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Two Essays Examining the Impact on
Married Couples' Earnings Distributions of
Standardizing For Differences in Hours Worked

by

Mary A. Kilfoil

Submitted in Partial Fulfillment of the Requirements
for the degree of Ph.D

at

Dalhousie University
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Canada

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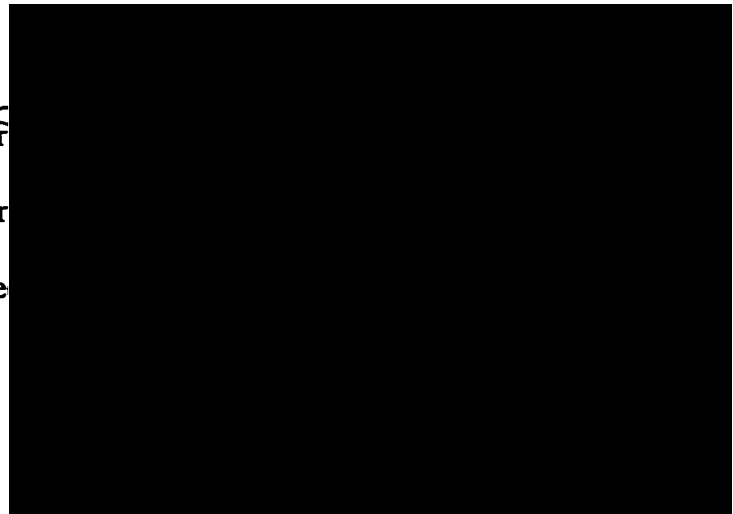
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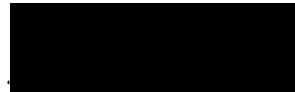
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To Brennan Zacharia, for many reasons!

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Abstract

This thesis is comprised of two separate but related essays examining the impact of standardizing for differences in average annual household hours of paid labour, either across countries or over time, in comparing household earnings. Household earnings are commonly adjusted for differences in prices faced by households or differences in household size between earnings distributions. This thesis proposes an additional standardization on household earnings to adjust for differences in hours of paid labour which exist across countries, or over time periods. For example, the annual hours of paid employment reported in the 1995 OECD Employment Outlook show employees in the United States work on average 1,780 hours per year versus European countries such as the Netherlands where employees work an average of 1,395 hours per year.¹ Chapter one examines the impact of standardizing for differences in hours worked on household earnings distributions across five OECD countries. Chapter two examines the impact of standardizing for differences in hours worked on household earnings distributions in Canada over the period of 1975 to 1994. Average annual household earnings and hours worked are examined at all vingtiles in the earnings distribution, and comparisons are then made across household earnings distributions.

¹ Source: OECD Employment Outlook, July 1995, Table C.

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Chapter One

Introduction

Although there has been a growing concern in understanding the impact of increased labour force participation of married women and the emergence of the “dual earner” family on the level and distribution of household earnings and income², little attention has been given to the change in the amount of labour time devoted to earning income, and the extent to which this also impacts the level of economic well-being of families. The counterpart to increased market earnings of second earners in the household, is a decline in the number of hours available for domestic production in the home and for leisure. It has been long argued by economists that the value of household production is significant and that ignoring the income and wealth generated by household production introduces a bias in various areas of economic analysis.³ Standard comparisons of earned family incomes across countries or over time, even when standardized for differences in exchange rates, prices and family size, (and the subsequent measures of inequality based on these incomes), are likely to give misleading implications of the relative level and distribution of economic well-being since they implicitly assume everyone has the same amount of time available for home production.

² Saunders, O'Connor and Smeeding (1994); Saunders (1993) Danziger (1980), Cancian, Danziger and Gottschalk (1993), and Cancian and Schoeni (1992)

³ For example, Kuznets (1955) pointed out the national income is significantly underestimated by not taking into account income in-kind provided by productive household activities.

Most developed countries have witnessed an increase in the number of hours of total household paid labour over the past two decades. Together husbands and wives are spending more time in paid employment, which has occurred, to a large extent, due to the contribution toward total household earnings by women. Increased labour force participation of married women has been a phenomenon experienced not only in Canada, but in most industrialized countries.⁴

There is, however, considerable variation across countries in the amount of time households spend in paid labour, and the relative distribution of time spent working between men and women. For example, married couples in the Netherlands work roughly two thirds of the average annual hours worked by couples in the United States and in the upper end of the household earnings distribution, they work roughly 12 to 16 hours less per week than do couples in the US, Canada, Australia or Finland.⁵ This difference is due largely to lower labour force participation of women relative to men in the Netherlands. Also, there is considerable variation in the amount of time couples spend in the labour market over time within most countries. For example, in Canada, the proportion of dual-earner families rose from only one-third to over two thirds of two-parent families by 1995.⁶ Labour force participation rates of males and married females reported by the

⁴ See Labour Force Statistics, OECD, 1996.

⁵ This is based on results from the LIS micro country data files presented in section 2.7 of this chapter. These findings showed that married couples in the Netherlands work, on average, 600 to 800 hours less per year in the upper end of the household earnings distribution than do couples in the US, Canada, Australia or Finland.

⁶ Source: Statistics Canada, Household Surveys Division, "Characteristics of Dual Earner Families, 1995, Catalogue #13-215, Table 5.

OECD suggest similar increases in total time spent in the labour force by married couples.⁷

Households can be thought of as “packaging their labour supply”, where husbands and wives form an implicit (or otherwise), agreement regarding their division of labour. This package consists of an arrangement regarding total household labour supply and total home production, with any remaining time being available for leisure activities. Since the norm in many developed countries is moving from the traditional single-earner family toward the dual-earner family, households have less time remaining for work in the home and for leisure, (unless increased labour force participation is taken from time normally spent sleeping). The resulting losses in the value of home production and leisure foregone partly offset the increase in money income earned by dual-earner families, so that the change in economic welfare is overstated by the change in money income alone.⁸

This volume consists of two independent but related studies examining the relationship between the distribution of average annual household pre-tax earnings and average annual household hours of market work for married couple households. The point of departure in this thesis is the treatment of the variation in annual hours worked either across countries (Chapter 2), or over time in Canada, (Chapter 3). Annual household hours are fixed to a common number of hours and household earnings are derived using three assumptions regarding the manner in which couples could potentially package their labour supply (discussed below). Annual household earnings,

⁷ See Labour Force Statistics, OECD, 1996.

⁸ This assumes a positive value for leisure and home production.

adjusted for differences in prices, family size, and hours worked across countries (or over time in Canada), are then compared to determine whether or not the standard of living derived from these adjusted earnings differs.

The object of standardizing household hours is to determine if, (in the case of the cross-country analysis), when we adjust for differences in time spent working, just as we adjust for differences in prices, exchange rates, and family size, whether or not there are differences in the earnings distributions of married couples. In the case of a within country analysis, (as in the second essay on Canada), adjusting household earnings for differences in prices, family size, and hours worked, allows one to determine if, all else equal, families are any better off now than they were in previous years, where the average annual hours worked by husbands and wives were less.

Also novel to this paper is the examination of average annual hours worked at each vingtile of the earnings distribution. This allows for a clearer understanding of annual average hours worked at both the bottom and the top of the distribution, rather than using an overall average hours worked. Obviously, the implications of changes in the value of home production and leisure foregone associated with increased dual earner households is not the same for couples at the bottom of the earnings distribution as it is for couples at the top. Couples at the bottom of the earnings distribution may suffer a loss in welfare because the opportunity cost of foregone home production may be so great they can not afford to purchase household production services (or these services may be purchased at the expense of a loss in household leisure activities).

The first essay, (Chapter Two) consists of an analysis of the level and distribution of household earnings across five countries. This paper focuses on differences in labour force participation across countries and addresses the comparison of household earnings across countries given the variation in hours worked among countries. The countries examined include Canada, the United States, Australia, Finland and the Netherlands. These countries are selected based on the variation in annual labour market hours for males and females among these countries.

Household earnings rather than individual earnings are examined. Regardless of the type of assumptions made about the intra-household sharing of resources, household earnings are an important element in understanding the level of well-being. This study focuses on married couple households (or equivalent, discussed below) only. This is done in order to facilitate an examination of the relationship between household hours of paid labour and the way in which husbands and wives “package” their combination of paid and unpaid work.

Household pre-tax earnings are first converted to a common currency (1991 US. dollars) and then standardized for differences in prices across countries using a Purchasing Power Parity (PPP) index. Household earnings are further standardized for differences in family size using the OECD equivalence scale. This chapter adds to the literature explicit consideration of the differences in hours worked across households, either across countries or over time periods, by proposing an additional standardization of household earnings to account for differences in the number of hours worked across households.

To facilitate cross-country comparison of average annual earnings, earnings are adjusted not only for differences in prevailing exchange rates, prices and family size, but for differences in time spent working to both recognize the value of non-work time and to adjust for the variance in time spent working across countries. In order to account for differences across countries in hours spent earning income, average annual household hours worked are fixed at the same level for all households. Based on the standardized number of hours chosen, average annual household earnings are then constructed in such a way that the results are not sensitive to the choice of standardized hours.⁹ Two alternative levels of annual household hours worked are used as the standard number of annual hours worked across countries. Annual household hours worked are standardized to 2,000 hours per year,¹⁰ and to the average annual household hours worked in the US at each vingtile of the earnings distribution. The choice of 2,000 hours is based on 40 hours of work per week over 50 weeks of work per year. The choice of the US. average annual hours worked at each vingtile of the earnings distribution facilitates a comparison between the US and the other selected countries. While these choices represent two alternative annual household hours, any number of hours may be used to fixed the average annual number of hours worked across countries.

Once annual household hours are standardized, another issue becomes how to assign a value to the standardized hours. Do we use the wages of the

⁹ The three approaches used to construct annual household earnings based on three assumptions concerning the way in which husbands and wives might "package" their combined labour supply. these approaches are insensitive to the choice of standard hours.

¹⁰ The choice of 2,000 hours is based on 40 hours of work per week over 50 weeks of work per year, an estimated number of hours for one full-time, full-year worker within the household.

husband or the wife or a combination of both? To address this, three approaches are used based on three assumptions concerning the way in which husbands and wives might “package” their combined labour supply. Household earnings are then computed under each of the standardization procedures. Household earnings, standardized for purchasing power, family size and hours worked, are compared at each vingtile of the household earnings distribution. This analysis includes an examination of both the level and inequality of the distribution of household earnings. The results of this analysis show, that when household earnings are adjusted for differences in hours worked, countries, such as the US, in which households supply greater hours of paid labour are not as well off as countries in which households supply fewer hours of paid labour, in the lower portion of the earnings distribution.¹¹

The second essay (Chapter Three) examines the trend in household earnings in Canada over the period 1975 to 1994. Together, husbands and wives in Canada are spending more time in paid employment, which has occurred, to a large extent, due to the increased labour force of women. In 1967, only one-third of husband-wife families were families in which both spouses reported earnings. By 1988, however, dual-earner families represented approximately 62% of all husband-wife families and by 1995, both parent were employed in approximately 70.7% of two-parent families.¹² Because couples spend more time in paid employment, households have less time remaining for work in the home and for leisure. Comparisons of earned incomes of Canadian

¹¹ This assumes a positive value to time spent outside the labour force.

¹² Source: Statistics Canada, Household Surveys Division, “Characteristics of Dual Earner Families, 1995, Catalogue #13-215, Table 5.

families over time, even when standardized for changes in prices and family size, (and the subsequent measures of inequality based on these incomes), are likely to give misleading implications of the relative level and distribution of economic well-being, and how this is changing over time.

Chapter three uses a similar analysis to that employed in the cross-country analysis in Chapter 2. Household earnings are first examined over time in nominal terms, and then standardized for differences in prices faced by Canadian households over this time period and examined at each vingtile of the earnings distribution. Earnings are further standardized to account for differences in family size over this time period. Canadian household earnings, standardized for prices and family size, are then compared. While these adjusted measures of household earnings give an economic standard which can be compared over time, they still mask the significant differences in hours of paid labour supplied by Canadian households over this time period.

Evidence of the increase in dual earner households in Canada from 1975 to 1994 is presented. As well, average annual hours of paid labour for households at each vingtile of the earnings distribution are presented. This analysis shows significant differences in the number of hours spent in paid labour for Canadian households. Household hours are fixed at both 2,000 hours and at the average annual household earnings in 1975 for each vingtile of the earnings distribution. This chapter uses the three standardization procedures used in Chapter Two to value a standard number of hours worked over time in Canada, based on three assumptions about the manner in which couples might organize their labour supply. Both the level and distribution of household earnings adjusted for hours of work are examined.

The results of this study show that while earnings in 1994, adjusted for prices and family size, show Canadian households to be maintaining a comparable standard of living as compared with previous periods, once we account for the differences in the amount of time spent to acquire these earnings, Canadian households in 1994 are not as well off as they were in 1975 in the bottom 65 percent of the earnings distribution.

While these results are based on simplifying assumptions regarding household labour supply, they do raise some concerns regarding the validity of using dollar measures of output, which are unadjusted for variation in time spent in the labour market over time, as a proxy for economic well-being.

CHAPTER 2

Standardizing For Differences In Household Hours Of Paid Work Across Five OECD Countries; An Examination Of The Level And Distribution Of Adjusted Household Earnings

2.1 Introduction

There has been a growing body of literature concerned with the impact of increases in the number of dual earner couples on the level and distribution of family earnings and income.¹³ However, little attention has been given to the amount of labour time used to produce earned incomes, and the extent to which this also impacts the level and distribution of economic well-being of families. Given the considerable variation in the hours worked among OECD countries,¹⁴ straight comparisons of household earnings, even when standardized for purchasing power, may not give valid comparisons.

Comparing household earnings between two countries, for example, where household earnings are roughly equivalent in terms of purchasing power, but households in one country spend, on average, one third more time acquiring these earnings than in the other, would not imply households in these two countries were equally well off, (all else equal). Differences in the amount of work time embodied in otherwise equivalent earnings poses a question not only for comparisons of the level and distribution of earnings, but also for measures of inequality and poverty based on these earnings distributions.

¹³ Saunders, O'Connor and Smeeding (1994); Saunders (1993) Danziger (1980), Cancian, Danziger and Gottschalk (1993), for the United States and Cancian and Schoeni (1992)

¹⁴ This is discussed in detail in Section 2.2 of this chapter. Also, see Daly, K.J., (1996), p. 153..

It is common practice to adjust earnings to allow for both differences in international exchange and differences in the purchasing power of earned incomes, (e.g., Smeeding, (1996), Osberg and Xu, (1997)). Fully adjusting for differences in the purchasing power of earnings includes adjusting earnings for differences in family size with the use of equivalence scales in order to provide a better proxy to measure economic well-being derived from earnings. Although the use of purchasing power parity indices and equivalence scales to facilitate cross-country comparison of income measures has become commonplace, both of these procedures have their problems.¹⁵

While the use of purchasing power parity indices and equivalence scales to adjust earned income may provide a more 'equivalized' monetary measure in terms of purchasing power, it ignores any differences across countries in the hours spent attaining these earnings and the subsequent variation in economic well-being among households after receiving this income due to the variation in time available for home production and leisure. One alternative is to measure earnings across countries, adjusted not only for differences in exchange rates, prevailing prices and differences in family size, but also, for differences in time spent working.

This study proposes an additional adjustment to cross-country money income measures in order to both recognize the value of non-paid work time and to

¹⁵ Several studies have examined and documented the sensitivity of relative inequality or poverty rankings across countries to the choice of equivalence scales (e.g., Burkhauser, Smeeding, Merz, (1994), Phipps, S., and Garner, T.L., (1994), Buhmann, M.L., L. Rainwater, G. Schmaus, & T. Smeeding, (1988)). Purchasing power parity indices ignore important country-specific characteristics such as differences in the composition of the typical consumer 'basket', differences in in-kind income (e.g., the value of government-provided health insurance or housing subsidies), or differences in political, (e.g., taxation), legal and social institutions, which vary substantially across countries. Income in-kind includes both privately (e.g., property income, value of home production, employee fringe benefits) and publicly (e.g., medical care, education, transportation, subsidized housing, police protection) provided goods. Adjusting measures of money income with the use of PPP indices also does not capture differences in social values, norms, and consumer preferences across countries.

adjust for the differences across countries in time available outside the labour market. This is done to further 'smooth out the playing field' when comparing money income measures across countries. The attention in this paper is restricted to families headed by married couples with a prime aged husband (aged 21 to 65 years).¹⁶ Selecting married couples permits a consideration of different ways in which husbands and wives could divide paid and unpaid work between them in order to compare differences across countries in the "package" of paid labour hours by couples.

In order to compare the different "packages" of hours worked by couples across countries, we need to hold annual household hours constant (i.e., pick a reference point). This chapter fixes annual hours to be the same for all households (within each vingtile of the earnings distribution), by standardizing average annual hours of work. Two choices of setting a common number of hours of paid work are used. The first method is to set hours worked to 2,000 hours across all households. The second method is to set hours worked equal to the average annual hours worked per family in the US. in each vingtile of the earnings distribution.¹⁷ Three alternative methods are then used to value this common number of hours across families.

The final objective of the paper is to measure earnings inequality among married couples in the selected countries to determine the differences across countries in couples' earnings inequality. The analysis of the inequality of married couples' earnings, standardized for differences in hours worked, is

¹⁶ It should be noted with retirement age becoming younger, household heads aged 65 may include individuals who do not work because they are retired.

¹⁷ Setting annual hours worked equal to the average annual hours worked of US. families at each vingtile of the earnings distribution is done for the Proportional Hours valuation procedure. This was not possible for the Wife as a Second Earner or the High Wage procedures.

conducted in an attempt to determine if cross-country differences in measures of couples' earning inequality are attributable to differences in hours worked.

This chapter presents, in a straight forward manner, empirical evidence concerning the pre-tax household earnings distributions and the associated hours of worked time embodied in the earnings distributions of single family households across five OECD countries using the Luxembourg Income Survey (LIS) data. The five countries examined in this study are Canada, United States, Australia, the Netherlands, and Finland. This selection of countries represents three English-speaking countries (high average annual hours worked), one Nordic country and one European country (low average annual hours worked) showing substantial variation in hours of paid labour. The year of analysis for Canada, United States, Finland and the Netherlands is 1991. In the case of Australia, the year of analysis is 1989 (the closest available year of LIS data for Australia). The distribution of actual household earnings, and the corresponding average household hours worked, are presented for each of the selected countries for each vingtile of the earnings distribution.

Married couples, (legally or common-law) is taken to be the unit of measure in this paper rather than the individual in order to examine alternative ways in which husbands and wives could allocate hours of paid and unpaid labour between them.

Household earnings are first adjusted for differences in exchange rates between countries and are expressed in terms of 1991 US dollars. Earnings are then adjusted for differences in prices faced by households across each of the

selected countries using the purchasing power parity indices.¹⁸ Real household earnings are further adjusted using an equivalence scale to account for differences in family size over the period, and therefore, differences in the purchasing power of household earnings. The equivalence scale used was the OECD equivalence scale.¹⁹

Once household earnings are fully adjusted for purchasing power, average annual household hours worked are compared across countries at each vingtile of the earnings distribution. This analysis shows substantial differences in the time spent acquiring household earnings.

Once a standard number of hours is chosen, the issue becomes how to value these hours. In the case of individual earnings, the valuation of a standard number of annual hours is straightforward. Individuals' wages would be applied to these hours. The accounting measure for this study however, is married couple households, therefore assumptions must be made about the manner in which couples could potentially "package" their combined labour supply. Three procedures are used to value the standardized 2,000 hours worked across households, based on three differing assumptions regarding the allocation of hours of paid work between couples. These include: the Proportional Hours standardization, where household hours worked are scaled up or down to the 2,000 hours by allocating hours to husbands and wives in proportion to their total actual allocation of hours; the High Wage standardization, where the 2,000 hours are allocated to either the husband or the wife on the basis of the higher wage earner; and the Wife as a Second

¹⁸ A description of the Purchasing Power Parity indices used is provided in Section 2.4 of this chapter.

¹⁹ A discussion of the OECD equivalence scale is presented in Section 2.5 of this chapter.

Earners standardization, where wives act as a supplementary earner within the household.²⁰ In addition, the Proportional Hours procedure establishes a common set of hours worked based on the average number of household hours worked in each quintile of the household earnings distribution of the United States. This standardization sets the reference point as the annual household hours worked in the United States. Using this standardization, one can then address the question of whether or not couples in the Netherlands, Canada, Australia, or Finland would be better or worse off if, all else equal, they spent the same amount of time in the labour market as did couples in the United States, throughout the earnings distribution.

Alternative methods of valuing the 2,000 hours could be incorporated into this analysis in keeping with models of family labour supply which describe intra-household decision making.²¹ Due to the explicit information required for such models, (e.g., income earned outside the marriage, social and institutional parameters, threat points, etc.), this was not done.

The analysis of household earnings is presented in the following sequence. A brief discussion of the empirical evidence on the cross-country differences in hours worked, labour force participation rates, unemployment rates and the phase of the business cycle is given in Section 2.2. Section 2.2.5 provides a brief literature review. Section 2.3 presents a discussion of the data used and the definition of the households selected for this study. Section 2.4 presents a

²⁰ Each of the standardization procedures, and the resulting impact on the distribution of household hours worked is discussed in detail in section 3.9 of this chapter.

²¹ For example, the "Divorce Threat cooperative Nash-bargaining models described by Manser and Brown, (1979, 1980, 1990); and McElroy and Horney (1981); the "Separate Spheres" bargaining models introduced by Lundberg (1991) and Lundberg and Pollak (1993); the "Attitudinal Models" suggested by Phipps and Burton (1995) or the non-cooperative bargaining models of Kanbur and Lawrence (1991), Ulph (1988) and Wooley (1988).

discussion of how the distribution of household earnings is derived and which households are included in each vingtile of the distribution. Section 2.5 presents an analysis of actual pre-tax household earnings, expressed in 1991 US dollars, adjusted for differences in prices across countries using a PPP index, unequivalized for family size, throughout the earnings distribution in each of the selected countries in the sample. This analysis shows that unadjusted real earnings were significantly greater in the United States than other countries throughout the earnings distribution, with the earnings distribution of Canada only slightly below that of the United States.

Section 2.6 presents an analysis of the distribution of actual pre-tax household earnings used in Section 2.5, equivalized for real purchasing power by adjusting for differences in family size using an OECD equivalence scale. Adjusting for differences in family size shows a slight widening of the gap in real earnings across countries since family also varies across countries.

The results of a cross-country examination of annual household hours is presented in Section 2.7. Section 2.8 contains a discussion of the procedures used to standardize household hours and the impact of each of the three standardization procedures on the change in household hours worked at each of the selected vingtiles in the earnings distribution. Section 2.9 discusses the impact on male and female hours ratios of household working time as a result of standardizing household hours worked.

The earnings distributions, adjusted for differences in hours worked, prices and family size for each of the standardization procedures, are presented and analyzed in Section 2.10. An analysis of the inequality of earnings under each

of the standardization processes is presented in Section 2.11. Section 2.12 presents the conclusions.

2.2 Empirical Background: What Does the Evidence Suggest?

This section provides a brief overview of the empirical evidence on the cross-country differences in hours worked, labour force participation rates, unemployment rates and the distribution of earnings for selected OECD countries over the 1980's and early 1990's. What this section shows is that substantial differences in hours worked by individuals have emerged among several OECD countries, and in particular, the five countries examined in this study, over the 1980's and early 1990's. Also, there is substantial variation in female labour force participation and unemployment rates, as well as considerable divergence in income and earnings inequality among the five selected countries.

The evidence concerning cross-country differences in annual hours worked and labour force participation rates raises concerns regarding the validity of cross-country comparisons of the level of real earnings or the corresponding measures of earnings inequality, used as proxies for economic well-being.

2.2.1 Inequality in Hours Worked Across Countries

Considerable variation exists in the reported hours worked of persons among advanced OECD countries. During the 1980s and 1990s differences in the amount of time spent in paid employment by Americans and Canadians compared to Western European workers increased noticeably. Americans and Canadians spend more hours in the paid labour than Western Europeans

who enjoy considerable leisure while employed as well as longer vacations and holidays.²²

Bell and Freeman (1996) in their study "Changes in Work Time in Canada and the United States" examined differences in annual hours worked among advanced OECD countries. Table 2.1a presents estimates of annual hours of paid employment in several major advanced OECD countries (reported in the OECD Employment Outlook, 1995). The sample of employed persons includes part-time as well as full-time workers. Comparisons of annual hours worked per employed person (Column 1) shows that countries with the highest annual hours worked include Japan, Australia and New Zealand, followed by the United States and Finland. Annual hours worked per employee in the United States and Finland is higher than in European countries (Germany, France and the Netherlands).

²² In fact, in many European Union countries work-sharing is encouraged as a method for dealing with unemployment.

Country	Annual hours Per Employee, 1994	Employment Population Ratio (Ages 15-64)	Annual Hours Per Adult (Ages 15-64)
<i>United States</i>	1,780	73.2	1,303
<i>Australia</i>	1,882	67	1,261
<i>Canada</i>	1,719	63.8	1,097
<i>Netherlands</i>	1,395	63.7	889
<i>Finland</i>	1,780	60.1	1,070
United Kingdom	1,717	66.5	1,142
New Zealand	1,843	68.2	1,257
Norway	1,415	72.7	1,029
Germany	1,578	62.6	988
France	1,631	59	962
Sweden	1,631	70.3	962
Japan	1,965 (1992)	74.2	1,458

Source: Column 1, OECD Employment Outlook July 1995, Table C.
Column 2, OECD Employment Outlook July 1995, Table A.

Average annual hours worked per employed person are converted to average annual hours worked per adult (Column 3), using employee-population ratios, (Column 2) to reflect full differences in working time among countries due to differences in the ratio of employees to the adult population. Differences in the ratio of employees to the adult population arise because of differences in labor force participation or differences in the rates of unemployment, (or both), across countries.

One notable pattern which emerges when examining average annual hours worked per adult across countries is the correlation between the "English-speaking" countries and high average annual hours worked. With the exception of Japan, (which has the highest average annual hours worked per

adult), average annual hours worked per adult are greatest in the United States, Australia, the United Kingdom and New Zealand, followed by Canada. Following Canada, the Scandinavian countries such as Sweden and Finland rank next, with relatively high hours worked per adult. Average hours worked in the OECD European countries such as Germany, France and the Netherlands are much lower, with the Netherlands showing the lowest average annual hours worked per adult among the OECD European countries shown in Table 2.1a.

The five countries examined in this study, therefore, represent countries with a wide variation in average annual hours worked by individuals, as shown in Table 2.1a above. Individuals in the three “English-speaking” countries (United States, Canada, and Australia), work the greatest number of average hours per year, followed by Finland, followed by the Netherlands.

Comparing average annual hours worked for individuals (shown in Table 2.1a) to the average annual hours of married couples for these five countries (shown in table 2.1b) reveals striking cross-country differences in the supply of annual hours of paid labour.

The figures in Table 2.1b represent average annual hours worked per married adult, with household head aged 15 to 64.²³ The average

²³ Average annual hours worked for married couples in households with household head aged 15 to 65 years. Data taken from LIS micro data country files for 1991 for Canada, the United States, Finland and the Netherlands and 1989 for Australia.

Table 2.1b	
Average Annual Hours Worked; Married Couples	
	Average Annual Hours
Males (Aged 15-64 Years)	
Canada, 1991	1,793
US, 1991	1,949
Finland, 1991	1,428
Netherlands, 1991	1,537
Australia, 1989	1,966
Females (Aged 15-64 Years)	
Canada, 1991	1,083
US, 1991	1,179
Finland, 1991	1,287
Netherlands, 1991	513
Australia, 1989	911

Source: LIS microdata country files,

annual hours worked for married men are higher than the average annual hours worked per adult individual in all countries. Out of the five countries examined in this study, married men in Australia work the greatest number of hours per year (1,966 hours) followed closely by married males in the united States (1,949 hours). Married men in Finland, however, spend far less time, on average, in paid employment (1,428 hours per year) than do married men in Australia or the United States. Based on a 50-week work year, this implies that married men in Finland work over 11 hours per week less than do married men in Australia and 10 hours per week less than do married men in the United States.

Married women in the Netherlands spend, by far, the smallest number of hours per year (513 hours) in paid employment, as compared to married

women in all four of the other countries examined. The low annual hours worked by married women in the Netherlands, when separated from average annual hours worked by men, shows that married men in the Netherlands work greater annual hours than married men in Finland.

By contrast, married women in countries such as Finland and the United States, spend more than twice as much time in paid employment as do married women in the Netherlands. Based on an average of 50 weeks of work per year, married women in the Netherlands work roughly 15 hours per week less than do married women in Finland and 13 hours less per week than do married women in the United States.

Average annual hours worked, however, mask what is happening to hours of work throughout the earnings distribution within a country. For example, couples at the bottom of the earnings distribution may be working a very different combination of annual hours than couples at the top of the earnings distribution. Also, contributing greater hours to paid employment has by both husbands and wives has a different impact on economic well-being at the bottom of the earnings distribution than at the top, given the cost of replacing losses in the value of foregone home production (e.g., child care). Section 2.7 of this paper presents the average annual household hours worked at each vingtile throughout the earnings distribution for each of the selected countries in an attempt to facilitate a cross-country comparison of the relationship between household earnings and average annual household hours worked in the early 1990s.

Bell and Freeman (1996) found that North Americans not only work longer hours than Europeans, but that they also have a greater preference for

additional hours of work than do Europeans. Bell and Freeman reviewed the results of similar surveys across countries which asked people about their desire to work more or fewer hours at the same rate of pay.²⁴ They found the proportion of workers wanting to work more hours than they currently do is higher for workers in Canada and the United States than for workers in Europe and Japan.²⁵ They also found the differences in hours worked and in preferences for additional work time between North Americans and Western Europeans to be a relatively recent phenomenon. An examination of OECD estimates revealed the greater work activity by North Americans developed in the 1970s and 1980s, and that in 1950, hours worked per capita in the US were considerably lower than most Western European countries. They show that by 1973, hours worked by Europeans started to diminish and the differences in hours worked between the US and Western Europe narrowed greatly as Europeans began to take much of their increased prosperity in leisure time. ²⁶

The difference in hours worked, and thus, in hours of leisure and unpaid work per employee between the Anglo-countries and Western Europe may be due to a wide variety of factors, namely, differences in the proportion of workers who are part-time, differences in weeks of paid vacation time, or differences in hours worked per week by full-time workers. Part-time work has shown a substantial increase since 1970 in the majority of European OECD

²⁴ See also Kahn and Lang (1988).

²⁵ Corresponding to this, they also found the proportion of workers who want to work fewer hours than currently is lower for Americans and Canadians than for Europeans and the Japanese.

²⁶ A similar pattern in hours worked per capita across countries from 1950 to 1992 was shown by data gathered by Angus Maddison (1995).

countries (OECD, 1996). For example, in the Netherlands, 35% of workers are part-time workers.

Bell and Freeman, (1996), however, find that the bulk of the difference in annual hours worked between North Americans and Europeans is attributable to differences in the hours of full-time workers rather than differences in part-time work. They show that while the increase in part-time work does help explain the 1980s-1990s falls in hours worked among European countries, changes in part-time work hours cannot fully explain differences in average annual hours worked among OECD countries. Furthermore, they found that approximately two-thirds of the difference between annual hours of full-time workers is attributable to differences in vacations and holidays and one-third to differences in hours worked per week.

While it is beyond the scope of this paper to determine the reasons for differences in average annual hours worked among advanced OECD countries, the wide variation in annual hours worked per adult suggests that comparing incomes across countries without taking into account the differences in hours worked may be seriously misleading. In welfare terms, fewer hours worked by the employed implies greater time for leisure or unpaid work, which presumably adds to a worker's utility, holding income constant. Standard neoclassical analysis suggests that workers in countries with fewer hours worked should be better off relative to those in countries with more hours worked, holding the level of GDP per capita constant.

2.2.2 Labour Force Participation Rates and Employment

Labour force participation rates for both males and females are shown in Table 2.2a below for selected countries for this study. As can be seen from Table 2.2a, labour force participation differs across countries, making straight comparisons of household earnings across countries misleading. Comparing the countries examined in this study in the corresponding year of analysis, indicates that male labour force participation is greatest in Australia (1989) at 86.2 percent, followed by the US (1991) at 84.7 percent, and Canada (1991) at 83.6 percent. Male labour force participation is also similar in Finland (79.6 percent) and in the Netherlands (at 80.3 percent) in 1991.

One of the striking features concerning labour force participation among the countries selected for this study is the difference in female labour force participation. In Finland (1991), while male labour force participation rates are the lowest among the five countries examined, female labour force participation rates are the highest at 71.9 percent, making the rate of female labour force participation relatively close to that of males in that country. In contrast, in Australia (1989), while male labour force participation is the highest among the countries examined, female labour force participation is 61.6 percent, the second lowest (next to the Netherlands). Female labour force participation is the lowest in the Netherlands (1991), at 54.5 percent. In Canada and the United States, (1991), female labour force participation rates are very similar, being slightly higher in the US (68.4 percent) than in Canada (67.2 percent).

Country	Males	Females
Canada 1991	85.1	67.2
United States 1991	86	68.4
Australia 1989	86.2	61.6
Netherlands 1991	79.6	51
Finland 1991	80.9	73.3

* Source: Labour Force Statistics, OECD, 1996

For those in employment, the rate of part-time employment is higher for females than for males across selected countries, with females occupying the bulk of all part-time jobs (Table 2.2b).²⁷

Country:	Part-time employment as a percentage of total employment:			Female Part-time employment as a percentage of total part-time employment
	Males	Females	total	
Australia	8.0	40.1	21.3	78.1
Canada	8.1	24.4	15.4	71.0
Finland	4.4	10.2	7.2	67.8
Netherlands	15.8	61.7	33.2	70.4
United States	10.0	25.2	16.9	67.6

Source: OECD Employment Outlook, July 1990, Table 2.9. p.46.

²⁷ Data not available through OECD publications for the years of analysis for the selected countries in this study.

One of the most striking differences across countries is the number of women working part-time as a proportion of total employment in the Netherlands. Indeed, the Netherlands has the highest percentage of part-time employment as a proportion of total employment of all countries examined in this study, and part-time employment amounted to around 62 per cent of women's total employment in 1990 (See Table 2.2b). Historically, labour market participation by married women has been discouraged in the Netherlands up until the 1970s. Few incentives for married women to enter the labour market existed and, as a result, women entered the labour market in a marginal way (See Maureen Baker, 1995)

Australia has the second highest percentage part-time work among women (40.1 percent in 1990). Although employment rates are relatively high in Australia, a large proportion of women work part-time and part-year. The US. has the largest annual and weekly hours, but a substantial number of women work part-time (25.2 percent in 1990). The labour force participation for Canada is slightly higher than for the US., but Canadian women work fewer hours.

For the selected years of analysis for this study, unemployment (Table 2.2.c) was greatest in Canada (1991) for both males (10.9 percent) and females (9.7 percent). The unemployment for males is higher in Finland (9.1 percent) than in the United States (7.1) in 1991. Male unemployment in the Netherlands in 1991 was similar to that in Australia in 1989.

Country	Males	Females	Males & Females
Canada 1991	10.9	9.7	10.4
United States 1991	7.1	6.4	6.8
Australia 1989	5.4	6.2	5.7
Netherlands 1991	5.3	9.5	6.9
Finland 1991	9.1	5.8	7.5

* Source: Labour Force Statistics, OECD, 1996

Female unemployment was lowest in Finland (5.8 percent) among the countries examined. Female unemployment in the Netherlands (9.5 percent) was close to that in Canada, with female unemployment being significantly greater in both countries than in the United States (6.4 percent) in 1991 or in Australia in 1989 (6.2) percent.

Cross-country comparisons of the percent of couples employed shows substantial differences in employment patterns, especially among married women.²⁸ The proportion of married males in paid employment is similar for Canada, the United States, and Finland. The proportion of married men with labour market earnings is lowest in the Netherlands.

²⁸ Based on an analysis of the LIS micro data country files for married males and females, aged 16 to 64 years.

	Canada 1991	US 1991	Finland 1991	Netherlands 1989	Australia 1991
Males (aged 16-64)					
Employed	85.14%	86.35%	85.16%	80.14%	83.16%
Not Employed	14.86%	13.65%	14.84%	19.86%	16.84%
Total	100.00%	100.00%	100.00%	100.00%	100.00%
Females (aged 16-64)					
Employed	73.20%	70.40%	83.88%	44.65%	63.67%
Not Employed	26.80%	29.60%	16.12%	55.35%	36.33%
Total	100.00%	100.00%	100.00%	100.00%	100.00%

Source: LIS microdata country files,

For married women, however, there is more variation across countries in the proportion of women in receiving earnings. The Netherlands has the lowest percentage of married women with labour market earnings. In fact, in the Netherlands, the majority of married women are not working outside the home. In contrast, Finland has the highest percentage of married women in paid employment, (83.9 percent), among the five countries examined. It is interesting to note that the percentage of married women working in Finland is greater than the percentage of married men in paid employment in either Australia or the Netherlands. The percentage of married women working in Canada is similar to that in the US, with the proportion of married women employed in Canada being slightly higher. Australia shows a lower percentage of women working outside the home than Canada, the US and Finland.

In summary, the variation in the proportion of married women receiving labour market earnings in the five countries examined in this study is substantial, ranging from being very low, (e.g., in the Netherlands, where the norm is for married women to not be working outside the home), to being

very high, (as in Finland, where the percentage of married women in paid labour is greater than the percentage of married men in paid employment in either Australia or the Netherlands).

2.2.3 Differences in the Phase of the Business Cycle

In addition to differences in hours worked, female labour force participation rate and unemployment rates, the five countries also differ slightly in their phase of the business cycle. Given the point-in-time nature of cross-country analysis, a snap-shop view of differences in labour statistics does not give a complete picture of the differences in the phase of the business cycle across countries. The year of analysis was selected to be as similar as possible among the five countries chosen for this study. Canada, Finland, the Netherlands and the United States are at a more similar stage in their business cycle since the year of analysis is for the four is 1991. For Australia, however, the year of analysis is two years prior, (1989). The recession in Australia didn't start until mid-1990. For Australia, 1989 marked a strong year, with a strong domestic demand, an improvement in terms of trade; and a 4 percent rise in GDP over 1988.²⁹ In fact, most indicators suggest that a cyclical peak was reached in late 1989.

By 1991, Canada, United States, Finland and the Netherlands were well into the recession of the early 1990's. Both the Netherlands and Finland were at a trough in the recession for the years of the study for these two countries. In 1991, GDP growth slowed to around 2 percent in the Netherlands, reflecting

²⁹ See OECD Economic Outlook, 1990, p. 86

sluggish domestic demand.³⁰ and in Finland, GDP fell 6 percent below its 1990 level.³¹

By 1991, however, the United States was on its way out of the recession with output increasing in the fourth quarter of 1991 as a result of a rise in final demand and consumer optimism.³² For Canada, the recession ended in the second quarter of 1991, when economic activity picked up after four consecutive quarters of contraction.³³ Differences across the selected countries in the phases of the business cycle help to form a back-drop on which to put differences in employment and output statistics into perspective.

30 See OECD Economic Outlook, 1992, p.112

31 Ibid., p.107

32 Ibid., p. 63

33 Ibid., p. 97

2.2.4 Summary Discussion

This section has briefly discussed the differences among several OECD countries over the late 1980's and early 1990's, characterized by substantial differences in hours worked, female labour force participation, unemployment, as well as considerable divergence in income and earnings inequality, in particular, among the five countries examined in this study. The evidence concerning cross-country differences in labour force participation of husbands and wives raises concerns regarding the validity of cross-country comparisons of the level of real earnings or the corresponding measures of earnings inequality, used as proxies for economic well-being. Comparisons of the distribution of family earnings, adjusted only for family size and purchasing power, mask variations in the amount of time available for household production and leisure.

2.2.5 Literature Review

Evidence that the trend toward a narrowing of earnings distributions experienced during the post-war period has reversed during the 1980s in many OECD countries has generated much research in the area of earnings inequality.³⁴ This section presents a review of the major research in earnings inequality and related areas, highlighting the major findings and their relevance to this thesis. Section 2.2.5.1 provides an overview of the literature on international comparisons of earnings inequality across major OECD countries. Section 2.2.5.2 reviews of the results of the studies examining the

³⁴ Studies in this area include OECD, 1993, Chapter 5; Blackburn and Bloom, 1994; Saunders, O'Connor and, 1994; Atkinson, 1995; U. Wagschal, 1997; Danziger, S., 1980; Danziger, S., and Gottschalk, P., 1993; Green, Coder and Ryscavage, 1992 and Katz and Murphy (1992).

relationship between earnings and income inequality. Section 2.2.5.3 provides a brief review of studies examining wage inequality. Section 2.2.5.4 presents the results of studies examining the impact of female labour force participation on earnings and income distributions. Section 2.2.5.5 provides a summary of the relevant findings of the empirical research and earnings distributions and their relevance to this thesis. This section also provides a brief discussion of how the research in this thesis contributes to the existing literature.

2.2.5.1 *Cross-National Earnings Inequality Comparisons*

Much of the research in cross-national comparisons of earnings inequality has focussed on trends, (versus levels), in male earnings inequality. The focus on trends rather than levels in research on earnings inequality largely reflects the lack of comparable data across countries.³⁵ The focus on the distribution of male earnings results from research on the distribution of wages in an attempt to explain the distribution of earnings.³⁶ It should be noted however, that several studies have examined the distribution of female earnings, (discussed in section 2.2.5.4 below), and this research has concentrated primarily on examining the correlation between husbands' and wives' earnings and the impact of wives' earnings on family income inequality.³⁷

35 This is acknowledged in the research of authors such as Blackburn and Bloom, (1994), Saunders, O'Connor and, (1994), U. Wagschal, (1997), and Danziger, S., (1980). However the emergence of efforts toward improved comparability in data, such as the LIS micro-data sets, has facilitated cross national comparisons of the level of earnings inequality.

36 Since the large changes in labour force participation of women, experienced in many countries, make it difficult to separate changes in the distribution of wages from changes in the composition of the female labour force, earnings and wage inequality research was directed primarily, although not exclusively, on male earnings.

37 For example, see Cancian Danziger and Gottschak (1993); Karoly and Burtless (1993); Blackburn and Bloom (1994); Saunders (1993); and Beach and Slottve (1994).

There has also been a substantial body of literature examining the impact of earnings inequality on family income inequality, (see Atkinson, (1995); Blackburn and Bloom, (1994); Saunders, O'Connor and Smeeding, (1994); U. Wagschal, (1997); Danziger, S., (1980); Danziger, S., and Gottschalk, P., (1993); Green, Coder and Ryscavage, (1992)).

The primary finding resulting from the body of literature examining trends in male earnings inequality is that there has been a diversity of experiences across OECD countries. Almost all countries experienced some increase in male earnings inequality, with the U.S. emerging leading the trend toward greater inequality in male earnings during the 1980s, (See OECD, (1993); Danziger and Gottschalk, (1994); Gottschalk and Smeeding (1995); and Blank, (1994); Saunders, Smeeding and O'Connor (1994)). This literature also showed that while earnings inequality did rise in many countries over the 1980s, only the United States, (followed by the United Kingdom), continued to experience a rapid rise in earnings inequality during the early 1990s (See OECD, 1995, Section B).

Studies on the distribution of male earnings in the US show that the distribution became less equal both because of a growth at the top and a decline at the bottom in both absolute and relative earnings, (Danziger and Gottschalk, (1994); Gottschalk and Smeeding (1995); and Blank, (1994)). The decline in relative earnings for males in the lower deciles was found to be common across a large number of countries during the 1980s, including Australia, Japan, Sweden and the U.K. (See OECD, 1993, Table 5.2) While less skilled workers lost ground during the 1980s in most countries, the gains at the top of the distribution were more modest than in the U.S. Only the U.K. rivaled the U.S. (OECD, 1993).

As for the first half of the 1990s, the results of the 16 countries examined by the OECD Employment Outlook (OECD, 1995), showed no clear tendency of a generalized increase in earnings inequality for males or females had emerged over this period. The 1995 OECD study showed earnings inequality increased in half the countries examined, and was either unchanged or declined somewhat in the rest. In countries such as Austria, Australia, France, and Sweden, which had experienced a small increase in earnings dispersion over the 1980s, earnings for high paid workers (relative to the median) continued to drift upwards in the early part of the 1990s. This trend, however, was found to be neither strong nor consistent for both male and female workers, (OECD, (1995)). Some countries, notably Canada, Finland and Germany were shown to have experienced a decline in earnings inequality for males and females during the early 1990s. In Canada, the relative earnings of high-paid workers was found to have declined in the 1990s as compared to the mid and early 1980s, (OECD, (1995)).

Several explanations for cross country differences in the male earnings inequality have been put forward. Freeman, (1994) argues country-specific institutional features such as declining union membership reflect variation across countries in earnings distributions. Freeman and Katz, (1994) stress the differences in wage setting institutions as accounting for some of the differences in the growth in earnings inequality across countries. This is consistent with the OECD (1994) findings that countries (such as the Scandinavian countries), with high unionization or centralized wage setting institutions were able to limit growth in inequality. Other studies refer to factors such as skill-based technical change (see for example, Katz and

Murphy, (1992)) or trade with low-wage developing countries (see for example Wood, 1994).

2.2.5.2 *Earnings Inequality and Income Inequality*

Another important result emerging from the literature on earnings inequality is a general consensus in the research community that the primary driving force behind the increase in family income inequality during the 1980s for many industrialized countries was the increased dispersion of male earnings. (See Atkinson, 1995, Blackburn and Bloom, 1994, Saunders, O'Connor and Smeeding, 1994, U. Wagschal, 1997, Danziger, S., 1980, Danziger, S., and Gottschalk, P., 1993, Green, Coder and Ryscavage, (1992); and Blank, (1994)). This body of work has also highlighted patterns emerging across countries. For example, it was found that there is a tendency for family income inequality to be lower in countries where female participation rates are highest (e.g., Finland), compared with countries characterized by low female participation (e.g., the Netherlands) and relatively high household income inequality. (OECD, 1994).

