_{86}}, B_{86}\right) \right] \qquad (5)$$

The term on the second line of equation (5) measures the "explained" change in coverage, i.e. the change in coverage due to compositional effects (i.e. changes in the X's)

The term on the right-hand side of the first line of equation (5) measures the "unexplained" change, i.e. the change in coverage due to changes in the B's.

(iv) The "explained" change (EXP) can be broken down to measure the contribution of each regressor j : Even-MacPherson define the contribution of regressor j (Z_j) as follows:

$$Z_j = EXP * \frac{\left[\left(\bar{C}_{j_{97}} - \bar{C}_{j_{86}} \right) * B_{j_{86}} \right]}{\left[\left(\bar{C}_{97} - \bar{C}_{86} \right) * B_{86} \right]} \qquad (6)$$

Where: $\bar{C}_{j_{97}}$ *and* $\bar{C}_{j_{86}}$ are the average values of regressor j in year 1997 and 1986, respectively.

$B_{j_{86}}$ is the logit coefficient for regressor j in year 1986

$\left[\left(\bar{C}_{97} - \bar{C}_{86} \right) * B_{86} \right]$ is simply the sum of changes in average values of <u>all</u> regressors, weighted by logit coefficients in year 1986

EXP is the "explained" change in coverage

II. Doiron - Riddell's method:

The change in coverage between 1986 and 1997 for an individual with characteristics $C_{i_{86}}$ *and* $C_{i_{97}}$ can be written as:

$$F(X_{i_{97}} B_{97}) - F(X_{i_{86}} B_{86}) \approx \frac{\partial F}{\partial Y} * (X_{i_{97}} B_{97} - X_{i_{86}} B_{86}) \qquad (7)$$

To implement equation (7), we need to choose the representative individual in 1986 and 1997 and the point Y around which the linearization is performed. A natural candidate for C_{i_t} is $\bar{C}_t$. For all four demographic groups, pension coverage varies between 40% and 65% and thus is fairly close to 50%. This allows us, - as Riddell (1993) does - to use the mean values as our "representative agent" each year.

Thus we choose to linearize at the mean values. We set $Y = \bar{C}_{86} B_{86}$.

The first term on the right hand size of equation (7) is the derivative of the logit cumulative density function evaluated at Y. The second term is a linear function of characteristics and coefficients and can thus be decomposed (as well as broken down into components) in the usual manner.

Thus, the decomposition we perform is the following:

$$F(\bar{C}_{97} B_{97}) - F(\bar{C}_{86} B_{86}) \approx \frac{\partial F}{\partial Y} * (\bar{C}_{97} B_{97} - \bar{C}_{86} B_{86}) \qquad (8)$$

In the Even-MacPherson method, we decompose the <u>observed</u> change in coverage

(since $\bar{m}_{97}$ and $\bar{m}_{86}$ equal pension coverage in 1997 and 1986, respectively)

By linearizing at the mean *X's*, we decompose the <u>predicted</u> change, i.e. the difference in probabilities evaluated at the means (rather than the difference in average probabilities)

The right-hand side of equation (8) is called the approximated change

The left-hand side of equation (8) is called the predicted change

The difference between the two is called the approximation error

The contribution of regressor *j* to the "explained" change is:

$$\frac{\partial F}{\partial Y} * (\bar{C}_{j\,97} - \bar{C}_{j\,86}) \bullet B_{j\,86} \qquad (9)$$

The "explained" change is:

$$\frac{\partial F}{\partial Y} * (\bar{C}_{97} - \bar{C}_{86}) \bullet B_{86} \qquad (10)$$

The "unexplained" change is:

$$\frac{\partial F}{\partial Y} * (B_{97} - B_{86}) \bullet \bar{C}_{97} \qquad (11)$$

Table 1 : Pension coverage of men and women, by age, 1984-1997.