Countries such as the United States, however, with high female participation rates along with high household income inequality, do not seem to conform to this general pattern (See Atkinson, Smeeding and Rainwater (1995)). Atkinson, Smeeding and Rainwater (1995) ranked OECD countries in terms of household income inequality and found the United States to have the highest level of income inequality followed by countries such as the United Kingdom, Ireland, and Italy. Countries such as Canada, Australia, France and New Zealand formed a middle group of countries with slightly lower income inequality followed by a third group of countries including the Netherlands,

Norway, Sweden, West Germany, Luxembourg and Belgium with low levels of household income inequality. Finland was found to have the lowest level of income inequality among this group of countries.

Two other important facets of the literature on cross country earnings dispersion which are of relevance to this thesis deserve mention. First, there has been a general recognition, evident in the empirical analysis that differences in earnings and income inequality trends across countries must be put into context against the backdrop of differences in their social and institutional framework, (Freeman, (1994); Gottschalk and Smeeding (1995); Katz and Murphy, (1992)). For example, Freeman (1994) argues that differences between the United States and Europe in the distribution of earnings mean that the low paid males in the United States fall far behind many of their European counterparts. According to his estimates, the hourly compensation in purchasing power of the American male at the bottom decile is far below his counterpart in other countries examined (half that of the comparable Italian) (1994, p.13) and that the differences in transfer systems and benefit schemes would be expected to intensify these differences.

Second, there is also a recognition in the literature that individual's total earnings are determined not just by their earnings per hour but also by the number of hours they work, and that differences in hours worked should be studied when examining earnings inequality, (see for example, Blackburn Bloom (1994); Bell and Freeman (1996), OECD (1993, 1995)). However, it also recognized that in proceeding from the study of individual wage inequality to the study of family income inequality, one is necessarily led to consider theories of family formation and family labour supply. Bell and Freeman

(1996) document the variation in average annual hours worked reported across OECD countries (discussed in section 2.2.1 above).

Although studies such as Blackburn and Bloom (1994) do not attempted to develop and estimate a structural model of family earnings, their empirical results are tempered by a recognition of variations in household hours worked. Blackburn and Bloom (1994) analyze only families headed by married couples in order to facilitate an investigation of the influence of the growth in two-earner couples on overall income inequality across countries.³⁸ One of the key empirical results which emerges from the analysis of Blackburn and Bloom (1994) is that increased income inequality in the United States in the 1980s is associated with a sizable increase in the correlation between husbands' and wives' earnings.

2.2.5.3 *Wage Inequality*

The substantial rise earnings inequality over the 1980s in the United States and the United Kingdom in the early 1990s, spawned a major debate about the causes of this phenomenon and raised fears that a growing number of workers, particularly those with few qualifications or little work experience would face a future of low-paid jobs or no jobs at all. Much of the research focussed on examining the extent, causes and consequence of differences in earnings and wage inequality in the US as compared to other countries. Levy and Murnane (1992) provide a review of a vast literature on earnings and wage inequality in the United States.

³⁸ One of the key empirical results which emerges from the analysis of Blackburn and Bloom (1994) is that increased income inequality in the United States in the 1980s is associated with a sizable increase in the correlation between husbands' and wives' earnings.

The results of studies on wage inequality in the United States show that over the 1980s both men and women experienced growing wage inequality (Levy and Murnane (1992)). Wage growth varied dramatically between the upper, middle and lower tails of the male earnings distribution in the United States, (Karoly, (1993)). Karoly found that part of the observed changes in the distribution of wages reflects large increases in the returns to education in the 1980s.³⁹ Women in the US, however, have experienced a faster growth in their hourly wages and their average annual hours of work have increased while men have not. Therefore, inequality in annual earnings has grown more slowly for women than inequality in hourly wages because their annual hours of work have become more equal.⁴⁰

While there is substantial agreement about the facts regarding greater wage inequality in the US, there is some disagreement about the underlying causes. For a review of competing explanations see Danziger and Gottschalk (1995), Chapter 6.

From a cross-country perspective, the widening in the earnings distribution in a number of countries implied very different outcomes in terms of real wage growth for low-paid and high-paid workers. In both the US and Australia, real wages for the entire bottom half of the male earnings distribution have either fallen or only risen slightly over the late 1980s and early 1990s, (OECD (1995)). Across all OECD countries, women have generally achieved larger increases in real earnings than men, narrowing somewhat

³⁹ The returns to experience also increased during the 1980s, though not as much as the returns to education., (Karoly, (1993); Levy and Murnane, (1992)).

⁴⁰ This result was expressed as a stylized fact resulting from the literature review in Levy and Murnane (1992)

the gender gap in earnings. The wage growth for the lowest decile of female workers has not only been greater compared with the lowest decile of male workers, but in most countries, also compared with the median earnings of male workers, (OECD (1995)).

Studies also showed the incidence of low hourly wages tends to be highest in those countries where earnings inequality is the most pronounced (Freeman, (1994); (OECD (1995))). In the case of the United States, one quarter of all full-time workers earn less than two thirds of the median earnings, compared to 7 percent in Finland, (OECD (1995)).

2.2.5.4 Increased Female Labour Force Participation

The contribution of the earnings of a second earner in families to the level of and distribution of family earnings and income has become an area of income distribution analysis of increasing interest and policy relevance. Saunders, O'Connor and Smeeding (1994) provide evidence to suggest that cross-country variations in female participation rates are a factor underlying cross-country differences in the distribution of family earnings and incomes. They found married women's earnings cause a reduction in income inequality among married couples across countries. Other studies which found that the earnings of wives has had an equalizing effect on the distribution of family income for a range of countries include: Saunders (1993) for Australia, and Danziger (1980), Cancian, Danziger and Gottschalk (1993), for the United States and Cancian and Schoeni (1992) for a range of countries, including Australia, Canada, United States, and the Netherlands, which are of particular

relevance to this study.⁴¹ Cancian Danziger and Gottschalk (1993) apportion little of the change in family income inequality to wives' earnings, whereas Karoly and Burtless (1993) and Blackburn and Bloom (1994) give them a larger role. Saunders (1993) found that in Australia, changes in married women's earnings lead to increased earnings inequality in the 1980s, whereas, Beach and Slottsvé (1994) found the opposite effect in Canada. There is however, wide agreement that the correlation in earnings among husbands and wives has never been large, but has grown during the 1980s, which would make wives' earnings more disequalizing.

The approach used by Cancian and Schoeni (1992) and Saunders, O'Connor and Smeeding (1994) is similar, where the actual distribution of family income is compared to an estimate of family income if each country had the same female labour force participation rate. This involves comparing the actual distribution of income with the distribution of income where all the earnings of wives are set to zero. The countries examined by Saunders, O'Connor and Smeeding also included Australia, Canada, United States, and the Netherlands, and in addition, (West) Germany. In all five countries examined, they found the actual distribution of earnings of couples Lorenz-dominated the earnings distribution where only husbands worked. The extent of the decline in inequality is measured by the percent reduction in the Gini coefficient and varies significantly across countries, from relatively low percent reduction levels of 1.9 percent in Australia and 5.3 percent in the Netherlands to high percent reduction levels of 12.3 percent in Canada and 13.8 percent in the United States. They also found the actual earnings

⁴¹ The countries analyzed in the Cancian and Schoeni study include: Australia, Canada, United States, the Netherlands, France, West Germany, Israel, Norway, Sweden, and the United Kingdom.

distribution of couples is less equally distributed in the United States than the earnings distribution of husbands alone in the Netherlands.

While studies have shown that married women's labor force participation reduced the measured level of overall earnings inequality in many countries, (Cancian, Danziger and Gottschalk, Saunders (1993)), these same studies also found that increased labour force participation of married women may not always have an equalizing effect on earnings distributions. Cancian, Danziger and Gottschalk, (1993) found the participation rate of wives whose husbands have the highest earnings has increased disproportionately in the U.S. Therefore the traditional explanation of the equalizing impact of wives earnings may be reversed. Also, due to assortative mating, the correlation of spouses' earnings may have risen. Saunders (1993) examined Australian data and also found that it is possible that the size of the equalizing impact of wives earnings may decline over time.

It is also recognized in the literature on earnings inequality that the counterpart to the increased market earnings of married women is a decline in either the number of hours of domestic production worked in the home or in leisure time available. (Saunders, O'Connor and Smeeding, (1994)). The resulting impact on the value of home production and leisure time available act to offset the increase in economic welfare of the family resulting from the increased money income due to the "second earner".⁴²

⁴² It is further recognized by Saunders, O'Connor and, (1994) that the degree of such overstatement is likely to vary across families within and between countries, thus affecting the interpretation of national and cross national differences in the distribution of (money) income.

Francine Blau (1998) charts the trends in the economic well-being of women in the United States from 1970 to 1995. Blau puts forth a broad range of indicators of women's economic well-being in the family, as well as, in the labour market. She examines trends in labour force such as participation by gender and by education within gender groups, trends in the gender wage gap, and in gender differences in occupation groups. Blau also examines trends in intra-family allocation such as the allocation of housework, wages and earnings.⁴³ Blau concludes that overall, women have made substantial progress toward gender equality in the labour market. However, she concludes that trends in family structure, (in particular the increase in households headed by single women) have adversely affected the economic well-being of women and their children. Moreover, the challenges of combining work and family pose serious obstacles for women, but do not affect men to the same extent.

Economist have argued for many years that ignoring the income and wealth generated by housework introduces a bias in various areas of economic analysis. Mitchell et al. (1921), Kuznets (1944) and Clark (1958), have pointed out that national income is significantly underestimated by not taking into account income in-kind provided by productive household activities. Weinrobe (1974) noted that measured growth rates are biased upwards as more and more women move into the labour market since no allowance is made for the resulting decline in non-market household production.

⁴³ Blau uses the Michigan Panel Study of Income Dynamics (PSID) to examine the allocation of housework between men and women. Her results suggest moderate, but significant changes in the reallocation of time use between men and women. Overall, for women, the average amount of time spent on housework decreased (5.4 hours per week) and average hours of market work increased. In contrast to the changes for women, the increase in men's housework time was entirely concentrated among married men (housework hours increased by 1.6 hours for married men, but fell by 1.1 hours for single men).

These considerations have prompted studies in which authors develop alternative measurement methods in recognition of the value added of productive activities of households outside the market. For example, the earnings capacity approach used by Saunders, O'Connor and Smeeding, (1995), which involves replacing actual earnings (whether positive or zero), by an estimate of full-time earnings capacity.⁴⁴

2.2.5.5 *Summary - Literature Review*

The major “lessons learned” highlighted in the earnings and wage inequality literature which are relevant to this thesis can be easily summarized.

Several main points emerge the cross-country literature on earnings inequality. First, the finding that the increased dispersion of earnings was the primary driving force behind the increase in family income inequality during the 1980s for many industrialized countries renders earnings inequality a particularly important topic to examine. Second, one of the important stylized facts which emerged from the literature was that while earnings inequality did rise in many countries over the 1980s, only the United States, (followed by the United Kingdom), continued to experience a rapid rise in earnings and wage inequality during the early 1990s.

Research has shown that both men and women in the US experienced growing earnings and wage inequality and that the distribution of wages has become increasingly polarized for both men and women in the US during the 1980s and early 1990s. For women, however, earnings inequality in the US has grown more slowly than wage inequality due to an equalizing of

⁴⁴ Full-time earnings capacity is derived using estimates of conventional human capital earnings functions.

women's annual hours worked, (Levy and Murnane, 1992). This would imply that women at the bottom of the earnings distribution are working, on average, an increasing number of hours, partially offsetting the lower average wages. The literature also reveals substantial variation across countries in the average annual number of hours worked by both men and women, (Freeman and Bell, 1996). Given the recognition in the literature that variation in hours worked should be studied when examining earnings inequality, the point of departure in this thesis is an explicit comparison of the distribution of hours worked for both husbands and wives across countries at each vingtile of the earnings distribution.

Much research has attempted to understand the relationship between variations in female labour force participation and measures of earnings and income inequality. The analysis by Saunders, O'Connor and (1994) implies that the impact of the second earner in reducing earnings inequality is greater in the United States and Canada than in either Australia or the Netherlands, but that the earnings distribution in the United States remains significantly more unequally distributed despite the equalizing effect of married women's earnings. In order to fully understand the relative earnings distributions across countries, one needs to examine the entire earnings distribution to determine the relationship between earnings and hours worked at the top, bottom, and throughout the earnings distribution.

Also, while the contribution of the second earner may contribute to lower earnings inequality among couples, it should also be recognized that the gain in money income overstates the gain in economic welfare due to a loss in non-work time. This was noted by Gottschalk and Meyer (1994) who indicated that while the increased incomes of families in the United States reflect the

increased labour force participation of married women, associated with the increased money income is the fall in the value of household production (and/or) leisure.

Although the approach used by Saunders et al (1995) and by Cancian and Schoeni (1992) is similar to the approach used in this analysis, this thesis adds to the analysis an examination and comparison of the entire earnings distribution under the assumption that all couples were working the same amount of hours. Rather than comparing the actual earnings distributions of married couples to the estimated earnings distributions without the second earner, this thesis compares actual earnings distributions of married couples to the earnings distributions where all households work the same amount of time. This is done to determine the impact on household earnings distributions of couples supplying the same amount of time in the labour market across countries. For example, if married households in Canada, Australia, Finland and the Netherlands spent the same amount of time in the labour market as did couples in the United States, would they be as well off as couples in the United States? If not, then in what part of the earnings distribution do they differ? Differences in the distribution of earnings across countries are put into context by recognizing differences in the social and institutional framework of the selected sample countries examined.

The analysis of earnings inequality is mostly restricted to gross cash earnings of wage and salary workers. Although cash earnings are an important component of family incomes, there are large differences across countries in the relationship between the distribution of earnings across workers and the distribution of family incomes and consumption levels. (OECD, 1995, Gottschalk and (1996). The primary rationale for analyzing the distribution of

gross cash earnings, (rather than take home pay or total labour compensation, inclusive of non-wage benefits), is that this choice facilitates comparisons with the literature on trends in earnings inequality, which adopts this definition of earnings (Freeman and Katz, 1995). Nonetheless, it must be borne in mind that data on gross cash earnings alone are not adequate to analyze trends in income distribution or labour market incentives.

2.3 Data Description

An essential preliminary to any inequality study is a clarification of the nature of the distribution to be analyzed to ensure that it represents the appropriate concept of economic power and does so for each constituent unit. This section reviews the choices made concerning the definition of earnings, the unit of analysis, and the measurement instruments used. The aim of this section is to provide the theoretical justification and framework which underlie the empirical results.

2.3.1 Why Household Earnings Inequality Among Couples?

The study of economic inequality is the analysis of differences across the population(s) in access to, and control over, economic resources. The distribution of several different measures of income could conceivably be considered. This paper focuses on earned income for two important reasons.

1.) First, and perhaps most directly relevant to the analysis in this paper, the distribution of labour market earnings is the appropriate income unit for examining the impact of changes in hours spent in the labour force. By using the distribution of pre-tax market earnings as the income variable of interest, earnings can be decomposed into hours worked times hourly wage, for

individuals within households, thereby facilitating the procedures used to standardize the total annual household labour supply.

2.) Second, there is a wide consensus in the existing literature on individual earnings inequality that changes in the distribution of individual earnings was the primary factor at the root of changes in the distribution of family income in many industrialized countries during the 1980's and early 1990's.⁴⁵

In the US. Smeeding and Gottschalk (1996) found that the increase in individual earnings inequality was the primary force behind the increase in family income inequality during this period and that poverty rates were, in turn, largely driven by these changes in the distribution of household income.⁴⁶

Concerns about earnings distribution are close to the top of the agenda in many other OECD nations as well. There is agreement in the research community that changes in earning inequality appear to be the prime force behind changes in market income during the 1980s for many industrialized countries.⁴⁷ With earnings more than 70 percent of market income in most modern nations, this is to be expected.⁴⁸ There is also a striking similarity

⁴⁵ See Danziger and Gottschalk (1994) and Blank (1994).

⁴⁶ A vast literature, reviewed in Levy and Murnane (1992), has documented the substantial increases in inequality of wage rates and annual earnings in the United States during the 1970s and 1980s. See also Danziger and Gottschalk, 1994.

⁴⁷ (Note: market income includes the earnings of all persons in the household and all income from interest, dividends, rents and other market sources.)

⁴⁸ See Smeeding et al. 1996.

between changes in the distribution of individual earnings and changes in the distribution of disposable income in most industrialized countries.

Increases in income inequality, in turn, has had an impact on the magnitude of social transfers in most industrialized countries. The 1980's ended with the vast majority of countries spending more on social protection programs over the decade than ten years earlier.

Since changes in the distribution of individual earnings has been recognized as the major contributing factor in explaining changes in the distribution of family income for many industrialized countries, analysis which focuses on the distribution of family or household income, without recognizing the corresponding earnings distribution, is likely to present an incomplete story.

2.3.2 Choice of Countries Examined

Five countries were selected for this study: Canada, United States, Australia, Finland and the Netherlands.⁴⁹ These countries were selected based on the fact that they represent countries with substantial variation in average annual hours worked for individuals and female labour force participation. For example, married men in Finland spend 10 to 11 hours per week less, on average, in paid employment than married men in Australia or in the United States. Married women in the Netherlands work, on average, roughly 13 to 15 hours per week less than married women in Finland and the United States.

These countries also represent countries which have not only experienced changes in male earnings inequality over the 1980's and early 1990's, but which span three categorizations of change in male earnings inequality over this period. The breakdown of these categories is discussed in Smeeding et. al. (1996) and is shown in Table 2.3a below. Smeeding et. al. (1996) examined the results of several recent studies on male earnings inequality across ten countries, all of which used consistent and comparable methodologies, and interestingly found the countries examined break down into four distinct categories.⁵⁰

The selected countries for this study are shown as the italicized countries in Table 2.3a. Each of the countries selected experienced varying degrees of

⁴⁹ Other countries examined, but not included in this study are France, Italy, Germany Sweden, Luxembourg, Denmark and the United Kingdom. These countries were not selected due to data limitations in the variables required in the transformation of household earnings using a standardized number of hours worked.

⁵⁰ As pointed out by Smeeding, the large changes in female labour force participation make it difficult to separate changes in the distribution of wages from changes in the composition of the female labour force. As a result, most of the cross country research is centered on the distribution of male earnings only.

increased male earnings inequality over the 1980's and early 1990's. As a result, the five countries selected represent a sample from each of the first three categories in Table 2.3a. The United States belongs to category A, with the largest increases in male earnings inequality; Canada and Australia belong to category B with increases in earnings inequality, but less than either the United States or the United Kingdom, and Finland and the Netherlands belong to category C with only modest increases in male earnings inequality.

Table 2.3a
Comparison of Changes in Male Earnings Inequality over the 1980's

Category	Country	Authors	Years
A. Countries which experienced the largest increase in earnings inequality	U.K.	Katz, Loveman, & Blanchflower (1993) Gottschalk & Joyce (1995)	1979-1990 1979-1986
	U.S.	Gottschalk & Joyce (1995)	
	<i>Canada</i>	Blackburn & Bloom (1993) Gottschalk & Joyce (1995)	1979-1987 1979-1984
B. Substantial increases in inequality, but less than the U.S. or the U.K.	<i>Australia</i>	Borland (1992) Gottschalk & Joyce (1995)	1981-1989 1981-1985
	Israel	Gottschalk & Joyce (1995)	
C. Positive, but quite small changes in inequality.	<i>The Netherlands</i>	Hartoog, Oosterbeck & Teulings (1992) Gottschalk & Joyce (1995)	1979-1989 1983-1987
	<i>Finland</i>	Eriksson & Jantti (1994) Gottschalk & Joyce (1995)	1980-1990 1987-1991
	Sweden	Bdin & Holmlund (1992) Gottschalk & Joyce (1995)	1984-1991 1981-1987
	France	Katz, Loveman, & Blanchflower (1993) Gottschalk & Joyce (1995)	1976-1987 1979-1984
	Japan	Katz, Loveman, & Blanchflower (1993)	1074-1990
D. No measurable increase in inequality.	Italy	Erickson & Ichino (1992)	1978-1987
	Germany	Abraham & Houseman (1992)	1983-1988

The five countries examined in this study also span the three categories of welfare states in Esping-Andersen's topology. Esping-Andersen (1990) in his topology of capitalist welfare states argues that capitalist countries differ with respect to their income transfer systems, their labour market policies and their commitment to gender equality. Esping-Andersen's topology can be used as a proxy for policy variables in each of the countries examined in this study.

"Social democratic" countries have the most egalitarian policies with generous income transfers that cover all individuals regardless of their family status, support of full employment and high wages and promotion of gender equality. According to Esping-Andersen, Finland is classified as a "social democratic" country. "Corporatist" welfare states also have generous income transfer systems, and their labour market policies foster high wages. Income transfers, however, are organized around families rather than individuals, and they tend to reproduce economic inequalities rather than redistribute income. Using this topology, the Netherlands exemplifies a "corporatist" welfare state. Finally, "liberal" welfare states take a hand-off approach and let the market have a free reign in distributing resources. Consequently, the minimum standard of living and gender equality in these countries is low. The three English-speaking countries, (Canada, the United States and Australia) examined in this study are classified as "liberal" welfare states.

2.3.3 Choice of Data

This paper uses the Luxembourg Income Study (LIS) data sets to examine household earnings across selected countries. The LIS data is a collection of micro data sets that was created specifically to improve consistency across countries in earnings and income measures obtained from the range of income surveys in various countries. Most of these surveys used in the LIS data are similar in form to the Current Population Survey for the United States or the Survey of Consumer Finances for Canada. A further advantage of the LIS data is that it offers the only publicly available micro data sets for the Netherlands and Finland. Table 2-3b shows the sources of data used for the countries examined in this study. Extensive effort has been made by country specialists to make information on income and household characteristics as comparable as possible across a large number of countries.

Country	Original Data Set	Survey Year	Observation Year
Australia	Income and Housing Survey	1990	1989
Canada	Survey of Consumer finances	1992	1991
Netherlands	Survey of Income and Program Users	1992	1991
United States	March Current Population Survey	1992	1991
Finland	Income and Expenditure Survey	1992	1991

Source: de Tombeur, Caroline et al. (1993), "Luxembourg Income Study (LIS): Information Guide", LIS CEPS Working Paper No. 7.

One common criticism of earnings (and income) distribution data derived from household surveys is that they are seriously incomplete in coverage of income and that this affects different income ranges in a non-uniform fashion. Atkinson, Rainwater, and Smeeding (1995) examined the magnitude

of this criticism by comparing various total income measures reported in the household surveys (comprising the LIS data) with external information, notably that drawn from national accounts and other external data sources, which are presumed to be more accurate in the aggregate. They show that while wages and salaries are fairly accurately reported across countries, total income reported in the micro data sets vary widely across the small number of countries for which such comparisons are possible (Canada, United States, the Netherlands, Australia). They found wage and salary income to be well-reported in the LIS data in all countries (varying from 93 to 101 percent of the aggregate estimate) while the reporting of government and private transfers and property income differ substantially across surveys. This, therefore, constitutes another reason why an examination of household earnings rather than household income may be preferable.

One major drawback of the LIS data which deserves mention is that data is available only for a limited number of years due to both limited availability of surveys and costs of annually updating each nation's data. This renders comparisons across several countries impossible for any given year. The comparisons years for the country data files were selected in an attempt to keep the years of analysis as similar as possible in order to provide a comparison of household earnings inequality across countries for roughly the same time period. The year of analysis for Canada, United States, Finland and the Netherlands is 1991. In the case of Australia, the year of analysis is 1989.

2.3.4 Choice of Unit of Measure

This study starts with the basic premise there is variation in the number of paid labour hours work supplied by couples across countries leaving less time

available for leisure and household production.⁵¹ The wide variation in the way husbands and wives “package” their labour supply and available time for home production and leisure can be seen in the differences in the number of wives which “stay at home” versus those which work in the labour market across countries. In the Netherlands, for example, roughly 45 percent of married women are engaged in market employment and the norm is for married women to stay at home, whereas in countries such as the Finland, roughly 84 percent of married women are employed and in the United States and Canada, 73 to 70 percent, (respectively) of married women are employed in the labour market.⁵²

Given the household as being preferred over the individual, there is another distinction which must be made for the accounting unit: the “household” (which includes all persons in a common residence) versus the “family” (which includes various definitions of persons related by blood or marriage.) It should be noted that the decision of whether to use the family or the household as the unit of analysis is further complicated by the manner in which the data is collected across countries.

Differences in institutions across countries affect the choice of whether to use single family household data or multifamily data. For example, the LIS data set for the United States, recognizes a couples as being married only if “legally” married.⁵³ The data for the Netherlands, on the other hand,

51 This is evidenced by the average annual hours of paid employment for married males and females shown in Table 2.1b in Section 2.2.1 above.

52 Source: LIS micro data files. Percentage of married women in employed in households with household heads are aged 15 to 64 years.

53 See de Tombeur, Caroline et al. (1993), “Luxembourg Income Study (LIS): Information Guide”, LIS CEPS Working Paper No. 7

classifies unmarried “couples” living together of whatever gender as married and are treated as a family unit.

The LIS data provides the opportunity for the user to disaggregate household units into primary “single” family units versus multi-family units whenever possible⁵⁴. The definition of a single or primary family unit corresponds to the definition of the “Census Family” used by Statistics Canada.⁵⁵ In the case of the Netherlands and Finland, the LIS household data files are not disaggregated and are defined such that they correspond to a single family household unit. In the case of Canada, Australia, and the US, the household data file contains several definitions of household, including multi-family households. Treating multi-family household datasets the same as single family households may cause problems in inequality measures.⁵⁶ In the case of Canada, the US, and Australia, only single family households were selected for the analysis in this paper, in an attempt to provide consistency across countries.

Table 2.3c provides a breakdown of the number of “single family” households as compared to families in “multi-family” households for each of the countries examined.⁵⁷ As shown in Table 2.3c, the percentage of single family

⁵⁴ For the purposes of this study, this is true for Canada, Australia, and the US data sets.

⁵⁵ The term Census Family refers to the traditional “nuclear” definition of family which includes a husband and/or wife, with or without children. The term Economic Family refers to a group of individuals who share a common dwelling who are either related through blood or marriage. This definition includes in-laws as well as persons adopted. Multi-family households may be comprised of one or more single family units.

⁵⁶ See Caroline de Tombeur, LIS Paper, 1995, for a discussion of the distinction between single family household and multi-family data. Australia, Canada and The United States were identified as the countries presenting the most potential problems with multi-family household data.

⁵⁷ This table shows the breakdown of single family households versus multi-family households and families in multi-family households, out of all married couples with household heads ages 21 to 65, with disposable income greater than or equal to zero.

Table 2.3c
 Cross country Comparison of Weighted Sample Size;
 Single Family Households and Families From Multi-Family Households

	Single Family Households	% of Total Families	# Families From Multi-Family Households	Total Families	Percent of Total Families
(Thousands of Households)					
United States, 1991	46,160	99%	630	46,790	1%
Canada, 1991	4,774	99%	57	4,831	1%
Australia, 1989	3,332	97%	91	3,423	3%
Finland, 1991*	1,044	100%	n/a	1,044	n/a
Netherlands, 1991*	3,417	100%	n/a	3,417	n/a

* Households only classified as family units.

Weighted Sample Size: Single family households and families from multi-family households equals total families.

households of total family units defined the number of households in the weighted sample ranges from 97 to 99 percent for the countries where households are disaggregated, and 100 percent for Finland and the Netherlands. Therefore, using couples as the unit of measure seems justifiable.

2.3.5 Sample Selection Criteria

Following the selection of data, choice of countries, and the choice of couples versus individuals, further decisions need to be made regarding observations included in the sample. The following discussion provides further insight on sample selection for this study. Table 2.3 d shows the proportion of the weighted sample size affected by each sample selection criterion across countries.

2.3.5.1 *Full-Time Earners Versus Part-Time*

Many studies on earnings inequality select only persons working full-time and full-year since they focus on changes in wages rather than changes in hours worked, (e.g., Smeeding et al., 1996). The omission of part-time part-year workers may be appropriate for studies measuring inequality of wages, but this exclusion would seriously hamper any analysis of changes in hours worked. This study includes all workers, both full-time and part-time and full-year and part-year to examine both actual earnings distributions and the derived earnings distributions with standardized hours worked. The methodology used in the transformation of actual household earnings to a standardized number of hours worked is discussed in detail below.

Table 2.3 d

	Cross comparison of Weighted Sample Affected by Sample Selection Criteria									
	Australia		US		Canada		NL		Finland	
	1989	Percentage	1991	Percentage	1991	Percentage	1991	Percentage	1991	Percentage
Total Sample:	14,285		14,328		18,459		3,893		10,690	
Single Family Households	10,868	76.1%	12,589	87.9%	15,750	85.3%	3,893	100.0%	10,690	100.0%
Households in Multi-Family HH:	706	4.9%	545	3.8%	855	4.6%	0	0.0%	0	0.0%
Families in Multi-Family HH:	1,562	10.9%	1,194	8.3%	855	4.6%	0	0.0%	0	0.0%
Other Family Classification	0	0.0%	0	0.0%	998	5.4%	0	0.0%	0	0.0%
Misling	1,148	8.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	14,285	100.0%	14,328	100.0%	18,459	100.0%	3,893	100.0%	10,690	100.0%
Hours ≥ zero and Earnings ≥ zero	11,578	81.1%	13,719	95.7%	16,123	87.3%	2,451	63.0%	9,723	91.0%
Not Hours ≥ 0 and Earnings ≥ 0	837	5.9%	608	4.2%	676	3.7%	1,442	37.0%	4	0.0%
Misling Values	1,870	13.1%	1	0.0%	1,660	9.0%	0	0.0%	964	9.0%
Total	14,285	100.0%	14,328	100.0%	18,459	100.0%	3,893	100.0%	10,690	100.0%
Head Aged 21 to 65	10,317	72.2%	11,335	79.1%	15,094	81.8%	3,086	78.5%	8,515	79.7%
Head Not Aged 21 to 66	2,818	19.7%	2,993	20.9%	3,365	18.2%	837	21.5%	2,175	20.3%
Misling Values	1,150	8.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	14,285	100.0%	14,328	100.0%	18,459	100.0%	3,893	100.0%	10,690	100.0%
Disposable Income > Zero	13,067	91.5%	14,212	99.2%	18,385	99.6%	3,849	98.9%	10,685	100.0%
Disposable Income < Zero	70	0.5%	116	0.8%	74	0.4%	44	1.1%	5	0.0%
Misling	1,148	8.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	14,285	100.0%	14,328	100.0%	18,459	100.0%	3,893	100.0%	10,690	100.0%
Spouse Present	7,759	54.3%	7,759	54.2%	10,315	55.9%	2,459	63.2%	5,808	54.3%
Spouse Not Present	5,376	37.6%	6,565	45.8%	8,144	44.1%	1,434	36.8%	4,882	45.7%
Misling Value	1,150	8.1%	4	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	14,285	100.0%	14,328	100.0%	18,459	100.0%	3,893	100.0%	10,690	100.0%
Male Household Head	9,977	69.8%	10,233	71.4%	13,753	74.5%	2,974	76.4%	7,528	70.4%
Female Household Head	3,168	22.1%	4,095	28.6%	4,706	25.5%	919	23.6%	3,162	29.6%
Misling	1,150	8.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	14,285	100.0%	14,328	100.0%	18,459	100.0%	3,893	100.0%	10,690	100.0%
Zero Earnings; Household Head	6,811	47.7%	5,817	40.6%	9,646	52.3%	1,984	51.0%	5,315	49.7%
Positive Earnings; Household Head	7,474	52.3%	8,511	59.4%	8,813	47.7%	1,909	49.0%	5,375	50.3%
Total	14,285	100.0%	14,328	100.0%	18,459	100.0%	3,893	100.0%	10,690	100.0%
Zero Earnings; Spouse	9,189	64.3%	9,690	67.6%	11,975	64.9%	1,304	33.5%	6,367	59.6%
Positive Earnings; Spouse	5,092	35.6%	4,638	32.4%	6,484	35.1%	2,580	66.3%	4,323	40.4%
Misling Values	0	0.0%	0	0.0%	0	0.0%	8	0.2%	0	0.0%
Total	14,281	100.0%	14,328	100.0%	18,459	100.0%	3,893	100.0%	10,690	100.0%

2.3.5.2 *Zero Earnings Households*

Households with zero earnings are included in the distribution of actual household earnings. Excluding zero earning households and generating a distribution of positive earnings only are very likely to result in different measures of the household earnings inequality than studies which include zero earnings, due to differences in the proportion of persons with zero earnings across countries.

It should also be noted that each of standardization procedures used preserves the zero earnings status of households. (i.e., households where neither husband or wife work, total household earnings would also be zero under each of the procedures used to value a standard number of hours). Along the same vein, each of the standardization procedures also preserves the zero earnings status of individuals within the household. In other words, under each of the standardization procedures used, it is assumed that if households were constrained to provide a given number of hours, households would decide who would provide these hours based on the individuals currently working.⁵⁸ Admittedly, there are a host of models of household labour supply which would generate alternative standardization procedures, however, the three used in this paper are based on current labour force participation. (A full discussion of the procedures used in the transformation of hours worked is provided in Section 2.8 below).

⁵⁸ No new individuals were put to work under the standardization's. Without knowing the earnings that zero earners would receive if they had worked it, either wages determined by wage regressions or country-specific average wages for each type of worker would have to be used to value their share of the standardized hours.

Households which reported zero or negative disposable incomes were excluded from the sample. Because real income must be positive (to ensure consumption required for survival), zero money income may represent measurement error. Following a recent study by Osberg and Xu (1997), all observations with zero recorded money income were deleted. Osberg and Xu showed significant differences in inequality measures between samples with zero or negative disposable incomes versus those with only positive disposable incomes.

2.3.5.3 *Self-Employment Earnings*

Self-employed persons are included in the analysis for each country selected. One justification for excluding self-employed earnings from the analysis when examining income inequality is that it is not possible to separate labor market earnings from returns to capital in households with self employment income. This represents more of a problem in the case of reported income than reported earnings. Reported wage and salary income from self-employment is not as prone to reported returns to capital as is income. Persons drawing a wage or salary from their own business usually report capital gains or losses outside their earned income for income tax purposes.⁵⁹ In general, the exclusion of self-employment earnings introduces a sample selection bias which will affect the distribution of earnings for the selected sample if the distribution of labor market earnings of the self-employed differs from the distribution for all other persons

⁵⁹ Also, since negative earnings were omitted from the data, persons reporting losses in earnings are automatically omitted from the sample.

2.3.5.4 *Married Couple; Household Head Aged 21 to 65 Years*

Cases were selected where both the household head and spouse are present for all households with household heads between the age of twenty one and sixty five, inclusive.⁶⁰ (Table 2.3 d shows the impact on the sample size of this sample selection criteria).

2.3.5.5 *Households Reporting Earnings but Zero Hours*

Households reporting earnings but zero or missing hours worked or weeks worked were omitted from the sample. This was done to facilitate the standardization procedures used.⁶¹

2.3.6 **Purchasing Power Parity Indices**

This paper adopts the Purchasing Power Parity (PPP) index created by Summers and Heston (1991) to transform the distributions of Figure 1 into a common currency under the strong assumption that the PPP conversions reflect differences in purchasing power that are equal at all points in the distribution or, if they are not, that these differences across percentile points are the same in all countries. Before proceeding it should be noted that the

⁶⁰ The impact of differences in retirement age across countries and over time should be noted. In countries with an average retirement age less than 65 years, this sample selection criterion will overstate the number of low earners in the sample. In Canada, while the average retirement age may have been 65 in 1975, it is now much lower. Also, at the bottom end of the age criterion, countries may differ in the number of married couples for whom the household head is aged less than 21 years.

⁶¹ This is due to the fact that all household earnings distributions examined are broken down into vingtiles based on the actual household earnings distribution within each country (discussed below in Section 2.4). Therefore each vingtile examined contains the same households under various standardization procedures used to adjust the household earnings distribution within a country. Records with reported earnings, but no reported hours worked would be placed within a particular vingtile of the earnings distribution, based on reported actual earnings, and would remain in that vingtile under each of the standardization's considered. However, if average hours worked are reported as either zero or missing, this alters the average "standardized" earnings within each vingtile computed through various standardization procedures.

use of purchasing power parity measures involve strong assumptions regarding cross-country comparisons of inequality. The following discussion points out some of the major issues concerning the use of purchasing power parity indices.

Purchasing Power Parity conversions ignore important country-specific characteristics which merit mention at this point. Country-specific characteristics such as non-cash income (e.g., the value of government-provided health insurance or housing subsidies), or tax rates can vary significantly among countries. Although these factors are sometimes difficult to value, these factors change total individuals' command over resources, and should be kept in mind when considering cross country comparisons of purchasing power.

2.4 Household Earnings Distribution Defined

Annual pre-tax earnings are used in this analysis for couples in the selected cross-country sample. Table 2.4a shows the variables used to examine the distribution of earnings and annual hours worked.

Variable ID	Reported/Computed	Variable Description
V39	Reported	Gross annual pre-tax earnings, household head.
V41	Reported	Gross annual pre-tax earnings, spouse
Hrshd	Reported	Average number of hours worked per week, household head
Hrssp	Reported	Average number of hours worked per week, spouse
Weekhdf	Reported	Total number of weeks worked full-time per year, household head
Weekhdpt	Reported	Total number of weeks worked part-time per year, Household head
Weekspft	Reported	Total number of weeks worked full-time per year, spouse
Weeksppt	Reported	Total number of weeks worked part-time per year, spouse
Wktothd	Computed	Total number of weeks worked (ft + pt) per year, household head
Wktotsp	Computed	Total number of weeks worked (ft + pt) per year, spouse
Hrstothd	Computed	Total number of hours worked per year, (Wktothd X Hrstohtd), HH head
Hrstotsp	Computed	Total number of hours worked per year, (Wktotsp X Hrstohtsp), Spouse

As can be seen in Table 2.4a, data on annual pre-tax earnings is a reported variable for both household head and spouse in the LIS data set for all countries selected in the sample. Total annual hours worked is computed using total average hours worked per week multiplied by total weeks worked per year for both household head and spouse.

The gender of the household head is given for all countries in the sample but the gender of the spouse is not given. Households were selected if the gender of the household head was indicated, and a frequency was done on the gender of the household head. In all households selected (where both household head and spouse are present) all records reported household heads as male for

all selected countries in the sample. Given this, earnings and the hours worked of the head were assigned as male earnings and hours worked and those of the spouse were assigned as female hours and earnings. Due to the lack of information on the gender of the spouse, households containing same gender couples cannot be identified

Pre-tax actual household earnings, (unadjusted for prices, family size or hours worked), within the selected sample were first sorted in ascending order and then split into twenty groups (vingtiles), of equal size for each year of analysis. Each vingtile contains an equal number of households for a given year of analysis. The average earnings and average number of hours worked within each vingtile are then calculated for males and females. For example, at the bottom of the earnings distribution, the average hours worked in the first vingtile of the distribution represents the average total household hours worked by all households included within this vingtile. This would be all households up to, and including the bottom 5th percentile of the household earnings distribution.

The same households within each vingtile were used to examine hours worked and earnings for each of the subsequent adjustments to the earnings function. In this manner, the impact of each of the adjustments on earnings, and hours worked for males and females can be examined. Since each vingtile always contains the same households as were included in the actual unadjusted earnings distributions, the same households are compared throughout this analysis for any given year.

2.5 Distribution of Actual Price-Adjusted Household Earnings

A comparison of actual pre-tax married couples' earnings distributions across countries, valued in 1991 US dollars and purchasing power parity, but unadjusted for differences in family size, shows substantial differences in the level of real earnings across countries.

Table 2.4 presents the distribution of actual pre-tax household earnings for couples, (valued in 1991 US dollars), in each of the selected countries. The earnings distributions contained in Table 2.4 represent average annual earnings for all married couple households contained within each vingtile of the earnings distribution. Figure 2.1 shows the household earnings distributions given in Table 2.4.

This analysis shows substantial differences in real earnings across countries. As can be seen in Figure 2.1, the distribution of real household earnings adjusted for purchasing power lie below the earnings distribution for the United States throughout most of the distribution. Canadian earnings are slightly less than US. earnings throughout the distribution with the gap in earnings beginning to widen slightly at the 15th vingtile of the distribution.

Vingtile	CN'91	US'91	AS'89	FI'91	NL'91
1	0	28	0	0	0
2	2,144	4,217	368	337	0
3	8,239	10,198	7,123	5,834	0
4	13,303	14,482	13,953	10,795	5,530
5	17,673	18,332	17,547	13,931	16,194
6	21,187	21,358	20,373	16,000	19,723
7	24,192	24,718	22,647	18,251	21,779
8	27,132	27,917	25,007	20,545	23,561
9	30,272	30,916	27,335	23,199	24,958
10	33,029	34,103	29,697	25,801	26,530
11	35,980	37,002	31,946	28,622	28,324
12	38,823	40,191	34,205	31,226	30,118
13	41,692	43,736	36,466	33,507	31,959
14	44,897	47,510	39,070	35,910	34,016
15	48,389	51,547	42,023	38,861	36,130
16	52,022	56,355	44,990	42,059	38,570
17	56,362	62,268	48,664	46,285	41,557
18	62,355	70,612	53,120	52,649	45,657
19	71,169	82,823	60,165	62,060	51,018
20	106,217	110,119	85,519	84,291	74,749

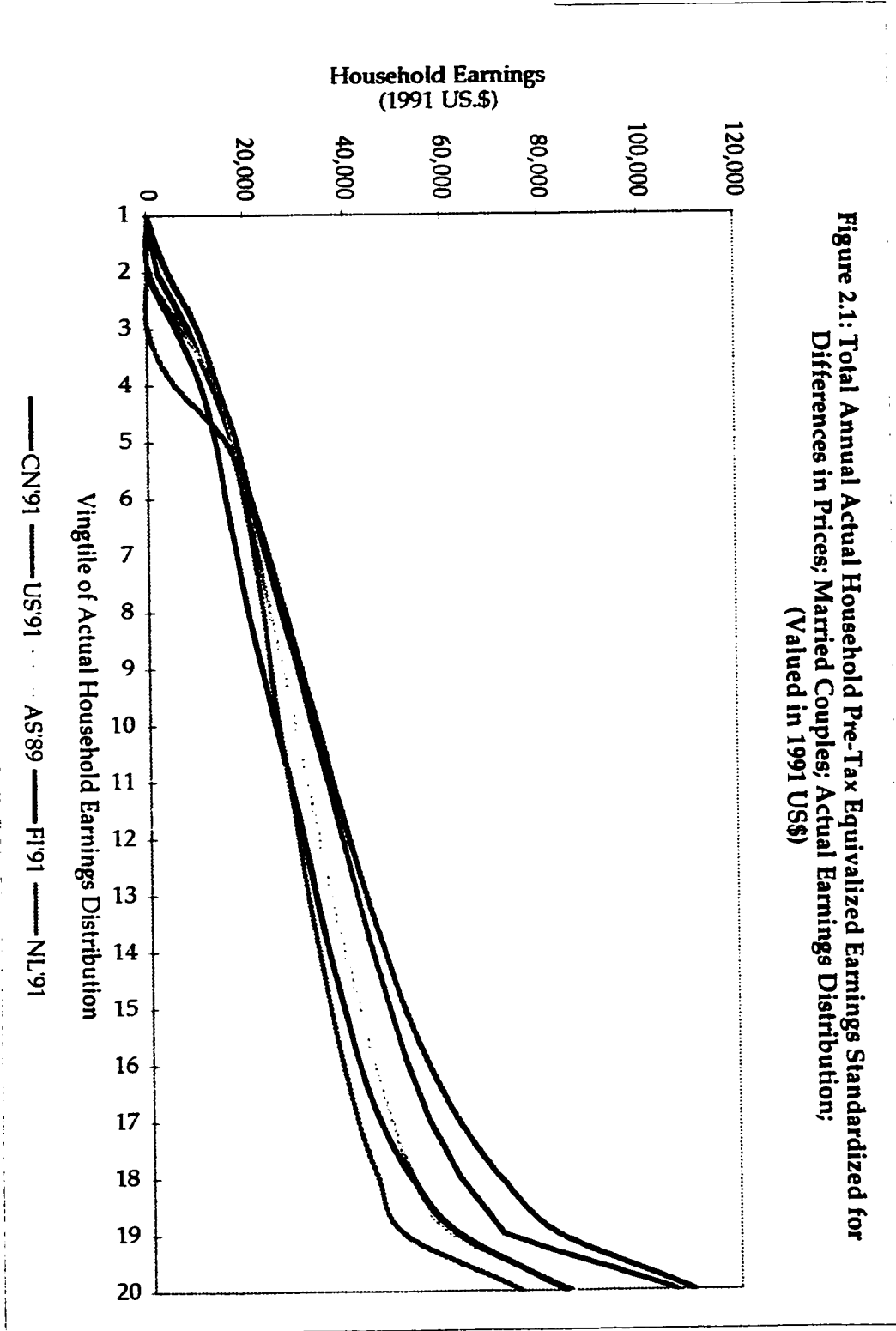


Figure 2.1: Total Annual Actual Household Pre-Tax Equivalized Earnings Standardized for Differences in Prices; Married Couples; Actual Earnings Distribution; (Valued in 1991 US\$)

One might conclude from this comparison, that married couple households are better off in absolute terms in the United States than they are in the comparison countries. However, differences in family size and hours worked across countries make it difficult to compare earnings which are adjusted for prices and exchange rates only. Section 2.6 examines the distribution of household earnings adjusted for differences in family size.

Earnings are also examined in terms of the contribution to total household earnings of husbands and wives for each of the countries examined. Table 2.5 presents the proportion of actual household hours attributable to husbands within the household for each quintile of the earnings distribution for each of the selected countries. Figure 2.2 shows the proportion of male earnings to total household earnings contained in Table 2.5.

Figures 2.3 and 2.4 present the distribution of average annual real pre-tax earnings (valued in 1991 US dollars and standardized for differences in prices using a PPP index), for husbands and wives, respectively. Figure 2.4 shows the earnings distribution for married women in Finland and Canada are very similar to married women's earnings in the United States. The three distributions cross over each other several times throughout the distribution. Married women in Australia earn less than married women in Canada throughout the earnings distribution, followed by married women in the Netherlands. The distribution of married men's earnings however, shows that married men in the United States have higher average annual earnings than

Table 2.5
Cross Country Comparison of Annual Male Hours Worked As Proportion of Total Household Hours;
Actual Earnings Distribution; Married Couples

Vingille	CN'91	US'91	AS'89	FI'91	NL'91
1	0.00	0.94	0.00	0.00	0.00
2	0.72	0.62	0.73	0.50	0.00
3	0.66	0.63	0.69	0.40	0.00
4	0.58	0.66	0.72	0.36	0.56
5	0.59	0.62	0.75	0.36	0.72
6	0.60	0.63	0.78	0.46	0.85
7	0.62	0.63	0.78	0.53	0.89
8	0.66	0.63	0.78	0.59	0.88
9	0.66	0.65	0.77	0.54	0.92
10	0.67	0.63	0.77	0.60	0.85
11	0.66	0.63	0.70	0.57	0.80
12	0.64	0.63	0.68	0.54	0.76
13	0.64	0.60	0.67	0.53	0.76
14	0.63	0.61	0.63	0.53	0.70
15	0.62	0.61	0.63	0.52	0.70
16	0.60	0.59	0.61	0.52	0.72
17	0.61	0.59	0.61	0.52	0.64
18	0.57	0.59	0.59	0.52	0.64
19	0.56	0.59	0.60	0.52	0.68
20	0.60	0.64	0.61	0.54	0.67

Figure 2.2
Cross Country Comparison of Annual Male Hours Worked as Proportion of Total
Household Hours Worked at Each Vingtile of the Earnings Distribution;
Actual Earnings Distribution, Married Couples

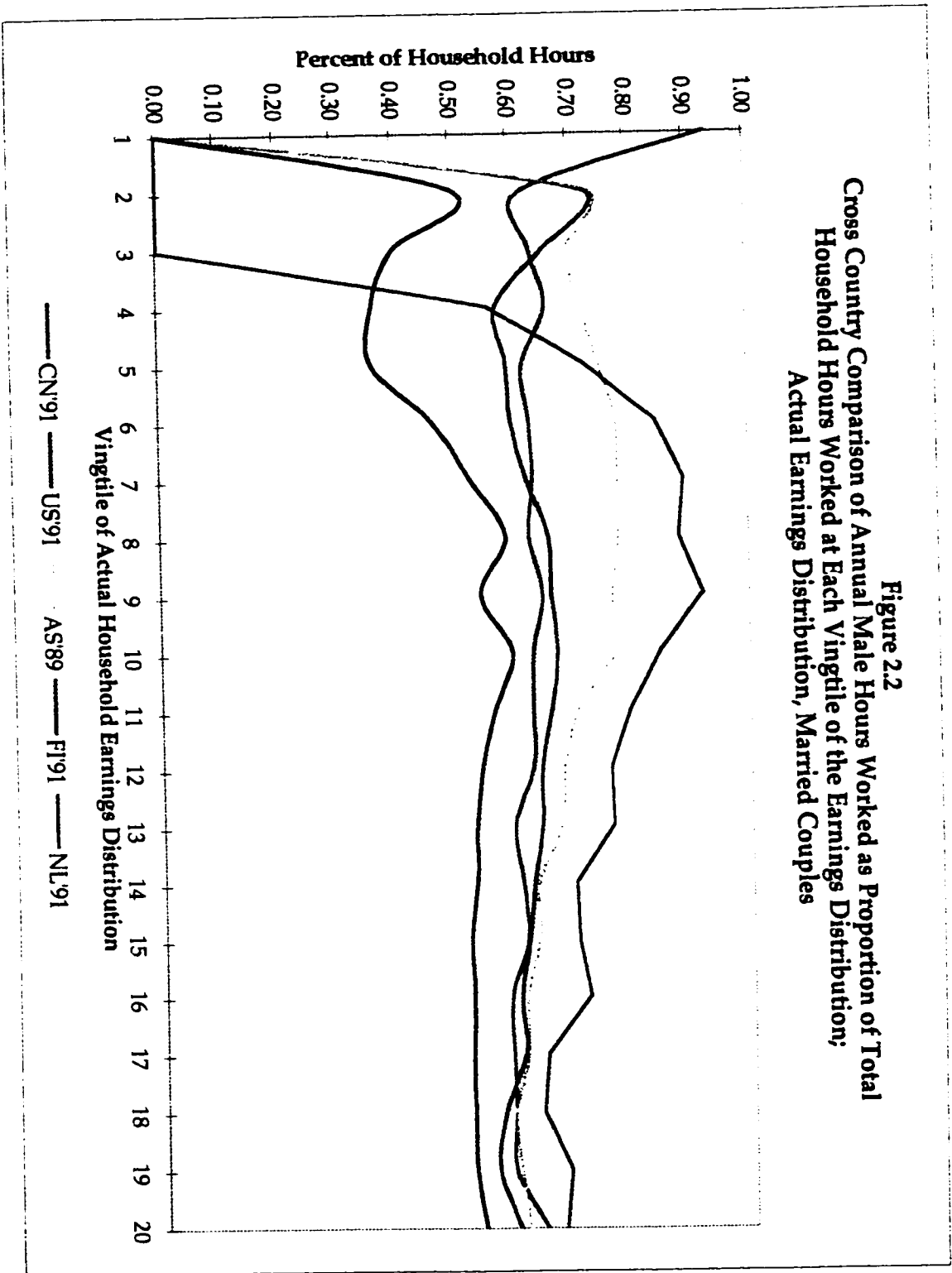
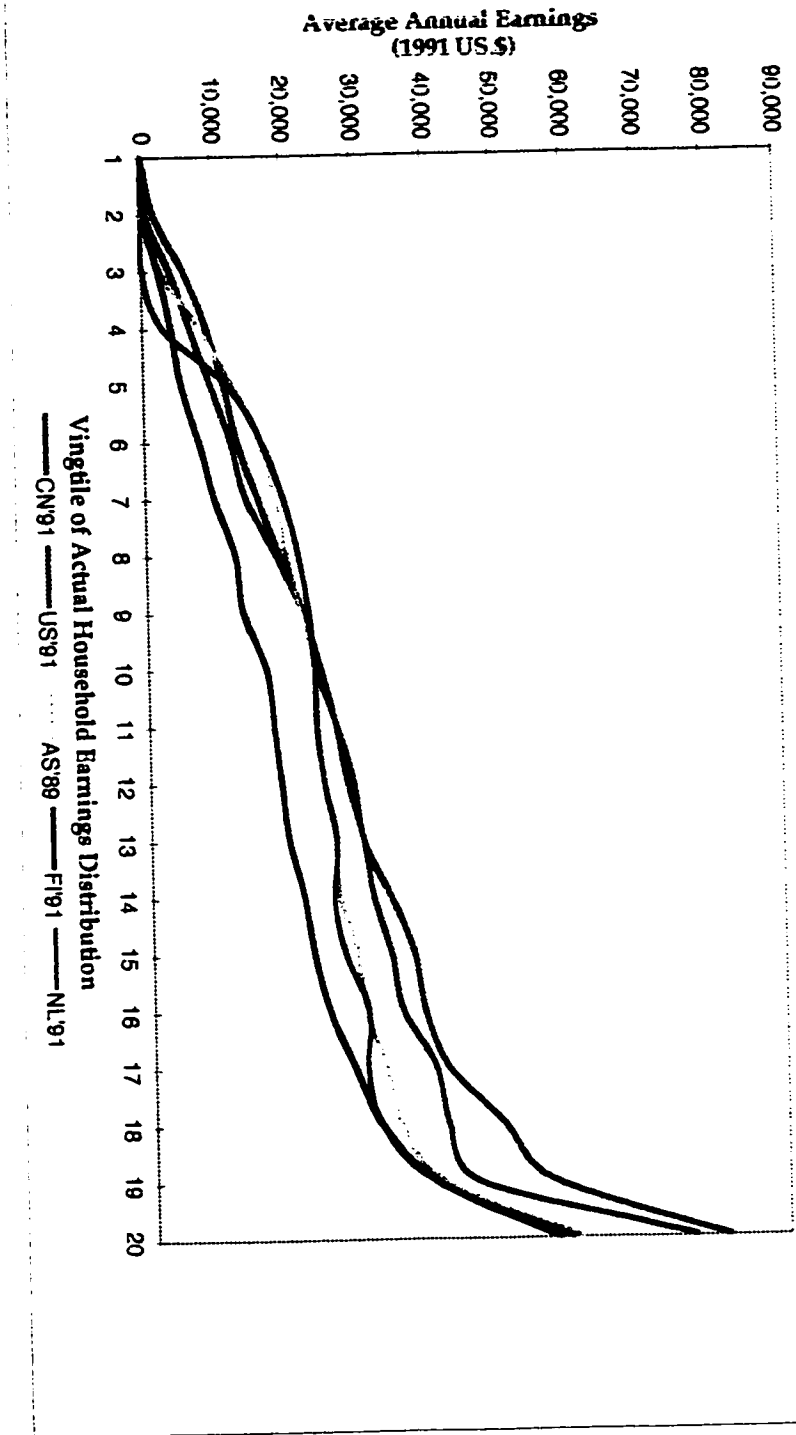


Figure 2.3: Cross Country Comparison of Annual Male Pre-Tax Earnings Standardized for Differences in Prices; Actual Earnings Distribution; Married Couples (Valued in 1991 US\$)



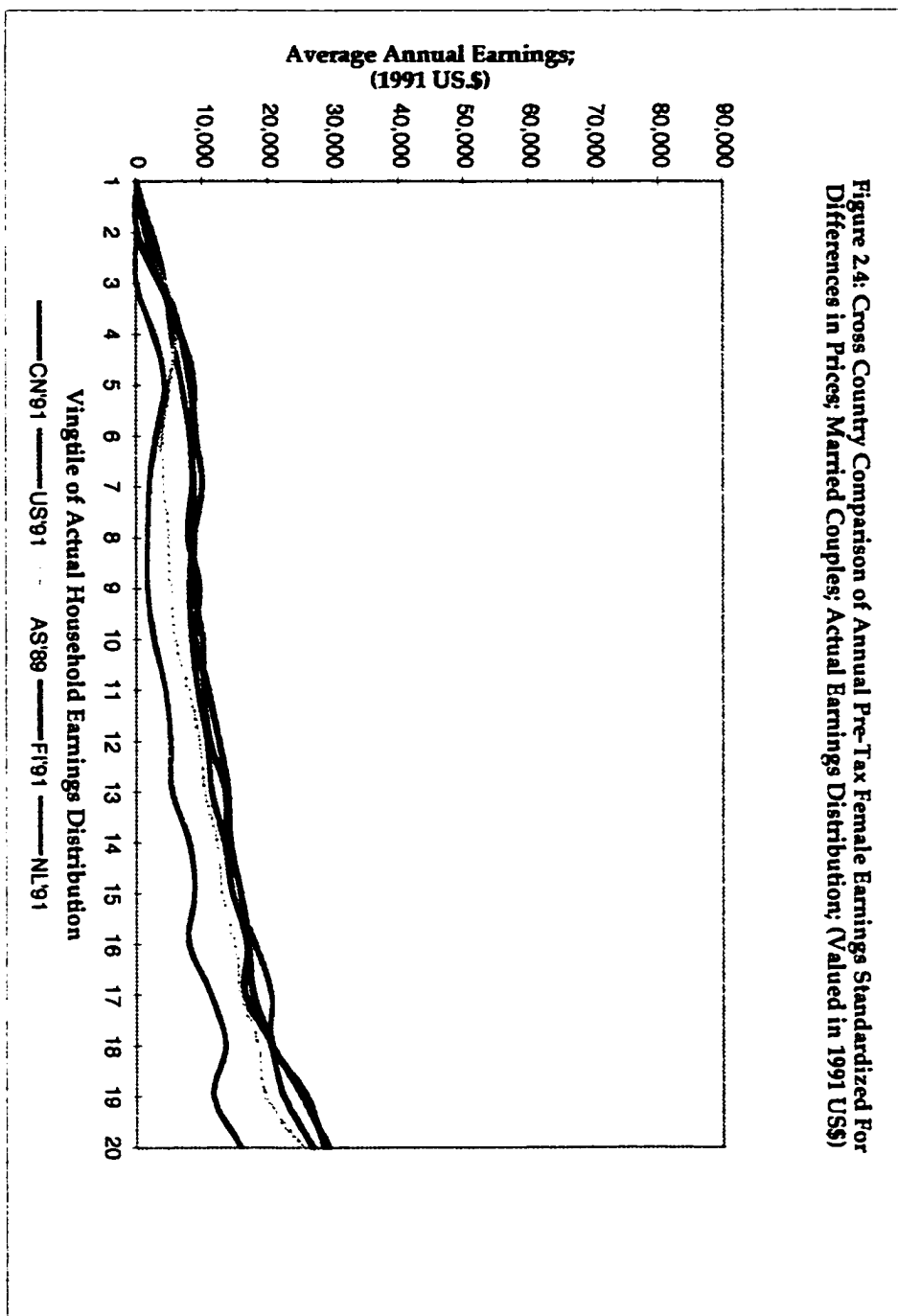


Figure 2.4: Cross Country Comparison of Annual Pre-Tax Female Earnings Standardized For Differences in Prices; Married Couples; Actual Earnings Distribution; (Valued in 1991 US\$)

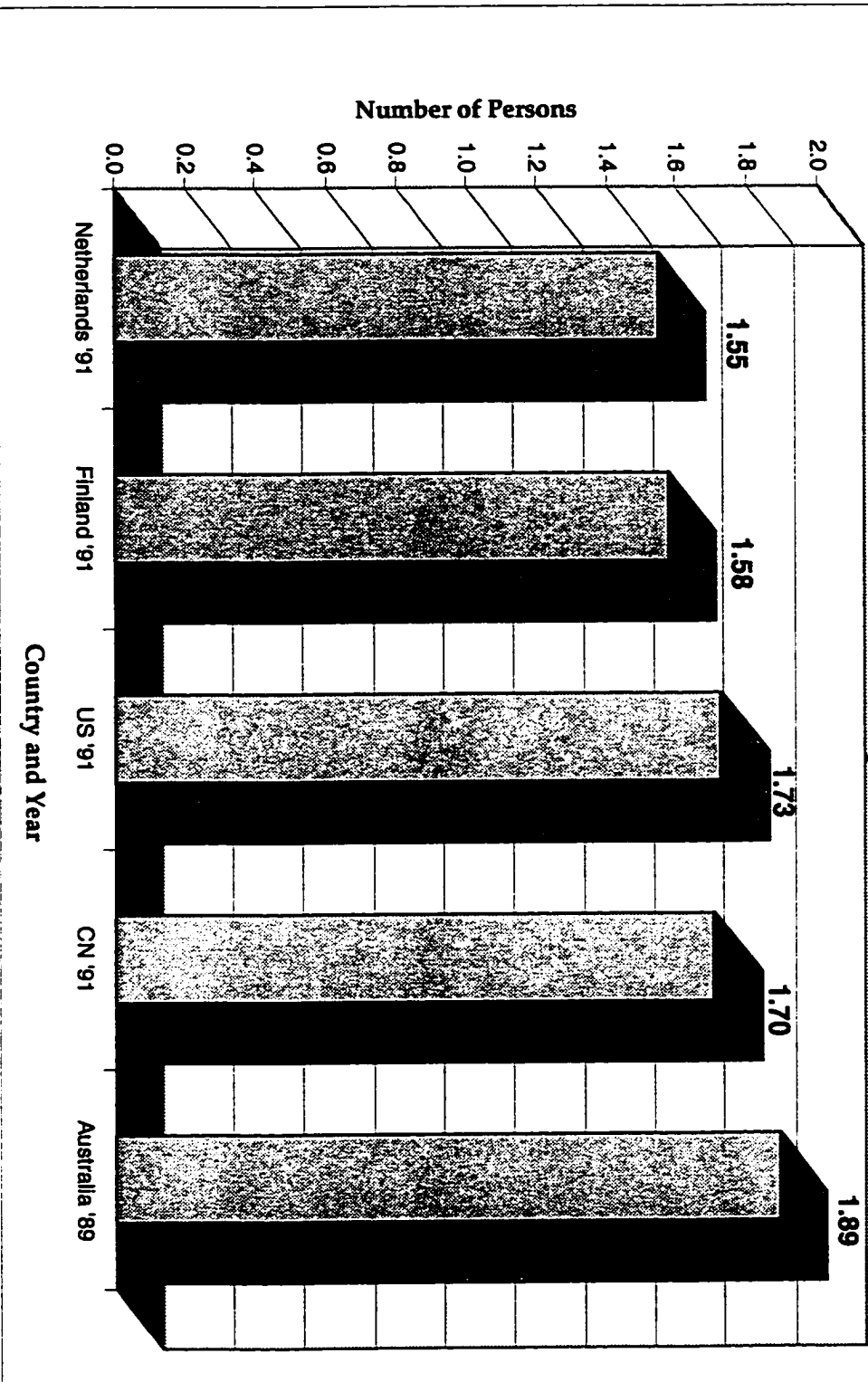
do married men in all other countries throughout most of the earnings distribution. Canadian married men's earnings follow the earnings of married men in the US, and lie below the US the earnings distribution of married men throughout the entire distribution. Earnings for married men in Australia and the Netherlands follow a very similar distribution. In Finland, married men earn less than married men in the United States, Canada, Netherlands and Australia. It would appear that the earnings of married men in Finland do not compare as well across countries as do earnings of married women.

2.6 Distribution of Household Earnings Adjusted for Differences in Family Size

Variation in family size can make large differences in terms of the purchasing power of earnings. Annual household earnings of \$35,000 would have vastly different purchasing power for a family of 5 than for a household of a couple without children. Once earnings are adjusted for cross-country differences in currency and prices, Table 2.6a gives a cross-country comparison of the mean number of children less than eighteen years old living in the household for married couples. These means are derived using the selected country samples of the LIS data for the year of analysis used in this study.

This information is shown graphically in Figure 2.5a. Average family size is largest in Australia, followed by the United States. Family size is the smallest in the Netherlands. It should also be noted that the standard deviation associated with the mean number of children less than 18 years old living with the family is fairly high.

Figure 2.5 a
 Cross Country Comparison of Average Number of Children Less Than 18 Years
 Old,
 Married Couples



Source: LIS microdata country files, married couples, household head aged 21 to 65.

	Mean # Children	Standard Deviation
Netherlands, 1991	0.97	1.14
Finland, 1991	0.99	1.14
United States, 1991	1.08	1.20
Canada, 1991	1.07	1.15
Australia, 1989	1.18	1.22

Source: LIS microdata country files; household head aged 21 to 65, with disposable income greater than zero.

Once household earnings are adjusted for prevailing currency and price differences across countries, real household earnings are further adjusted for differences in family size using the OECD equivalence scale. The OECD equivalence scale calculates the equivalent earnings of each household member as:

$$\text{Equivalent Earnings} = E / (1 + .7(A - 1) + .5(C)),$$

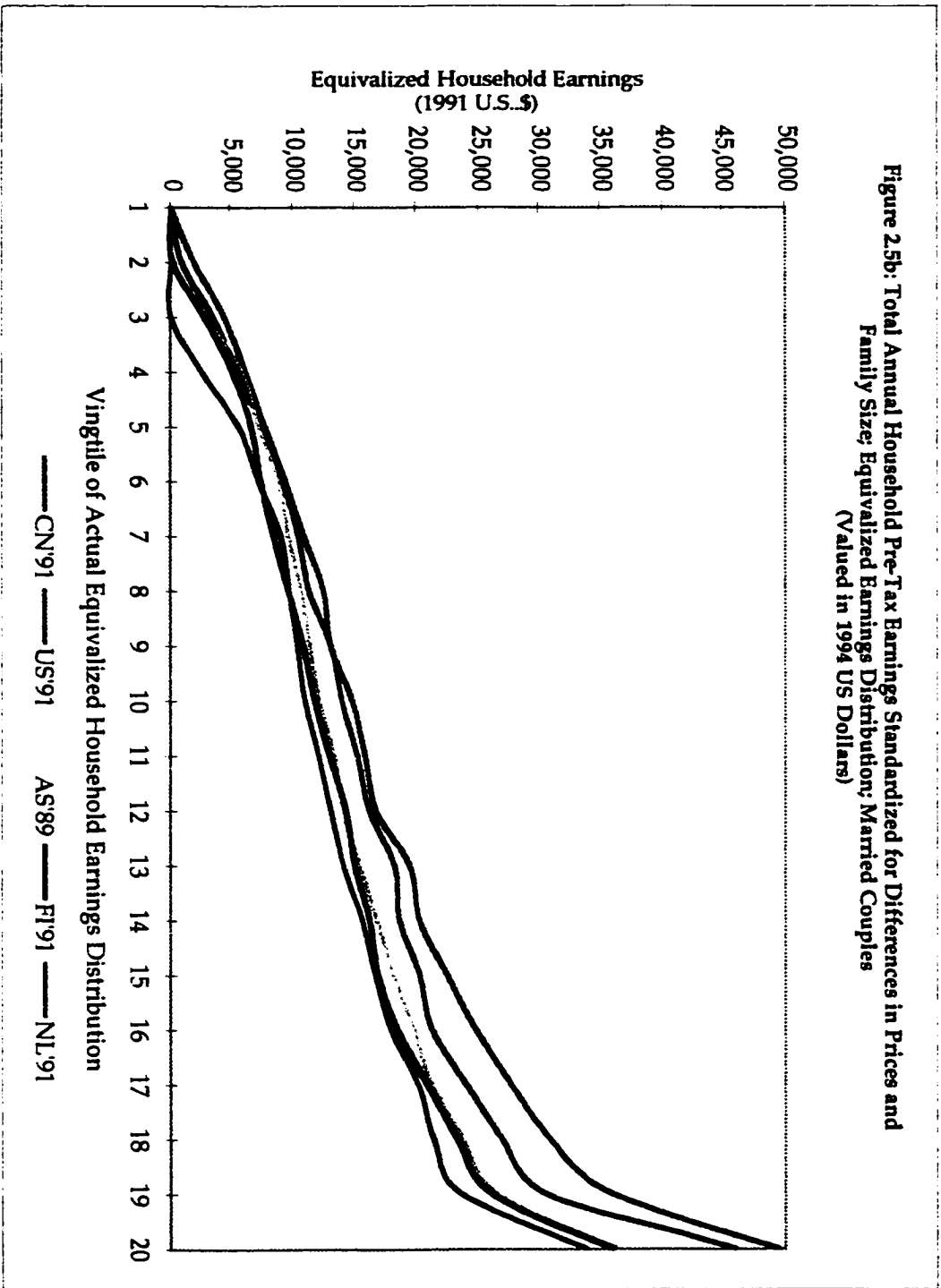
where E represents household earnings, A is the number of adults in the household, and C is the number of children under the age of 18.

Table 2.6b shows real household earnings (valued in 1991 US dollars), standardized for differences in prices (using a PPP index) and for differences in family size, for each vingtile of the distribution. (Note: Each vingtile is comprised of the same households as in the vingtiles of the distribution of actual earnings, unadjusted for family size, shown in Table 2.4 above). Figure 2.5b shows the distributions of real household earnings, (valued in 1991 US dollars), standardized for differences in prices and family size.

Table 2.6 b
Annual Household Pre-Tax Earnings Standardized for Differences in Prices and Family Size;
Married Couples; Equivalent Earnings Distribution (Valued in 1991 US\$)

Vingtile	CN'91	US'91	AS'89	FI'91	NL'91
1	0	13	0	0	0
2	904	1,914	154	161	0
3	3,543	4,522	3,029	2,779	0
4	5,645	6,270	6,063	5,188	2,571
5	7,647	7,822	7,385	6,712	5,688
6	9,271	9,431	8,887	7,494	7,310
7	10,507	10,885	9,686	8,488	9,047
8	11,320	12,499	10,691	9,688	9,723
9	13,106	13,078	11,382	10,846	10,371
10	13,963	14,888	12,163	11,776	10,969
11	15,291	15,959	13,372	12,988	12,104
12	16,273	16,848	14,077	14,341	13,080
13	18,334	19,529	15,479	15,056	14,085
14	18,717	20,331	16,928	16,331	15,684
15	20,343	22,506	18,256	17,022	16,763
16	21,302	24,737	19,886	18,579	18,038
17	23,988	27,662	21,266	20,961	20,185
18	26,871	30,964	23,734	23,298	21,448
19	30,568	35,957	26,450	26,017	23,610
20	46,017	49,473	36,244	35,973	33,885

Figure 2.5b: Total Annual Household Pre-Tax Earnings Standardized for Differences in Prices and Family Size; Equivalized Earnings Distribution; Married Couples (Valued in 1994 US Dollars)



Examining real household earnings, standardized for differences in family size in Figure 2.5b, shows average equivalized household earnings in the US are greater than equivalized earnings for all other countries examined throughout most of the distribution. Again, based on the distribution of real household earnings which has been standardized for differences in both prices and family size, households in the United States could be considered to be better off than households in other countries. However, a comparison of household earnings which have been fully adjusted for purchasing power, may not give a valid ranking of economic well-being if one considers the variation in hours spent in paid labour across the countries examined.⁶² The following section examines average annual household hours worked and reveals substantial differences in the average number of hours spent by households to acquire these earnings. This section presents the distribution of average annual hours worked by households, to produce the household earnings distributions (presented in this section) for each vingtile of the earnings distributions.

⁶² Referring to earnings which have been fully adjusted for purchasing power includes the conversion of earnings to a common monetary unit, standardizing for differences in prices faced by households across countries, and standardizing for differences in family size across households.

2.7 Distribution of Annual Household Hours Worked

In order to fully understand differences in the earnings distributions across countries, it is important to understand differences in the hours spent to acquire these earnings. As a starting point, it is useful to examine annual household hours worked at each vingtile in the earnings distribution.

The distribution of annual household hours worked across countries is contained in Table 2.7a for each vingtile of the earnings distribution, and shown in Figure 2.6a.

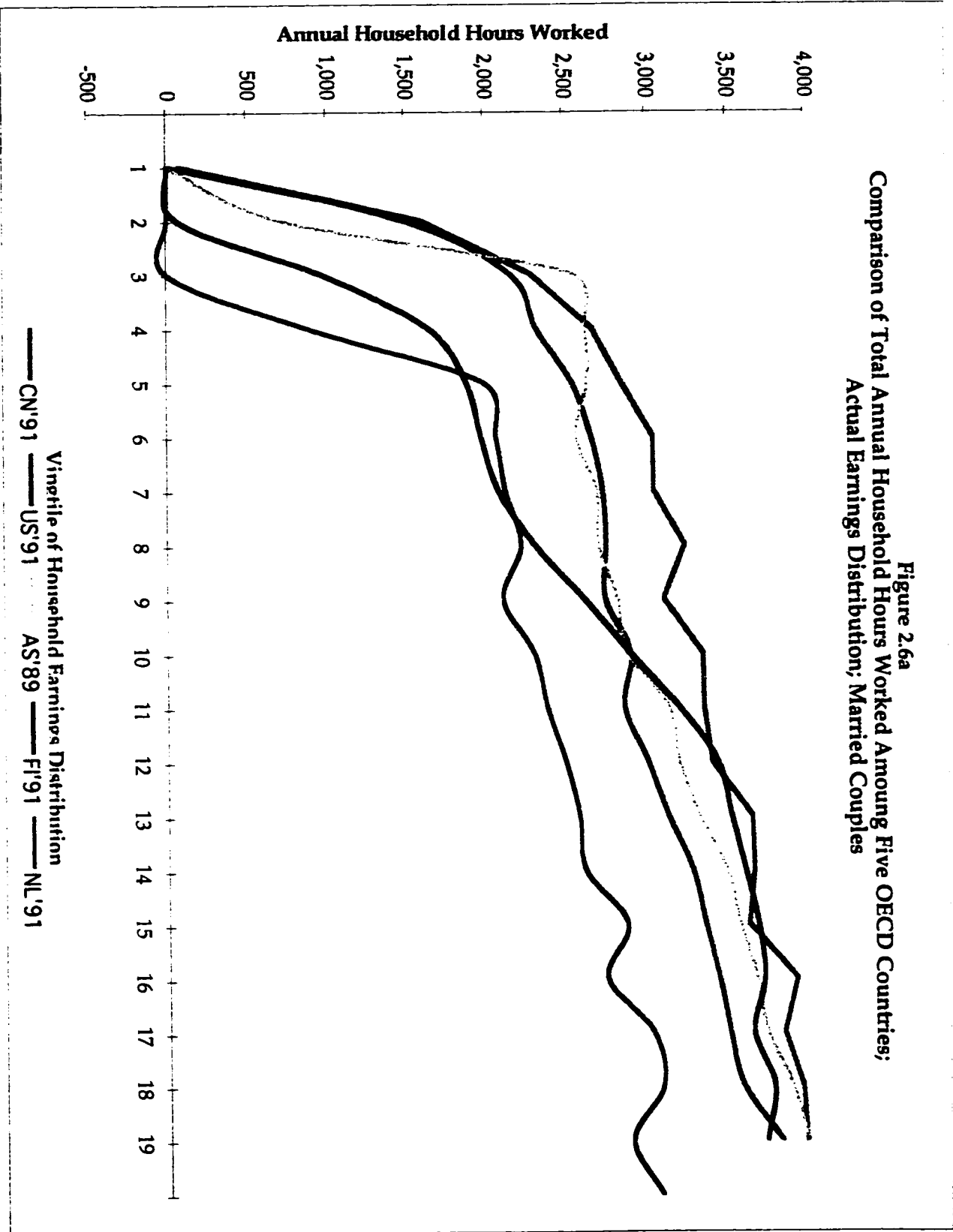
The distribution of annual household hours worked is examined using the actual household earnings distributions for each of the selected countries in the sample. Average annual hours household worked are computed for each vingtile of the distribution using the same households within each vingtile of the earnings distribution as were used to compute average annual household earnings.

An examination of the distribution of annual household hours worked for all vingtiles of the earnings distribution, (shown in Figure 2.6a), reveals that couples in the United States spend more time in the paid labour market, throughout most of the earnings distribution, than do families in other countries. At the bottom of the earnings distribution, the US is followed by Canada with the next highest number of household hours spent in the labour market. Average household hours worked in Canada however, experience a slight decline at around the median with average household hours worked

Table 2.7a

Total Household Annual Hours Worked; Actual Earnings Distribution					
Vingtile	CN'91	US'91	AS'89	PI'91	NL'91
1	0.00	78.68	0.00	0.00	0.00
2	1,479.69	1,602.38	705.31	63.32	0.00
3	2,160.63	2,294.71	2,552.20	966.79	0.00
4	2,324.94	2,672.82	2,631.72	1,647.08	883.91
5	2,549.23	2,846.12	2,643.49	1,885.54	1,990.86
6	2,664.99	3,036.10	2,572.96	1,976.76	2,072.28
7	2,733.56	3,039.30	2,698.40	2,087.02	2,129.21
8	2,750.76	3,230.23	2,704.13	2,316.23	2,224.65
9	2,744.27	3,100.93	2,817.48	2,619.48	2,114.15
10	2,893.51	3,340.82	2,877.55	2,894.45	2,306.48
11	2,855.15	3,348.44	3,128.86	3,194.54	2,385.64
12	2,996.72	3,391.18	3,188.91	3,429.38	2,499.86
13	3,121.01	3,644.13	3,312.27	3,515.64	2,583.79
14	3,271.59	3,654.35	3,481.50	3,599.76	2,617.62
15	3,348.50	3,621.10	3,563.35	3,678.59	2,863.29
16	3,430.93	3,927.74	3,668.37	3,715.73	2,746.17
17	3,499.30	3,844.15	3,733.78	3,646.70	3,021.96
18	3,580.73	3,963.28	3,894.31	3,777.17	3,080.20
19	3,825.37	3,986.24	3,999.60	3,728.82	2,894.08
20	3,863.92	3,898.68	4,055.13	3,726.91	3,070.40
Average	2,804.74	3,126.07	2,911.47	2,623.50	2,074.23

Figure 2.6a
Comparison of Total Annual Household Hours Worked Among Five OECD Countries;
Actual Earnings Distribution; Married Couples



dropping off. Hours worked by married couples in the Netherlands are the lowest overall, with the lowest distribution beyond the 8th vingtile of the earnings distribution. In Finland, hours worked start to increase at around the 8th percentile due to a relatively large number of married women in the labour market.

The hours worked in the United States increase at a rapid rate with hours worked well above hours worked in the other countries between the 4th and the 12th vingtile. By contrast, households in the Netherlands work on average 600 to 800 hours less per year than households in the other five countries examined in the upper end of the earnings distribution. Based on a 50-week work year, this translates into 12 to 16 hours less each week.

These findings are in keeping with the OECD reported hours worked per adult, presented in Section 2.2.1 in this chapter. Among the five countries examined in this study, the OECD reported annual hours ranked the US as having the highest annual hours worked per adult, followed by Australia, Canada, Finland and the Netherlands. The average annual household hours worked throughout the earnings distributions in each country is also shown at the bottom of Table 2.7a. This analysis shows average *household* hours worked follow the same ranking as average annual hours worked *per adult* reported as reported by the OECD across the countries examined in this study.

Examining the entire distribution of hours worked provides a more complete understanding of the distribution of household hours embodied in the average hours worked. This analysis shows average annual household hours worked in the US being predominantly higher throughout the earnings distribution. Average annual hours worked in Australia and Canada follow a

similar pattern as the United States at the bottom of the earnings distribution, with household in these two countries working similar hours for the bottom 15 percent of earners, however, average household hours worked in Canada and Australia begin to fall below the hours worked in the United States from the bottom 20 percent of earners upwards. Above the median, households in Australia worked a greater number of hours than in Canada for the top 50 percent of households, indicating that the higher average number of household hours worked in Australia over Canada results primarily from households in the top 50 percent of earners working more hours.

Splitting average annual household hours worked out into average annual hours worked for males and females also reveals patterns which help explain the distribution of average annual household hours worked. Table 2.7b gives average annual hours worked for males and Table 2.7c shows average annual hours worked for females across countries examined. In Finland, there is a marked split in the distribution of households hours worked, relative to the three Anglo-countries which can be explained by the distribution of female hours worked. For the bottom 50 percent of Finnish households, the average annual hours worked are much less than those in the three Anglo-countries, but above the median household hours rise sharply and approach the level of hours worked in the United States, giving Finland a relatively high overall average number of annual household hours worked.

Table 2.7b

Total Annual Hours Worked; Males: Actual Earnings Distribution						
Vingille	CN'91	US'91	AS'89	FI'91	NI'91	
1	0.00	73.57	0.00	0.00	0.00	0.00
2	1,068.58	993.53	515.73	31.89	0.00	0.00
3	1,418.78	1,453.40	1,773.63	386.20	0.00	0.00
4	1,340.46	1,756.93	1,889.23	597.44	495.39	1,434.36
5	1,511.12	1,759.57	1,978.30	681.30	1,753.21	1,753.21
6	1,592.93	1,906.14	1,999.10	913.37	1,898.57	1,898.57
7	1,699.85	1,922.66	2,102.41	1,099.48	1,962.50	1,962.50
8	1,804.76	2,020.80	2,108.02	1,360.16	1,946.71	1,946.71
9	1,808.63	2,001.28	2,161.30	1,423.32	1,959.45	1,959.45
10	1,937.42	2,106.75	2,214.50	1,722.39	1,902.75	1,902.75
11	1,879.87	2,101.92	2,202.58	1,806.85	1,902.75	1,902.75
12	1,919.20	2,127.82	2,162.25	1,856.44	1,974.81	1,974.81
13	1,994.75	2,171.72	2,228.18	1,863.69	2,002.95	2,002.95
14	2,045.36	2,214.35	2,206.64	1,907.35	1,822.63	1,822.63
15	2,060.82	2,219.55	2,252.16	1,903.04	1,972.63	1,972.63
16	2,064.15	2,300.88	2,242.37	1,936.34	1,946.42	1,946.42
17	2,120.59	2,259.26	2,284.62	1,893.52	1,961.55	1,961.55
18	2,053.02	2,343.45	2,300.42	1,951.53	2,065.92	2,065.92
19	2,152.93	2,349.45	2,392.15	2,008.16	1,548.77	1,548.77
20	2,301.10	2,493.96	2,479.21	1,365.46		
Average	1,738.72	1,928.85	1,974.64	1,365.46	1,548.77	1,548.77

Figure 2.6b
Cross Country Comparison of Average Annual Male Hours Worked at Each Vintile of the Actual Earnings Distribution Among Five OECD Countries, Married Couples

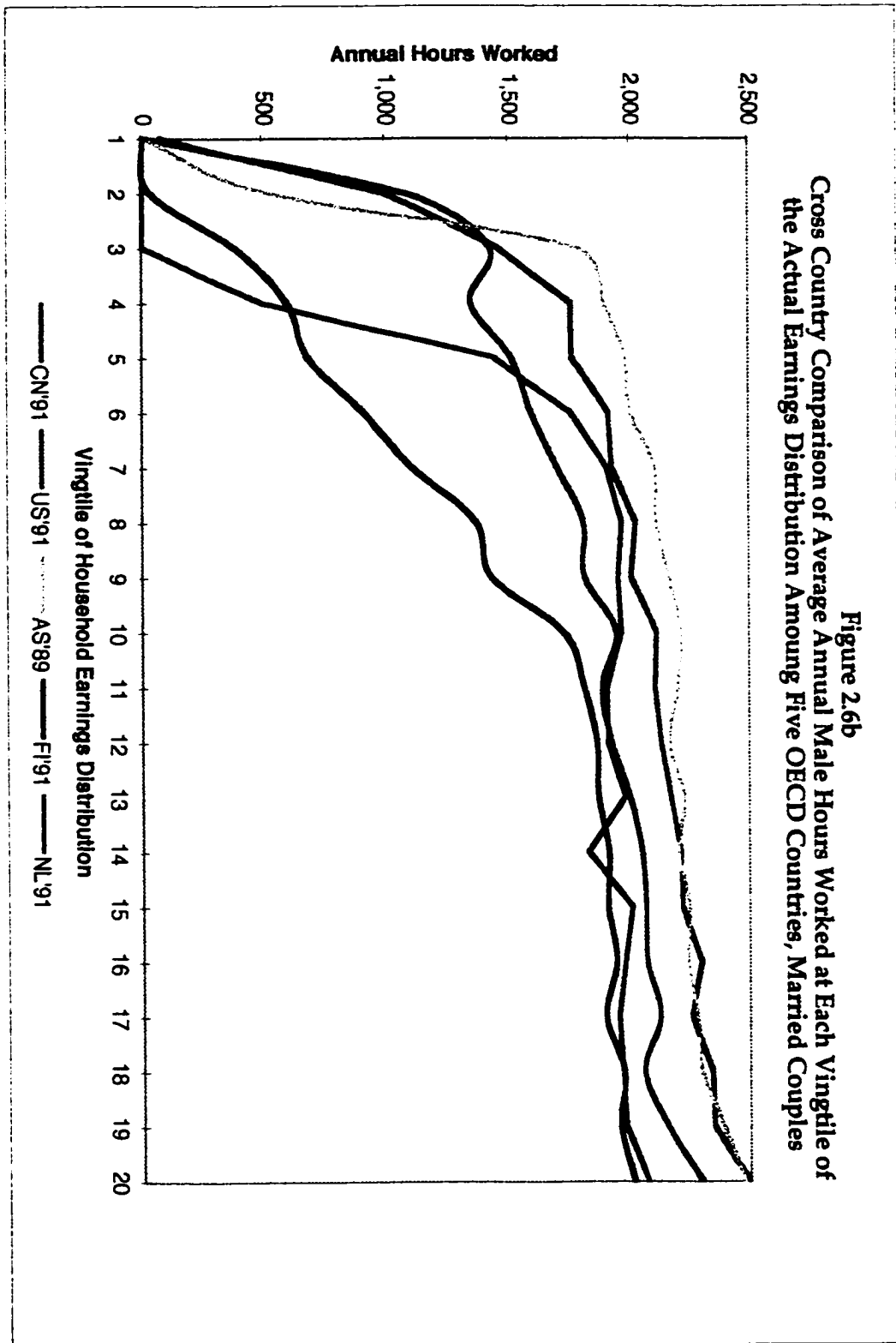
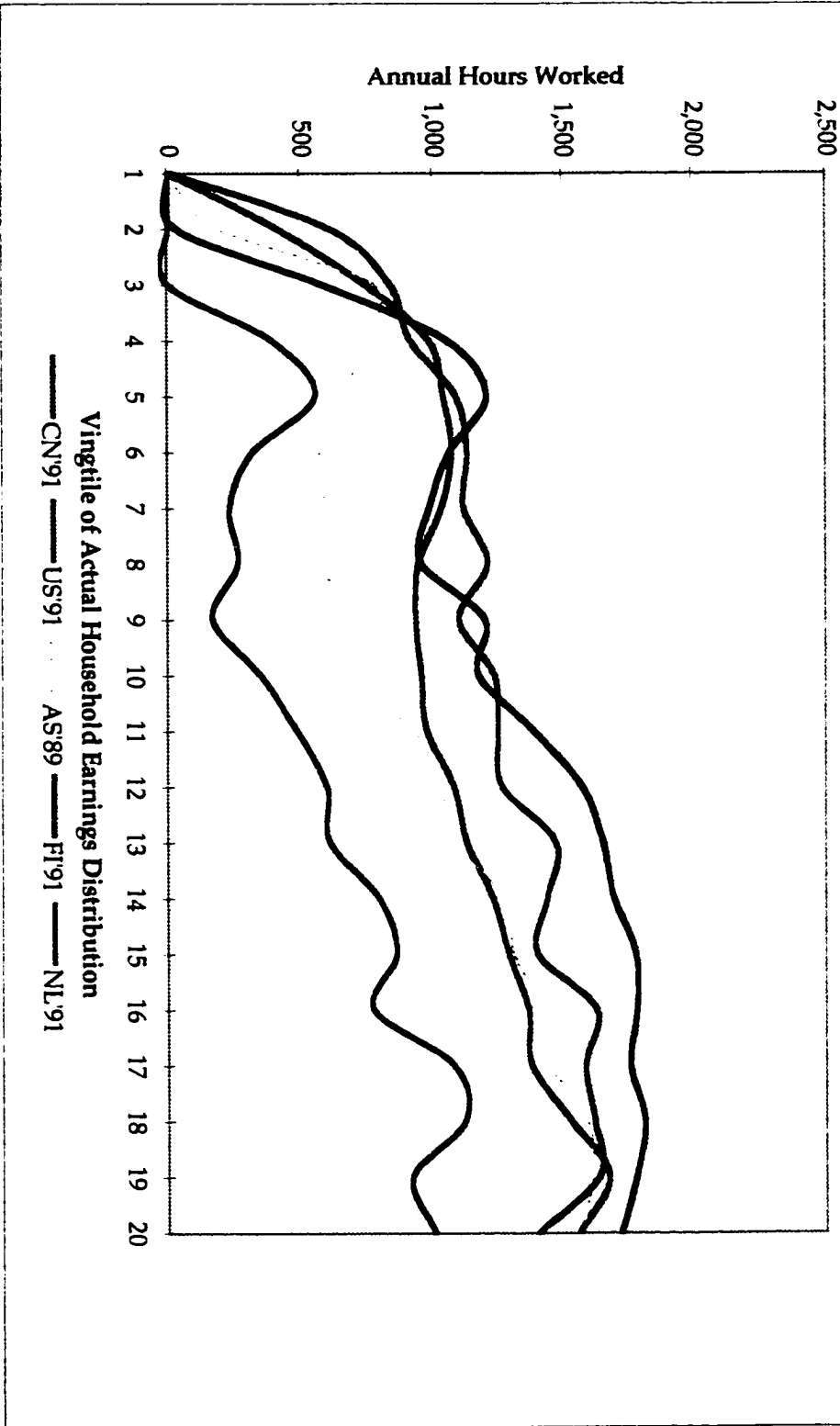


Table 2.7c

Total Annual Hours Worked; Females; Actual Earnings Distribution					
Vingtile	CN'91	US'91	AS'89	PT'91	NL'91
1	0.00	5.11	0.00	0.00	0.00
2	411.11	608.85	189.58	31.43	0.00
3	741.85	841.31	778.57	580.59	0.00
4	984.48	915.89	742.49	1,049.64	388.52
5	1,038.11	1,086.55	665.19	1,204.24	556.50
6	1,072.06	1,129.96	573.86	1,063.39	319.07
7	1,033.71	1,116.64	595.99	987.54	230.64
8	946.00	1,209.43	596.11	956.07	262.15
9	935.64	1,099.65	656.18	1,196.16	167.44
10	956.09	1,234.07	663.05	1,172.06	347.03
11	975.28	1,246.52	926.28	1,387.69	485.19
12	1,077.52	1,263.36	1,026.66	1,572.94	597.11
13	1,126.26	1,472.41	1,084.09	1,651.95	608.98
14	1,226.23	1,440.00	1,274.86	1,692.41	794.99
15	1,287.68	1,401.55	1,311.19	1,775.55	860.34
16	1,366.78	1,626.86	1,426.00	1,779.39	773.54
17	1,378.71	1,584.89	1,449.16	1,753.18	1,075.54
18	1,527.71	1,619.83	1,593.89	1,810.39	1,118.65
19	1,672.44	1,636.79	1,607.45	1,777.29	918.94
20	1,562.82	1,404.72	1,575.92	1,718.75	1,004.48
Average	1,066.02	1,197.22	936.83	1,258.03	525.46

Figure 2.6c
Cross Country Comparison of Average Annual Female Hours Worked at each Quintile of the Actual Earnings Distribution Across Five OECD Countries; Married Couples



As can be seen in Table 2.7b, this is due largely to labour force participation of females in the upper region of the earnings distribution.

In the Netherlands the overall average household hours worked is roughly two thirds of the average household hours worked in the United States. The distribution of household hours worked in the Netherlands lies below that for the other countries examined for all households, giving the Netherlands the lowest overall average number of household hours worked.