Concept measured	Percentage of paid workers covered by a pension plan connected with their job				Percentage of tax filers who make positive contributions to a contributory RPP			
Data sets	SUM-LMAS-SLID*				Londitudinal Administrative Databank (LAD)**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Demographic group	Men 25-34	Men 35-54	Women 25-34	Women 35-54	Men 25-34	Men 35-54	Women 25-34	Women 35-54
Year								
1984	0.542	0.693	0.467	0.457	-	-	-	-
	(0.009)	(0.007)	(0.009)	(0.009)				
1986	0.504	0.672	0.429	0.464	0.262	0.378	0.276	0.319
	(0.010)	(0.007)	(0.011)	(0.009)				
1987	0.496	0.676	0.431	0.468	0.256	0.370	0.273	0.323
	(0.008)	(0.007)	(0.010)	(0.008)				
1988	0.509	0.675	0.430	0.496	0.255	0.370	0.277	0.338
	(0.010)	(0.007)	(0.011)	(0.009)				
1989	0.517	0.689	0.432	0.508	0.247	0.362	0.273	0.343
	(0.011)	(0.008)	(0.012)	(0.010)				
1990	0.491	0.692	0.448	0.505	0.245	0.361	0.277	0.350
	(0.010)	(0.008)	(0.012)	(0.009)				
1991	-	-	-	-	0.241	0.357	0.277	0.357
1992	-	-	-	-	0.238	0.355	0.282	0.365
1993	0.469	0.687	0.463	0.542	0.232	0.353	0.279	0.368
	(0.017)	(0.013)	(0.019)	(0.015)				
1994	0.492	0.710	0.443	0.558	0.221	0.344	0.270	0.366
	(0.017)	(0.013)	(0.019)	(0.016)				
1995	0.454	0.672	0.427	0.539	0.212	0.338	0.262	0.365
	(0.017)	(0.012)	(0.018)	(0.015)				
1996	0.439	0.632	0.409	0.519	0.203	0.329	0.251	0.360
	(0.010)	(0.008)	(0.011)	(0.010)				
1997	0.426	0.625	0.404	0.507	0.197	0.322	0.240	0.350
	(0.010)	(0.008)	(0.011)	(0.010)				
% change between 1986 and 1997	-15.5%	-7.0%	-5.8%	9.3%	-24.8%	-14.8%	-13.0%	9.7%
% change between 1993 and 1997	-9.2%	-9.0%	-12.7%	-6.5%	-15.1%	-8.8%	-14.0%	-4.9%

* The sample used in SUM-LMAS-SLID consists of paid workers aged 25-54 who are employed in December. The numbers refer to the main job held in December. The main job is the job with the highest weekly hours. There is no household survey which provides data on pension coverage for the years 1985, 1991 and 1992. Standard errors are between parentheses. Standard errors are corrected for the clustering of observations by individuals.

** The sample used in LAD consists of tax filers aged 25-54 who have annual earnings (wages and salaries plus net income from self-employment) of at least $1000 in 1994 constant dollars. Prior to 1986, LAD has no data on the percentage of tax filers who make positive contributions to a contributory RPP.

Table 2 : Percentage of tax filers with a positive pension adjustment, 1991-1997.*

Data set	Longitudinal Administrative Databank (LAD)			
Demographic group	Men 25-34	Men 35-54	Women 25-34	Women 35-54
Year				
1991	35.7	49.8	34.3	41.6
1992	35.3	49.7	35.1	42.9
1993	34.0	48.9	34.9	43.5
1994	32.2	47.4	33.6	42.9
1995	31.7	47.2	33.1	43.3
1996	30.8	46.2	31.9	42.9
1997	30.3	45.2	31.7	42.8
% change between 1991 and 1997	-15.1%	-9.2%	-7.6%	2.9%
% change between 1993 and 1997	-10.9%	-7.6%	-9.2%	-1.6%

* The sample consists of individuals aged 25-54 who have annual earnings (wages and salaries plus net income from self-employment) of at least $1,000 in 1994 constant dollars.

Table 3: Pension coverage of young and prime-aged workers, 1986 and 1997.

Variables	MEN				WOMEN			
	Aged 25 - 34		Aged 35 - 54		Aged 25 - 34		Aged 35 - 54	
	1986	1997	1986	1997	1986	1997	1986	1997
All	50.4	42.6	67.2	62.5	42.9	40.4	46.4	50.7
Union status								
Unionized	78.1	78.4	84.7	89.8	71.7	80.0	76.4	84.9
Non-unionized	33.0	30.3	51.2	43.4	28.1	25.0	28.4	30.8
Industry								
Agriculture and Fishing	8.0	-	-	-	-	-	-	-
Forestry and mining	63.6	-	69.3	64.8	-	-	-	-
Construction	31.9	29.7	41.7	46.7	-	-	-	-
Manufacturing	54.8	50.2	71.1	66.0	35.7	40.2	41.6	43.7
Distributive services	60.8	53.0	68.6	62.4	53.7	50.3	53.0	50.8
Business services	37.0	33.2	59.2	54.2	42.6	46.6	39.9	45.0
Consumer services	27.1	23.9	35.9	31.4	20.7	14.4	16.8	21.8
Public services	71.2	65.9	86.2	90.2	58.1	58.9	65.1	70.9
Occupation								
Professional / managers	49.8	44.1	73.7	61.6	49.5	53.4	56.8	58.9
Natural / Social science	59.9	51.1	80.5	79.2	56.4	57.3	67	71.3
Clerical	62.4	46.7	79.3	72.7	46.0	39.8	48.5	49.1
Sales	33.6	32.2	39.5	39.5	26.7	20.6	19.0	33.2
Services	45.6	41.4	62	62.9	19.6	19	25.4	24.1
Primary / Processing	50.4	39.1	64.6	60.9	26.9	33.1	27.7	29.4
Construction	48.8	36.0	58.9	59.6	-	-	-	20.2
Other	48.9	48.5	63.0	56.8	40.0	-	-	-
Education								
Less than university	49.4	40.9	64.1	59.8	39.8	35.9	42.6	45.8
University degree	54.9	48.9	78.9	72.1	56.6	53.3	67.1	69.2
Status								
Full-time	51.9	44.8	68.2	64.0	49.3	45.5	54.7	57.9
Part-time	16.1	15.7	27.5	24.7	20.4	24.6	22.5	28.9
Sample size	6,051	3,484	7,880	6,747	5,028	3,250	6,418	6,463

Note: The sample consists of paid workers aged 25-54 who are employed in their main job in December.

- : numbers too small to report.

Source : Labour Market Activity Survey of 1986
Survey of Labour and Income Dynamics of 1997

Table 4 : Changes in the distribution of employment, 1986 and 1997.

Variables	MEN				WOMEN			
	Aged 25 - 34		Aged 35 - 54		Aged 25 - 34		Aged 35 - 54	
	1986	1997	1986	1997	1986	1997	1986	1997
Unionized	38.6	25.6	47.9	41.1	34.0	28.0	37.6	36.9
Non-unionized	61.4	74.4	52.1	58.9	66.0	72.0	62.4	63.1
Industry								
Agriculture and Fishing	1.5	-	0.8	1.6	0.9	-	1.0	1.1
Forestry and mining	4.5	3.2	4.2	3.3	0.9	-	0.6	-
Construction	6.8	9.8	6.9	6.9	1.1	-	1.1	1.1
Manufacturing	25.9	24.9	26.3	24.6	12.6	12.3	13.7	10.0
Distributive services	20.3	15.0	17.9	19.7	8.5	7.7	7.5	8.7
Business services	8.6	12.2	7.5	9.8	16.7	16.7	11.4	14.3
Consumer services	17.1	20.0	10.9	13.6	22.9	28.1	21.8	21.6
Public services	15.4	13.5	25.6	20.5	36.4	32.5	42.9	42.4
Occupation								
Professional / managers	13.4	11.7	18.9	18.2	11.9	15.3	11.1	15.6
Natural / Social science	13.6	15.2	15.4	14.7	23.5	24.7	24.7	26.5
Clerical	7.1	6.7	5.7	5.2	34.6	23.6	30.4	28.3
Sales	8.0	7.8	5.8	6.4	7.0	9.0	7.9	7.6
Services	7.6	9.7	8.5	8.9	11.5	16.0	13.8	11.4
Primary / Processing	26.4	26.3	24.3	25.1	6.8	6.5	8.6	6.0
Construction	8.7	9.5	8.8	8.0	0.2	-	0.2	-
Other	15.3	13.1	12.6	13.6	4.4	4.6	3.1	4.5
Education								
Less than university degree	82.2	78.5	78.8	78.0	81.4	74.3	84.6	79.1
University degree	17.8	21.5	21.2	22.0	18.6	25.7	15.4	20.9
Status								
Full-time	95.8	92.6	97.6	96.1	77.9	75.5	74.3	75.1
Part-time	4.2	7.4	2.4	3.9	22.1	24.5	25.7	24.9
Average real hourly wages								
(1986 constant dollars)	$ 12.27	$ 12.09	$ 15.33	$ 15.16	$ 10.11	$ 10.19	$ 10.69	$ 11.56
Sample size	6,051	3,484	7,880	6,747	5,028	3,250	6,418	6,463

Note: The sample consists of paid workers aged 25-54 who are employed in their main job in December.
- : numbers too small to report.

Source: Labour Market Activity Survey of 1986.
Survey of Labour and Income Dynamics of 1997

Table 5: Sources of changes in pension coverage rates between 1986 and 1997.