2.8 Standardizing Household Hours Worked

Given the variation in household hours worked among the five OECD countries examined (presented in the previous section), this paper proposes an additional standardization to facilitate cross-country comparisons of household earnings. Three standardization procedures are used to adjust household earnings for differences in hours allocated to the paid labour market by households across countries. As discussed in Section 2.1 above, the standard number of hours chosen was 2,000 hours. Before examining the impact on household earnings of standardizing for hours worked, this section first examines the impact on household hours worked resulting from imposing each of the three standardizing procedures.

If we assumed individuals act independently in choosing their hours worked then it would be straight forward to value the standardized hours worked. Individuals' wages would be applied to a standard number of hours worked to calculate the resulting earnings. However, it is now widely recognized both within the theory and in empirical work that while individuals ultimately do make choices about their labour supply, they do so within the context of the

household or family in which they live. If we knew the “true” model of household labour supply, placing a value on standardized hours worked would also be straight forward. However, not knowing the true model of household labour supply we must look to the literature.

This section presents a description of each of the three procedures used to standardize household hours worked as well as the change in hours worked for males and females within the household resulting each standardization procedure. Each of the procedures used to standardize the couples’ hours worked resembles a modified version of household labour supply we might find in the literature. It should be pointed out however, that standardizing couples’ labour supply is not a choice or decision problem. Rather, it is simply an empirical exercise, where couples’ earnings are measured using a uniform number of hours, and husbands and wives are assumed to behave as if their labour supply was as described by each of the standardization procedures.

The Proportional Hours Standardization procedure resembles a pre-arranged agreement between husband and wife regarding the relative proportion of hours each would supply in the labour market. The High Wage Standardization procedure depicts husband and wife as being perfect substitutes for one another in household production activities. Whomever has the highest opportunity cost (wage obtained in labour market) associated with working at home supplies all of the labour to the labour market (total standardized hours) and the other engages in home production. The Wife as a Second Earner (WSE) standardization procedure resembles the early classifications of household labour supply models known as the “unitary” models of household behavior, (e.g., Samuelson’s “consensus model”) where each member of the family behaves as if there were a family utility function

which all attempt to maximize as a single unit. Here the wife's labour supply is described as though it were derived as a residual labour supply, simply making up the difference between her husband's labour supply and the specified standard number of hours.

2.8.1 The Proportional Hours Standardization

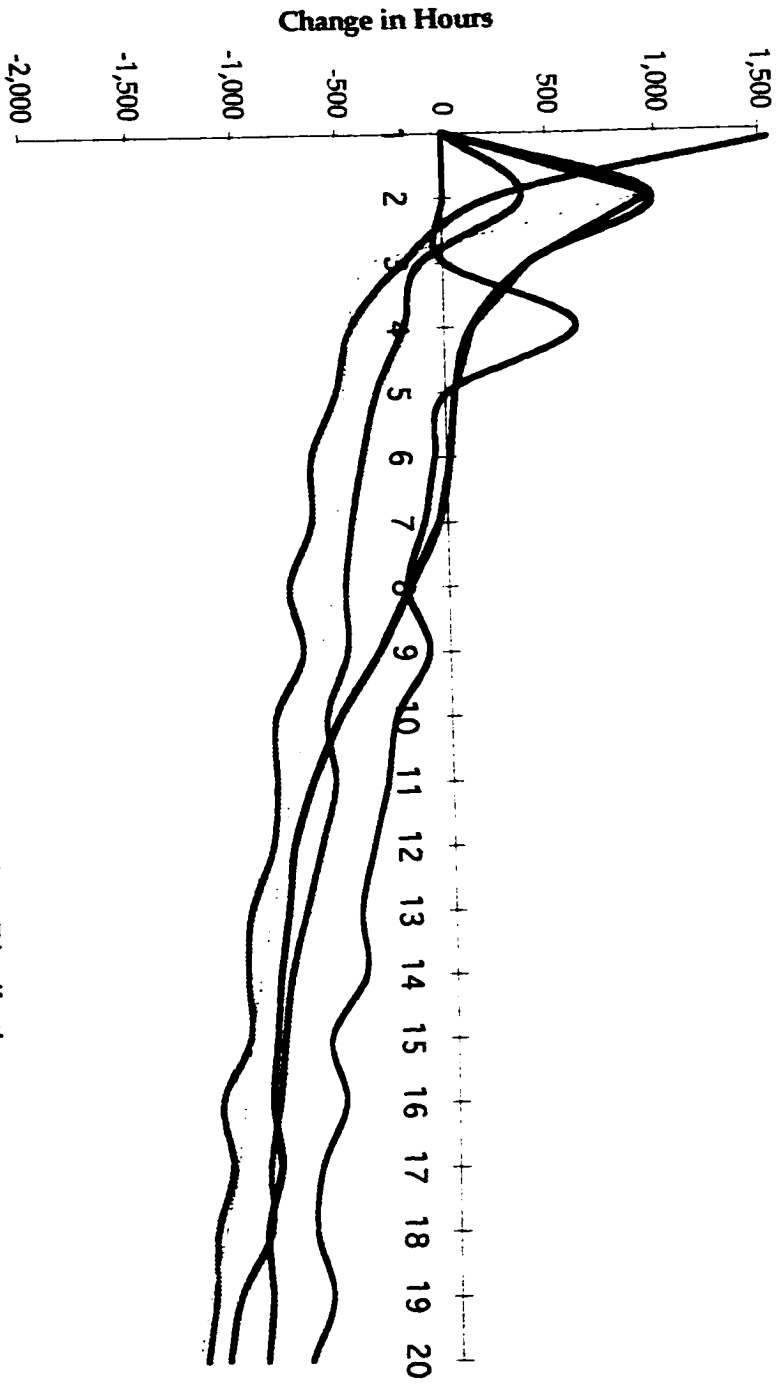
The Proportional Hours standardization procedure uses the actual proportion of male and female (husband and wife) hours to total household hours in each household, to allocate a standard number of hours to the household. Under this standardization procedure, the proportion of the husband's share of annual hours spent in the labour force to the wife's share of annual labour force hours is fixed. This procedure may be thought of as a type of pre-arranged agreement or bargain between husband and wife regarding their relative proportion of hours spent in paid labour. The existing share of husband's and wife's hours of paid labour hours are used to apportion the standardized number of hours between them. The hourly wages of husband and wife, calculated by dividing their annual pre-tax earnings by their total number of annual hours spent working, are used to value their share of their share of standardized hours to calculate household earnings. This procedure essentially scales up or down, (whichever the case may be) total household hours to the standardized hours, and therefore scales male and female hours worked and their subsequent earnings according to the proportion of household hours husbands and wives actually labour supply. This procedure may result in a change in the number of hours worked by males and females within a household, but it does not result in a change in the ratio of male to female hours worked.

Table 2.8a and Figure 2.7 show the change in total male hours worked and Table 2.8b and Figure 2.8 show the change in annual female hours worked resulting from the Proportional Hours standardization for each of the countries examined. As can be seen in Figure 2.7 and Figure 2.8, additional hours are allocated to both husbands and wives in the bottom of the earnings distribution where actual household hours worked are low and taken away from households at the top of the distribution.

Table 2.8a
Change in Annual Hours Worked; Males; Proportional Hours Earnings Distribution

Vingtile	CN'91	US'91	AS'89	PI'91	NL'91
1	0.00	1,796.54	0.00	0.00	0.00
2	375.75	246.54	946.69	975.37	0.00
3	-105.48	-186.66	-383.75	412.73	0.00
4	-187.35	-442.27	-453.49	128.01	625.52
5	-325.57	-523.10	-481.57	41.36	6.59
6	-397.48	-650.49	-445.17	10.74	-61.15
7	-456.16	-657.46	-544.15	-45.84	-115.21
8	-492.57	-769.62	-548.91	-185.70	-198.18
9	-490.52	-710.52	-627.09	-336.60	-105.11
10	-598.27	-845.53	-675.34	-532.26	-260.37
11	-563.04	-846.46	-794.67	-675.64	-307.21
12	-638.33	-872.91	-806.14	-773.77	-380.46
13	-716.48	-979.82	-882.77	-803.46	-446.20
14	-794.98	-1,002.45	-939.00	-847.64	-430.04
15	-829.93	-993.65	-988.09	-868.38	-603.90
16	-860.89	-1,129.27	-1,019.83	-894.10	-535.99
17	-908.58	-1,083.83	-1,060.86	-855.04	-658.24
18	-906.32	-1,160.87	-1,118.99	-925.38	-687.90
19	-1,055.42	-1,170.67	-1,195.96	-904.80	-610.19
20	-1,110.03	-1,214.57	-1,256.46	-930.51	-720.22

Figure 2.7
Change in Annual Male Hours Worked:
Standardized Hours Minus Actual Hours Worked
(Proportional Hours Standardization)



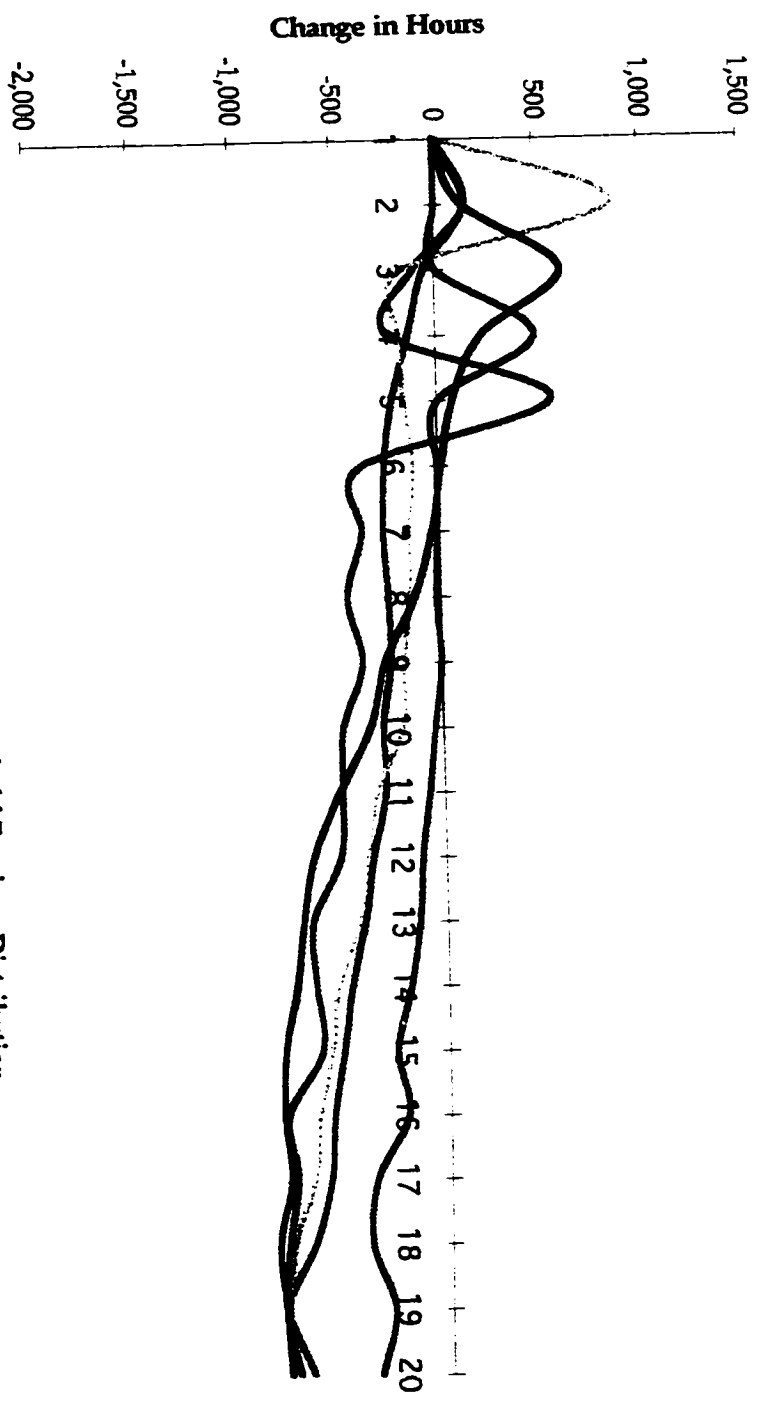
Quintile of Actual Household Earnings Distribution

— CN'91 - - - US'91 AS'89 . . . FI'91 — NL'91

Table 2.8b
Change in Annual Hours Worked, Females; Proportional Hours Earnings Distribution

Vingtile	CN'91	US'91	AS'89	FI'91	NL'91
1	0.00	7.88	0.00	0.00	0.00
2	144.56	151.08	862.59	130.72	0.00
3	-55.15	-108.05	-168.45	620.48	0.00
4	-137.59	-230.55	-178.23	224.91	490.57
5	-223.66	567.32	-161.92	73.10	2.55
6	-267.51	-385.61	-127.79	12.50	-11.13
7	-277.40	-381.84	-154.25	-41.18	-14.00
8	-258.19	-460.61	-155.22	-130.53	-26.47
9	-253.75	-390.41	-190.39	-282.88	-9.04
10	-295.24	-495.29	-202.21	-362.19	-46.11
11	-292.11	-501.98	-334.19	-518.90	-78.43
12	-358.39	-518.27	-382.77	-655.61	-119.40
13	-404.53	-664.31	-429.50	-712.18	-137.59
14	-476.61	-651.90	-542.50	-752.12	-187.58
15	-518.57	-627.45	-575.26	-810.21	-259.39
16	-570.04	-798.47	-648.54	-821.63	-210.18
17	-590.72	-760.32	-672.92	-791.66	-363.72
18	-674.41	-802.41	-775.32	-851.79	-392.30
19	-819.87	-815.57	-803.64	-824.02	-283.89
20	-753.89	-684.11	-798.67	-796.40	-350.18

Figure 2.8
Change in Female Hours Worked:
Standardized Hours Minus Actual Hours Worked;
Proportional Hours Standardization



Virgile of Actual Household Earnings Distribution

— CN'91 - - - US'91 AS'89 - . - . - FI'91 - - - NL'91

The male-female ratio of hours worked within the family is maintained and is the same as the ratio for actual earnings distributions since the changes in hours worked are proportional for both males and females. The resulting hours of males and females under the proportional Hours standardization are given in Appendix 1, attached.

2.8.2 The High Wage Hours Standardization

The High Wage standardization allocates the standardized number of hours worked to males and females within the household based on their relative computed average hourly wages.⁶³ The standardized number of hours are allocated to the individual with the highest hourly wage and this wage is used to value the standardized hours to calculate household earnings. This type of standardization procedure can be thought of as resembling the case where husband and wife are perfect substitutes for household production (work in the home), and it is the opportunity cost of their time (as measured by their average annual wage captured on the labour market) which dictates which stays home and which works outside the home.

In the case where the wage of the female is equal to the wage of the male, however, the hours of work were allocated to males. Table 2.8c shows the proportion of households where computed male hourly wages are greater than female hourly wages, using the weighted sample. As can be seen in Table 2.8c, the proportion of weighted households where the computed

⁶³ Their average hourly wage is computed by dividing their annual pre-tax wages and salary (reported) by their total hours worked per year (computed, see Table 4.a).

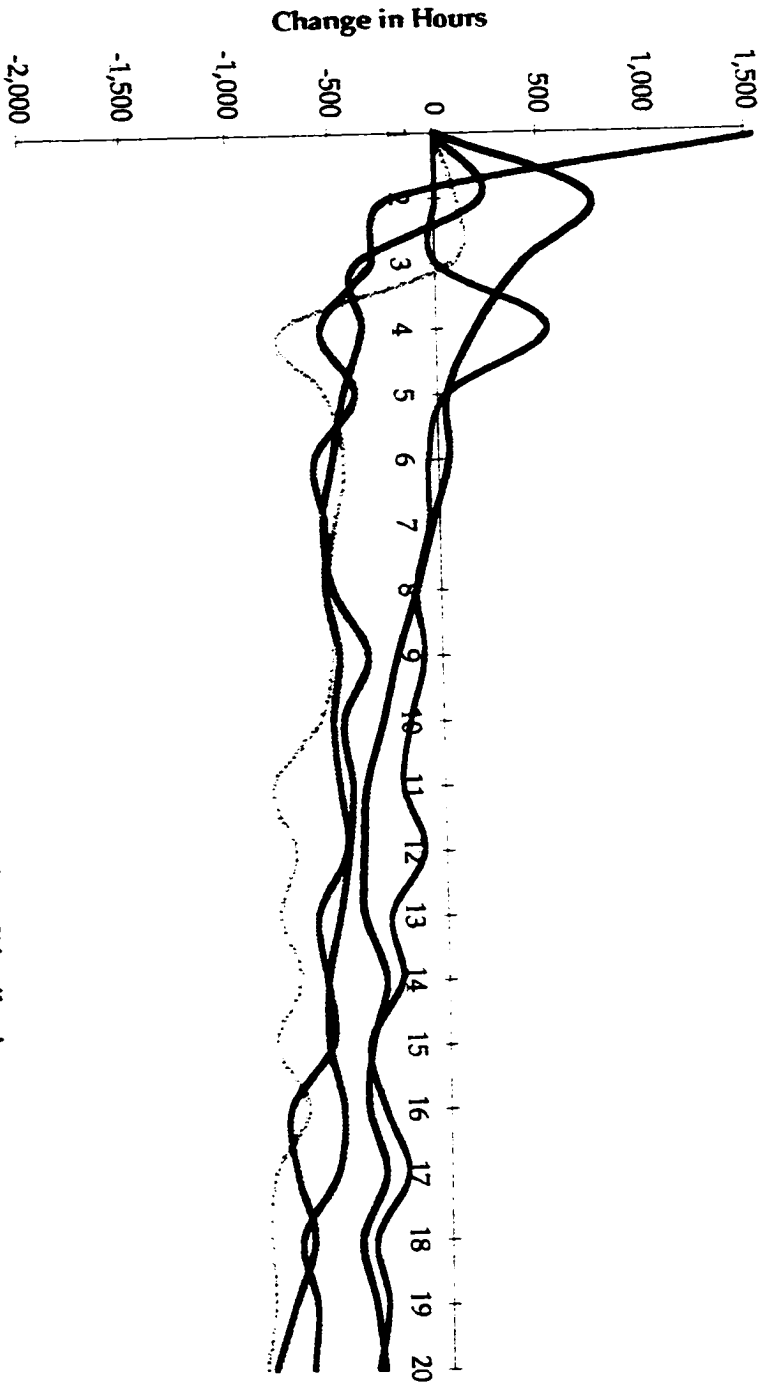
Table 2.8c		
Percent of Weighted Sample With Households Where Male Average Wages are Greater Than or Equal To Female Average Wages		
	Weighted Number of Households (000's Households)	Percent of Total Weighted Sample
US 1991:		
Male average hourly wage greater than female wage	30,310	68.6%
Male and female average hourly wage equal to zero	2,015	4.6%
Male average hourly wage equal to female av. hr. wage*	392	0.9%
Female average hourly wage greater than male av. hr. wage	11,436	25.9%
Canada, 1991:		
Male average hourly wage greater than female wage	2,949	61.8%
Male and female average hourly wage equal to zero	344	7.2%
Male average hourly wage equal to female av. hr. wage*	20	0.4%
Female average hourly wage greater than male av. hr. wage	1,460	30.6%
Australia, 1989:		
Male average hourly wage greater than female wage	1,912	64.9%
Male and female average hourly wage equal to zero	267	9.1%
Male average hourly wage equal to female av. hr. wage*	0	0.0%
Female average hourly wage greater than male av. hr. wage	765	26.0%
Finland, 1991:		
Male average hourly wage greater than female wage	584	60.9%
Male and female average hourly wage equal to zero	64	6.6%
Male average hourly wage equal to female av. hr. wage*	2	0.2%
Female average hourly wage greater than male av. hr. wage	310	32.3%
Netherlands, 1991:		
Male average hourly wage greater than female wage	2,296	69.1%
Male and female average hourly wage equal to zero	541	16.3%
Male average hourly wage equal to female av. hr. wage*	2	0.0%
Female average hourly wage greater than male av. hr. wage	486	14.6%

Male average wage equal to female wage*: This includes non-zero wages only

Table 2.9
Change in Annual Hours Worked; Males; High Wage Earnings Distribution

Vingtile	CN'91	US'91	AS'89	FI'91	NL'91
1	0.00	1,800.35	0.00	0.00	0.00
2	230.12	-218.98	103.96	745.91	0.00
3	-382.57	-315.46	80.12	420.01	0.00
4	-367.27	-561.03	-750.53	192.27	528.93
5	-459.51	-403.18	-543.80	45.34	43.49
6	-515.94	-600.74	-459.52	47.46	-55.51
7	-568.32	-554.90	-513.38	-43.38	-62.65
8	-525.39	-561.73	-557.18	-127.94	-130.68
9	-370.60	-501.75	-534.97	-230.38	-98.31
10	-488.20	-540.28	-602.45	-306.18	-175.06
11	-454.34	-514.37	-834.11	-393.70	-215.73
12	-478.77	-490.18	-728.44	-412.16	-118.52
13	-526.90	-628.76	-805.59	-415.13	-286.11
14	-585.12	-591.28	-713.86	-314.25	-237.66
15	-588.02	-569.25	-837.88	-386.77	-400.72
16	-524.49	-768.27	-685.37	-409.45	-329.62
17	-553.09	-741.72	-849.76	-329.39	-220.98
18	-719.82	-666.22	-874.39	-444.83	-377.41
19	-656.39	-754.59	-858.86	-381.15	-324.08
20	-673.86	-854.02	-900.76	-344.49	-373.98

Figure 2.9
Change in Annual Male Hours Worked:
Standardized Hours Minus Actual Hours Worked
(High Wage Standardization)



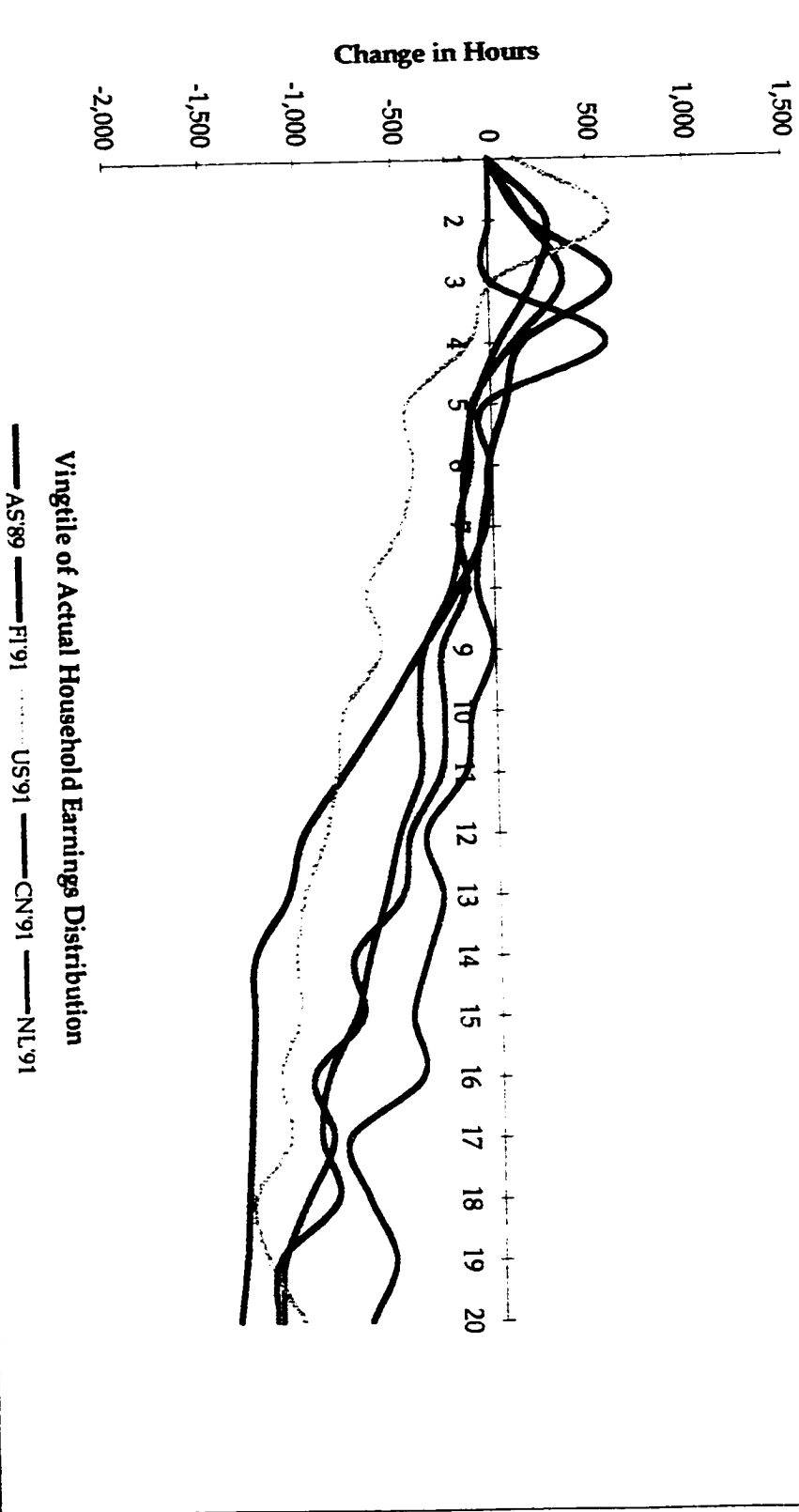
Vingtile of Actual Household Earnings Distribution

..... AS'89 — FI'91 — US'91 — NL'91 — CN'91

Table 2.10
Change in Annual Hours Worked, Females; High Wage Earnings Distribution

Vingille	CN'91	US'91	AS'89	FI'91	NL'91
1	0.00	120.97	0.00	0.00	0.00
2	290.19	616.60	190.73	190.77	0.00
3	221.94	20.75	367.68	613.20	0.00
4	42.33	-111.79	118.81	160.65	587.16
5	-89.72	-442.94	-99.69	69.12	-34.35
6	-149.05	-415.24	-113.44	-24.22	-16.77
7	-165.24	-484.40	-185.02	-43.64	-66.56
8	-225.37	-668.50	-146.95	-188.29	-93.97
9	-373.67	-599.18	-282.51	-389.10	-15.84
10	-405.31	-800.54	-275.10	-588.27	-131.42
11	-400.81	-834.07	-294.75	-800.84	-169.91
12	-517.95	-901.00	-460.47	-1,017.22	-381.34
13	-594.11	-1,015.37	-506.68	-1,100.51	-297.68
14	-686.47	-1,063.07	-767.64	-1,285.51	-379.96
15	-760.48	-1,051.85	-725.47	-1,291.82	-462.57
16	-906.44	-1,159.47	-983.00	-1,306.28	-416.55
17	-946.21	-1,102.43	-884.02	-1,317.31	-800.98
18	-860.91	-1,297.06	-1,019.92	-1,332.34	-702.79
19	-1,168.98	-1,231.65	-1,140.74	-1,347.67	-570.00
20	-1,190.06	-1,044.66	-1,154.37	-1,382.42	-696.42

Figure 2.10
Change in Female Hours Worked:
Standardized Hours Minus Actual Hours Worked
(High Wage Standardization)



average hourly male wage is greater than that of females is close to 60 to 70 percent for all countries examined.

This procedure results in a change in the average number of hours worked by males and females within the household at each point in the earnings distribution, and a change in the ratio of male to female hours worked.

The change in total male hours worked resulting from the High Wage standardization procedure for each of the countries examined is given in Table 2.9 and Figure 2.9 and the change in total female hours worked is given in Table 2.10 and Figure 2.10.

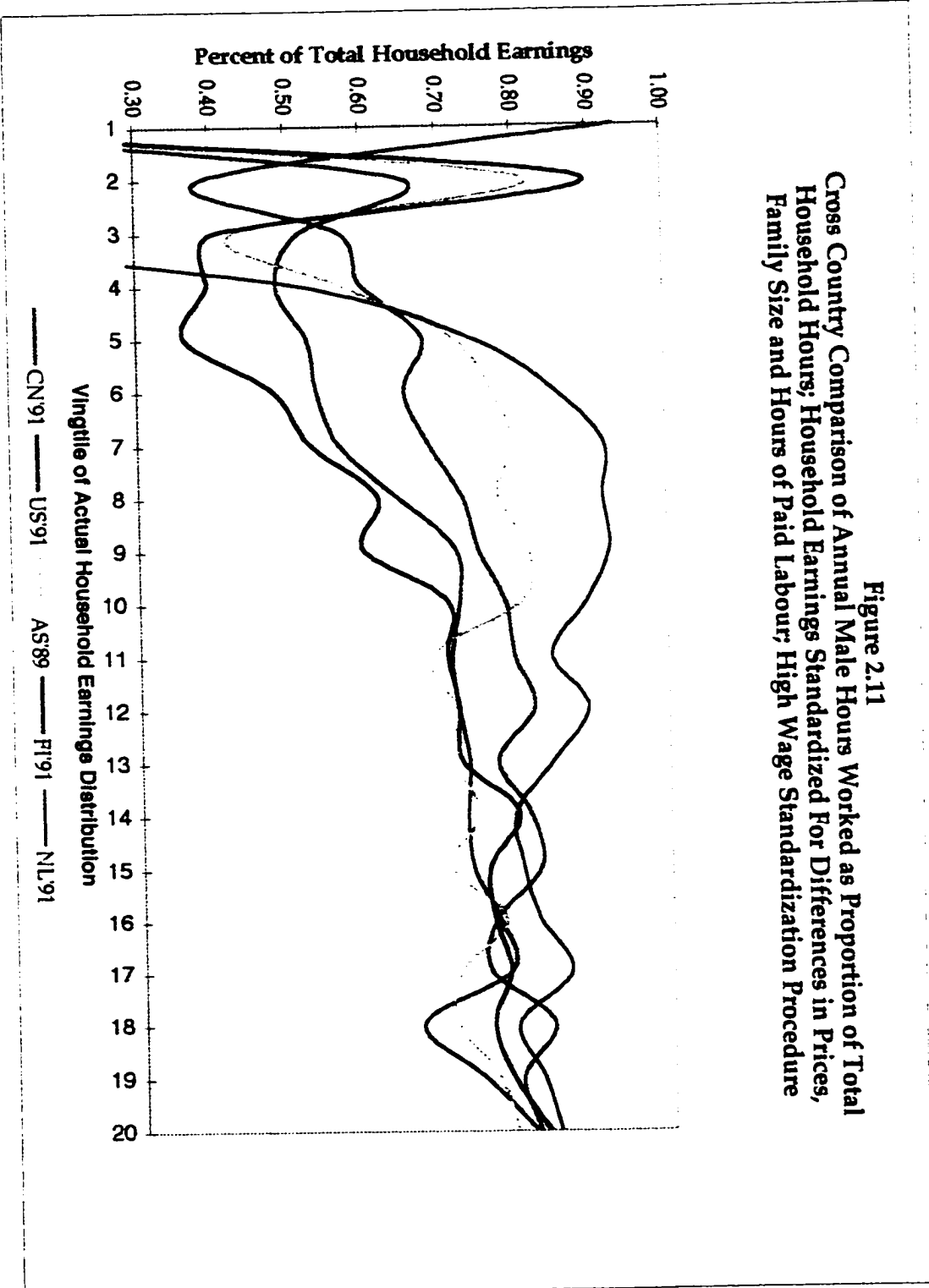
As can be seen in Figure 2.9 and Figure 2.10, the 2,000 hours are primarily allocated to husbands rather than wives throughout the earnings distribution, indicating that males predominantly have higher wages than females in most households.

The impact of this standardization procedure on the proportion of hours worked by husbands to total hours worked in the household at each point in the earnings distribution is given. This is shown in Table 2.11 and graphically in Figure 2.11.

Table 2.11
 Cross Country Comparison of Annual Male Hours Worked As Proportion of Total Household Hours;
 Household Earnings Standardized For Differences in Prices, Family Size and Hours of Paid Labour;
 High Wage Standardization Procedure

Vingtile	CN'91	US'91	AS'89	FI'91	NL'91
1	0.00	0.94	0.00	0.00	0.00
2	0.65	0.39	0.81	0.89	0.00
3	0.52	0.57	0.43	0.40	0.00
4	0.49	0.60	0.57	0.39	0.51
5	0.53	0.68	0.72	0.36	0.74
6	0.54	0.65	0.77	0.48	0.85
7	0.57	0.68	0.79	0.53	0.92
8	0.64	0.73	0.78	0.62	0.92
9	0.72	0.75	0.81	0.60	0.92
10	0.72	0.78	0.81	0.71	0.89
11	0.71	0.79	0.68	0.71	0.84
12	0.72	0.82	0.72	0.72	0.89
13	0.73	0.77	0.71	0.72	0.84
14	0.73	0.81	0.75	0.80	0.79
15	0.74	0.83	0.71	0.76	0.80
16	0.77	0.77	0.78	0.76	0.82
17	0.78	0.76	0.72	0.78	0.86
18	0.67	0.84	0.71	0.76	0.79
19	0.75	0.80	0.77	0.79	0.83
20	0.81	0.82	0.79	0.83	0.85

Figure 2.11
Cross Country Comparison of Annual Male Hours Worked as Proportion of Total Household Hours; Household Earnings Standardized For Differences in Prices, Family Size and Hours of Paid Labour; High Wage Standardization Procedure



2.8.3 The Wife as a Second Earner Standardization

The Wife as a Second Earner (WSE) standardization is based on an older notion of the wife being a supplementary earner for the household and uses this premise to allocate a standard number of hours worked (2,000 hours) to males and females within the household. If the husband's actual hours worked are equal to or greater than 2,000 hours the total standardized hours are allocated to the husband and no hours are allocated to the wife. If the husband's actual hours are less than 2,000 hours and the wife's hours are greater than zero, the actual hours of the husband are used and the difference in hours is allocated to the wife. If the husband's hours are zero, and the wife's hours are greater than zero, the total standardized hours are allocated to the wife. If the husband's hours are less than 2,000 hours and the wife's hours are zero, the total standardized hours are allocated to the husband. If both the husband and the wife's hours are zero, then zero hours are allocated to the household. The average hourly wages of the household head and spouse, computed using total reported earnings, weeks worked, and hours worked per week of the household head and spouse, are used to value their share of the standardized hours to calculate household earnings. This procedure results in a change in the average number of hours worked by males and females within the household at each point in the earnings distribution, and a change in the ratio of male to female hours worked.

Table 2.12 and Figure 2.12 show the change in total male hours worked and Table 2.13 and Figure 2.13 show the change in total female hours

Table 2.12
Change in Annual Hours Worked; Males; WSE Earnings Distribution

Vingtile	CN'91	US'91	AS'89	FI'91	NL'91
1	0.00	48.44	0.00	0.00	0.00
2	85.67	178.38	-30.19	154.30	0.00
3	190.86	-27.74	-93.90	495.31	0.00
4	165.54	-156.51	-73.93	268.14	407.03
5	97.58	-155.01	-127.30	239.11	109.46
6	51.55	-192.84	-111.21	223.92	-2.20
7	-33.25	-161.30	-196.28	225.38	-4.62
8	5.08	-222.27	-209.47	216.67	-10.61
9	50.03	-197.79	-227.18	143.27	-29.54
10	-38.72	-240.08	-263.12	75.29	0.89
11	13.54	-233.65	-254.36	28.11	-11.48
12	-16.10	-257.96	-209.54	11.17	33.91
13	-76.61	-274.55	-286.42	36.70	-25.89
14	-99.30	-278.94	-262.70	24.21	25.23
15	-94.61	-282.88	-282.65	20.00	-58.47
16	-115.36	-350.19	-262.41	-2.46	-29.69
17	-150.82	-315.53	-342.47	24.52	-4.92
18	-89.61	-382.87	-337.42	-29.14	-48.28
19	-181.69	-391.59	-416.41	-4.04	-35.88
20	-324.21	-538.97	-515.63	-64.73	-106.46

Figure 2. 12
Change in Annual Male Hours Worked:
Standardized Hours Minus Actual Hours Worked;
(Wife as A Second Earner Standardization)

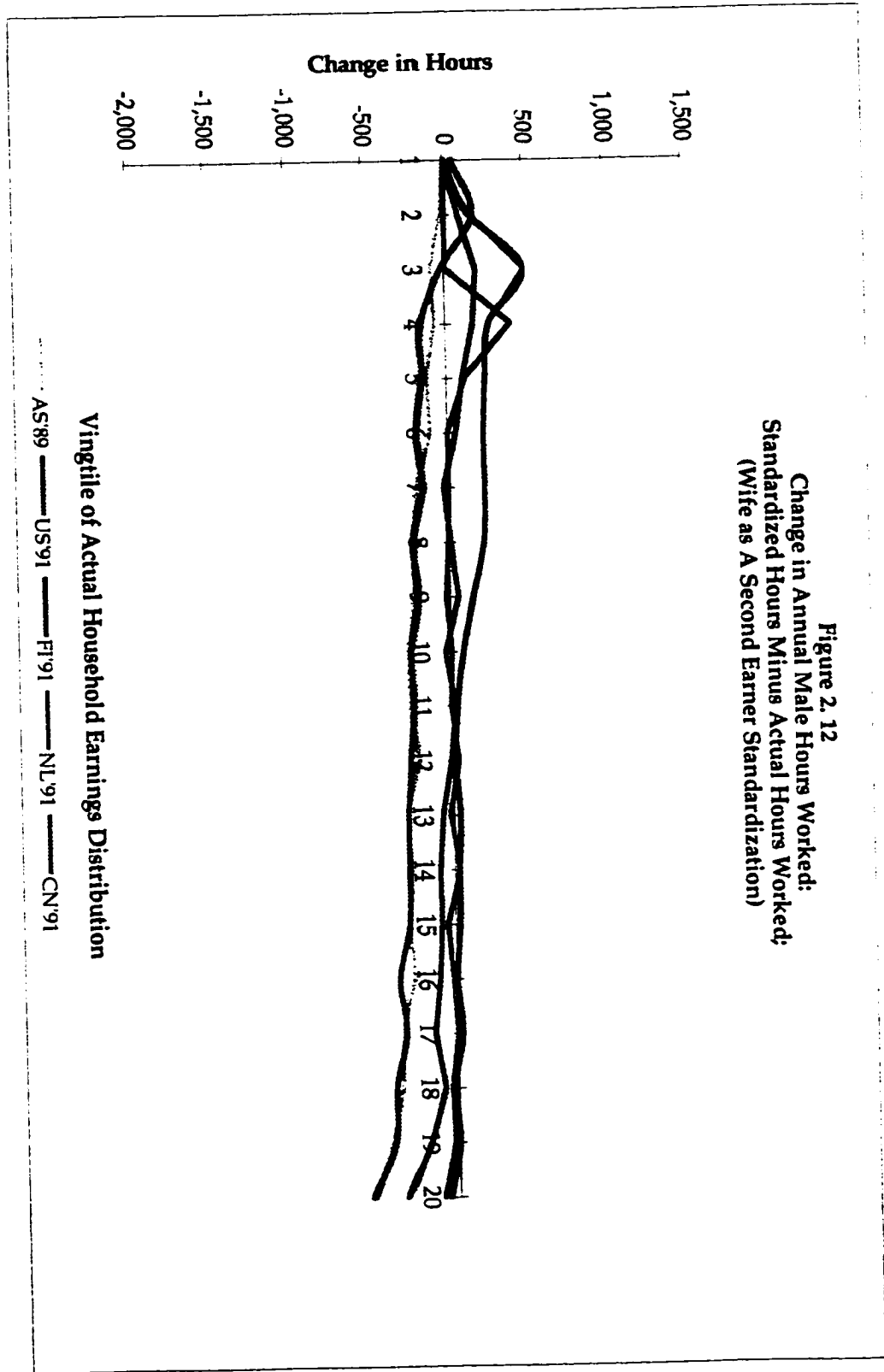


Table 2.13
Change in Annual Hours Worked; Females; WSD Earnings Distribution

Vingtile	CN'91	US'91	AS'89	FI'91	NI'91
1	0.00	68.23	0.00	0.00	0.00
2	-76.11	219.24	-45.44	153.65	0.00
3	-263.17	-266.97	-413.33	696.51	0.00
4	-414.12	-516.31	-540.86	216.53	604.55
5	-573.37	-691.11	-503.27	-1.55	-86.33
6	-676.91	-843.26	-455.03	-93.94	-64.04
7	-655.36	-878.00	-493.41	-185.73	-118.13
8	-727.66	-1,007.96	-484.66	-446.81	-212.19
9	-778.13	-903.14	-583.50	-722.10	-77.25
10	-844.23	-1,100.74	-606.55	-944.72	-305.95
11	-856.23	-1,114.79	-870.63	-1,209.94	-367.47
12	-967.59	-1,133.22	-973.96	-1,428.85	-530.60
13	-1,032.81	-1,369.58	-1,018.17	-1,544.96	-556.29
14	-1,167.24	-1,375.41	-1,214.64	-1,620.99	-637.93
15	-1,250.21	-1,338.22	-1,278.05	-1,696.10	-801.26
16	-1,310.00	-1,577.55	-1,404.13	-1,710.83	-714.79
17	-1,346.03	-1,528.62	-1,386.62	-1,667.28	-1,015.02
18	-1,489.28	-1,580.41	-1,554.52	-1,746.38	-1,026.14
19	-1,641.75	-1,594.65	-1,581.40	-1,722.55	-856.46
20	-1,537.69	-1,359.71	-1,536.40	-1,659.61	-961.75

Figure 2.13
Change in Female hours Worked:
Standardized Hours Minus Actual Hours Worked
(Wife as a Second Earner Standardization)

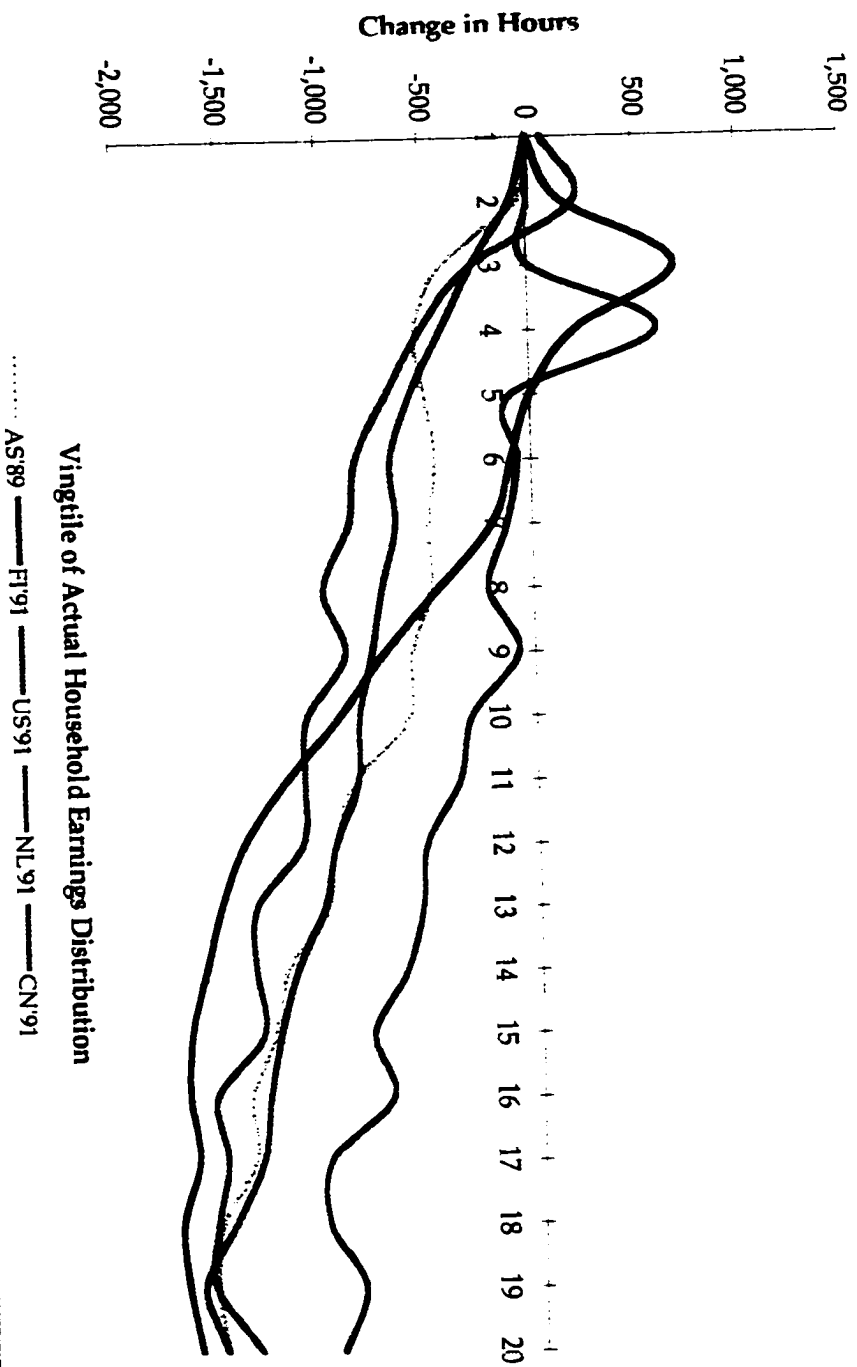
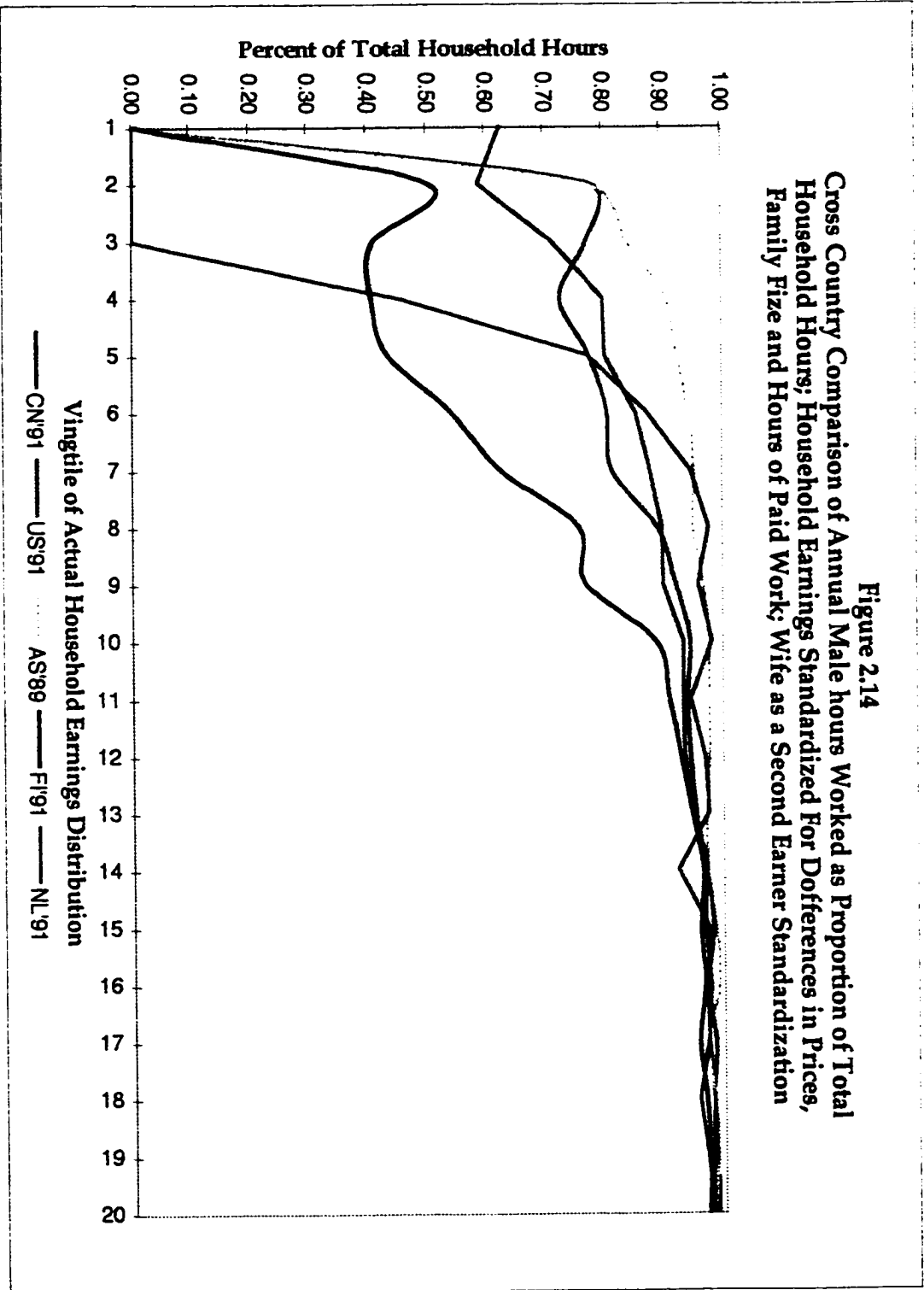


Table 2.14
Cross Country Comparison of Annual Male Hours Worked As Proportion of Total Household Hours;
Household Earnings Standardized For Differences in Prices, Family Size and Hours of Paid Labour;
Wife as a Second Earner Earnings Standardization Procedure

Vingille	CN'91	US'91	AS'89	FI'91	NI,'91
1	0.00	0.62	0.00	0.00	0.00
2	0.78	0.59	0.77	0.50	0.00
3	0.77	0.71	0.84	0.41	0.00
4	0.73	0.80	0.91	0.41	0.45
5	0.78	0.80	0.93	0.43	0.77
6	0.81	0.86	0.94	0.54	0.88
7	0.81	0.88	0.95	0.62	0.95
8	0.89	0.90	0.95	0.76	0.98
9	0.92	0.90	0.97	0.77	0.96
10	0.94	0.93	0.98	0.89	0.98
11	0.94	0.93	0.97	0.91	0.94
12	0.95	0.93	0.98	0.93	0.97
13	0.95	0.95	0.97	0.95	0.97
14	0.97	0.97	0.97	0.96	0.92
15	0.98	0.97	0.98	0.96	0.97
16	0.97	0.98	0.99	0.97	0.97
17	0.98	0.97	0.97	0.96	0.97
18	0.98	0.98	0.98	0.97	0.96
19	0.98	0.98	0.99	0.97	0.97
20	0.99	0.98	0.98	0.97	0.98

Figure 2.14
Cross Country Comparison of Annual Male hours Worked as Proportion of Total Household Hours; Household Earnings Standardized For Differences in Prices, Family Size and Hours of Paid Work; Wife as a Second Earner Standardization



worked as a result of the WSE standardization procedure for each of the countries examined.

Table 2.14 shows the impact on the proportion of male hours worked to total household hours within the household at each point in the earnings distribution as a result of the WSE standardization procedure. This is shown graphically in Figure 2.15. Figure 2.15 shows almost all of the 2,000 standardized hours are allocated to males, especially in the upper portion of the distribution, where average annual males hours worked approach and exceed 2,000 hours, leaving the wife with little to zero hours.

2.9 Standardized Distribution of Earnings

We can now turn to examining the real household earnings across countries, standardized for differences in hours spent in the labour market. The resulting earnings distributions for each of the standardization procedures represent earnings for comparable households, (valued in 1991 US dollars) which have been standardized for differences faced by households in prices, family size, and hours of paid labour across countries.

The earnings distributions for each of the standardization procedures are presented in Tables 2.15 to 2.17. Earnings are presented for each vingtile of the actual earnings distribution and represent the *same composition of families within each vingtile* as in the actual earnings distributions.

2.9.1 Proportional Hours Standardization

Standardizing total household hours worked in proportion to the actual hours worked by husbands and wives is done in two separate standardization processes:

- 1) Standardizing hours to a common number of hours (2,000 hours per year) based on the proportion of the hours worked by husband and wife to total household hours worked, for each household within a given earnings distribution; and
- 2) Establishing a common set of hours worked based on the average number of household hours worked in each vingtile of the household earnings distribution of the United States.

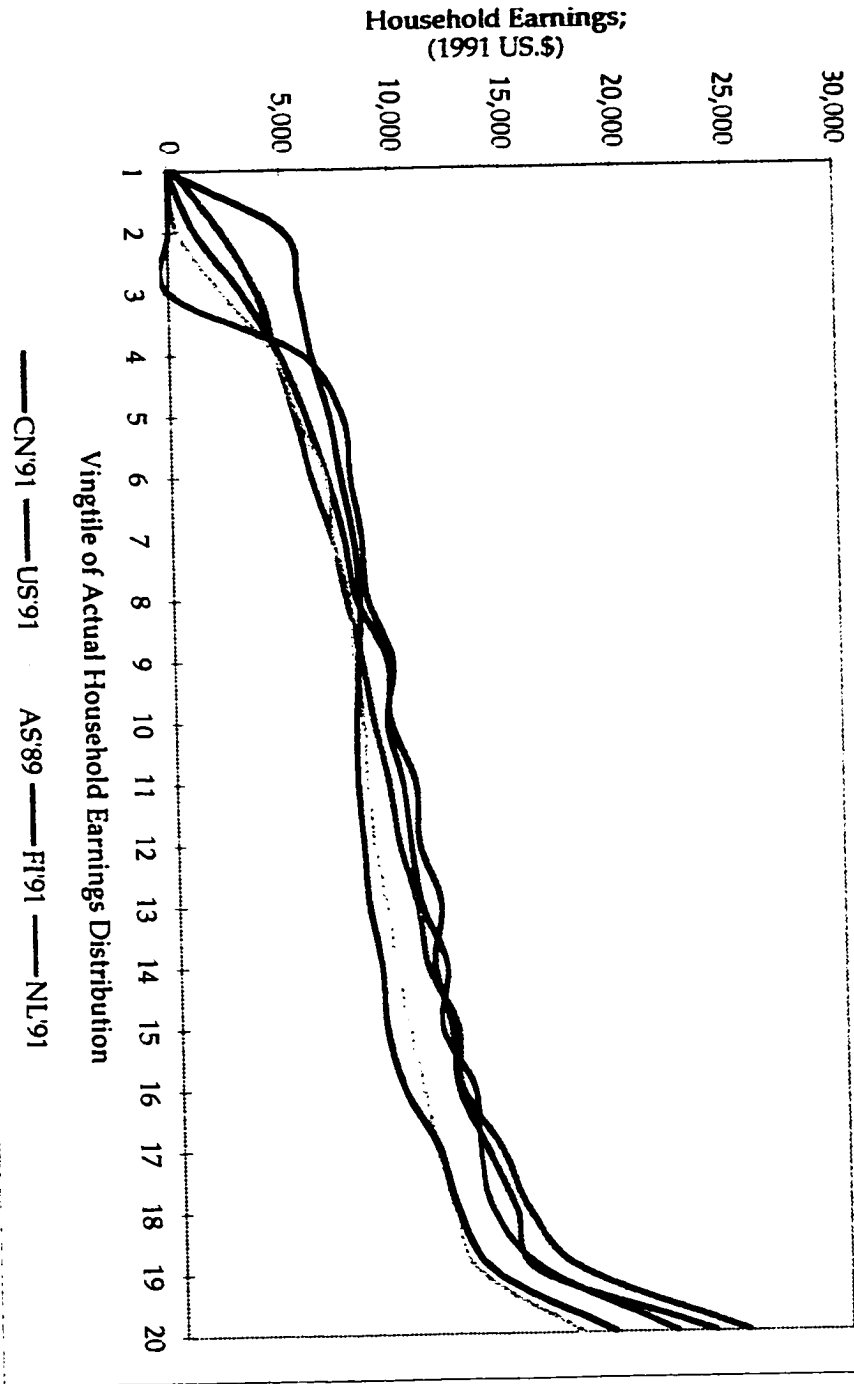
The first procedure assumes a given amount of hours would be allocated based on the proportion of average annual hours actually contributed to total household labour supply by husband and wife given in the data for each of the selected countries. The quantity of household hours selected is 2,000 hours per year.

The second procedure determines the average total number of household hours worked to be the average number of hours worked in each vingtile of the distribution in the United States in 1991, and then allocates these hours based on the husband and wife's proportion of total household hours.

The results of the first proportional hours standardization procedure is given in Table 2.15a and shown in Figure 2.15a. Once household earnings have been

Vingtile	CN'91	US'91	AS'89	FI'91	NL'91
1	0	331	0	0	0
2	1,221	2,389	436	5,085	0
3	3,279	3,941	2,374	5,749	0
4	4,856	4,692	4,608	6,299	5,818
5	5,999	5,497	5,588	7,120	7,723
6	6,957	6,212	6,908	7,582	8,021
7	7,688	7,163	7,179	8,134	8,498
8	8,231	7,739	7,907	8,366	8,741
9	9,552	8,435	8,079	8,281	9,811
10	9,651	8,913	8,454	8,137	9,511
11	10,711	9,532	8,547	8,132	10,147
12	10,861	9,936	8,829	8,364	10,465
13	11,749	10,718	9,347	8,565	10,903
14	11,442	11,127	9,725	9,074	11,983
15	12,150	12,430	10,247	9,255	11,709
16	12,418	12,596	10,842	10,000	13,137
17	13,710	14,392	11,391	11,496	13,359
18	15,009	15,626	12,189	12,336	13,926
19	15,982	18,041	13,226	13,954	16,316
20	23,819	25,379	17,875	19,304	22,072

Figure 2.15.a: Total Annual Household Pre-Tax Equivalized Earnings Standardized for Differences in Prices, Family Size and Hours of Paid Labour; Proportional Hours Standardization; (Valued in 1991 U.S. Dollars)



standardized for variations in hours of paid labour, the household earnings distribution of the US no longer lies above the earnings distributions of the four other countries examined throughout much of the earnings distribution. As can be seen in Figure 2.15a the earnings distributions of Canada, and the Netherlands lie above the distribution of the US throughout much of the middle portion of the earnings distribution, (from 4th vingtile to the 15th vingtile). The earnings distribution of Finland lies above the US earnings distribution for the bottom 40 percent of households in the distribution, when the higher hours worked above of the median of the distribution reduces the standardized earnings distribution back below the US distribution. This would suggest that when adjusting household earnings for differences in hours of paid labour in this manner, not only were families at least as well-off in Canada, the Netherlands, Finland and Australia, (over the portion of the distribution where they lie above the US earnings distribution), as they were in the United States (for the years of comparison), but in fact they are better off (obtaining a higher standard of living). Comparing households at the top of the earnings distribution, (the highest 15 percent of household earners) across countries, however, households in the US at the top of the distribution still enjoyed higher earnings even when standardized for hours worked. This implies US. couples at the top of the distribution really earn a lot of money, given the size of the adjustments for the large number of hours worked.

The results of the second Proportional Hours type of standardization procedure produces, where hours worked are set equal to the average annual hours worked in the US at each vingtile of the earnings distribution, yield

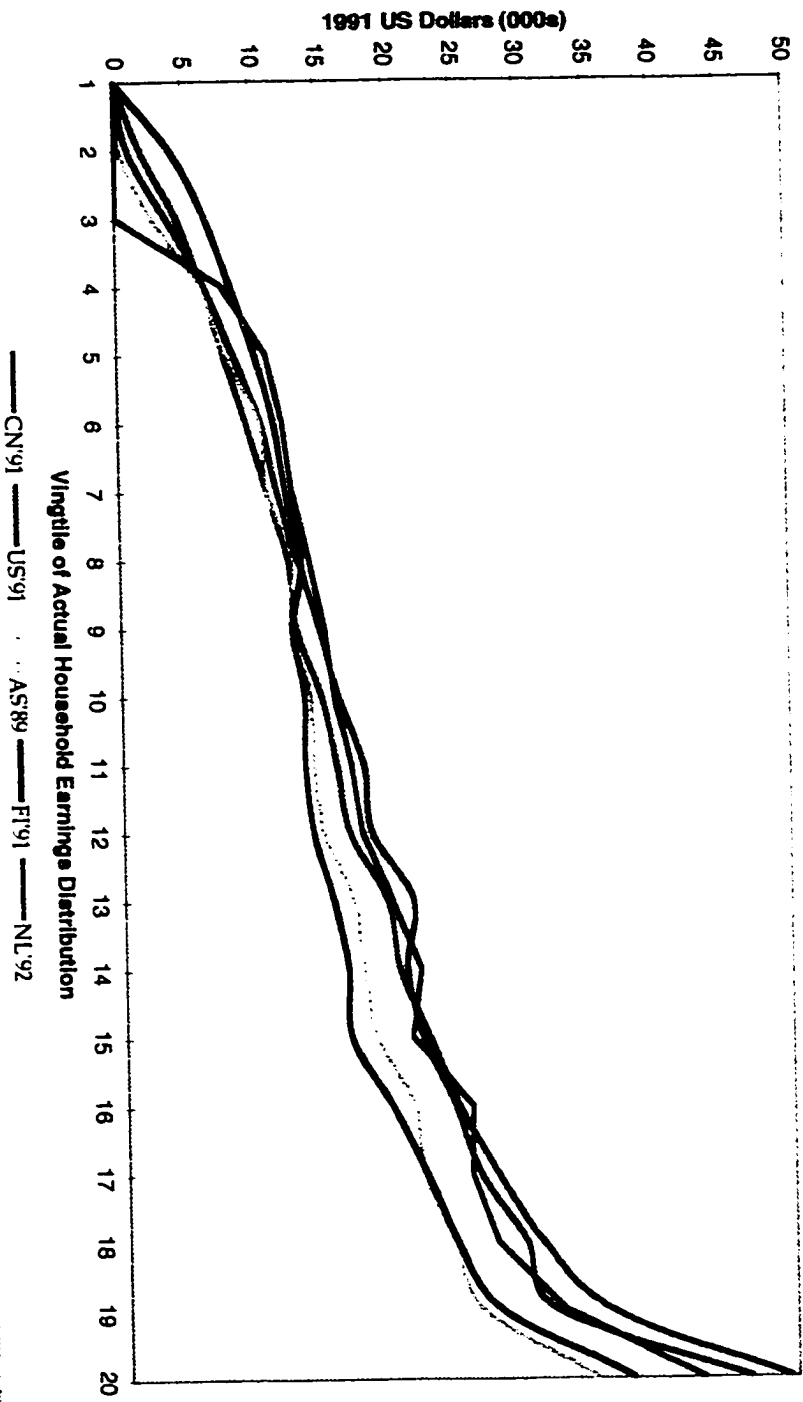
similar results. The results are given in Table 2.15b and shown in Figure 2.15b.

This analysis shows the earnings distributions of Canada, and the Netherlands lie again above the distribution of the US throughout much of the middle portion of the earnings distribution, (from 4th vingtile to the 15th vingtile). The earnings distribution of Finland lies above the US earnings distribution for the bottom 40 percent of households in the distribution. This again suggests that when adjusting household earnings for differences in hours of paid labour in this manner, not only were families at least as well-off in Canada, the Netherlands, Finland and Australia, as they were in the United States, but in fact they were better off . Comparing households in the top 20 percent of the earnings distribution, across countries, shows households in the US at the top of the distribution still enjoyed higher earnings even when standardized for hours worked.

Table 2.15.b
 Annual Household Equivalent Earnings;
 Hours Worked Standardized to US (1991) Hours Worked in Each Vintile of the Earnings Distribution
 Married Couples; (Valued in 1991 US Dollars)

Vintile	CN'91	US'91	AS'89	FI'91	NL'91
1	0	13	0	0	0
2	978	1,914	349	4,074	0
3	3,762	4,522	2,724	6,596	0
4	6,490	6,270	6,158	8,418	7,775
5	8,538	7,822	7,951	10,132	10,991
6	10,562	9,431	10,486	11,510	12,176
7	11,683	10,885	10,909	12,362	12,914
8	13,294	12,499	12,770	13,511	14,118
9	14,809	13,078	12,527	12,839	15,212
10	16,122	14,888	14,121	13,592	15,887
11	17,933	15,959	14,310	13,614	16,989
12	18,415	16,848	14,970	14,182	17,744
13	21,407	19,529	17,030	15,606	19,865
14	20,907	20,331	17,769	16,579	21,895
15	21,999	22,506	18,552	16,756	21,200
16	24,387	24,737	21,292	19,639	25,799
17	26,352	27,662	21,895	22,096	25,677
18	29,742	30,964	24,154	24,446	27,597
19	31,854	35,957	26,361	27,813	32,520
20	46,431	49,473	34,845	37,631	43,027

Figure 2.15.b
Annual Household Pre-Tax Earnings Standardized for Differences in Prices, Family Size, and Hours of Paid Labour; Hours Standardized to 1991 US Hours Worked at Each Quintile of the Distribution; Proportional Hours Standardization



This would suggest that, if couples in countries other than the United States worked the same number of average hours within each vingtile as did households in the United States in 1991, couples in countries such as Canada and the Netherlands would have obtained higher earnings throughout the middle portion of the earnings distribution (households from the 20th vingtile to the 70th vingtile). Also, families in Finland would obtain greater earnings for the bottom 40 percent of the population.

In top of the earnings distribution, however, the top 20 percent of households in the United States are still better off in terms of greater earnings, when comparing across countries, even if households in other countries worked the same number of hours (at each vingtile of the earnings distribution) as did Americans in 1991. Also, in the bottom tail of the distribution, households in the United States show greater earnings than did households in Canada and Australia for the bottom 20 percent of earners. The earnings distribution in Australia lies predominantly below the earnings distribution of the United States except between the 4th vingtile to the 8th vingtile, where Australian earnings are slightly greater than in the United States. The earnings distribution of the Netherlands is pulled down to zero below the 4th vingtile due to the large number of zero earner families in that country.

In other words, "leveling the playing field" across countries, in terms of paid labour time, to facilitate comparisons of household earnings, results in a different ranking of the level of household earnings than that which results from standardizing household earnings for differences in prices and family size only. The earnings distribution of the United States no longer lies above the households earnings distribution of other countries throughout most of

the earnings distribution. This result implies that the additional hours worked in United States, (over the hours worked in other countries), does not result in increased economic well-being, as measured by household earnings, when we take account of the value of these hours of paid labour, especially in the middle and lower portions of the earnings distribution. If we adjust household earnings for differences in hours worked, valued at the wages households receive for their labour time (assuming a proportionate combination of husband and wife supply of household labour), we see that the middle and lower portions of the household earnings distribution (from the 4th to the 14th quintile) in the United States are not achieving higher earnings than comparable households in countries where the average annual household hours worked is much lower (i.e., Finland and the Netherlands).

Both types of proportional hours standardization methods resulted in comparable, and higher, levels of earnings in the countries such as Canada, Finland and the Netherlands on the middle and lower portion of the household earnings distribution. Once earnings are adjusted for the variations in the amount of time spent in the workplace, differences in earnings arise solely due to differences in average hourly wages. If we value a standard number of hours such that the ratio of male and female labour supply is held constant over a given range of total household hours worked, then the real hourly wages in the middle and lower portions of the earnings distribution in the United States are lower than that in other countries.

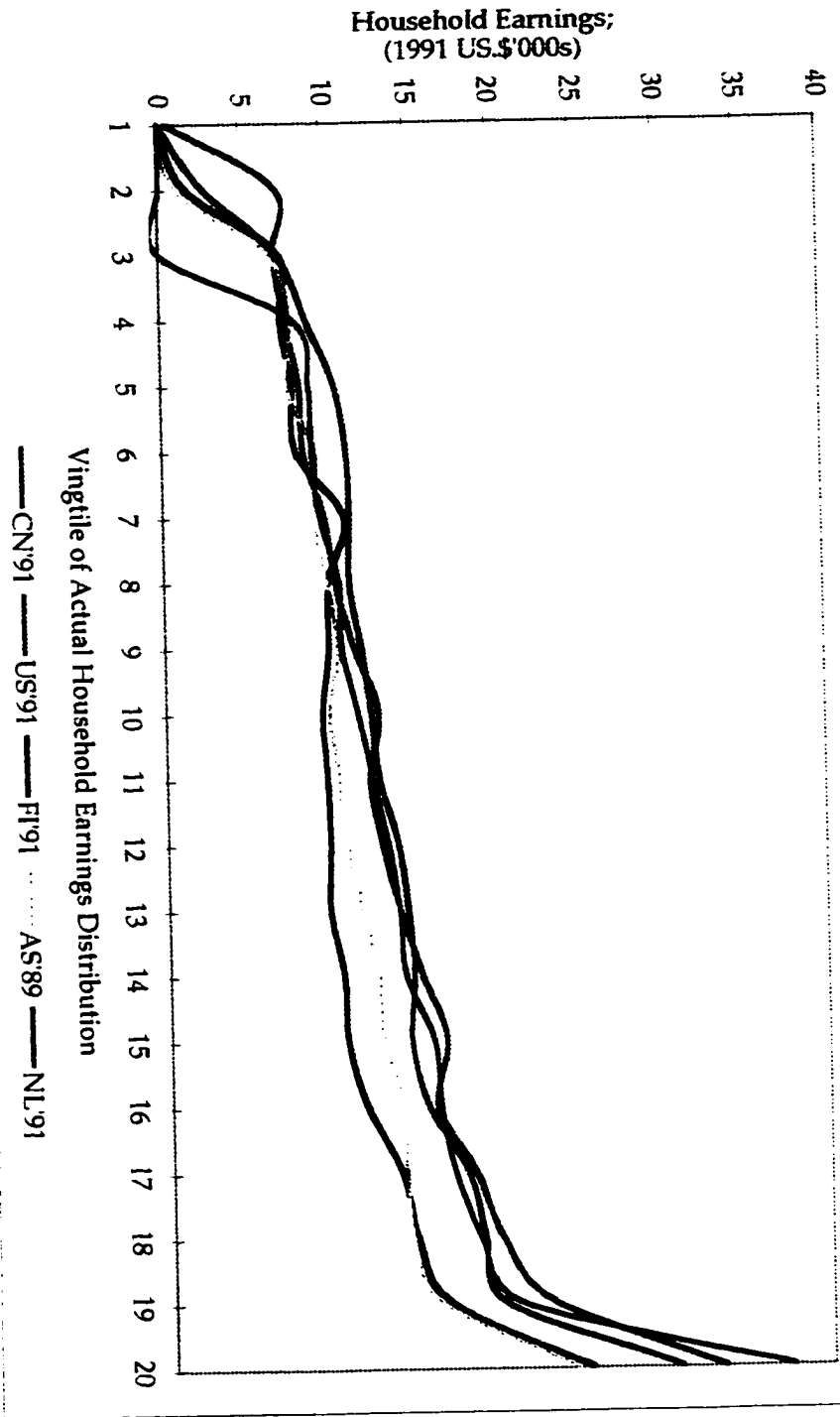
2.9.2 The High Wage Standardization

The results of the High Wage Standardization procedure are presented in Table 2.16 and shown in Figure 2.16. This procedure resulted in the earnings

distribution of Canada lying above the earnings distribution of the United States throughout much of the middle portion of the household earnings distribution, (from the 3rd vingtile up to the 13th vingtile) and then lies just below the US distribution for the remaining top 35 percent of the households. The earnings distributions of Finland and Australia are indistinguishable from the US household earnings distribution for the bottom 45 percent of households (except for the bottom tail of the distribution where US household earnings are greater than the household earnings of the four other countries examined for the bottom 15 percent of households) and then lie somewhat below the US distribution for the remaining 65 percent of households at the top of the distribution.

Vingtile	CN'91	US'91	AS'89	FI'91	NL'91
1	0	481	0	0	0
2	2,746	7,174	1,117	1,688	0
3	7,175	6,971	6,621	7,282	0
4	8,917	7,630	7,916	7,290	8,083
5	10,570	8,464	7,713	8,006	9,014
6	11,237	8,640	9,369	8,178	9,208
7	11,368	9,861	9,192	11,054	9,630
8	11,283	10,493	9,960	10,054	10,698
9	11,933	11,514	10,588	9,994	11,284
10	12,409	12,843	10,087	9,551	11,686
11	12,857	12,269	10,530	9,797	12,435
12	13,950	12,917	10,919	9,921	13,322
13	14,438	13,971	11,752	9,853	14,943
14	14,773	15,257	12,542	10,573	15,234
15	14,524	16,670	12,867	10,760	16,892
16	15,507	16,053	13,970	11,814	17,260
17	17,838	18,318	14,107	13,810	18,033
18	18,830	19,903	14,473	14,720	18,574
19	19,997	22,970	16,180	16,671	20,964
20	30,699	33,416	24,508	25,166	37,484

Figure 2.16: Total Annual Household Pre-Tax Earnings Standardized for Differences in Prices, Family Size and Hours of Paid Labour; High Wage Standardization; Married Couples (Valued in 1991 US Dollars)



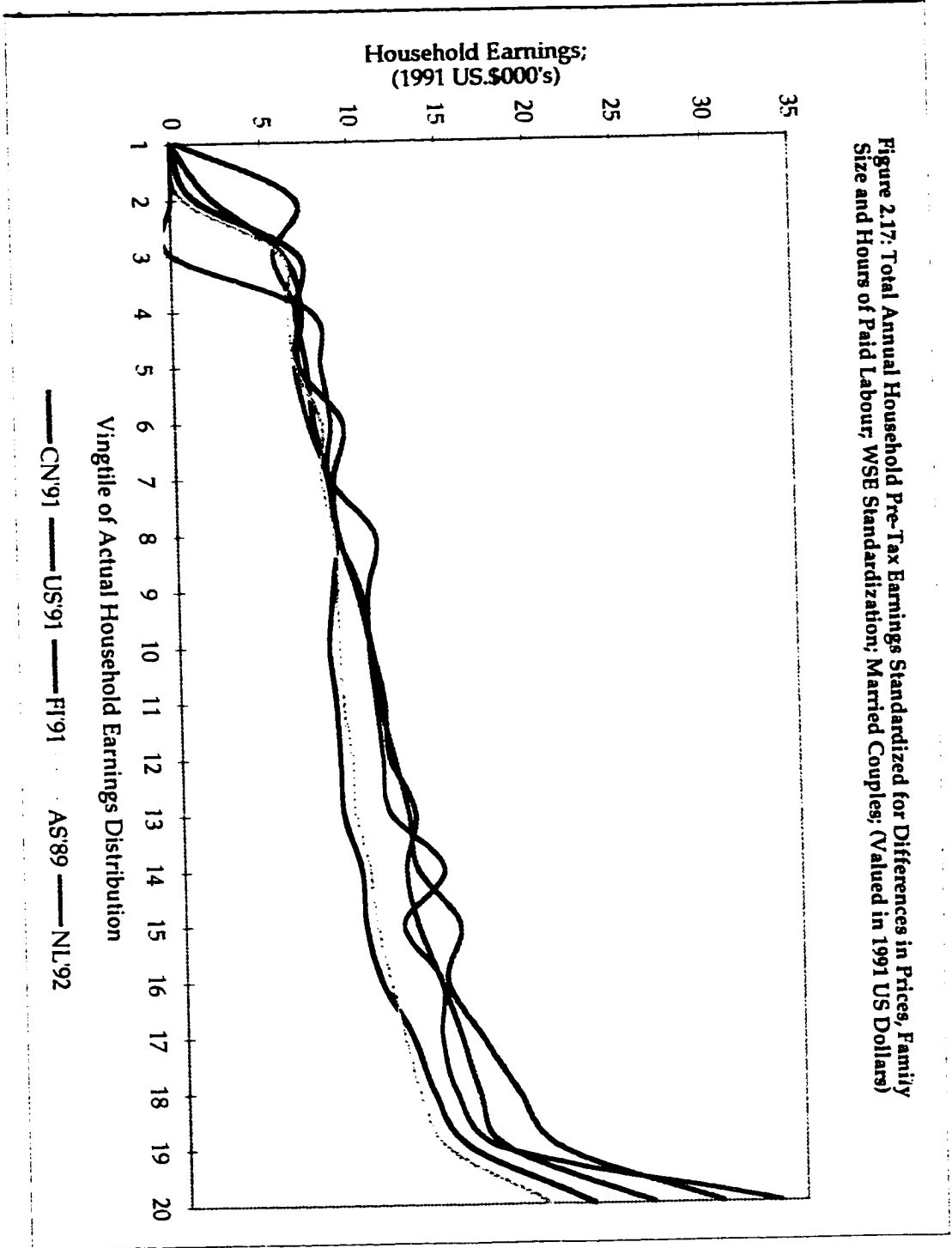
This standardization procedure implies that if households worked the same number of hours across countries, and allocated their resources such that the higher wage earner within the household, either husband or wife, supplied these hours, then households in the US do not exhibit unequivocally higher earnings, and therefore higher standards of living, as compared to the other OECD countries examined, (as was described in Figure 2.4 and Figure 2.5 earlier). Standardizing the earnings distributions under the assumptions of the high wage procedure resulted in the earnings of households in Canada and the Netherlands fluctuating around the earnings of households in the US throughout much of the distribution in earnings, whereas the earnings of households in Finland and Australia, which exhibit greater average household hours worked for the top half of households, showed average earnings somewhat below households in the US in the top half of the distribution.

2.9.3 The Wife as a Second Earner Standardization

The results of the Wife as a Second Earner Standardization procedure are presented in Table 2.17 and shown in Figure 2.17. This adjustment procedure resulted in the adjusted earnings distribution of Canada following the earnings distribution of the US very closely for the bottom 65 percent of households, (virtually indistinguishable) and then falling short of household earnings in the US for the top 45 percent of households. Household earnings in Finland and Australia follow a similar pattern as in the High Wage standardization procedure, where household earnings are indistinguishable from the US household earnings distribution for the bottom 45 percent of households (except for the bottom tail of the distribution where US

Table 2.17
Annual Household Pre-Tax Earnings Standardized for Differences in Prices, Family Size and Hours of Paid Labour;
Wife as a Second Earner Standardization; Married Couples; (Valued in 1991 US\$)

Vintage	CN'91	US'91	AS'89	FI'91	NL'91
1	0	337	0	0	0
2	2,202	6,928	618	1,272	0
3	6,227	5,626	6,118	7,023	0
4	7,235	6,958	6,343	6,877	7,700
5	6,993	6,759	6,806	7,449	8,253
6	9,434	7,480	8,235	7,795	8,740
7	8,847	8,595	8,126	8,529	8,642
8	9,016	9,064	8,861	8,959	11,121
9	10,260	10,019	8,916	8,684	10,683
10	10,794	10,746	8,985	8,423	10,170
11	11,481	11,207	9,158	8,763	10,995
12	11,731	11,967	9,565	8,904	15,325
13	13,152	12,722	9,744	9,045	11,697
14	12,530	13,209	10,476	9,996	14,765
15	13,154	15,618	10,806	10,182	12,357
16	14,457	14,860	11,539	11,000	14,495
17	15,585	16,761	12,254	12,761	14,479
18	16,568	18,749	13,101	13,943	15,273
19	18,046	21,051	14,662	16,042	17,759
20	26,295	30,085	20,388	22,947	33,498



household earnings are greater than household earnings in each of the four other countries examined for the bottom 15 percent of households), and then fall short of average household earnings in the US, Canada and the Netherlands for the top 60 percent of households. Household earnings in the Netherlands fluctuate around the US household earnings throughout most of the distribution, and lie below US household earnings for the top 25 percent of households.

Once household earnings have been standardized for differences in prices, family size, and hours worked, and if it assumed households organize themselves in such a way that wives act as supplementary earners, household earnings in the US are not significantly higher in the US over the four other OECD countries examined, except in the top 30 percent on households, where household earnings in the US still dominate average household earnings in each of the four other OECD countries examined.

2.10. Discussion of Results

What have we learned from this analysis? While the procedures used to value a common number of hours worked do not represent sophisticated household bargaining models, five main results should, however, be highlighted.⁶⁴

First, the cross country comparison of real pre-tax earnings for married couples, (adjusted for only differences in currency and prices) found the married couple households in the US to be the most affluent among the countries examined, (in terms of pre-tax labour earnings for married couples), throughout the earnings distribution.⁶⁵ Even when couples' earnings are adjusted for differences in family size, this result holds.⁶⁶ While this result may not seem to be a significant finding of this analysis, it consistent with the findings of Gottschalk and Joyce, (1995), in comparing the level of male earnings across countries.

Second, the preceding analysis resulted in the finding that in the bottom and middle portions of the earnings distribution, the difference in affluence could be partially attributed to differences in hours worked. This analysis attempted to determine to what extent cross country differences in the level of earnings for married couples is due to differences in hours worked. The relative

⁶⁴ Clearly, the procedures used to value a common number of hours worked do not represent sophisticated household bargaining models, however, without cross-country information on the relative bargaining position within the family, more sophisticated models were not possible. The notion of adjustment for hours spent working lends itself to a wide variety of models of household labour supply .

⁶⁵ The average annual real labour market earnings of married couples in the United States is greater at each vingtile of the earnings distribution than the equivalent average annual earnings of married couples in each of the countries examined.

⁶⁶ Except at the 9th vingtile, where earnings distribution of Canadian married couples is slightly higher than that of the US.

ranking of economic well-being of married couples households across countries depends on where families lie in the household earnings distribution. If married couples spent the same amount of time in the labour market across countries, couples in the bottom and middle portions of the earnings distribution in the US no longer show greater earnings⁶⁷. These results suggest the “working poor” are worse off in the US when we consider the value of the time spent to acquire their earnings. This analysis also showed that at the top of the earnings distribution married couples in the US still enjoyed higher earnings even when hours are standardized. This implies that even if high earner couples in Canada, Australia, Finland or the Netherlands worked as much as the high earnings counterparts in the US, they still would not match their earnings.⁶⁸

Third, the use of three substantially different procedures to value a common number of hours, all yield the same result: that smoothing out the “playing field” across countries, in terms of paid labour time, to facilitate comparisons of household earnings, results in a much different ranking of relative affluence among married couples than that which results when using earnings adjusted for differences in prices and family size only. In each procedure used, the earnings distribution of the United States no longer lies above the households earnings distribution of other countries throughout the earnings distribution. The procedures used to eliminate the variance in total labour supply of husbands and wives have the potential to vary significantly from one another. In the High Wage standardization procedure,

⁶⁷ This is assuming labour supply is similar to that assumed in the standardization procedures used.

⁶⁸ This is, of course, assuming couples' labour supply would be similar to that assumed in the procedures used to standardize hours worked.

the higher wage earner (of the husband and wife) is attributed the full standard number of hours. As pointed out in Table 2.8c, in 61 to 69 percent of couples, male wages are greater than female wages. This standardization procedure resulted in a much larger loss of annual female hours worked, (Table 2.10), as compared to the two other standardization procedures used. Yet, despite the variation in the relative distribution of hours among the three standardization procedures, all three procedures resulted in similar results.

Fourth, it should also be noted that standard results of individual earnings inequality reveal little about the economic burden associated with the increased attachment of women to the labour force. There are potential distributional impacts associated with wives spending more time working outside the home since the loss in the value of household production associated with greater female force participation has possible gender implications. Time use studies have shown that women, on average, contribute to a larger share of total household production than men, not only in Canada, but in other countries as well.⁶⁹

Table 2.18a presents cross-country comparison of findings of time-use surveys on the relative contribution to total household production for males and females for a selected number of countries.⁷⁰ These results show that women

⁶⁹ For Canada, see the General Social Survey on Time Use, Statistics Canada, 1992. For the results of time use surveys for a selected number of other countries, see "The Measurement of Non-Market Production, OECD Survey Reports, OECD, 1992. See also Phipps (1996), p. 92. Other evidence on gender differences in the use of time across countries which suggest women contribute to a larger share of household responsibilities can be found (Daly, (1996), Witt and Goodale (1981), and Presser (1989)).

⁷⁰ Unfortunately the year of analysis in many of these surveys does not match the year of analysis for the corresponding country examined in this thesis, and in many cases is dated. However, this does provide some evidence of women devoting more time to household production than men. The extent to which this is still true would have to be verified with more the results of more current time-use studies.

contribute between two thirds to three quarters of the housework time of men and women combined in the five countries examined. This would imply, that with greater labour force participation of women and fewer hours available for housework, unless husbands and wives “repackage” their total labour resources and provide for an alternative arrangement for the provision of housework, or unless some housework activities are not provided, women would feel the “time crunch” of the double-work day.

Country	Year	Percent of Housework Time	
		Females	Males
United States	1976	72	28
Canada	1991	68	32
Australia	1986	69	31
France	1975	77	23
Norway	1981	70	30

Source: “Measurement of Non-Market Production”, OECD, *Economic Studies*, 1992, p. 95.

Canada: Statistics Canada (1992); United States: Murphy (1982); France: Chadeau and Fouquet (1981); Australia: Australian Bureau of Statistics (1990); Norway: Brathaug (1991).

Table 2.18b shows the four main housework activities included in “total housework” in Table 2.18a, and the distribution of time across these activities in four countries.⁷¹ As can be seen in Table 2.18b, housework activities include household repairs and shopping as well as child and adult care, laundry cooking and cleaning.

⁷¹ Table 2.19b shows the distribution of time across the four main activities included in “total housework” for four countries as presents in the OECD report: “The Measurement of Non-Market Production, OECD Survey Reports, 1992, p. 96. The original sources for the time use data are cited below the table.

Table 2.18 b Cross-Country Comparison of the Distribution of Time By Household Activity				
Country	France 1985-86	Australia 1975-76	Finland 1982	Netherlands 1980
	Percent of Total Housework Time			
Cooking and Washing up	36.2	26.1	31.9	27.7
Cleaning, Laundering, Repairs, Other Housework	30.2	42.2	43.1	38.9
Child care; Adult Care	16.3	15.4	15.3	16.8
Shopping	17.3	16.3	9.7	16.6
Total	100	100	100	100

Source: "Measurement of Non-Market Production", OECD, Economic Studies, 1992, p. 96.

France: INSEE (1987); Australia: Ironmonger (1989); Finland: Suviranta (1982);
Netherlands: Aldershoff (1983)

Whether or not women carry the brunt of the burden of diminished time available to take care of home and child care responsibilities depends on how couples "package" their supply of labour for both work inside and outside the home in response to the emergence of the dual-earner family, as experienced in countries such as Canada, the United States and Finland.⁷²

Clearly, it is more difficult for couples at the bottom of the earnings distribution to "contract out" some of the household responsibilities than for couples at the top of the earnings distribution. For families who cannot afford to purchase housework services, the stress associated with juggling work, household and family responsibilities could be great.⁷³ For this reason,

⁷² Husbands and wives may equally share the household work, or perhaps some household work doesn't get done or is contracted out to a third party, or perhaps women put in a "double-work" day and feel the time crunch.

⁷³ In the case of Canada, the results of the 1992 General Social Survey on Time Use by Statistics Canada, showed that in contrast to men, time stress rose markedly for women with marriage and children, and that time crunch levels virtually exploded for married mothers who were employed full-time.

“working poor” dual earner families may suffer a greater loss in the foregone value of home production, with the potential for this burden to be shifted to the “working poor women”.

More specifically, the results of this study, indicating that the “working poor” were the worst off among the countries examined in the US, (once earnings are adjusted for the variance in time spent working), places the “working poor women” in the US in the worse position of all.

The fifth point which deserves mention concerns putting the above results into the context of the prevailing differences in social institutions and policies across countries. Market forces go a long way in explaining the diversity of experiences across countries, but institutions also matter. If, for example, earners in the bottom tail of the earnings distribution in one country may compare poorly, in money terms, with low earners in elsewhere, but, due to differences in social policies, these low earner families may not in fact, have a lower level of economic well-being.

Cross country comparison of earnings does not allow for a comparison of full consumption potential or the full command over goods and services of families. Hence, the relationship between labour market earnings and “full” family income is less clear due to differences in political and social institutions across countries.

Among the five countries examined in this study, large differences in social policies and programs play a substantial role in the economic well-being

associated with household earnings.⁷⁴ Low earner families in the United States face very different income transfer schemes and social policies than is the case for low earnings families in a country such as Finland.

Finland is characterized as a social democratic country, (using Esping-Anderson's topology), with very egalitarian policies and generous income transfers that cover all individuals regardless of their family or employment status. Finland's social policy can be characterized as being highly universalistic, with child benefits available to all families with children under 16 years old consisting of: a generous family allowance scheme providing social support for all families with children, maternity and parental benefits which are not tied to labour force attachment,⁷⁵ job-protected parental leaves at the end of the maternity or parental benefits; child-rearing allowances, and funds available which may be used to pay for child-care in or out of a family's own home; up to 60 days of paid leave from work to care for a sick child per year; and an advance maintenance payments program⁷⁶. In addition, none of these child support payments are means-tested.⁷⁷

In contrast, the working poor in the "liberal welfare" countries such the United States, Canada, and Australia face a much more market-oriented

⁷⁴ See Phipps (1996) for a comparative cross country review of social policy in five countries, including Finland and Canada. Also, S.B. Kamerman, (1980). The comparative section on social policy is taken from Phipps, 1996. Also, Maureen Baker, (1995).

⁷⁵ Maternity and parental benefits have up a total duration of 46 weeks. Parental leaves may be taken at the end of the maternity or parental benefits until the child is three years old and may be taken by either parent. (Phipps, 1996).

⁷⁶ An advance maintenance payments program, where single parents receiving child support from absent parents which is less than a specified minimal amount receive a benefit (non-taxable) from the state to bring them up to a "state-guaranteed" monthly income level.

⁷⁷ See Phipps, (1996) and Maureen Baker, (1995).

approach to distributing resources. This is evident in their family benefits programs. In the United States, social assistance benefits are income-tested and determined on an individual basis;⁷⁸ pregnancy leave is treated the same as short-term disability; there is no family allowance program or leave from work to care for a sick child. In Australia, social assistance benefits are means-tested and paid on a family unit basis; there is no formal maternity or paternity leave or tax benefits for children; the family allowances program is income-tested; capital and operational subsidies are available to child care givers rather than given directly to families requiring child care; and leave from work to care for sick children is included under parental leave programs.⁷⁹

In Canada, the child benefit system consists of a basic child tax benefit and an earned income supplement (wage subsidy) paid to parents with low earnings. Maternity and parental benefits are treated as labour market programs and are available to workers through the unemployment insurance system; and paid leave from work to care for sick children or an advance maintenance payments program is not available.⁸⁰

The Netherlands, (a "Corporatist" welfare state), is characterized as having income transfer programs organized around families rather than individuals:⁸¹ married persons are ineligible for social assistance benefits if

⁷⁸ As in Canada, benefits for children come in the form of deductions for dependents which reduce taxable income.

⁷⁹ See Maureen Baker, (1995); J. Sohrab 1996, p. 146.

⁸⁰ See Phipps, 1996.

⁸¹ See J. Sohrab 1996, p. 153

their spouses are employed and all social insurance schemes are means-tested; child care has remained largely within the private domain and public child care facilities are not widely available; paid leave from work to care for sick children or an advance maintenance payments program are not available in the Netherlands. A child care credit system is used to enable unemployment insurance claimants to lengthen the period of unemployment for which benefits are paid.⁸²

The large differences in social policies and programs among the countries examined imply that there is substantial variation in the economic well-being associated with household earnings.⁸³ Low earnings families in the United States face very different social policies and income transfer schemes than would be the case for low earnings families would face in a country such as Finland.

Working poor females in the US face limited support by way of family benefits, whereas low earning females in countries such as in Finland receive much more in-kind income in the form of family benefits. Set in this context, low earner families in the United States have, all else equal, an even lower level of economic well-being and command over market goods and services, associated with their market earnings than do low earning families in Finland. Thus, low earner families in the United States are particularly vulnerable.

82 Ibid.

83 See Phipps (1996) for a comparative cross country review of social policy in five countries, including Finland and Canada. Also, S.B. Kamerman, (1980). The comparative section on social policy is taken from Phipps, 1996.

2.11 Earnings Inequality

An analysis of the distribution of any measure of money income involves examining both the level of money income and the degree of inequality of its distribution. Countries may be very affluent in terms of the level of labour market earnings but earnings may be very unequally distributed throughout the population. For example, the United States is recognized as being one of the most affluent countries in the world, but as also having very unequally distributed household income.⁸⁴

The analysis in the preceding section showed the United States was, in fact, the most affluent country, among the countries compared, in terms of the level of pre-tax labour earnings for married couples, throughout most of the earnings distribution. This result still holds when couples' earnings are adjusted for cross-country differences in prices and family size. The relative affluence among the countries examined was considerably altered, however, when couples spent the same amount of time in the labour market. This analysis showed, that differences in affluence may be partially attributable to differences in hours worked by married couples in the bottom and middle portions of the earnings distribution.⁸⁵

This section examines the pre-tax labour market earnings of married couples across the selected countries to determine how equally or unequally these

⁸⁴ Levy and Murnane (1992), Danziger and Gottschalk, (1994), Smeeding and Gottschalk (1996)

⁸⁵ This of course, assumes labour supply is similar to that which is assumed in the procedures used to standardize paid labour hours.

earnings are distributed, and to what extent international differences in the measures of inequality are due to differences in hours worked.