	Men aged 25-34						Men aged 35-54					
Model	LPM	E-M	D-R	LPM	E-M	D-R	LPM	E-M	D-R	LPM	E-M	D-R
Independent variable	hourly wages excluded			hourly wages included			hourly wages excluded			hourly wages included		
Occupation	-0.06	-0.08	-0.10	-0.04	-0.06	-0.08	-0.31	-0.29	-0.33	-0.27	-0.23	-0.26
Province	0.08	0.09	0.11	0.03	0.03	0.04	0.00	-0.01	-0.01	0.00	-0.01	-0.02
Education	0.13	0.12	0.15	0.02	-0.01	-0.01	0.05	0.06	0.07	0.01	0.01	0.01
Age	0.34	0.37	0.48	0.23	0.24	0.32	0.06	0.06	0.07	0.04	0.04	0.05
Part-time	-0.76	-1.00	-1.29	-0.81	-1.12	-1.49	-0.46	-0.47	-0.53	-0.47	-0.48	-0.55
Union	-4.95	-4.82	-6.26	-4.57	-4.34	-5.77	-2.01	-1.99	-2.28	-1.97	-1.87	-2.16
Industry	-3.10	-3.07	-3.99	-2.85	-2.79	-3.71	-1.67	-1.67	-1.90	-1.63	-1.64	-1.88
Hourly wages	-	-	-	-0.22	-0.25	-0.33	-	-	-	-0.17	-0.22	-0.25
Total explained	-8.32	-8.41	-10.90	-8.21	-8.30	-11.03	-4.34	-4.30	-4.91	-4.45	-4.40	-5.07
Total unexplained	0.55	0.60	0.85	0.44	0.50	0.43	-0.44	-0.40	3.32	-0.31	-0.30	2.99
Total change	-7.77	-7.81	-	-7.76	-7.80	-	-4.78	-4.70	-	-4.77	-4.70	-
Approximated change	-	-	-10.05	-	-	-10.60	-	-	-1.60	-	-	-2.08
Approximation error	-	-	0.09	-	-	0.12	-	-	-0.03	-	-	-0.05
Predicted change	-	-	-9.96	-	-	-10.48	-	-	-1.63	-	-	-2.13

	Women aged 25-34						Women aged 35-54					
Model	LPM	E-M	D-R	LPM	E-M	D-R	LPM	E-M	D-R	LPM	E-M	D-R
Independent variable	hourly wages excluded			hourly wages included			hourly wages excluded			hourly wages included		
Occupation	0.11	0.03	0.04	0.01	-0.12	-0.15	0.96	0.72	1.39	0.82	0.76	1.01
Province	-0.04	-0.04	-0.05	-0.02	-0.02	-0.02	-0.21	-0.18	-0.35	-0.20	-0.26	-0.35
Education	0.39	0.42	0.53	0.15	0.14	0.18	0.25	0.20	0.38	0.09	-0.06	-0.08
Age	0.32	0.37	0.47	0.25	0.29	0.38	0.04	0.02	0.05	0.02	0.03	0.04
Part-time	-0.55	-0.66	-0.84	-0.57	-0.70	-0.90	0.20	0.16	0.31	0.20	0.25	0.33
Union	-2.28	-2.16	-2.75	-2.10	-1.97	-2.54	-0.24	-0.16	-0.32	-0.23	-0.22	-0.30
Industry	-2.59	-2.76	-3.51	-2.42	-2.56	-3.30	-0.15	-0.06	-0.11	-0.19	-0.24	-0.32
Hourly wages	-	-	-	0.11	0.12	0.16	-	-	-	0.51	1.45	1.93
Total explained	-4.64	-4.80	-6.10	-4.60	-4.80	-6.20	0.85	0.70	1.35	1.03	1.70	2.26
Total unexplained	2.12	2.30	3.46	2.08	2.30	3.47	3.46	3.60	7.73	3.28	2.60	6.86
Total change	-2.52	-2.50	-	-2.52	-2.50	-	4.31	4.30	-	4.31	4.30	-
Approximated change	-	-	-2.65	-	-	-2.73	-	-	9.08	-	-	9.12
Approximation error	-	-	0.04	-	-	0.04	-	-	0.12	-	-	0.12
Predicted change	-	-	-2.61	-	-	-2.69	-	-	9.20	-	-	9.24

Note: LPM: linear probability model. E-M: Even-MacPherson method. D-R: Doiron-Riddell method. The sum of components may not add to sub-totals or totals due to rounding.

Source : Authors' calculations from the Labour Market Activity Survey of 1986 and the Survey of Labour and Income Dynamics of 1997.