Cross country differences in the inequality of the distribution of labour market earnings of married couples are first determined using actual pre-tax earnings.⁸⁶ The pre-tax earnings distribution is then standardized for differences in family size (as outlined in Section 2.6 above), and inequality measures are compared to those using actual earnings. This comparison is done to determine the impact of differences in family size across countries on the inequality of married couples' earnings.

To facilitate an analysis of the extent to which married couples earnings inequality is impacted by cross-country differences in hours worked, inequality measures are estimated for each of the procedures used to adjust earnings for differences in hours worked.⁸⁷ A comparison is then made between the inequality measures derived for couples' earnings under each procedure used to standardize hours worked and inequality measures using actual earnings, adjusted only for family size.

Standard inequality measures are used: the Atkinson inequality index, with $\epsilon = 0.5$; the Gini coefficient; and the Theil inequality index.⁸⁸ These all belong to the same group of inequality measures and hold the property that they are

⁸⁶ The pre-tax earnings distribution for married couples is the same distribution described by the sample selection criteria in Section 2.3. The actual pre-tax earnings distribution is unadjusted for cross-country differences in prices and currency since these are constant values and do not affect the measures of inequality selected.

⁸⁷ The pre-tax earnings distribution for married couples is the same distribution used to standardize hours worked, described by in Section 2.9. The earnings distribution is adjusted for cross-country differences in family size and hours worked, as described in each of the three procedures used in Section 2.9.

⁸⁸ See Appendix C for the technical conventions employed in the estimation of these indices.

not sensitive to relative changes in the earnings scale. The Atkinson index is sensitive to inequality changes in the lowest part of the income distribution, the Theil index is sensitive to changes in the top part of the distribution, and the Gini coefficient is sensitive to inequality changes around the median.

2.10.1 Inequality of Pre-tax Earnings Distributions for Married Couples

Measures of inequality for each of the earnings distributions are presented in Table 2.19. The rank order of each of the inequality coefficients under each standardization procedure is also presented to facilitate comparison.

Examining actual pre-tax earnings of married couples, two features stand out: 1) the Netherlands shows the highest degree of inequality as measured by the Gini, Atkinson and Theil indices;⁸⁹ and 2) the most equally distributed household earnings overall are in Finland, as measured by all three indices.

Using the Gini and the Atkinson index of inequality, the United States has the next highest measure of inequality, followed by Canada, Australia and Finland, respectively. According to the Theil index, which is more sensitive to the upper tail of the distribution, the rank order differs slightly from the Gini and Atkinson rank order, with the Canada showing the second highest degree of inequality, followed by the United States, Australia and Finland. The cross-country ranking of inequality using both the Gini and the Theil index is similar to the ranking using the Atkinson index, except that Canada is ranked as having greater inequality in the upper tail than the United States using the Theil index.

⁸⁹ The Netherlands has a large number of zero earner households in the lower tail of the earnings distribution for married couples, as shown in Table 2.4 of this paper.

2.10.2 Inequality of Pre-tax Earnings Distributions Standardized for Differences in Family size

When household earnings are further standardized for differences in family size using an equivalence scale, we see an increase in all measures of inequality. This result differs from the impact on the inequality rankings across countries using family incomes as computed by Smeeding, (1991). Smeeding showed that when family incomes are standardized for differences in family size, inequality measures were reduced. Since family incomes include transfers designed to smooth out differences in family incomes, whereas household earnings do not, this difference in results seems reasonable. The rank order of family incomes, equivalized for differences in family size computed by Smeeding (1991) resulted in the United States having the greatest degree of inequality as measured by the Gini, Theil, and Atkinson indices.⁹⁰

As can be seen in Table 2.19, when household earnings are “equivalized” for family size, the rank order of countries under the Gini and the Theil indices (which occurred using actual, unadjusted earnings), remains preserved. Again, the Netherlands shows the highest degree of inequality as measured by the Gini index, followed by the US., Canada, and Australia, with Finland showing the lowest inequality. Using the Atkinson index of inequality, the rank order of the country with the highest level of inequality (the Netherlands) and the lowest level of inequality (Finland) remains preserved. However, the rank order for Canada, Australia the United States is altered

⁹⁰ The United States is followed by Australia and the Netherlands, respectively, under both the Gini and the Theil index and by the Netherlands and then Australia under the Atkinson index. These three countries are followed by Canada and lastly, Finland.

somewhat. Under the Atkinson index, the inequality of couples' earnings is lowered in the United States in the lower tail when earnings are adjusted for family size, whereas inequality in the lower tail in Australia increases.

Examining the resulting earnings distributions once household earnings have been standardized for differences in hours worked, the rank order across countries is, however, no longer similar to that which occurs using actual earnings adjusted for family size.

One feature of standardizing for hours worked under the standardization procedures examined in this study, is that Finland is ranked as having the lowest household earnings inequality under each of the standardization procedures for all inequality measures used.

Inequality indices in the following three sections are compared to the inequality indices obtained using earnings standardized for family size and prices only.

2.10.3 Inequality of Pre-tax Earnings Distributions Standardized for Differences in Family size and Hours Worked: Proportional Hours Procedure

One feature of the Proportional Hours standardization procedure is that the rank order under the Gini, Theil and Atkinson indices remain the same as that which occurred using the Gini index, with actual earnings and earnings adjusted for family size only. Married couples' earnings inequality, as measured by the Gini index, decreased for Canada, the United States, and Australia but increased in the Netherlands and Finland, (as compared to the Gini indices using earnings standardized for family size only).

The two tails of the distribution were affected differently across countries. Although the rank order of inequality remains the same under the Theil index and the Gini index, married couples' earnings inequality in both the top and lower portions of the earnings distribution increases in Canada using this procedure to standardize hours. This would imply that if couples work more hours at the bottom and fewer hours at the top of couples' earnings distribution, but do so in the same male - female proportion, earnings inequality is increased in both tails, and decreased in the middle of the earnings distribution.

In Australia, this standardization reduced inequality in both tails, resulting in Australia being ranked next to Finland in terms of lowest overall earnings inequality for all three indices. In the United States, earnings inequality is reduced in both the upper and lower tails. Examining the Theil coefficients in Table 2.19, we see that following Canada, the Netherlands showed the next highest level of household earnings inequality, followed by the United States, Australia and then Finland. The Atkinson index showed a slightly different ranking with the Netherlands showing the greatest degree of inequality, followed by the United States, Canada, Australia, and Finland.

These results indicate that if households organize their labour supply such that husband and wife supply labour in a constant proportion to one another, and all households worked the same amount of total hours, Finland would still have the lowest degree of inequality in earnings and the Netherlands would still have the greatest inequality of couples' earnings.

Table 2.19			
Cross-Country Comparison of Household Earnings Inequality Measures; Married Couples			
Unadjusted and Standardized Household Earnings Distributions			
<i>Cross-Country Inequality Measures; Actual Household Earnings; Married Couples:</i>			
Country	Gini	Theil	Atkinson*
United States, 1991	0.3757 (2)	0.2461 (3)	0.1454 (2)
Canada, 1991	0.3642 (3)	0.2476 (2)	0.1471 (3)
Australia, 1989	0.3489 (4)	0.2319 (4)	0.1523 (4)
Finland, 1991	0.3289 (5)	0.2021 (5)	0.1306 (5)
Netherlands, 1991	0.3785 (1)	0.3071 (1)	0.2212 (1)
<i>Cross-Country Inequality Measures; Household Earnings Adjusted for Family Size:</i>			
Country	Gini	Theil	Atkinson*
United States, 1991	0.4048 (2)	0.2840 (2)	0.1608 (4)
Canada, 1991	0.3933 (3)	0.2811 (3)	0.1614 (3)
Australia, 1989	0.3841 (4)	0.2678 (4)	0.1677 (2)
Finland, 1991	0.3441 (5)	0.2159 (5)	0.1368 (5)
Netherlands, 1991	0.4211 (1)	0.3515 (1)	0.2373 (1)
<i>Cross-Country Inequality Measures; Proportional Hours Standardization:</i>			
Country	Gini	Theil	Atkinson*
United States, 1991	0.4038 (2)	0.2543 (2)	0.1803 (2)
Canada, 1991	0.3849 (3)	0.2508 (3)	0.1661 (3)
Australia, 1989	0.3798 (4)	0.2477 (4)	0.1593 (4)
Finland, 1991	0.3691 (5)	0.1630 (5)	0.1081 (5)
Netherlands, 1991	0.4530 (1)	0.3209 (1)	0.2562 (1)
<i>Cross-Country Inequality Measures; Wife as a Second Earner Standardization:</i>			
Country	Gini	Theil	Atkinson*
United States, 1991	0.4320 (3)	0.3413 (4)	0.2153 (4)
Canada, 1991	0.4723 (1)	0.4396 (1)	0.2849 (2)
Australia, 1989	0.4509 (2)	0.4133 (2)	0.2919 (1)
Finland, 1991	0.3914 (5)	0.2700 (5)	0.1897 (5)
Netherlands, 1991	0.4267 (4)	0.3609 (3)	0.2457 (3)
<i>Cross-Country Inequality Measures; High Wage Standardization:</i>			
Country	Gini	Theil	Atkinson*
United States, 1991	0.3796 (3)	0.2743 (4)	0.1444 (4)
Canada, 1991	0.4061 (2)	0.3464 (2)	0.1803 (2)
Australia, 1989	0.3776 (4)	0.3152 (3)	0.1743 (3)
Finland, 1991	0.3147 (5)	0.2166 (5)	0.1251 (5)
Netherlands, 1991	0.4698 (1)	0.5044 (1)	0.2826 (1)

Atkinson*: Epsilon=0.5

These results also indicate that current household hours worked result in a “smoothing out” of household earnings in the top of the distribution in Canada and in the bottom of the distribution in the Netherlands, as compared to the hours worked implied by this standardization.

2.10.4 Inequality of Pre-tax Earnings Distributions Standardized for Differences in Family size and Hours Worked: Wife as a Second Earner Procedure

This standardization procedure, results in a substantial increase in inequality in the top, bottom and middle of the distribution in all countries examined, resulting in higher Gini, Theil and Atkinson indices, as compared to the Gini indices using earnings standardized for family size and prices only. This standardization results in the greatest increases in inequality in Canada, resulting in Canada having the highest Gini index, followed by Australia, the United States and the Netherlands and Finland.

Under this standardization procedure, wives are treated as supplementary earners and work if their husband’s hours worked is less than the standardized number of hours. This analysis showed that if households organize their labour supply in such a manner, Canada exhibits the greatest level of household earnings inequality in the middle and upper tails of the distribution and Australia shows the highest earnings inequality in the lower tail, as measured by the Atkinson index. Finland again shows the lowest measures of household earnings inequality for all three indices.

2.10.5 Inequality of Pre-tax Earnings Distributions Standardized for Differences in Family size and Hours Worked: High Wage Procedure

The High Wage standardization procedure resulted in lower Gini indices (as compared with the other two standardization procedures for hours worked) for all countries examined except the Netherlands and Canada. Couples' earnings inequality under this procedure is affected differently in the tails of distribution across countries. The Netherlands faces the greatest increase in inequality under this standardization, with a large increase in inequality in the upper tail of the distribution, as well as an increase in inequality in the lower tail, resulting in a Gini index larger than that obtained using earnings which are standardized for family size only.

Canada is ranked as having the second highest earnings inequality under High Wage standardization for all indices. In Canada, this standardization procedure resulted in a rise in inequality, as measured by all three indices. In the United States, on the other hand, this procedure resulted in lower inequality in the upper and lower tail and the middle of the distribution. This implies that if households worked an equal amount of time, but now only the high wage earner only works, that the distribution of couples' earnings in the US would be more equally distributed, but more unequally in Canada.

In Australia, the High Wage procedure lowers inequality in middle portion of the earnings distribution, as measured by the Gini index, but increases inequality in both tails, as measured by the Theil and Atkinson indices. In Finland, earnings inequality is lowered in the in the middle and lower regions of the earnings distribution, as compared to those obtained by using equivalized earnings only, but increased in the upper portions of the earnings distribution, as measured by the Theil index.

This implies that if households supplied a fixed amount of labour, such that only the high wage earner worked in the paid labour market, there would be an increase in overall inequality throughout the distribution in the Netherlands and Canada. This would imply that the current supply of labour in these two countries, using a combination of high and low wage earners, is “smoothing out” household earnings and has an equalizing effect on the distribution of family earnings.

2.11 Summary of Results

What have we learned from the above analysis? This section examined the pre-tax labour market earnings of married couples across the selected countries to determine how equally or unequally these earnings are distributed, and to what extent international differences in the measures of inequality are due to differences in hours worked. Although the three standardization procedures affected the distribution of married couples’ earnings differently across countries, several points become evident.

First, the comparison of earnings inequality shows annual pre-tax earnings of married couples, adjusted for differences in prices and family size only, are most equally distributed in Finland and most unequally distributed in the Netherlands, as measured by the Gini, Atkinson and Theil indices. This analysis also showed that when couples’ earnings are “equivalized” for family size only, the rank order of countries under each of the inequality indices used remains preserved, using Gini and the Theil indices. Adjusting couples’ earnings for family size lowers the earnings inequality among low earner couples in the US and increases inequality for low earners in Australia.

Second, under each of the procedures used to fix hours, Finland is ranked as having the lowest household earnings inequality for all inequality measures used. The relative earnings inequality measures among the remaining four countries are altered significantly, however, when couples' hours spent working outside the home are standardized.

Using the Proportional Hours standardization procedure, although the rank order of inequality remains the same under the Theil index and the Gini index, married couples' earnings inequality in both the top and lower portions of the earnings distribution increases in Canada using this procedure to standardize hours. These results indicate that current household hours worked result in a "smoothing out" of household earnings in the top of the distribution in Canada and in the bottom of the distribution in the Netherlands, as compared to the hours worked implied by this standardization. In Australia, measures of inequality decreased under this procedure for all three measures of inequality. If couples organized their labour time in this manner, a portion of the inequality in couples' earnings in Australia exists due to differences in hours worked.

In contrast to the Proportional Hours procedure, the Wife as a Second Earner procedure, resulted in a substantial increase in inequality in the top, bottom and middle of the distribution in all countries examined results, as measured by all three inequality indices used.

The High Wage standardization procedure resulted in lower Gini indices (as compared with the other two standardization procedures for hours worked) for all countries examined except the Netherlands and Canada. The Netherlands faces the greatest increase in couples' earnings inequality under

this standardization, with Canada being ranked as having the second highest earnings inequality under High Wage standardization for all indices. This implies that if households worked an equal amount of time, but now only the high wage earner works outside the home, that the distribution of couples' earnings in the US would be more equally distributed, but more unequally in Canada. If couples organized their labour time in this manner, a portion of the inequality in couples' earnings in the US exists due to differences in hours worked, whereas this would not be the case in Australia, Finland, the Netherlands or Canada.

Third, the analysis of the inequality of married couples' earnings found some evidence of differences in cross-country measures of couples' earning inequality being attributable to differences in hours worked. Measures of inequality, as measured by the Gini index, for the United States, Canada and Australia were reduced under the Proportional Hours procedure. All three measures of inequality of married couples' earnings in Australia were reduced (over the inequality measures resulting from earnings adjusted for differences in family size only), under the Proportional Hours procedure. Under the high Wage procedure, all three measures of inequality were reduced to the United States. No evidence of differences in cross-country measures of couples' earning inequality being attributable to differences in hours worked were found in the Wife as a Second procedure.

Fourth, since all three procedures fix hours to the same level, one can then compare the results across procedures to determine which procedure results in the greatest increase or reduction in inequality. Based on this comparison, the Wife as a Second Earner procedure results in an overall increase in

earnings for family size lowers the earnings inequality among low earner couples in the US and increases inequality for low earners in Australia.

Second, under each of the procedures used to fix hours, Finland is ranked as having the lowest household earnings inequality for all inequality measures used. The relative earnings inequality measures among the remaining four countries are altered significantly, however, when couples' hours spent working outside the home are standardized.

Using the Proportional Hours standardization procedure, although the rank order of inequality remains the same under the Theil index and the Gini index, married couples' earnings inequality in both the top and lower portions of the earnings distribution increases in Canada using this procedure to standardize hours. These results indicate that current household hours worked result in a "smoothing out" of household earnings in the top of the distribution in Canada and in the bottom of the distribution in the Netherlands, as compared to the hours worked implied by this standardization. In Australia, measures of inequality decreased under this procedure for all three measures of inequality. If couples organized their labour time in this manner, a portion of the inequality in couples' earnings in Australia exists due to differences in hours worked.

In contrast to the Proportional Hours procedure, the Wife as a Second Earner procedure, resulted in a substantial increase in inequality in the top, bottom and middle of the distribution in all countries examined results, as measured by all three inequality indices used.

The High Wage standardization procedure resulted in lower Gini indices (as compared with the other two standardization procedures for hours worked) for all countries examined except the Netherlands and Canada. The Netherlands faces the greatest increase in couples' earnings inequality under this standardization, with Canada being ranked as having the second highest earnings inequality under High Wage standardization for all indices. This implies that if households worked an equal amount of time, but now only the high wage earner works outside the home, that the distribution of couples' earnings in the US would be more equally distributed, but more unequally in Canada. If couples organized their labour time in this manner, a portion of the inequality in couples' earnings in the US exists due to differences in hours worked, whereas this would not be the case in Australia, Finland, the Netherlands or Canada.

Third, the analysis of the inequality of married couples' earnings found some evidence of differences in cross-country measures of couples' earning inequality being attributable to differences in hours worked. Measures of inequality, as measured by the Gini index, for the United States, Canada and Australia were reduced under the Proportional Hours procedure. All three measures of inequality of married couples' earnings in Australia were reduced (over the inequality measures resulting from earnings adjusted for differences in family size only), under the Proportional Hours procedure. Under the high Wage procedure, all three measures of inequality were reduced to the United States. No evidence of differences in cross-country measures of couples' earning inequality being attributable to differences in hours worked were found in the Wife as a Second procedure.

Fourth, since all three procedures fix hours to the same level, one can then compare the results across procedures to determine which procedure results in the greatest increase or reduction in inequality. Based on this comparison, the Wife as a Second Earner procedure results in an overall increase in earnings inequality over and above that which would occur by adjusting couples' earnings for family size alone.

2.12 Cross-Country Differences in Average Hourly Wages

There may be some important implications regarding the differences in the distribution of average hourly wages across countries, explaining differences in the amount of resources households are putting into paid labour in order to maintain living standards.

2.12.1 Average Male Hourly Wages

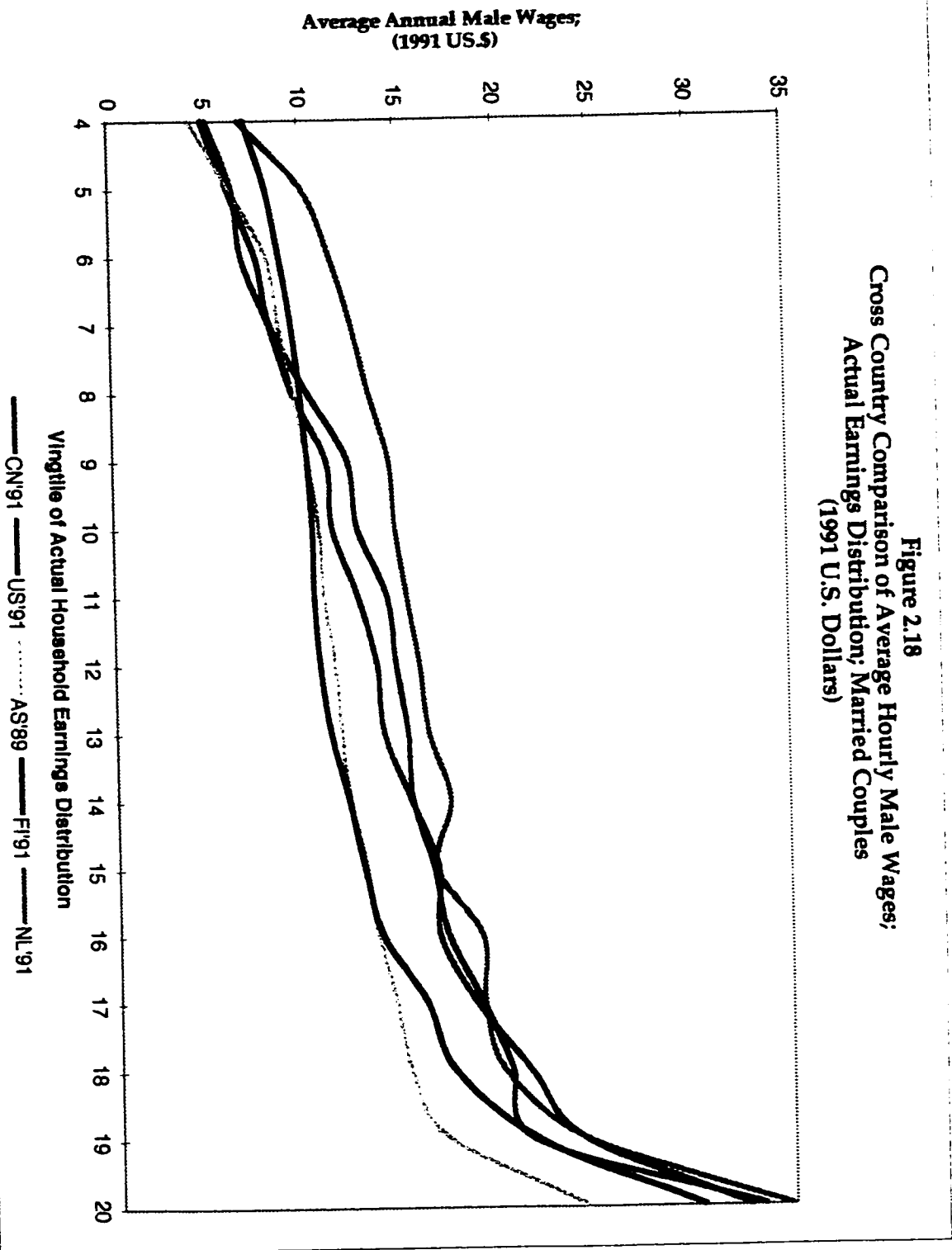
Calculating the hourly wage for husbands and wives from their average earnings and hours worked at each vingtile of the distribution provides some insight into the distribution of wages across the earnings distribution. Table 2.20 presents the distribution of wages for all vingtiles of the distribution for which there are positive earnings for all countries, to facilitate comparison. All wages in Table 2.20 are expressed in 1991 US. dollars. Figure 2.18 presents this same distribution of average hourly household wages across countries.

Women earn less relative to men in Canada, as compared to the other countries examined. Thus the potential vulnerability of families who rely on women's earnings is greatest in Canada and the United States.

Vingtile	CN'91	US'91	AS'89	FI'91	NL'91
4	4.93	5.16	4.28	7.14	6.85
5	6.25	6.49	6.34	8.24	10.11
6	7.68	6.93	8.22	8.93	11.55
7	8.38	8.32	8.81	9.48	12.61
8	10.28	9.47	9.52	9.89	13.44
9	12.29	11.18	10.20	10.22	14.44
10	12.75	11.45	10.79	10.42	14.74
11	14.25	12.75	10.96	10.47	15.27
12	14.68	13.67	11.50	10.73	15.91
13	15.23	13.98	11.80	11.25	16.32
14	15.45	15.35	12.19	12.12	17.35
15	16.48	16.72	12.97	12.87	16.63
16	17.14	16.71	13.51	13.77	18.85
17	18.83	18.51	14.42	16.03	18.95
18	20.34	21.30	15.15	17.41	19.94
19	21.33	24.16	17.03	21.58	24.21
20	33.41	32.65	24.34	30.29	34.71

Table 2.20 shows the cross-country comparison of average hourly wages for males, (computed from reported average annual earnings and hours worked), for all vingtiles of the earnings distribution with positive earnings for all countries. This distribution is presented in Figure 2.19. As can be seen in Table 2.20, average male hourly wages in the United States at the bottom of

Figure 2.18
Cross Country Comparison of Average Hourly Male Wages;
Actual Earnings Distribution; Married Couples
(1991 U.S. Dollars)



the household earnings distribution are higher than male hourly wages in Canada and Australia for the 4th and 5th vingtile. From the 6th to the 8th vingtile, male hourly wages are lower than in all countries examined. From the 9th vingtile onwards, however, average hourly wages for males in the United States begin to pick up and surpass average hourly wages for all countries examined, (with the exception of the top 95 percent of the earnings distribution where average hourly wages in Canada and the Netherlands are higher).

2.12.2 Average Female Hourly Wages

A cross-country comparison of the distribution of average hourly wages for women shows a different picture. Table 2.21 shows the cross-country comparison of average hourly wages for women, (computed from reported average annual earnings and hours worked), for vingtiles of the earnings distribution with positive household earnings for all countries.

This distribution is presented in Figure 2.19. As can be seen in Table 2.21, average hourly wages for females in some countries (Canada, the United States, Australia and the Netherlands) are higher than average hourly wages for males at the bottom of the distribution, but by the 6th vingtile, average male hourly wages are higher than female wages for all countries for the remainder of the earnings distribution.

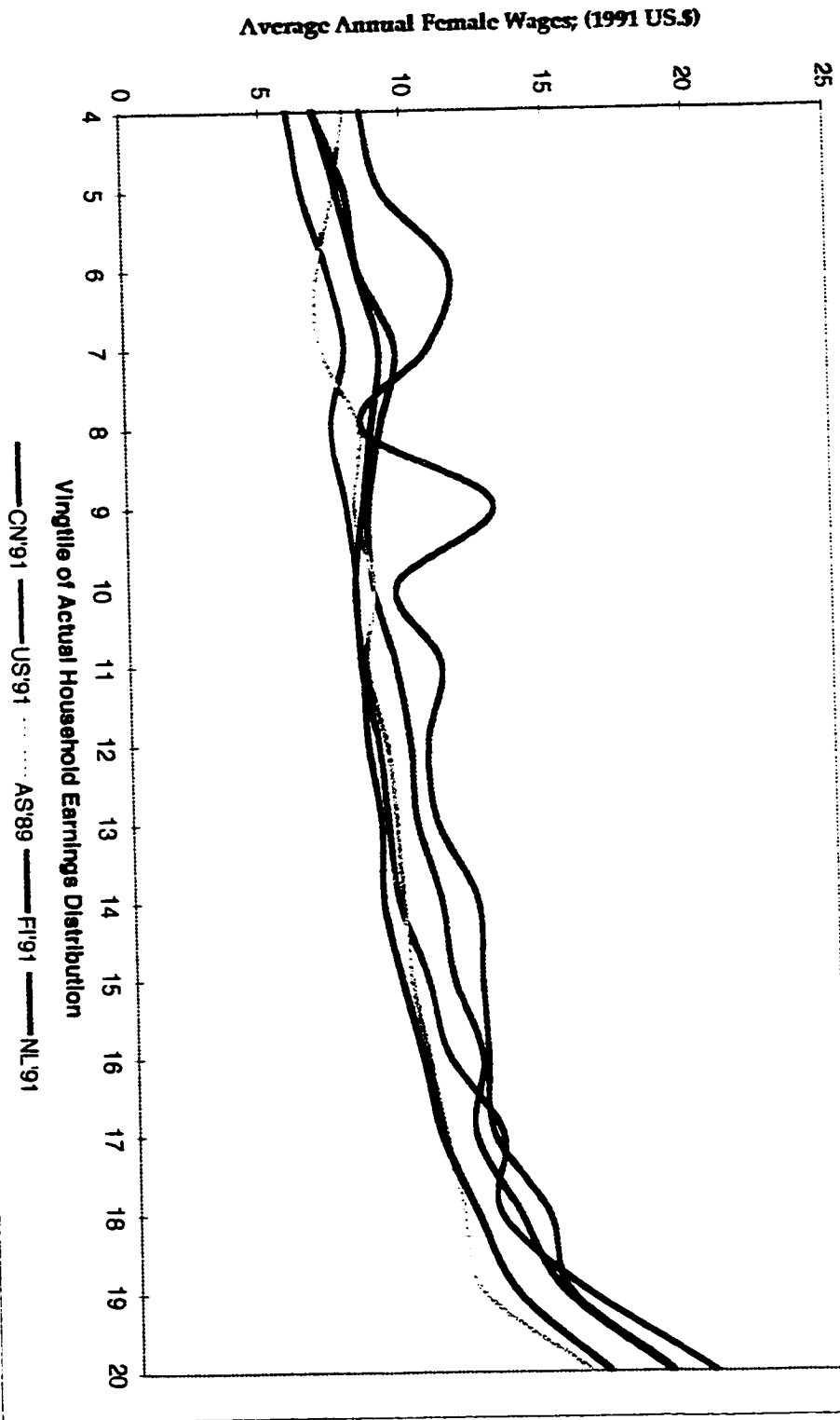
Perhaps the most notable feature of the distribution of average hourly wages is that the average female hourly wages in the United States are lower than average hourly wages for females in all countries examined throughout the

bottom half of the household earnings distribution, (with the exception of the 6th and 7th percentile, where average hourly

Vingtile	CN'91	US'91	AS'89	FI'91	NL'91
4	6.80	5.92	7.90	6.85	8.53
5	7.92	6.37	7.52	7.61	9.22
6	8.35	7.21	6.87	8.29	11.53
7	9.62	7.80	6.92	9.05	10.76
8	9.08	7.27	8.28	8.73	8.38
9	8.59	7.76	8.05	8.42	12.95
10	8.71	8.09	8.74	8.04	9.52
11	9.43	8.18	8.42	8.25	11.01
12	9.89	8.80	9.09	8.40	10.49
13	10.05	9.08	9.39	8.83	10.75
14	10.84	9.38	9.55	8.85	12.12
15	11.20	10.30	9.77	9.43	12.23
16	12.18	11.00	10.31	10.09	12.41
17	11.91	12.90	10.85	10.70	12.57
18	13.48	12.78	11.46	11.94	14.54
19	15.10	15.93	12.08	13.35	15.30
20	18.77	20.42	15.98	16.64	18.88

wages of females in Australia were slightly lower). In the top half of the distribution, however, average hourly wages for women in the US. begin to increase, relative to the other countries examined, until the top 90 percent of the earnings distribution, where average female hourly wages in the US. are higher those than in all other countries examined. Average hourly wages for women in Canada and the Netherlands are greater than average hourly wages in the US. throughout the bottom and middle portions of the

Figure 2.19:
Cross Country Comparison of Average Hourly Female Wages;
Actual Earnings Distribution for Married Couples
(1991 U.S. Dollars)



household earnings distribution, up to the top 90 percent of household earnings.

This shows the high US. earnings in the top 90 percent of the distribution is not due solely to high male wages. The relatively high average hourly wages for both married males and females in the top 90 percent of the earnings distribution suggests some evidence of assortative mating as found by Danziger, Cancian and Gottschalk (1992).

2.13 Conclusion

In different countries we observe different “packages” of hours worked by husbands and wives and subsequently, different combinations of time available for housework and leisure. By examining the earnings distributions of couples and their paid labour time at each vingtile of the earnings distribution, this paper attempts to show the wide variation in the relative contribution to total paid labour time of husbands and wives across selected countries. Given this wide variation in paid labour hours, one way to compare the earnings of married couples across countries, is to hold hours constant (i.e., pick a reference point) and eliminate cross-country variation in hours of paid labour.

This study examines the earnings distributions of married couples across countries when hours of paid labour within each vingtile are fixed across countries. Three procedures are used to value a common number of hours worked across countries. While these procedures do not represent highly

sophisticated household bargaining models,⁹¹ the results imply that the use of standard monetary measures, such as GDP or incomes, even when adjusted for purchasing power, may not be appropriate proxies for measures of economic well-being since they mask the differences in time spent acquiring earnings.

It may be argued that a full valuation of foregone household production time, based on the market wages of husbands and wives is not a suitable standardization for differences in household hours worked across countries. It should also be pointed out, however, that even though it has become common practice to standardize across countries or over time for differences in prices faced by households, there are inherent problems in the use of Purchasing Power Parity indices across countries, in that they do not reflect similar purchasing patterns. Also, there are significant differences in results based on difference equivalence scales used.⁹²

The results of the cross country comparison of real pre-tax earnings for married couples, (adjusted for only differences in currency and prices) found married couple households in the US to be the most affluent among the countries examined, (in terms of pre-tax labour earnings for married couples), throughout the earnings distribution. Even when couples' earnings are adjusted for differences in family size, this result holds.

⁹¹ However, without cross-country information on the relative bargaining position within the family, more sophisticated models were not possible.

⁹² See Burkhauser et al. (1996), and Phipps & Garner (1994).

However, when earnings are adjusted for differences in hours of paid labour across countries, the relative ranking of affluence is significantly altered. Although the three procedures used to value a common number of hours substantially differ from one another, all three procedures resulted in similar results. In each procedure used, married couples' earnings in the US are no longer greater than couples' earnings in the other countries examined throughout the earnings distribution.

This analysis attempted to determine to what extent cross country differences in the level of earnings for married couples is due to differences in hours worked. The results of standardizing for hours worked showed that in the bottom and middle portions of the earnings distribution, cross-country differences in affluence could be partially attributed to differences in hours worked.

The relative ranking of economic well-being of married couples households across countries depends on where families lie in the household earnings distribution. The results suggest the "working poor" are worse off in the US when we consider the value of the time spent to acquire their earnings. This analysis also showed that at the top of the earnings distribution married couples in the US still enjoyed higher earnings even when hours are standardized. This implies that the earnings of high earner couples the US cannot be matched by high earners in Canada, Australia, Finland or the Netherlands even if they worked the same number of hours as their counterparts in the US. This is explained by examining the average hourly wages of males and females in the top vingtiles. The high US. earnings in the top 90 percent of the distribution is not due solely to high male wages. The

relatively high average hourly wages for both married males and females in the top 90 percent of the earnings distribution suggests some evidence of assortative mating.

Standard results of individual earnings inequality reveal little about upon whom the economic burden (associated with the increased attachment of women to the labour force) is falling. Given the international evidence on the relative share of household production carried out by husbands and wives, and the increased labour force participation of women, women are more likely to feel the "time crunch" of the double-work day. Also, the implications of this depend on where in the earnings distribution households lie. At the top of the earnings distribution, it is much easier for families to purchase household production services, whereas, for low earners, the opportunity cost of purchasing home production services may be too great. For this reason, there is potential for the burden to be shifted from the "working poor" to more specifically, "working poor women".

The analysis of cross-country differences in average hourly wages suggest that a poor working woman in the US must work hardest of all. While standardizing for differences in hours worked showed couples in the US. being worse off than couples in the other countries examined throughout the bottom and middle portions of the earnings distribution, an analysis of average hourly wages showed female hourly wages in the United States being lower than in all countries examined throughout the bottom half of the household earnings distribution. In contrast, married women in the Netherlands showed the highest average hourly wages in the bottom portion of the earnings distribution, followed by Finland and Canada.

Cross country comparisons of earnings does not allow for a comparison of full consumption potential or the full command over goods and services of families. Prevailing differences in the earnings of married couples must be viewed against the background of cross-country differences in social institutions and policies across countries. Among the five countries examined in this study, large differences in social policies and programs play a substantial role in the economic well-being associated with household earnings. Working poor families in the US face limited support by way of family benefits, whereas low earning families in countries such as in Finland receive much more in-kind income in the form of family benefits. Set in this context, low earner families in the United States have, all else equal, an even lower level of economic well-being and command over market goods and services, associated with their market earnings than do low earning families in Finland.

This analysis of the inequality of married couples' earnings found some evidence of differences in cross-country measures of couples' earning inequality being attributable to differences in hours worked in the Proportional Hours and the High Wage procedures used to value a common amount of hours worked. Under the Proportional Hours procedure, measures of inequality, as measured by the Gini index, were reduced for the United States, Canada and Australia. All three measures of inequality of married couples' earnings in Australia were reduced under the Proportional Hours procedure. Under the High Wage procedure, all three measures of inequality were reduced in the United States. No evidence of differences in cross-country measures of couples' earning inequality being attributable to

differences in hours worked were found in the Wife as a Second Earner procedure.

There is ample scope for continuing a research programme on the impacts of increased time spent by married couples in the labour market. Incorporating more sophisticated models of household labour supply may lead to different results. While this study does not examine the source of the differences in annual hours worked for couples across countries, if a large part of the difference is due to differences in vacations and holidays as well as differences in hours worked per week, (as found by Freeman and Bell), this raises some important implications regarding differences cross-country differences in the nature and flexibility of the labour market.

Families contributing greater hours to paid labour result in less time available for unpaid work and leisure. If families must continue to forego time available for unpaid work and leisure in order to keep pace economically, without a social family support system in place we will increasingly witness more harried life styles. It seems this boils down to a social policy issue regarding family support programs, as well as, increased cultural support for "family living".

CHAPTER 3

Standardizing For Differences In Household Hours Of Paid Work In Canada Over Time; An Examination Of The Level And Distribution Of Adjusted Household Earnings

3.1 Introduction

Are households with equivalent earnings, but different amounts of time spent in the paid labour market, equally well-off? Alternatively, one could ask the question: what is the impact on economic well-being across households of variations in available leisure and household production time, holding earnings constant?

Increased labour force participation of women over the past two decades has been a phenomenon experienced not only in Canada, but in many industrialized countries.⁹² The counterpart to the increased market earnings of second earners in the household is the decline in either the number of hours of unpaid work in the home or in leisure, or both.

The value of non paid work time is now widely recognized as an important indicator of economic well-being. In fact, the demand to recognize and value non-paid production, including household work, in a national accounting sense (Clift and Wells, 1990) has lead Canada to pioneer efforts to value housework in monetary terms. Methodologies to value non paid production, initially developed in the mid- 1970s, have been updated using time-use

⁹² See Saunders, O'Connor, and Smeeding, "The Distribution of Welfare: Inequality, Earnings Capacity and Household Production in a Comparative Perspective", Syracuse University, New York, 1994.

surveys to produce estimates on a regular basis.⁹³

Much of the literature concerned with the relationship between employment earnings and the economic well-being of families in Canada has focussed on the level of earnings, (or lack thereof), the distribution of earnings or measures of inequality in earnings in general.⁹⁴ However, very little attention has been given to the amount of labour time embodied in earned income, and the extent to which this also impacts the level of economic well-being of families. Canadian households have been spending more time in the labour market over the past twenty years, due largely to the increased labour force participation of women.⁹⁵

Given the increased time spent in the labour market by Canadian households, an obvious question then becomes, is the dollar value of earnings an appropriate measure of economic well-being? Posed alternatively, are Canadian households really better off in 1994 than they were in 1975, given the increased time spent to acquire these earnings?

It goes without saying that nominal values of earned income over time can not be compared due to differences in prices faced by families, and therefore differences in the purchasing power of earnings. It has become standard practice to standardize nominal earnings using a CPI index to adjust for

⁹³ Barbara Clift and Stewart Wells, "The Reliability of the Canadian National Accounts Estimates", *Canadian Economic Observer*, Statistics Canada Catalogue 11-010, February, 1990.

⁹⁴ Studies on the increased polarization of employment earnings in Canada include: Myles and Picot, (1988); The Economic Council of Canada, (1991); Morissette, Myles and Picot (1994); Burbidge, Magee and Robb, (1993); Beach Slotsve, (1994). The relationship between declining real and relative wage of young workers and increased earnings polarization have also been analyzed: Myles, Picot and Wannell, (1988); Davis, (1992); Betcherman and Morissette, (1994).

⁹⁵ The change in female labour force participation rates is presented in Section 3.9 of this chapter.

differences in prices over time. In addition, it is becoming common practice to adjust household earnings for family size in order to better represent the purchasing power and, thus, economic well-being derived from earnings. However, an examination of household earnings, adjusted for differences in prices and family size may give a financial standard of the dollar value of earnings but does not capture any differences in the amount of time spent attaining these earnings, and therefore the economic well-being of households after receiving this income.

Economic well-being depends on more than just income (earned or otherwise). Standard labour economics represents utility in terms of both consumption and leisure, thus recognizing the value of non-work time.⁹⁶ The question then becomes: how could we further adjust earnings to both recognize the value of non-work time and to capture the trend toward increased time spent working, as evidenced by Canadian households? One alternative is to measure earnings over time, adjusted not only for differences in prevailing prices and differences in family size, but also, for differences in time spent working.

This chapter proposes an additional standardization of household earnings, adjusting for differences in hours worked over time, to allow comparisons of the level and distribution of household earnings over time. Couples (married or common-law), are taken to be the unit of measure in order to examine alternative ways in which husbands and wives could allocate hours of paid labour between them. Selecting households where both the household head

⁹⁶ This assumes all non-labour time is labeled as "leisure" and has a positive utility value.

and spouse (husbands and wives, or equivalent) are present also seems relevant in light of the increase in dual earner families in Canada over time.

Three standardization procedures are used to adjust household earnings for differences in hours worked, based on three differing assumptions regarding the best way to value a standard (2,000) number of hours worked within the household. These include: the Proportional Hours standardization, where household hours worked are scaled up or down to the standardized number of hours by allocating hours to husbands and wives in proportion to their actual allocation of hours within the household; the High Wage standardization, where the standardized hours worked are allocated to either the husband or the wife on the basis of the higher wage earner; and the Wife as a Second Earner standardization, where wives act as a supplementary earner within the household.⁹⁷

Household hours of work are standardized to 2,000 hours per year for all three of the standardization procedures used. The choice of 2,000 hours is based on 40 hours of work per week over 50 weeks of work per year, an estimated number of hours for one full-time, full-year worker within the household. This represents one possible choice of standardized hours, any number of other hours may be used as a standardized number of hours. Both the Proportional Hours and the High Wage standardization procedures are invariant to the choice of total standardized household hours used. Household hours are also standardized to the average number of household

⁹⁷ Each of the standardization procedures, and the resulting impact on the distribution of household hours worked is discussed in detail in section 3.9 of this chapter.

hours worked in 1975 in each vingtile of the earnings distribution for the Proportional Hours standardization procedure.

This chapter presents empirical evidence concerning the pre-tax household earnings distribution of Canadian households and the associated hours of worked time embodied in these earnings distributions using the Luxembourg Income Survey (LIS) data. The distribution of actual earnings, and hours worked are presented for selected years over the period of 1975 to 1994 for each vingtile of the earnings distribution.

Household earnings are first examined using actual earnings, expressed in nominal dollars for each of the years examined. Earnings are then adjusted for differences in prices faced by households over this period using CPI indices, and are expressed in 1994 (Canadian) dollars.

To account for differences in family size over the period, and therefore, differences in the purchasing power of earnings, household earnings are further adjusted using an equivalence scale. The equivalence scale used was the OECD Equivalence Scale.⁹⁸

An examination of hours worked by households over this period for each vingtile of the selected earnings distribution shows substantial differences in the time spent acquiring household earnings. In order to adjust household earnings for differences in time spent to acquire earned income, household hours worked are standardized to a common number of hours worked. Three standardization procedures are used to standardize household earnings for differences in hours worked. Household earnings, adjusted for differences in

⁹⁸ The OECD equivalence scale is discussed in detail in section 3.7 of this chapter.

prices, family size and hours worked, are then compared using the selected years of analysis to determine whether or not the standard of living derived from these earnings has improved.

The analysis follows the following sequence. First unadjusted actual household earnings are examined throughout the earnings distribution for each of the selected years in the Canadian sample. Household earnings are adjusted for differences in prices faced by households over time. It is clear that, measured in nominal dollars, earned income has increased from 1975 to 1994, but it is also clear that much of that increase is inflation.⁹⁹

Household earnings are then adjusted for differences in family size using the OECD equivalence scale. Adjusting for differences in family size shows a slight widening of the gap between real earnings in 1994 and those in 1975 from the 8th vingtile upwards, since families were generally larger in 1975 than in 1994.

Average household total hours of work (from husbands and wives combined hours of paid work), corresponding to average total earnings, at each vingtile of the household earnings distribution are examined. Household earnings are then standardized for differences in hours worked using three standardization procedures.

The change in the hours worked from the actual hours worked resulting from each standardization procedure, is presented at each of the selected percentiles in the earnings distribution. The impact of standardizing hours

⁹⁹ This thesis does not address the extent to which measurement error in the Canadian Consumer Price Indices over this time period may overstate inflation.

worked on the proportion of male and female hours to total household hours worked is also examined for each of the standardization procedures.

Once household earnings are adjusted for differences in hours worked, prices and family size, the resulting household earnings distributions are examined to address the question: Are Canadian households any better off now than they were twenty years ago? Household earnings for 1975 are expressed in real terms (valued in 1994 dollars) and are compared to the 1994 level of earnings under each standardization procedure.¹⁰⁰

Section 3.2 presents a brief discussion of the empirical evidence on the increase in dual earner households and increased polarization of earnings in Canada. Section 3.3 describes the data used for this analysis and the definition of the households selected for this study. Section 3.4 presents a discussion on how the distribution of household earnings is derived and which households are included in each vingtile of the distribution. Section 3.5 presents the results of an examination of annual hours over time. This section includes the labour force participation rates in Canadian in the selected years of the Canadian sample. Section 3.6 provides an analysis of the distribution of household earnings in each of the selected years, using actual household earnings. Section 3.7 contains a discussion of the procedures used to standardize household hours. This section also includes a discussion of the impact of each of the standardization procedures on household hours worked at each point in the earnings distribution. Section 3.8 discusses the impact on

¹⁰⁰ The adjusted earnings distribution for 1975 is available for the proportional hours standardization procedure but is unavailable for the other two standardization procedures. These two procedures were unable to be applied since family earnings were not decomposed into male and female earnings in the data base used. This is discussed in detail in the methodology section of this chapter.

male and female hours ratios of household working time. Section 3.9 presents and analyzes the adjusted earnings distributions for each of the standardization procedures. Section 3.10 presents an examination of the impact on earnings inequality of standardizing for differences in household hours of paid work. Section 3.11 is the conclusion.

3.2 Empirical Background

3.2.1 Increase in Dual Earner Families in Canada

Together, husbands and wives in Canada are spending more time in paid employment, which has occurred, to a large extent, due to the increased labour force participation of wives. Where the social norm in Canada used to be one earner within the family unit, the norm has now moved to two-earner families. The percentage distribution of Husband-Wife Families in Canada by earning status of spouses from 1967 to 1995 is given in Table 3.1 and shown graphically in Figure 3.1. In 1967, only one-third of husband-wife families (with and without children) were families in which both spouses reported earnings. By 1988, dual earner families represented approximately 62% of all husband-wife families. Dual earners also represent the majority of husband-wife families with children. By 1995, both parents were employed in approximately 70.7% of two-parent families.¹⁰¹

¹⁰¹ Source: Statistics Canada, Household Surveys Division, "Characteristics of Dual earner families, 1991 (Ottawa: 1993) Catalogue # 13-215, Table 5.

Table 3.1
Percentage Distribution of Husband-Wife Families by Earning Status of Spouses;
1967 to 1995

	Dual Earner Families (1)	Single Earner Families (1)	Neither Spouse Had Earnings	Total All Husband- Wife Families
1967	32.7	59.4	7.9	100.0
1971	38.8	52.2	9.0	100.0
1975	45.5	44.4	10.1	100.0
1979	51.2	38.4	10.4	100.0
1981	55.5	33.5	11.0	100.0
1982	54.4	33.5	12.1	100.0
1983	54.7	32.9	12.4	100.0
1984	56.1	30.2	13.7	100.0
1985	57.5	28.7	13.8	100.0
1986	58.0	27.8	14.2	100.0
1987	60.2	25.5	14.3	100.0
1988	62.6	22.9	14.5	100.0
1989	62.7	22.8	14.5	100.0
1990	62.0	23.0	15.0	100.0
1991	61.5	23.1	15.4	100.0
1992	61.2	22.7	16.1	100.0
1993	60.3	22.9	16.8	100.0
1994	60.4	22.5	17.1	100.0
1995	60.5	22.7	16.8	100.0

(1) Includes Families where both spouses had equal earnings

Source: Statistics Canada Catalogue 13-215-XPB

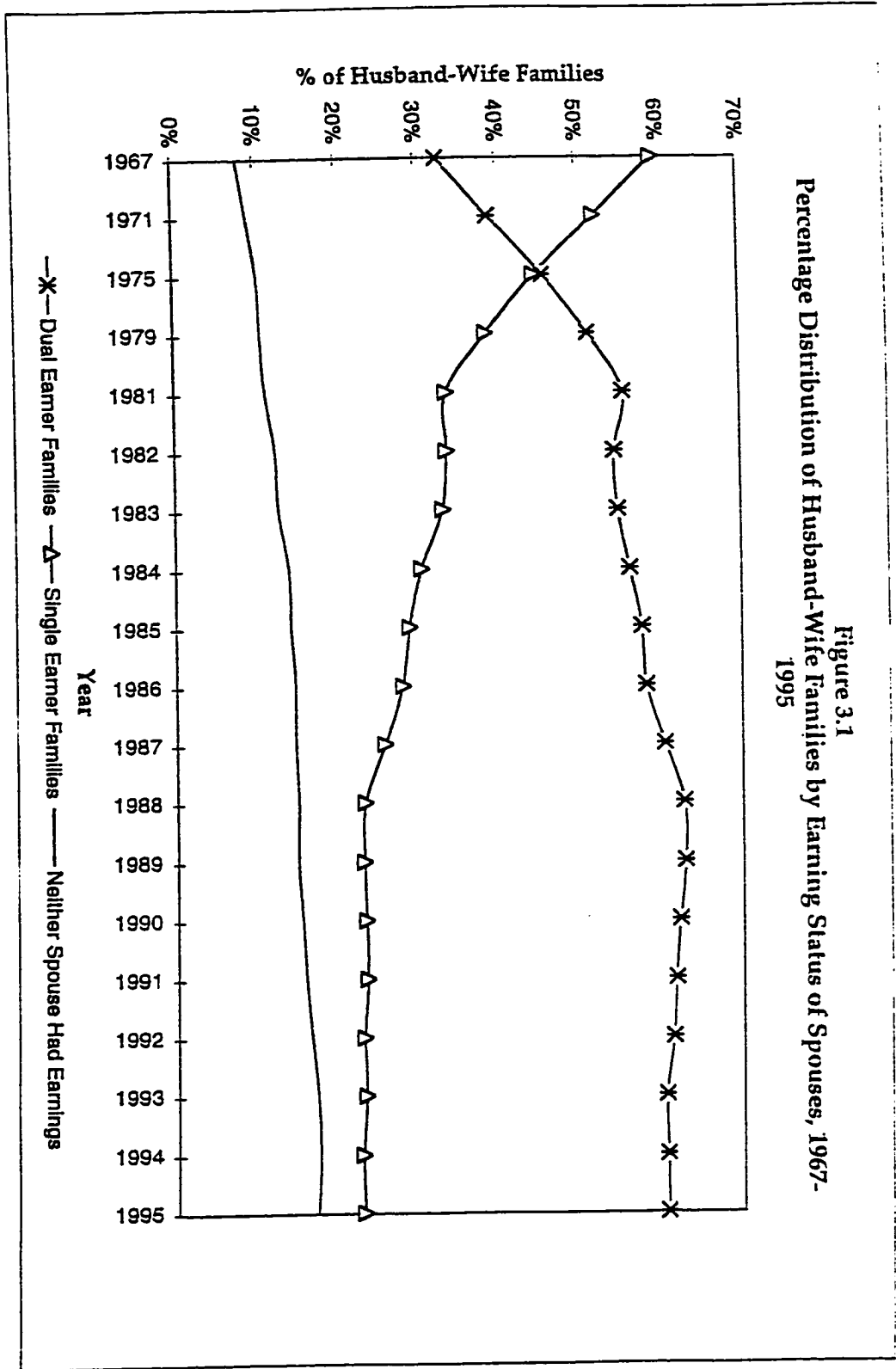


Figure 3.1
 Percentage Distribution of Husband-Wife Families by Earning Status of Spouses, 1967-1995

While the trend toward increases in two earner households may result in higher earned income, these trends do not necessarily imply increased economic well-being. Because people spend more time in paid employment, households have less time remaining for work in the home and for leisure. Comparisons of earned incomes of families over time, even when standardized for prices and family size, (and the subsequent measures of inequality based on these incomes), are likely to give misleading implications of the relative level and distribution of economic well-being, and how this is changing over time.

3.2.2 Empirical Research

Studies have found that the rising inequality in Canada in annual labour market incomes, has been offset by social transfers so that, unlike the United States, the final distribution of total household incomes in Canada have been relatively stable in the 1980's (Economic Council of Canada (1991); Wolfson (1992); Blank and Hanratty (1991); Love and Poulin (1991)).

Canadian studies (Leckie (1988); Myles, Picot and Wannell (1988); Burbidge, Magee and Robb, (1993)) have also documented the rise in earnings inequality for individuals and the polarization of the labour force which took place between 1981 and 1986 in Canada. Wolfson (1992) and Beach and Slotsve (1994) found this shift was not simply a cyclical phenomenon induced by the recession of the early 1980's. Beach and Slotsve found that overall earnings inequality in Canada increased less than the distribution of individual earnings. Morissette, Myles and Picot (1994) concluded that the rise in inequality and polarization observed in the 1980's is not due solely to the 1981-83 recession, but they found that shifts in Canadian earnings inequality,

at the aggregate level, were mainly driven by changes in the distribution of annual hours worked. They focus their analysis on individual annual earnings inequality rather than on household or family economic inequality changes and they show that increased female labour force participation over the past two decades may have had partial offsetting effects in terms of household economic inequality.

However, as pointed out by Picot (1996), in most of the work on increasing earnings inequality in Canada, changes in the distribution of working time have been largely ignored. Freeman (1994), Juhn, Murphy and Topel (1991) and Kuhn and Robb (1996) have examined the declining hours of work of lower paid, less skilled workers relative to the higher paid resulting from a supply side response on the part of workers. Studies which have recognized the polarization in hours worked through the 1980s as influencing the degree of earnings polarization for individuals include Picot, Myles and Wannell (1990), McPhail (1993) Morrissette, Myles and Picot, (1994) and Morrissette (1995). They found that the increased polarization in hours worked increased inequality in annual earnings inequality, with the more highly paid individuals working longer hours versus the less paid working relatively shorter hours.

The goal of this paper is to examine the impact of changes in hours worked over time on household earnings versus individual earnings by proposing a standardization to adjust for differences in household hours worked. Actual household pre-tax earnings are examined over time (1975 to 1994), as well as the corresponding household hours worked, at each vingtile of the earnings distribution. In addition to standardizing for differences in prices, and family size over time, household earnings are also standardized for differences in

hours worked using three standardizing procedures. The resulting earnings distributions, standardized for hours worked are presented for each vingtile of the actual earnings distribution. Measures of earnings inequality for the resulting earnings distributions are then compared to measures of earnings inequality using actual unadjusted earnings.

3.3 Data Description

The pre-tax earnings distributions for households in Canada are examined for Canadian households over the period from 1975 to 1994. The specific years of analysis are 1975, 1987, 1991 and 1994. Data on Canadian earnings is taken from the Luxembourg Income Study (LIS) data. The original source of the LIS data for Canadian households is the Canadian Survey of Consumer Finances. One major advantage of using the LIS data as a source for the Canadian data rather the micro data files from the Canadian Survey of Consumer Finances is that information on household hours worked for both household head and spouse is available in the LIS data for the years prior to 1987, but not available on the micro data files from the Survey of Consumer Finances.¹⁰² Table 3.1 b shows the impact on the weighted sample size of the LIS data for each of the sample selection criterion used.

¹⁰² The variables on household hours worked are available through the LIS data due to a special request to match files with the Canadian Labour Market Activity Survey so that these files would correspond to the LIS data format. Information on hours worked for individual records is not available through the Canadian Survey of Consumer Finances micro data files prior to 1987.

Table 3.1b
Sample Selection Criteria, LIS Data, Canada; For Selected Years

	Canada '75		Canada '87		Canada '91		Canada '94	
Total Sample:	7,787		10,351		18,459		32,653	
Single Family Households	7,787	100.00%	8,830	85.31%	15,750	85.33%	27,239	83.42%
Households in Multi-Family HH.	0	0.00%	475	4.59%	855	4.63%	3,403	10.42%
Families in Multi-Family HH.	0	0.00%	1,046	10.11%	855	4.63%	843	2.58%
Other Family Classification	0	0.00%	0	0.00%	998	5.41%	1,123	3.44%
Missing	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total	7,787	100.00%	10,351	100.00%	18,459	100.00%	32,653	100.00%
Check hours = 1	7,773	99.82%	9,312	89.96%	16,123	87.35%	17,367	53.19%
Check hours = 0	14	0.18%	403	3.89%	676	3.66%	675	2.07%
Missing Values	0	0.00%	636	6.14%	1,660	8.99%	14,611	44.75%
Total	7,787	100.00%	10,351	100.00%	18,459	100.00%	32,653	100.00%
Head Aged 21 to 65	6,330	81.29%	8,605	83.13%	15,094	81.77%	26,459	81.03%
Head Not Aged 21 to 66	1,457	18.71%	1,746	16.87%	3,365	18.23%	6,194	18.97%
Missing Values	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total	7,787	100.00%	10,351	100.00%	18,459	100.00%	32,653	100.00%
Disposable Income ≥ Zero	7,776	99.86%	10,315	99.65%	18,385	99.60%	32,565	99.73%
Disposable Income Less Than Zero	11	0.14%	36	0.35%	74	0.40%	88	0.27%
Missing	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total	7,787	100.00%	10,351	100.00%	18,459	100.00%	32,653	100.00%
Spouse Present	4,989	64.07%	6,104	58.97%	10,315	55.88%	19,089	58.46%
Spouse Not Present	2,798	35.93%	4,247	41.03%	8,144	44.12%	13,564	41.54%
Missing Value	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total	7,787	100.00%	10,351	100.00%	18,459	100.00%	32,653	100.00%
Male Household Head	6,121	78.61%	7,895	76.27%	13,753	74.50%	24,844	76.09%
Female Household Head	1,666	21.39%	2,455	23.72%	4,706	25.50%	7,809	23.91%
Missing	0	0.00%	1	0.01%	0	0.00%	0	0.00%
Total	7,787	100.00%	10,351	100.00%	18,459	100.00%	32,653	100.00%
Zero Earnings; Household Head	1,373	17.63%	3,203	30.94%	9,646	52.25%	11,992	36.73%
Positive Earnings; Household Head	6,400	82.19%	7,148	69.06%	8,813	47.75%	20,661	63.27%
Negative Earnings; Household Head	14	0.18%	0	0.00%	0	0.00%	0	0.00%
Missing	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total	7,787	100.00%	10,351	100.00%	18,459	64.87%	32,653	100.00%
Zero Earnings; Spouse			6,692	64.65%	11,975	64.87%	7,533	23.07%
Positive Earnings; Spouse			3,658	35.34%	6,484	35.13%	11,556	35.39%
Negative Earnings; Spouse			0	0.00%	0	0.00%	0	0.00%
Missing			1	0.01%	0	0.00%	13,564	41.54%
Total			10,351	100.00%	18,459	100.00%	32,653	100.00%

*Note: Earnings in 1975 data file are not split into earnings of head and spouse; earnings are total earnings of household. This data file contained negative household earnings.

Households selected are specified as married (or equivalent), containing a household head and spouse. This is done because the procedures used in this paper to standardize the hours worked of the household attempt to simulate three possible ways in which husbands and wives could potentially allocate their time to paid labour. Also, records which reported hours worked but zero earnings were omitted from the sample to facilitate the standardization procedures used.¹⁰³

For the years 1987 to 1994, households are defined as single family units, corresponding to the definition of the "Census Family", by Statistics Canada.¹⁰⁴ For 1975 the household units contained in the LIS survey data (Canadian Survey of Consumer Finances) are defined as "Economic Families", a broader definition of family than the single family unit. Economic families include single family units plus households with where a husband, wife and children may be also living with other relatives. However, for the purposes of this paper, we are concerned only with households in which husband and wife (a couple) are present and the allocation of time between couples to paid work. The breakdown of the number of households from single family households and from multi-family households given by

103 This is due to the fact that the household earnings distributions are broken down into vingtiles based on the actual household earnings distribution for each year (discussed in Section 2.4 of this thesis). Records with reported earnings, but no reported hours worked are placed within a particular vingtile of the earnings distribution, based on reported actual earnings, and remain in that vingtile under each of the standardizations considered. If average hours worked are reported as either zero or missing, this may seriously alter the average "standardized" earnings within each vingtile computed through various standardization procedures.

104 The term Census Family refers to the traditional "nuclear" definition of family which includes a husband and/or wife, with or without children. The term Economic Family refers to a group of individuals who share a common dwelling who are either related through blood or marriage. This definition includes in-laws as well as persons adopted.

the weighted sample size for the years 1987, 1991, and 1994 are given in Table 3.1b below.

Sample selection criteria is as described in Section 2.3.5 of this thesis. All households with negative earnings are excluded from the sample, but all households with zero earnings are included in the sample. Both full-time and part-time earners are included in the sample. Households with zero earnings are included in the distribution of actual household earnings. Households which reported zero or negative disposable incomes were excluded from the sample. Self-employed persons are included in the analysis for each country selected.

Data on hours worked for head and spouse of the household is available for all years selected in the sample. Data on household earnings in 1975 is not broken down into earnings of head and spouse, however, but is available for each of the subsequent years. The gender of the household head is given for all years in the sample but the gender of the spouse is not given. Households were selected if the gender of the household head was indicated, and a frequency was done on the gender of the head. In all selected years in the Canadian sample, all records reported household heads as male. Given this, earnings and the hours worked of the head were assigned as male earnings and hours worked and those of the spouse were assigned as female hours and earnings.

3.4 The Household Earnings Distribution Defined

Pre-tax actual total household earnings, (unadjusted for prices, family size or hours worked), within the selected sample were first sorted in ascending order and then split into twenty groups (vingtiles), of equal size for each year of analysis. Each vingtile contains an equal number of households for a given year of analysis. The average earnings and average number of hours worked within each vingtile are then calculated for males and females. For example, at the bottom of the earnings distribution, the average hours worked in the first vingtile of the distribution represents the average total household hours worked by all households included within this vingtile. This would be all households up to, and including the bottom 5th vingtile of the household earnings distribution.

While standardizing earned income for differences in family size could alter the relative rank order of households in the earnings distribution, standardizing for hours worked certainly will alter the rank order of households in the earnings distribution. However, it should be stressed that the same households within each vingtile were used to examine hours worked and earnings for each of the subsequent adjustments to the earnings function. In this manner, the impact of each of the adjustments on earnings, and hours worked for males and females can be examined. Since each vingtile always contains the same households as were included in the actual unadjusted earnings distributions, the same households are compared throughout this analysis for any given year.

3.5 Distribution of Actual Unadjusted Household Earnings

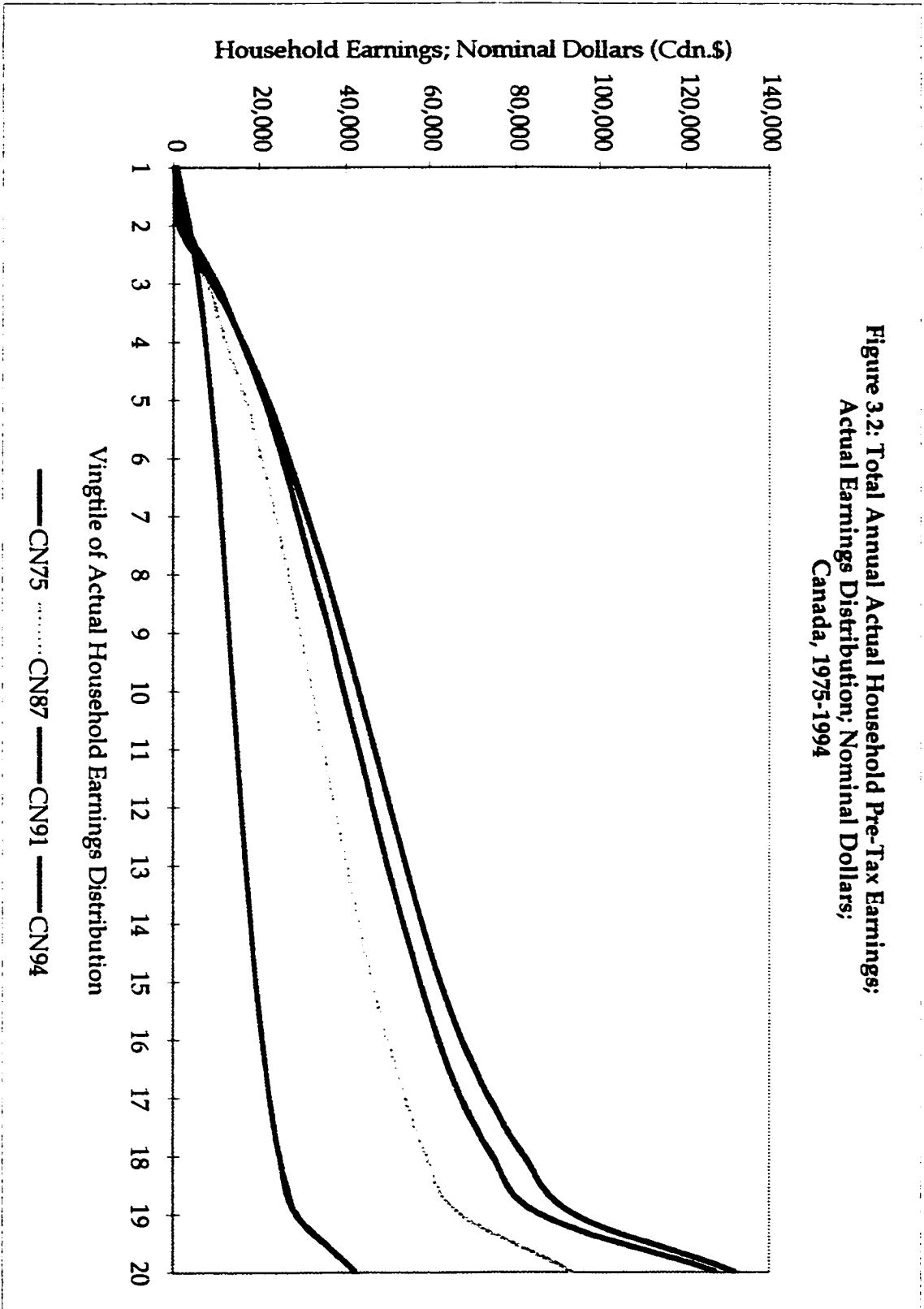
Table 3.2 presents the distribution of actual pre-tax household earnings for Canadian families in nominal dollars in each of the selected years. The earnings distributions contained in Table 3.2 represent average earnings for all families contained in each vingtile of the earnings distribution. Figure 3.2 shows the household earnings distributions from Table 3.2

This analysis shows substantial differences in nominal earnings between 1975 and 1994. As can be seen in Figure 3.2, the distribution of nominal household pre-tax earnings in 1975 are substantially less than the earnings in 1994 throughout most of the distribution. The nominal earnings distribution for 1991 lies just below that in 1994, however, in the lower tail of the distribution it lies above the nominal distribution for 1994 up to the third vingtile.

Table 3.2
Annual Household Pre-Tax Earnings, Actual Earnings Distribution
Canada, 1975-1994 (Valued in Nominal Dollars)

Vingtile	CN75	CN87	CN91	CN94
1	506	0	0	0
2	3,300	2,094	2,557	1,097
3	5,556	7,753	9,826	8,992
4	7,218	11,852	15,866	16,055
5	8,625	16,723	21,078	21,936
6	9,853	20,241	25,269	26,654
7	10,890	23,608	28,854	31,014
8	11,881	26,561	32,359	35,278
9	12,815	29,284	36,105	39,223
10	13,798	31,909	39,393	42,972
11	14,775	34,559	42,913	46,672
12	15,760	37,278	46,304	50,360
13	16,801	40,014	49,725	54,193
14	17,944	43,016	53,548	58,269
15	19,204	45,974	57,712	62,535
16	20,706	49,679	62,045	67,515
17	22,431	53,919	67,222	73,611
18	24,797	59,101	74,370	81,653
19	28,568	66,686	84,882	93,260
20	42,178	92,771	126,682	131,476

Figure 3.2: Total Annual Actual Household Pre-Tax Earnings; Actual Earnings Distribution; Nominal Dollars; Canada, 1975-1994



3.6 Distribution of Household Earnings Adjusted for Differences in Prices

Canadian household earnings from 1975 to 1994 are standardized, adjusting for differences in prevailing prices over this time period using Statistics Canada CPI indices. All earnings are reported in 1994 Canadian dollars. Table 3.3 shows actual household earnings in real terms for each vingtile of the distribution. Figure 3.3 shows the distributions of real household earnings taken from Table 3.3.

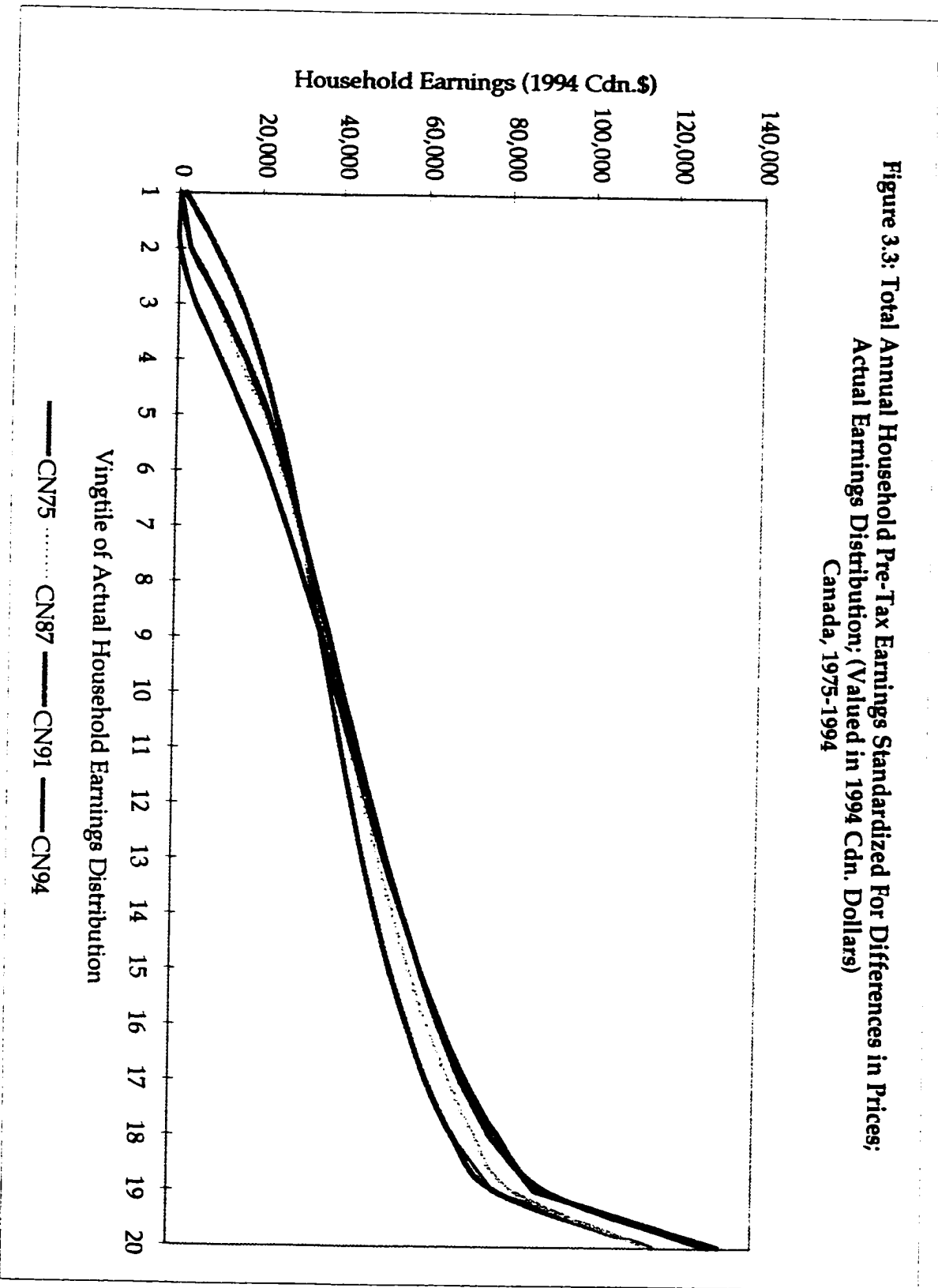
As can be seen in Figure 3.3, the distribution of real household earnings prior to 1994 no longer lie below the earnings distribution in 1994 throughout the earnings distribution, even when valued in constant dollars. This analysis shows that actual household earnings in the years prior to 1994, when adjusted for prices, result in real earnings for all three years being greater than the 1994 earnings in the bottom half of the distribution, (up to the 8th vingtile). The earnings distribution of 1975, valued in 1994 dollars lies above the 1994 earnings distribution up to the 8th vingtile. The earnings distribution of 1987, adjusted for prices cuts the 1994 earnings distribution from above at the median of the earnings distribution, while that for 1991 cuts the 1994 earnings distribution at the 14th vingtile.

This shows that while nominal household earnings have increased over the period 1975 to 1994, much of this increase has been inflation and that even when adjusted for prices, earnings in the bottom of the household earnings distribution have deteriorated since 1975.

Table 3.3
Annual Household Pre-Tax Earnings Standardized For Differences in Prices,
Actual Household Earnings Distribution, Canada, 1975-1994 (Valued in 1994 Dollars)

Vingtile	CN75	CN87	CN91	CN94
1	1,396	0	0	0
2	9,106	2,607	2,666	12
3	15,331	9,654	10,245	4,129
4	19,917	14,758	16,543	10,484
5	23,799	20,823	21,978	16,330
6	27,186	25,204	26,347	21,852
7	30,047	29,397	30,085	26,594
8	32,782	33,074	33,740	31,089
9	35,360	36,465	37,646	35,491
10	38,070	39,732	41,074	39,543
11	40,768	43,032	44,744	43,560
12	43,485	46,419	48,280	47,635
13	46,356	49,825	51,847	51,450
14	49,511	53,563	55,833	55,824
15	52,987	57,246	60,175	60,177
16	57,132	61,860	64,693	65,286
17	61,893	67,140	70,090	71,331
18	68,420	73,593	77,543	79,453
19	78,824	83,037	88,504	91,155
20	116,377	115,517	132,088	129,494

**Figure 3.3: Total Annual Household Pre-Tax Earnings Standardized For Differences in Prices; Actual Earnings Distribution; (Valued in 1994 Cdn. Dollars)
Canada, 1975-1994**



However, differences in family size and hours worked make it difficult to compare earnings which are adjusted for prices only. Section 3.7 examines the distribution of household earnings adjusted for differences in family size.

3.7 Distribution of Household Earnings Adjusted for Differences in Family Size

Variation in family size can make large differences in terms of the purchasing power of earnings. Annual household earnings of \$35,000 would have vastly different purchasing power for a family of 5 than for a household of a couple without children. Table 3.4 shows the change in average family size for Census Families in Canada over the period 1971 to 1995. This information is shown graphically in Figure 3.4.

Household earnings are adjusted for differences in family size using the OECD equivalence scale. The OECD equivalence scale is defined as in Section 2.6 in Chapter Two of this thesis.

Table 3.5 shows real household earnings adjusted for differences in prices and family size for each vingtile of the distribution. (Note: Each vingtile is comprised of the same households as in the vingtiles of the distribution of actual earnings, unadjusted for family size.) Figure 3.5 shows the distributions of real household earnings, adjusted for differences in family size, taken from Table 3.5.

Examining real household earnings, adjusted for differences in prices and family size shown in Figure 3.5, reveals that households in 1975 had greater equivalized earnings than did households in all other years in the bottom

Table 3.4 Average Family Size; Census Families; Canada, 1971 to 1995		
	All Families	Husband-Wife Families
1971 (2)	3.7	3.8
1976 (2)	3.5	3.5
1981 (2)	3.3	3.3
1986 (2)	3.1	3.2
1991 (3)	3.1	3.1
1993 (3)	3.0	3.1
1994 (3)	3.0	3.1
1995 (3)	3.0	3.1

(1) Excluding Yukon and Northwest Territories

(2) At June 1st and unadjusted for net census undercoverage up to 1991

(3) At July 1st and adjusted for net census undercoverage

Source: Statistics Canada Catalogue no. 91-213

Figure 3.4
Average Family Size, Census Families, Canada, 1971-1995

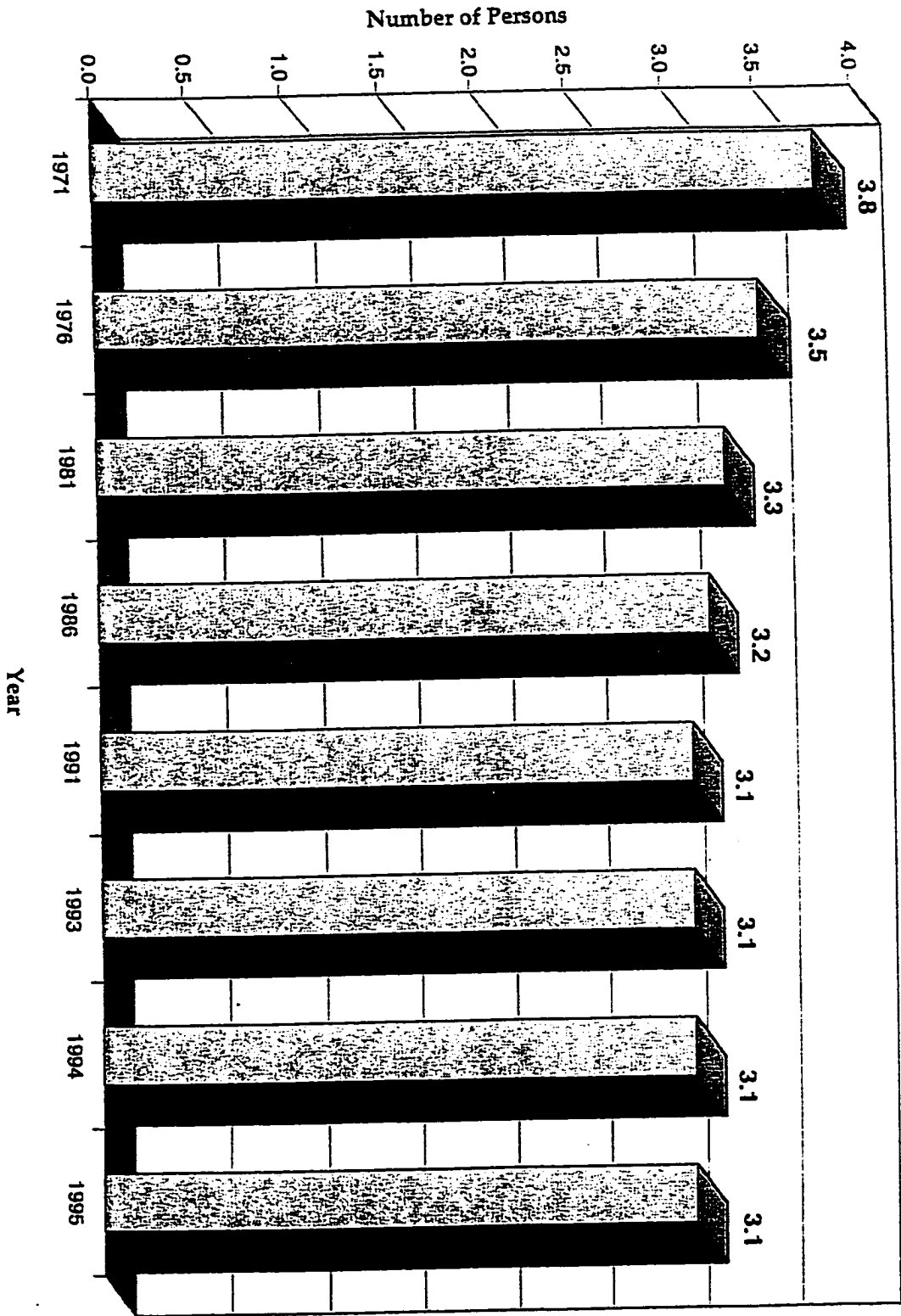
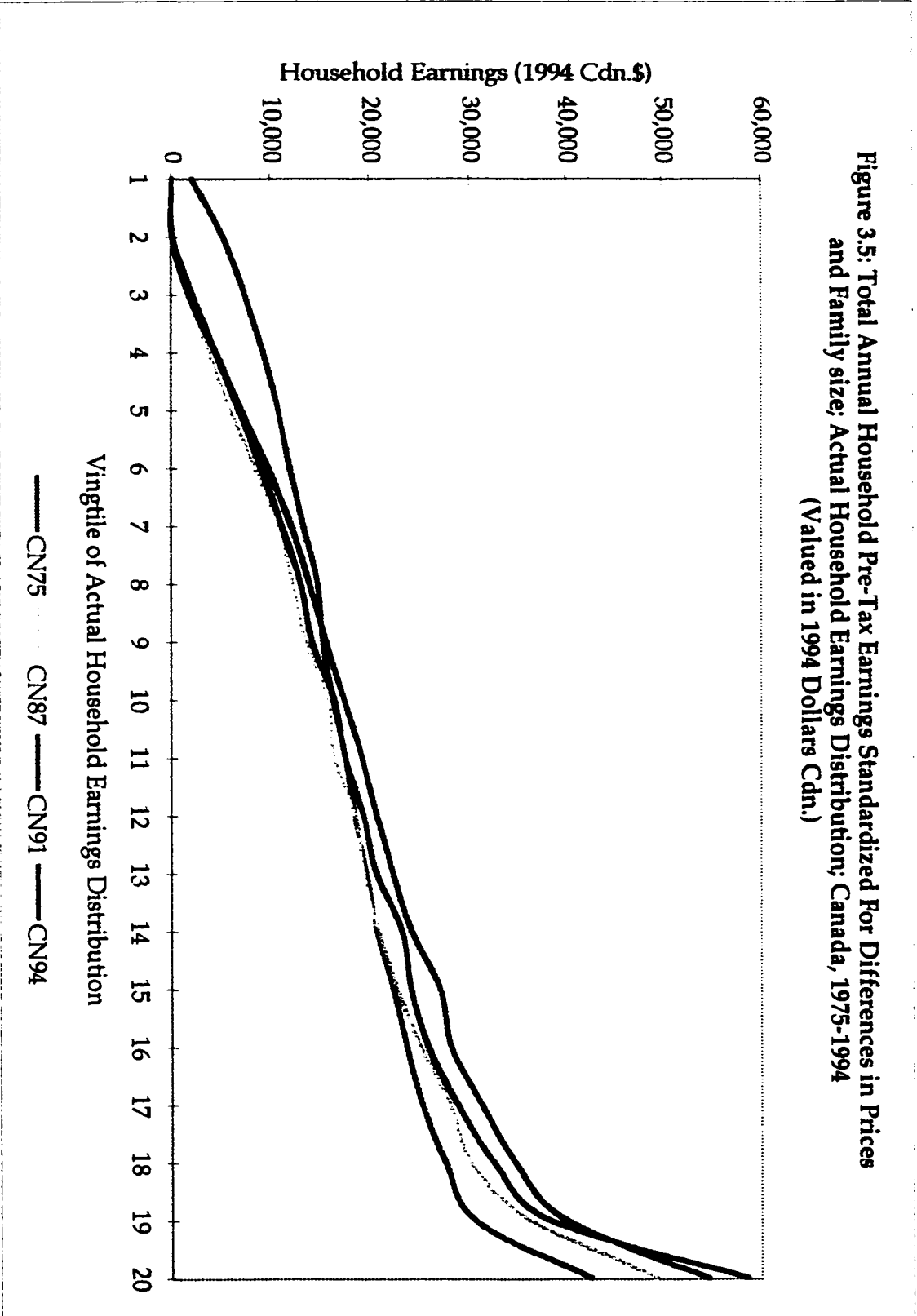


Table 3.5
Annual Household Pre-Tax Earnings Standardized For Prices and Family Size;
Actual Earnings Distribution; Canada 1975-1994; (Valued in 1994 Dollars)

Vingtile	CN75	CN87	CN91	CN94
1	2,150	0	0	0
2	5,340	31	138	6
3	7,482	1,764	2,233	1,825
4	9,284	3,959	4,591	4,640
5	10,744	6,035	6,926	7,179
6	11,875	8,444	9,116	9,774
7	13,177	10,768	11,108	11,980
8	14,615	12,111	12,902	13,789
9	15,127	13,465	14,028	15,429
10	16,204	15,687	16,317	17,328
11	17,500	16,270	17,432	19,140
12	18,441	18,457	19,323	20,669
13	19,572	19,364	20,619	22,252
14	20,629	20,795	23,106	24,098
15	22,234	22,641	24,001	26,870
16	23,566	24,960	25,712	27,963
17	25,128	27,846	28,666	31,189
18	27,391	30,006	32,480	34,754
19	30,475	36,125	38,230	39,919
20	42,390	49,359	58,521	54,566

Figure 3.5: Total Annual Household Pre-Tax Earnings Standardized For Differences in Prices and Family size; Actual Household Earnings Distribution; Canada, 1975-1994 (Valued in 1994 Dollars Cdn.)



40% of the distribution, but had lower equivalized earnings than did households in all subsequent years from the 15th vingtile upwards. Households in 1987 and 1991 show lower real earnings, standardized for prices and family size throughout much of the earnings distribution, except in the bottom 15% of the distribution, where average household earnings in 1987 and 1991 are greater than average earnings in 1994. Households in 1991 also show equivalized earnings greater than those in 1994 in the top 5% of the earnings distribution.

This analysis shows that although average family size in 1974 was larger than in 1994, couples had greater equivalized earnings in 1975 than did couples in subsequent years in the bottom 40% of the distribution.

3.8 Distribution of Annual Household Hours Worked Over Time

In order to fully understand differences in the earnings distributions in Canada over time, it is important to understand differences in the hours spent in the paid labour market. As a starting point, it is useful to examine annual household hours worked at each point in the earnings distribution over time.

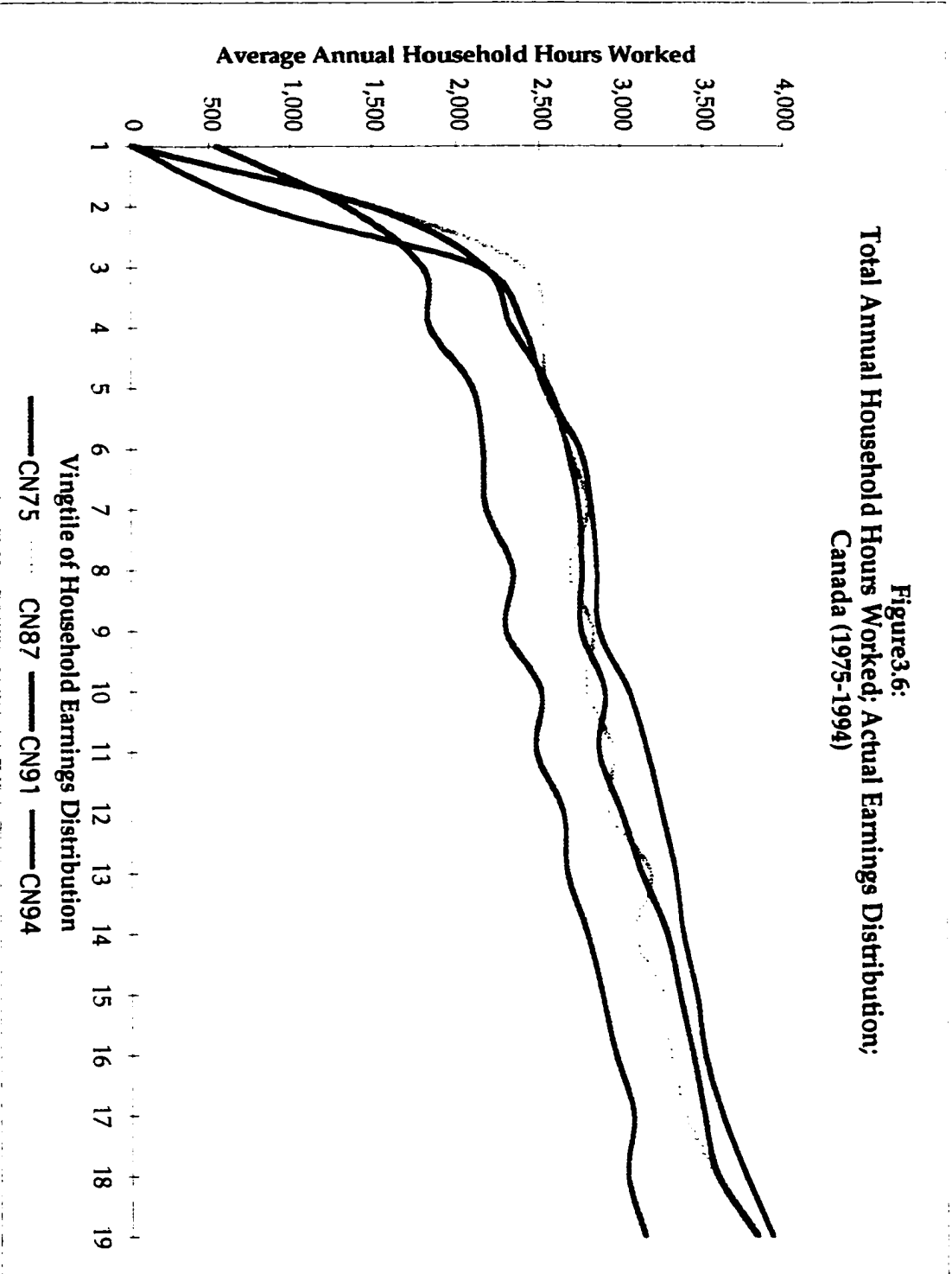
The distribution of annual household hours worked is examined using the actual earnings distributions of households for selected years over the period from 1975 to 1994. Average annual hours household worked is computed hours for each vingtile of the distribution.

An examination of the hours of paid worked spent attaining these earnings reveals that Canadian families are spending a great deal more

Table 3.6a

Total Household Annual Hours Worked; Actual Earnings Distribution				
Vingtile	CN75	CN87	CN91	CN94
1	541.91	0.00	0.00	0.00
2	1,333.11	1,495.57	1,479.69	806.96
3	1,800.32	2,400.88	2,160.63	2,137.08
4	1,842.33	2,514.79	2,324.94	2,400.76
5	2,091.16	2,533.92	2,549.23	2,520.91
6	2,152.65	2,671.81	2,664.99	2,738.68
7	2,170.63	2,791.22	2,733.56	2,811.74
8	2,332.53	2,672.07	2,750.76	2,842.41
9	2,290.99	2,819.36	2,744.27	2,858.17
10	2,500.09	2,779.01	2,893.51	3,043.79
11	2,469.65	2,950.42	2,855.15	3,155.90
12	2,635.08	2,911.63	2,996.72	3,243.26
13	2,659.18	3,177.01	3,121.01	3,322.56
14	2,779.97	3,079.31	3,271.59	3,370.81
15	2,876.17	3,244.33	3,348.50	3,457.00
16	2,961.79	3,291.24	3,430.93	3,506.05
17	3,070.76	3,384.53	3,499.30	3,610.77
18	3,036.92	3,567.94	3,580.73	3,755.23
19	3,142.21	3,798.83	3,825.37	3,923.29
20	3,097.30	3,801.89	3,863.92	4,026.51

Figure 3.6:
Total Annual Household Hours Worked; Actual Earnings Distribution;
Canada (1975-1994)



time in the paid labour market in 1994 than they did in 1975. Figure 3.6 shows the distribution of annual household hours worked for each of the selected years of analysis. The distribution of annual hours worked for Canadian households is contained in Table 3.6a for each vingtile of the earnings distribution.