Table 6 : Average contributions to RPP's and RRSP's, 1986-1997.

	Men aged 25-34				Men aged 35-54		
	Contributions to :				Contributions to :		
	(1)	(2)	(3)		(4)	(5)	(6)
Year	RPP's	RRSP's	RPP's and RRSP'S	Year	RPP's	RRSP's	RPP's and RRSP'S
	($)	($)	($)		($)	($)	($)
1986	430	670	1100	1986	890	1500	2390
1987	410	560	970	1987	850	1500	2350
1988	400	710	1110	1988	850	1500	2350
1989	380	700	1080	1989	830	1400	2230
1990	380	690	1070	1990	840	1300	2140
1991	380	800	1180	1991	830	1700	2530
1992	390	870	1260	1992	850	1800	2650
1993	370	1000	1370	1993	830	2000	2830
1994	350	1100	1450	1994	810	2200	3010
1995	330	1300	1630	1995	780	2400	3180
1996	310	1600	1910	1996	750	2600	3350
1997	300	1600	1900	1997	710	2600	3310

	Women aged 25-34				Women aged 35-54		
	Contributions to :				Contributions to :		
	(7)	(8)	(9)		(10)	(11)	(12)
Year	RPP's	RRSP's	RPP's and RRSP'S	Year	RPP's	RRSP's	RPP's and RRSP'S
	($)	($)	($)		($)	($)	($)
1986	350	460	810	1986	520	860	1380
1987	340	380	720	1987	530	900	1430
1988	340	480	820	1988	540	950	1490
1989	330	470	800	1989	540	910	1450
1990	350	470	820	1990	580	880	1460
1991	350	540	890	1991	610	1000	1610
1992	370	600	970	1992	650	1100	1750
1993	380	730	1110	1993	670	1300	1970
1994	360	820	1180	1994	680	1400	2080
1995	340	930	1270	1995	660	1500	2160
1996	330	1100	1430	1996	640	1700	2340
1997	310	1100	1410	1997	620	1700	2320

* The sample consists of individuals aged 25-54, who had annual earnings (i.e. wages and salaries plus net income from self-employment) of at least $1,000 in 1994 constant dollars. The numbers are expressed in 1994 constant dollars.

Source : Longitudinal Administrative Databank, Statistics Canada.

Table 7 : Average contributions to RPPs and RRSPs, by quintile of the (age-gender specific) earnings distribution.*

Men aged 25-34

Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Quintile												
1st	100	70	120	110	100	120	130	140	140	160	180	170
2nd	370	300	420	410	390	380	410	440	450	520	620	600
3rd	800	690	830	810	800	800	820	880	980	1100	1300	1200
4th	1500	1300	1500	1500	1500	1600	1700	1800	1900	2200	2400	2400
5th	2800	2500	2700	2600	2600	3000	3300	3700	3900	4400	4800	5000

Men aged 35-54

Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Quintile												
1st	450	480	520	440	380	460	440	490	530	570	630	610
2nd	1300	1400	1400	1300	1200	1300	1300	1400	1400	1600	1700	1600
3rd	2100	2100	2200	2200	2100	2100	2300	2400	2500	2700	2900	2900
4th	2900	3000	3000	2900	2800	3200	3400	3600	3800	4000	4300	4300
5th	5000	4900	4900	4500	4300	5500	5900	6400	6600	7000	7300	7300

Women aged 25-34

Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Quintile												
1st	60	60	70	50	50	80	90	100	100	120	130	120
2nd	200	180	220	200	210	230	250	300	330	370	400	370
3rd	490	430	500	510	510	540	590	650	720	810	880	850
4th	1000	900	1000	990	1000	1100	1100	1300	1400	1500	1700	1700
5th	2300	2100	2300	2200	2300	2600	2800	3200	3400	3600	4000	4000

Women aged 35-54

Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Quintile												
1st	190	190	210	160	160	210	220	280	310	320	360	360
2nd	460	480	570	540	550	580	630	730	780	850	910	930
3rd	1000	1000	1100	1100	1100	1200	1300	1400	1500	1600	1800	1800
4th	1800	1800	1900	1900	1900	2000	2200	2400	2600	2700	3000	3000
5th	3500	3600	3600	3500	3500	4200	4500	4900	5100	5300	5700	5700

* The sample consists of individuals aged 25-54, who had annual earnings (i.e. wages and salaries plus net income from self-employment) of at least $1,000 in 1994 constant dollars. The numbers are expressed in 1994 constant dollars.

Source : Longitudinal Administrative Databank, Statistics Canada.