Four features concerning the distribution of household hours worked stand out. Each of these features is dealt with separately in the following four sections.

3.8.1 Differences in Total Household Hours Worked

One of the most striking features of the analysis of paid labour time by Canadian households is the substantial differences in hours worked throughout the distribution over time. In 1975, the average annual household hours worked in the 20th vingtile of the household earnings distribution was 3,097 hours. By contrast, in 1994, the average annual hours worked in the 20th vingtile was 4,027 hours. This represents a difference of roughly 1,000 hours worked by the household per year or roughly 20 hours per week. Similarly, households at the 15th vingtile of the earnings distribution worked an average of 2,876 hours in 1975, versus 2,457 hours worked by households in 1994. Again, this represents a difference of roughly 600 hours worked per household. Large differences in annual household hours worked per year are evident from the 60th percentile upward when comparing the household earnings distributions of 1975 and 1994. An average of 700 hours worked per year per household is equivalent to every household supplying 14 more hours of paid work per week.

Examining the distribution of household earnings, without an examination of the changes in hours worked over time in Canada ignores the impact on households of allocating additional time to the paid labour market away from potential household production or leisure activities.

3.8.2 Polarization of Hours Worked

An analysis of hours worked shows not only are Canadian spending increased amounts of time working, but that the distribution of these hours is becoming more polarized. Households at the bottom of the earnings distribution are spending less time in the labour market whereas households at the top of the distribution are spending increasing amounts of time working over this period. As can be seen in Table 3.6 b, increasing unemployment rates in Canada over the period from 1975 to 1994 have also contributed to the increasing polarization of hours worked.

Year	Males	Females	Males & Females
1975	6.4	8.4	7.2
1980	6.9	8.4	7.5
1987	8.6	9.3	8.9
1990	8.1	8.1	8.1
1991	10.9	9.7	10.4
1992	12.1	10.4	11.3
1993	11.8	10.6	11.2
1994	10.8	9.9	10.4

Source: Labour Force Statistics, OECD, 1996

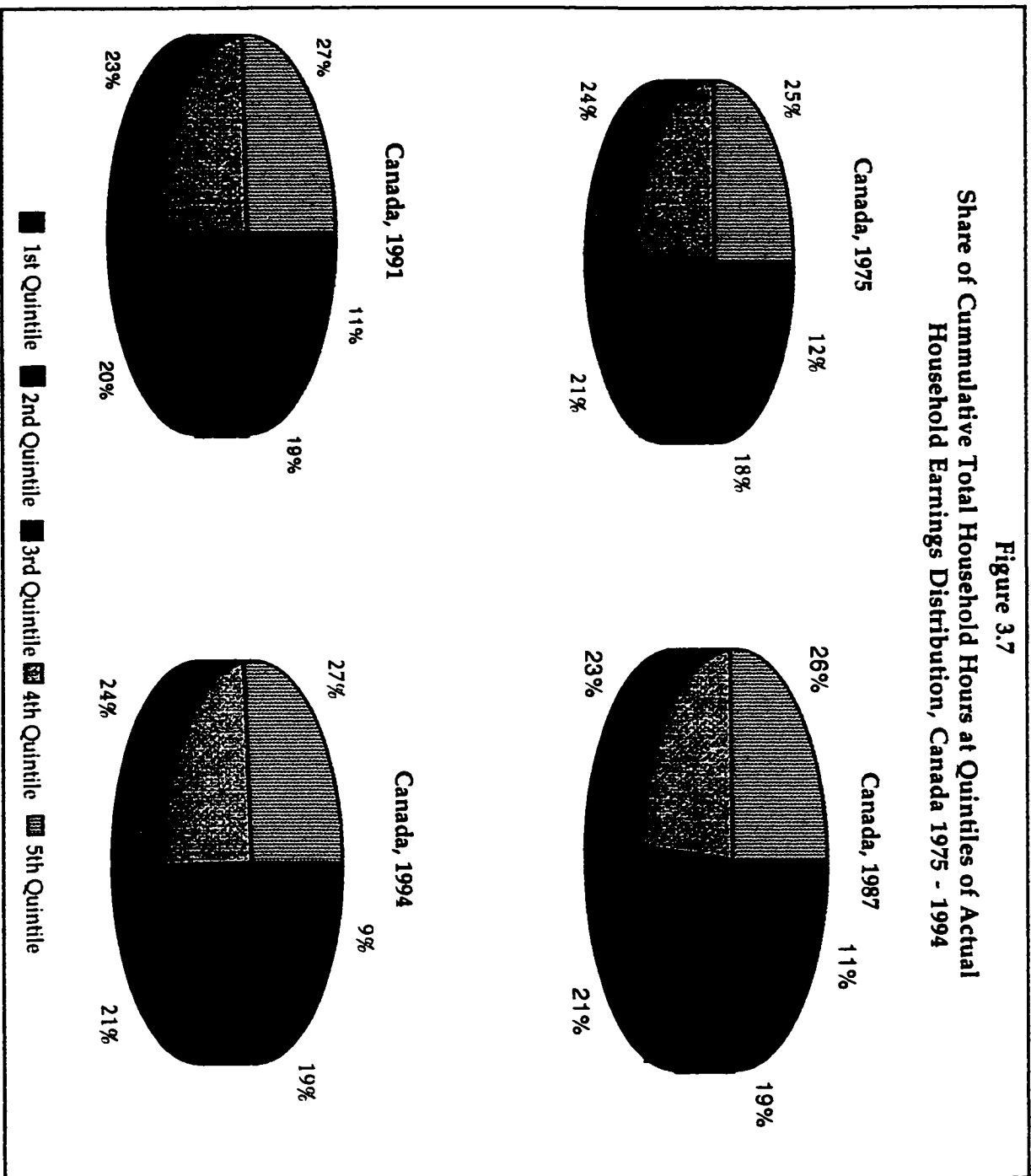
A comparison of household hours worked at the top and the bottom of the earnings distribution over the period 1975 to 1994 shows that households at the bottom of the distribution are working increasingly fewer hours and

households at the top of the distribution show modest increases in hours worked over this time period.

Figure 3.7 compares the percent share of grouped vingtiles of the distribution of the cumulative sum of household hours supplied for each of the years selected. These pie diagrams aggregate the vingtiles up to quintiles and show the percent share of the cumulative sum of household hours supplied for each quintile of the earnings distribution. As can be seen from these figures, households at the bottom of the distribution, in the first quintile, are supplying a smaller percentage of maximum hours in 1987, 1991 and 1994 than Canadian households did in 1975. In 1975, the bottom twenty percent of the distribution contributed 12% of the cumulative sum of household hours supplied for the distribution. In contrast, in 1987 and 1991, the bottom twenty percent of the distribution contributed only 11% of the cumulative sum of household hours, and by 1994 this figure fell to 9 percent. Households in top 20% of the earnings distribution contributed have shown modest increases in the percent share of the cumulative sum of total household hours. In 1975, the top quintile of the earnings distribution contributed 25% of the cumulative sum of household hours, whereas by 1987 this figure rose slightly 26% and by 1991 and 1994 this figure was 27 percent.

These findings on increases in the polarization of household hours are in keeping with the findings of Picot, Myles and Wannell (1990), Morrissette, Myles and Picot, (1994) and Morissette (1995) who found increased polarization in individual earnings through the 1980s.

Figure 3.7
Share of Cumulative Total Household Hours at Quintiles of Actual Household Earnings Distribution, Canada 1975 - 1994



3.8.3 Median Earnings

Total household hours worked exceed 2,000 hours at the median of the distribution for each of the selected years. Average hours worked for Canadian households is below 2,000 hours in the bottom of the distribution and above 2,000 hours at the top of the distribution for each of the selected years in this study. This implies that imposing an average of 2,000 hours worked for all households raises the total hours worked for households at the bottom of the earnings distribution and lowers the time spent in the labour market at the top of the distribution.

3.8.4 Increased Female Hours Worked

This analysis also showed substantial increases in the contribution of females in total household hours worked for pay. This is consistent with increased labour force participation rates for females and the increase in dual earner families in Canada over this time period.

The ratio of male to female hours worked within the household has also changed over this time period. Examining the contribution to total household hours worked by males and females shows the proportion of female hours to total household hours worked has increased. The proportion of male hours worked to total household hours worked has decreased from 1975 to 1994 in Canada. This is also shown in Table 3.7 and Figure 3.8.

Examining total annual female hours worked over the earnings distribution also gives a clear picture of what has happened to female labour supply for married women. Figure 3.9 shows the distribution of female hours worked from household with spouses present for each of the selected years.

Table 3.7
Annual Male Hours Worked As Proportion of Total Household Hours;
Actual Earnings Distribution; Economic Families, Canada

Vingtile	CN75	CN87	CN91	CN94
1	0.75	0.00	0.00	0.00
2	0.81	0.71	0.72	0.69
3	0.80	0.64	0.66	0.65
4	0.84	0.65	0.58	0.58
5	0.84	0.67	0.59	0.62
6	0.84	0.68	0.60	0.62
7	0.85	0.67	0.62	0.63
8	0.81	0.74	0.66	0.65
9	0.83	0.72	0.66	0.65
10	0.80	0.70	0.67	0.64
11	0.78	0.67	0.66	0.64
12	0.76	0.69	0.64	0.63
13	0.74	0.67	0.64	0.63
14	0.73	0.67	0.63	0.61
15	0.71	0.66	0.62	0.60
16	0.71	0.62	0.60	0.60
17	0.67	0.64	0.61	0.59
18	0.68	0.61	0.57	0.57
19	0.68	0.58	0.56	0.57
20	0.73	0.61	0.60	0.58

Figure 3.8
Annual Male Hours Worked as Proportion of Total Household Hours Worked at Each
Vingtile of the Earnings Distribution; Actual Household Earnings Distribution,
Canada

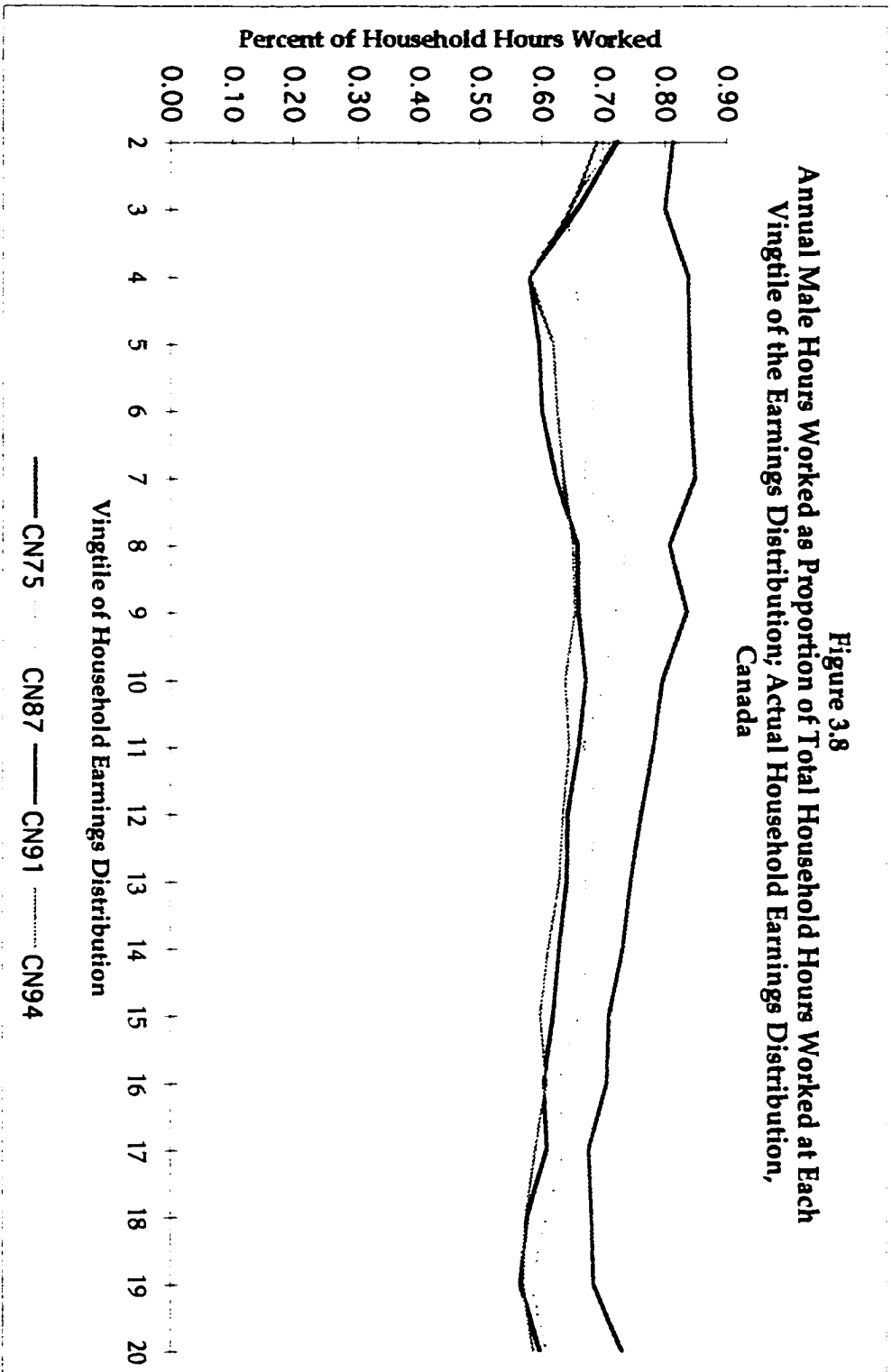
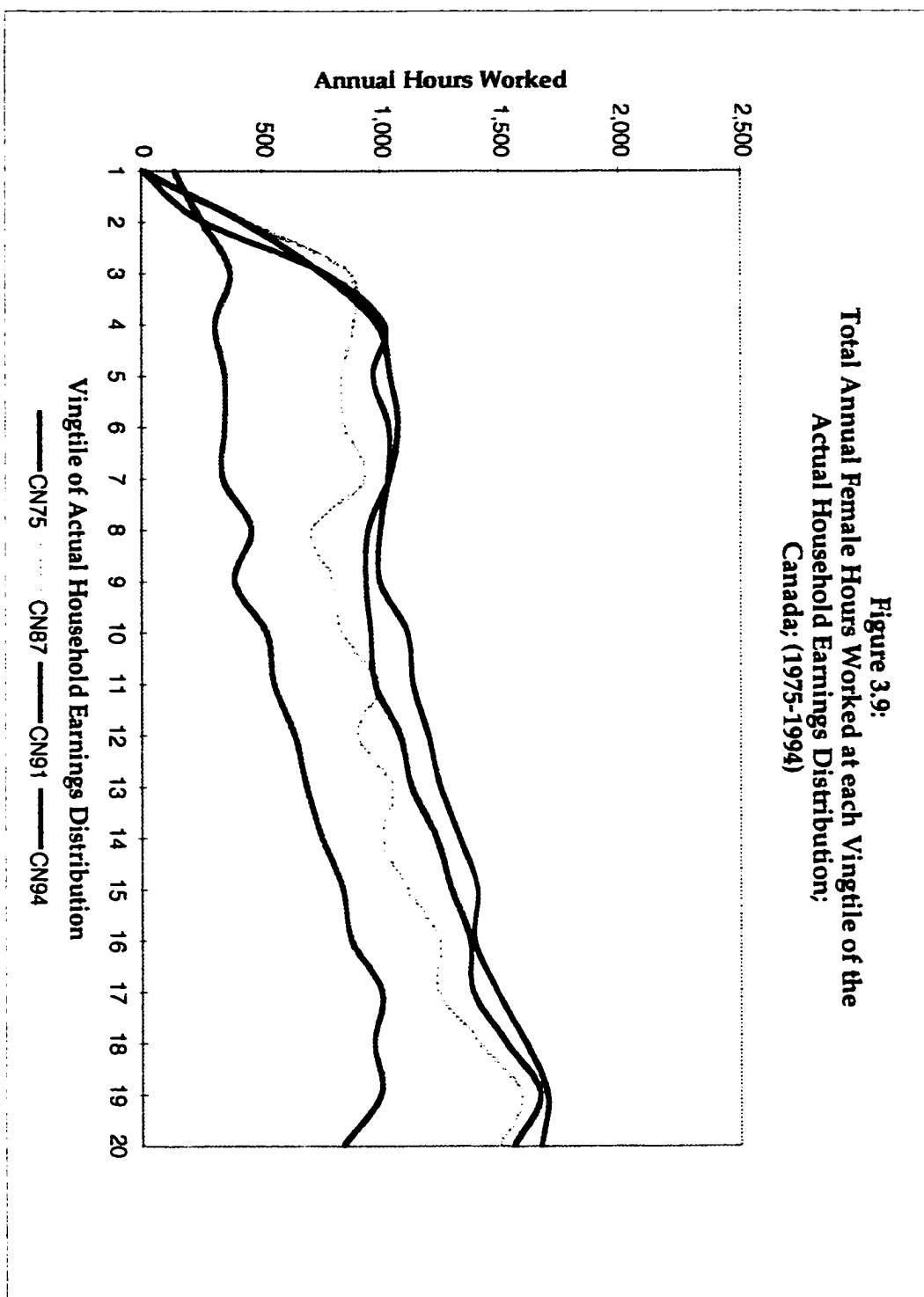


Table 3.8
Total Annual Hours Worked; Females; Actual Earnings Distribution

Vingtile	CN75	CN87	CN91	CN94
1	137.17	0.00	0.00	0.00
2	251.55	426.49	411.11	251.56
3	364.95	861.65	741.85	756.26
4	302.54	882.78	984.48	1,014.61
5	342.12	831.38	1,038.11	967.29
6	342.85	843.81	1,072.06	1,031.87
7	332.93	929.36	1,033.71	1,029.45
8	453.59	696.69	946.00	997.85
9	382.20	792.76	935.64	995.14
10	512.42	827.43	956.09	1,108.18
11	543.80	984.93	975.28	1,131.23
12	631.35	896.24	1,077.52	1,192.42
13	678.89	1,047.26	1,126.26	1,242.65
14	745.04	1,002.17	1,226.23	1,322.70
15	835.66	1,107.61	1,287.68	1,398.92
16	872.19	1,235.32	1,366.78	1,387.69
17	1,000.92	1,231.69	1,378.71	1,488.53
18	971.36	1,403.60	1,527.71	1,611.43
19	997.69	1,592.83	1,672.44	1,703.02
20	836.59	1,496.74	1,562.82	1,675.73

Figure 3.9:
Total Annual Female Hours Worked at each Quintile of the
Actual Household Earnings Distribution;
Canada; (1975-1994)



The breakdown of female and male hours is presented for each vingtile of the actual household earnings distribution, and represents the average number of total household hours worked by husband and wife for all households included within each vingtile of the household earnings distribution.

The data contained in Table 3.8, reveals two major features of the labour supply for married women in Canada. First, married women's labour supply experienced fairly large increases from year to year. This is evident in Figure 3.9 where the distribution of female hours for each of the years subsequent to 1975 is roughly stacked on top of the 1975 distribution of female hours.

Second, the increases in female labour supply from year to year have been substantial. This is in contrast to labour supply of males, shown in Table 3.9 and Figure 3.10, where the distributions of hours worked for each of the selected years lie close to one another, with no specific ordering throughout the distribution from year to year.

The breakdown of male and hours is presented for each vingtile of the actual household earnings distribution. Table 3.9 and Figure 3.10 show the distribution of annual hours worked for males living in households with a spouse present.

This is consistent with the published data on labour force participation rates for Canada over this time period. Table 3.10.a shows the labour force participation rates for the selected years in Canada for males and females. As can be seen in Table 3.10.a, female labour force participation rates have increased significantly from 50 percent in 1975 to 68.5 percent in 1994.

Table 3.9
Total Annual Hours Worked, Males: Actual Earnings Distribution

Vingtile	CN75	CN87	CN91	CN94
1	404.74	0.00	0.00	0.00
2	1,081.56	1,069.08	1,068.58	555.40
3	1,435.37	1,539.23	1,418.78	1,380.82
4	1,539.79	1,632.01	1,340.46	1,386.15
5	1,749.04	1,702.54	1,511.12	1,553.62
6	1,809.80	1,828.00	1,592.93	1,706.81
7	1,837.70	1,861.86	1,699.85	1,782.29
8	1,878.94	1,975.38	1,804.76	1,844.56
9	1,908.79	2,026.60	1,808.63	1,863.03
10	1,987.67	1,951.58	1,937.42	1,935.61
11	1,925.85	1,965.49	1,879.87	2,024.67
12	2,003.73	2,015.39	1,919.20	2,050.84
13	1,980.29	2,129.75	1,994.75	2,079.91
14	2,034.93	2,077.14	2,045.36	2,048.11
15	2,040.51	2,136.72	2,060.82	2,058.08
16	2,089.60	2,055.92	2,064.15	2,118.36
17	2,069.84	2,152.84	2,120.59	2,122.24
18	2,065.56	2,164.34	2,053.02	2,143.80
19	2,144.52	2,206.00	2,152.93	2,220.27
20	2,260.71	2,305.15	2,301.10	2,350.78

Figure 3.10: Total Annual Male Hours Worked at Each Quintile of the Actual Earnings Distribution; Canada, (1975-1994)

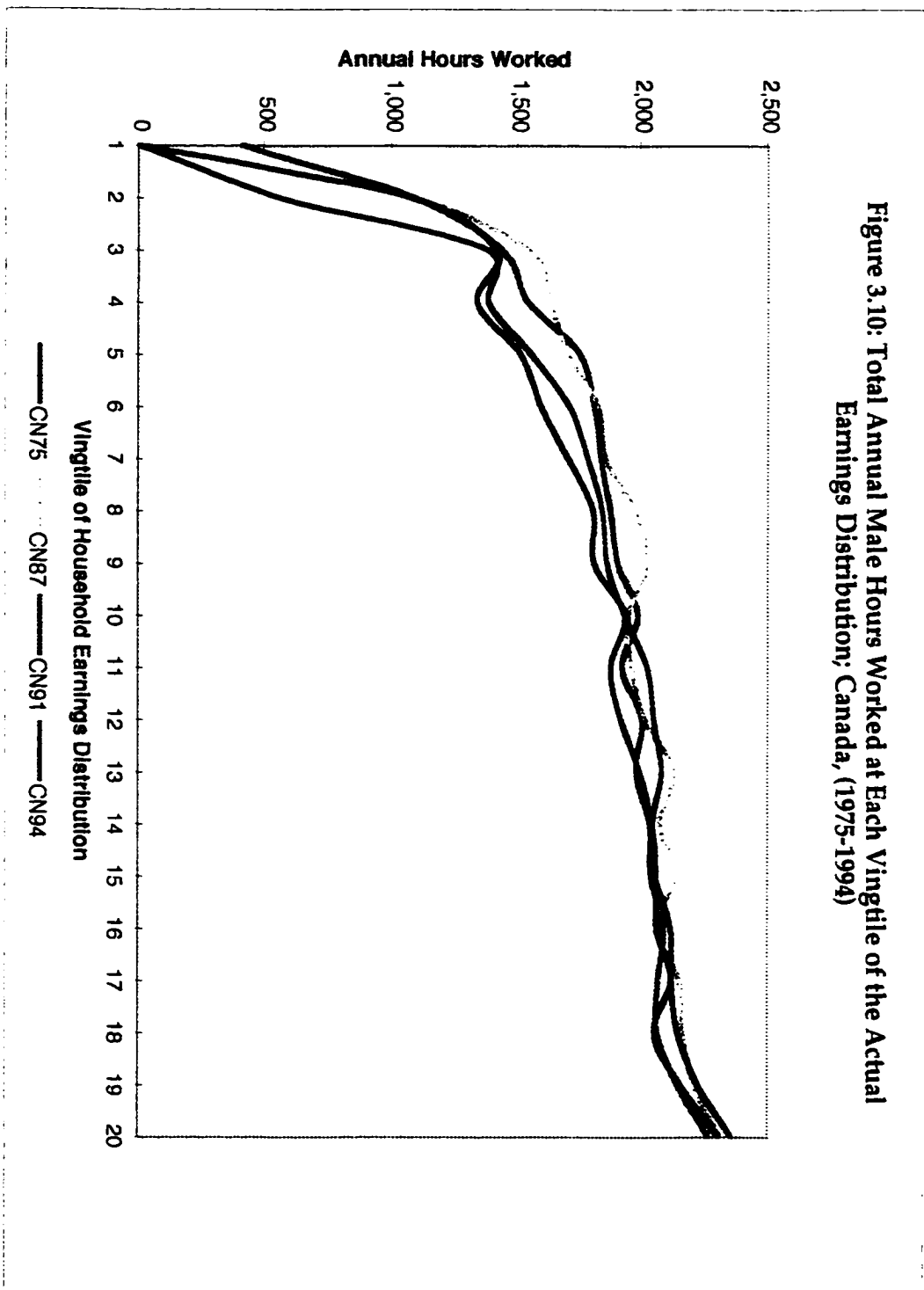


Table 3.10 .a					
Labour Force Participation Rates for Selected Years; Canada, 1975-1994					
	1975	1981	1987	1991	1994
Males	86.1	87.7	86.7	85.3	83.7
Females	50.3	66.3	66.3	69.2	68.5

Source: Labour Force Statistics, OECD, 1996

From 1975 to 1994, while female labour force participation has increased steadily, male labour force participation rates have dropped off since 1981. Much of the increase in total household hours worked in Canada has been comprised of increased female labour force participation.

Increases in household paid labour hours, resulting primarily from increased labour supply of women, is particularly significant for women, where women have traditionally engaged in household production activities relating to meal preparation, child care and housework in general. Table 3.10.b shows the trends in women's share of time spent on unpaid work within the household in Canada from 1961 to 1992. While activities such as clothing care is almost exclusively done by women and management, shopping, transportation, travel, other domestic work and other unpaid work are more equally shared, women, however, continue to do most of the food preparation, cleaning and care-giving within the household.

These results show that with greater labour force participation of women and fewer hours available for housework, unless husbands and wives "repackage" their total labour resources and provide for an alternative arrangement for the provision of housework, or unless some housework activities are not provided, women would feel the "time crunch" of the "double-work" day.

Table 3.10.b
Women's Share of time Spent on Unpaid Work

Type of unpaid Work	1961	1971	1981	1986	1992
	Percent				
Domestic work	71.6	71.1	69.8	73.0	66.9
Meal preparation	82.5	81.4	80.1	81.7	76.0
Cleaning	69.1	71.5	71.8	72.8	78.6
Clothing care	95.2	94.7	94.1	93.9	92.0
Repairs and maintenance	29.4	28.0	26.8	34.5	25.5
Other domestic work	44.2	46.1	46.6	51.4	56.2
Help and care	74.5	74.5	73.8	73.2	71.8
Management and shopping	58.9	59.1	59.6	57.1	60.8
Transportation and travel	50.9	52.4	53.1	56.0	58.0
Other unpaid work	54.6	55.3	56.2	63.1	57.1

Source: Statistics Canada - Catalogue No. 13-603E, No. 3

The results of the 1992 General Social Survey on Time Use by Statistics Canada, revealed that time stress rose markedly for women with marriage and children and that "time crunch" levels virtually exploded for married mothers who were employed full-time.

Moreover, there are distributional implications associated with this time crunch. It is more difficult for couples at the bottom of the earnings distribution to "purchase" household production services than for couples at the top of the earnings distribution. Those families who can not afford to purchase housework services suffer a greater loss in the foregone value of home production and the stress associated with juggling the responsibilities of work, home and family. Thus, there is the potential for the burden of the "time crunch" to be shifted to the "working poor" women.

3.9 Standardizing Household Hours Worked

Three standardization procedures are used to adjust for differences in hours allocated to the paid labour market by Canadian families both within a given year and over time. The standard number of hours chosen in this paper was 2,000 hours (roughly equal to one full-time full-year earners with 50 weeks of work at 40 hours per week). Before examining the impact on household earnings of standardizing for hours worked, it is useful to first examine the impact on household hours worked resulting from imposing each of the three standardizing procedures. The procedures used to standardize household hours worked include the Proportional Hours, High Wage and the Wife as a Second Earner standardization. The standardization procedures used are as described in Section 2.8 in Chapter 2 of this thesis.

This section presents a brief description of each of the procedures used to standardize household hours worked as well as the change in hours worked for males and females within the household resulting.

3.9.1 The Proportional Hours Standardization

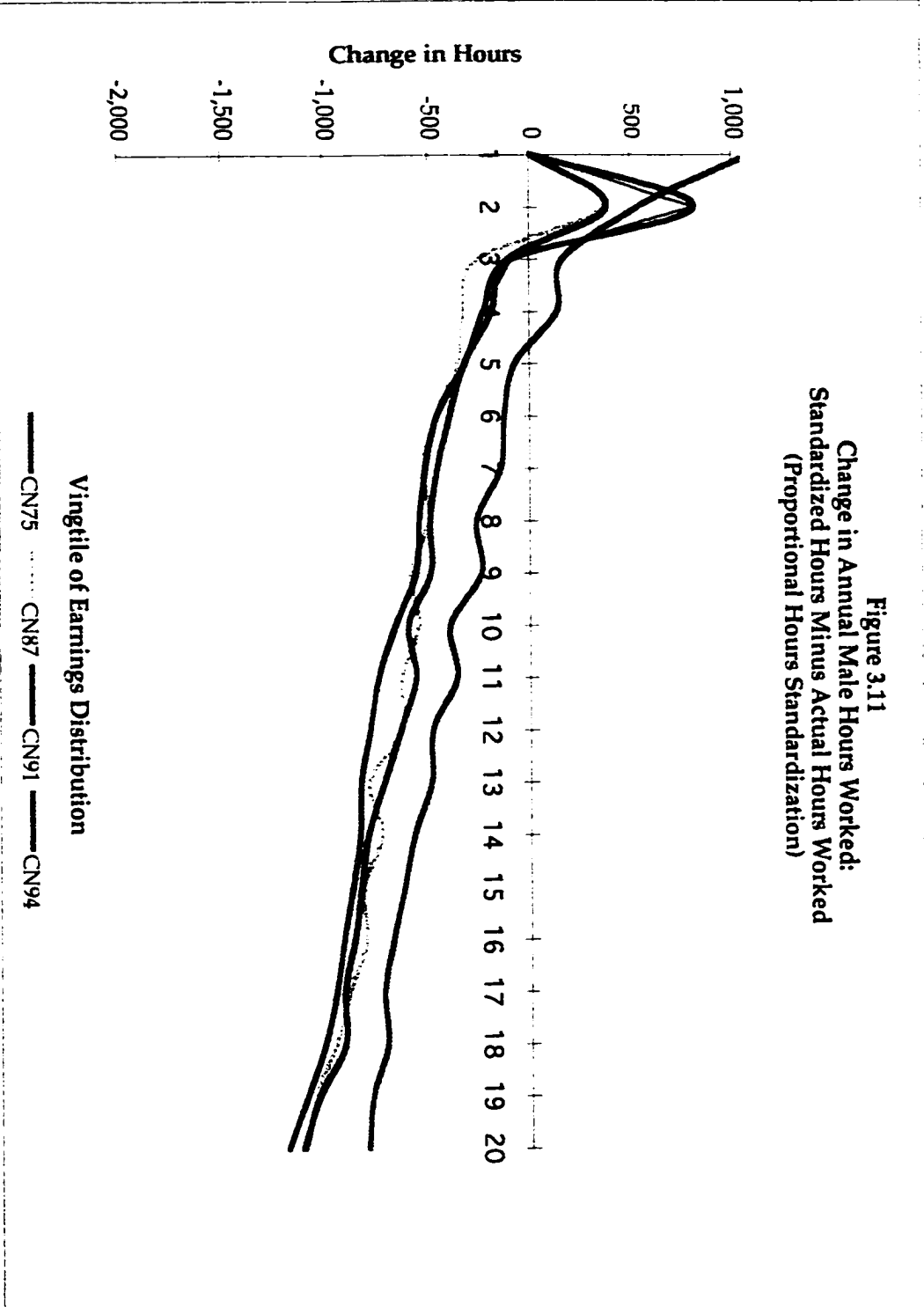
The Proportional Hours standardization procedure uses the proportion of male and female (husband and wife) hours to total household hours in each household, to allocate a standard number of hours worked to the household. Actual wages of individuals within the household are used to value their share of the standardized hours to calculate household earnings.

The change in total household hours worked is decomposed into the change in male and female hours worked. Table 3.11 and Figure 3.11 show the change in total male hours worked and Table 3.12 and Figure 3.12 show the change in annual female hours worked resulting from the Proportional Hours standardization. As can be seen in Figure 3.11 and Figure 3.12, additional

Table 3.11

Change in Annual Hours Worked; Males; Proportional Hours Earnings Distribution		CN75	CN81	CN87	CN91	CN94
Vingille						
1	1,089.01	0.00	0.00	0.00	0.00	0.00
2	541.05	0.00	360.58	375.75	821.12	821.12
3	159.20	0.00	-257.01	-105.48	-88.57	-88.57
4	131.78	0.00	-334.08	-187.35	-231.39	-231.39
5	-76.25	543.69	-358.74	-325.57	-321.03	-321.03
6	-128.34	539.73	-459.64	-397.48	-460.36	-460.36
7	-144.46	111.20	-527.78	-456.16	-514.54	-514.54
8	-267.87	-157.22	-496.84	-492.57	-546.68	-546.68
9	-242.44	-269.87	-588.97	-490.52	-559.38	-559.38
10	-397.59	-277.36	-547.07	-598.27	-663.77	-663.77
11	-366.24	-419.69	-633.14	-563.04	-741.57	-741.57
12	-482.92	-490.87	-631.02	-638.33	-786.16	-786.16
13	-490.89	-591.46	-789.02	-716.48	-827.92	-827.92
14	-570.94	-592.71	-728.05	-794.98	-832.91	-832.91
15	-621.60	-654.32	-819.52	-829.93	-867.41	-867.41
16	-678.56	-713.62	-806.59	-860.89	-909.96	-909.96
17	-721.74	-747.96	-880.68	-908.58	-946.73	-946.73
18	-705.26	-830.66	-951.12	-906.32	-1,002.03	-1,002.03
19	-779.54	-874.20	-1,044.59	-1,027.32	-1,088.43	-1,088.43
20	-800.92	-895.60	-1,092.52	-1,110.03	-1,183.13	-1,183.13

Figure 3.11
Change in Annual Male Hours Worked:
Standardized Hours Minus Actual Hours Worked
(Proportional Hours Standardization)



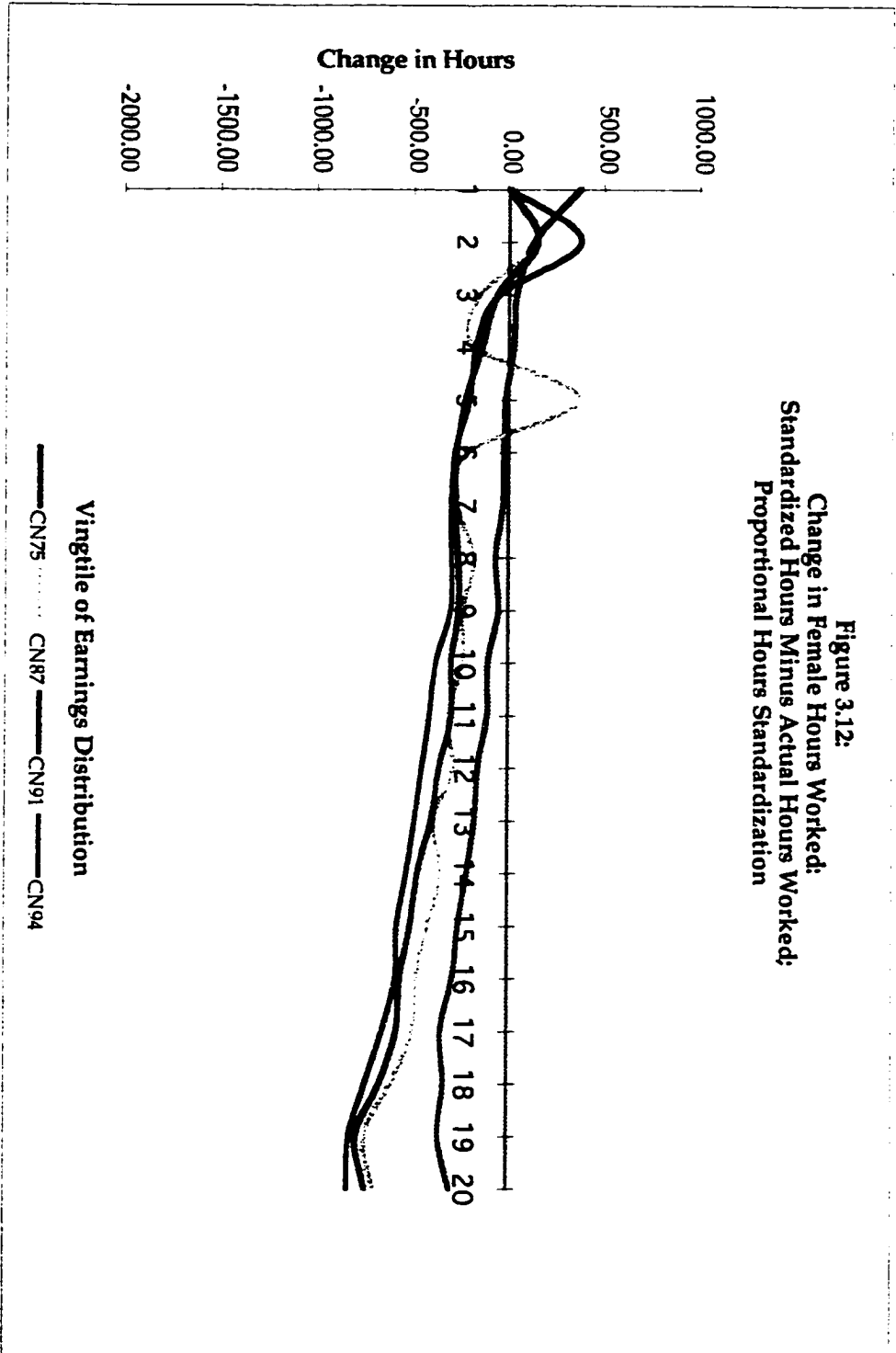
Vingtile of Earnings Distribution

— CN75 CN87 - - - - CN91 - - - - CN94

Table 3.12
Change in Annual Hours Worked, Remales; Proportional Hours Earnings Distribution

Vingtile	CN75	CN87	CN91	CN94
1	369.08	0.00	0.00	0.00
2	125.84	143.85	144.56	371.92
3	40.48	-143.87	-55.15	-48.51
4	25.89	-180.71	-137.59	-169.37
5	-14.91	361.54	-223.66	-199.88
6	-24.31	-212.17	-267.51	-278.32
7	-26.17	-263.44	-277.40	-297.20
8	-64.66	-175.23	-258.19	-295.73
9	-48.55	-230.39	-253.75	-298.79
10	-102.50	-231.94	-295.24	-380.02
11	-103.41	-317.28	-292.11	-414.33
12	-152.16	-280.61	-358.39	-457.10
13	-168.29	-387.99	-404.53	-494.64
14	-209.03	-351.26	-476.61	-537.90
15	-254.57	-424.81	-518.57	-589.59
16	-283.23	-484.65	-570.04	-596.09
17	-349.02	-503.85	-590.72	-664.04
18	-331.66	-616.82	-674.41	-753.20
19	-362.67	-754.24	-798.05	-834.86
20	-296.38	-709.37	-753.89	-843.38

Figure 3.12:
Change in Female Hours Worked:
Standardized Hours Minus Actual Hours Worked:
Proportional Hours Standardization



hours are allocated to both husbands and wives in the bottom of the earnings distribution where actual hours worked are low and taken away from households at the top of the distribution.

The male-female ratio of hours worked within the household is maintained and is the same as the ratio for actual earnings distributions since the changes in hours worked are proportional for both husbands and wives. The resulting total hours of husbands and wives under the proportional Hours standardization are given in Appendix B.

3.9.2 The High Wage Hours Standardization

The High Wage standardization allocates the standardized number of hours worked to males and females within the household based on their relative wages. The standardized number of hours are allocated to the individual with the highest wage and this wage is used to value the standardized hours to calculate household earnings, as described in Section 2.8.2 of this paper.

Both the High Wage standardization and the Wife as a Second Earner standardization procedures could not be applied to the 1975 distribution of household earnings, since the proportionate split in male and female earnings is not identified in the 1975 data set.

In the event of wages being equal between the husband and wife, the standardized number of hours are allocated to the husband. Table 3.12a shows the percent of households, based on the weighted sample, where the wage of the male is equal to that of the female for the years 1987 to 1994. This procedure results in a change in the average number of hours worked by

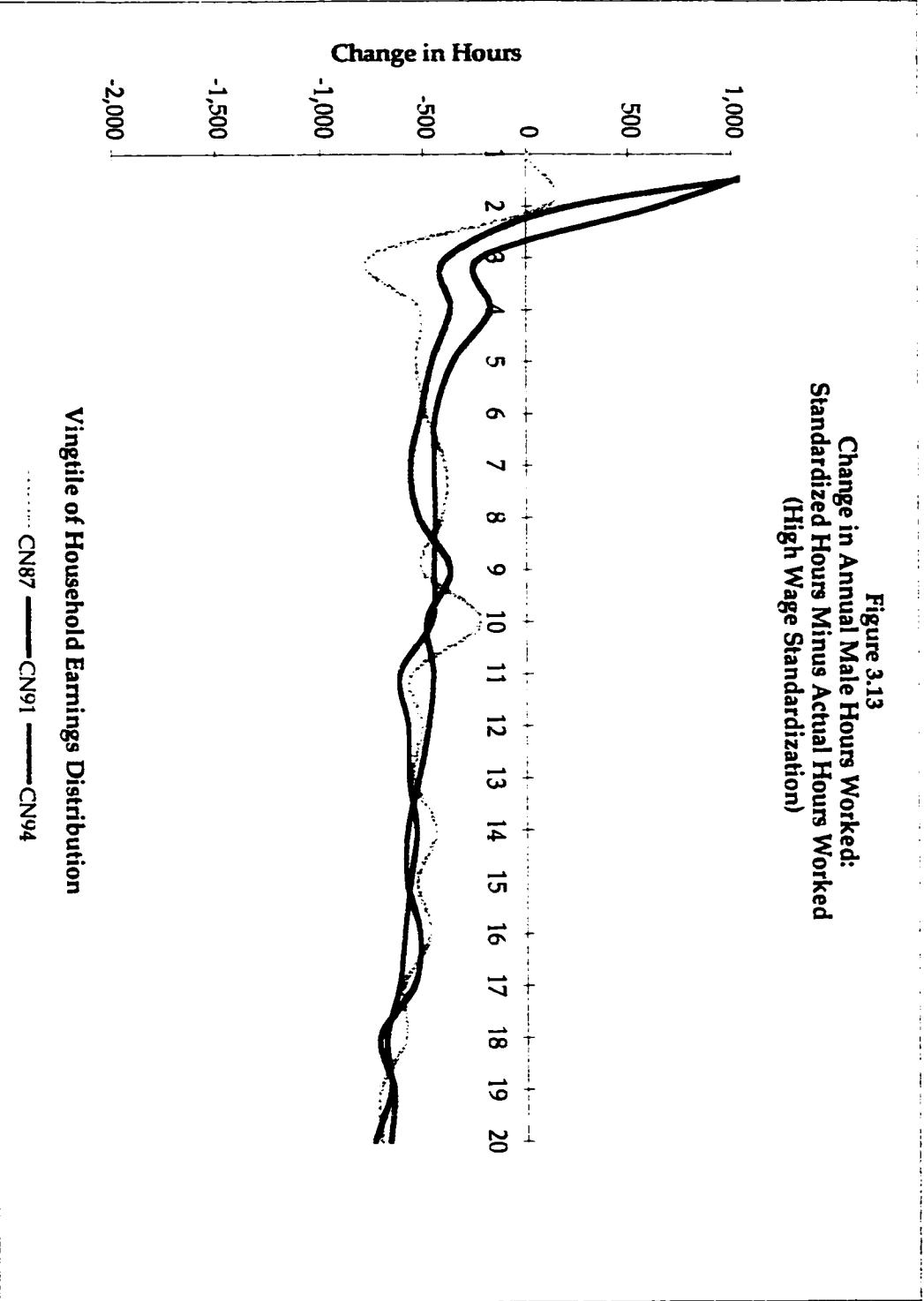
Table 3.12a		
Percent of Weighted Sample With Households Where Male Average Wages are Greater Than or Equal To Female Average Wages		
	Weighted Number of Households	Percent of Total Weighted Sample
	(000's Households)	
Canada, 1987:		
Male average hourly wage greater than female wage	3,202	67.7%
Male and female average hourly wage equal to zero	280	5.9%
Male average hourly wage equal to female av. hr. wage*	17	0.4%
Female average hourly wage greater than male av. hr. w	1,231	26.0%
Canada, 1991:		
Male average hourly wage greater than female wage	2,949	61.8%
Male and female average hourly wage equal to zero	344	7.2%
Male average hourly wage equal to female av. hr. wage*	20	0.4%
Female average hourly wage greater than male av. hr. w	1,460	30.6%
Canada, 1994:		
Male average hourly wage greater than female wage	3,168	38.7%
Male and female average hourly wage equal to zero	510	6.2%
Male average hourly wage equal to female av. hr. wage*	31	0.4%
Female average hourly wage greater than male av. hr. w	4,177	54.7%

Male average wage equal to female wage*: Includes non-zero average wages only

Table 3.13
 Change in Annual Hours Worked, Males; High Wage Earnings Distribution

Vingtille	CN75	CN87	CN91	CN94
1	N/A	0.00	2,000.00	1,359.43
2	N/A	98.75	230.12	649.13
3	N/A	-770.39	-382.57	-221.45
4	N/A	-527.16	-367.27	-178.77
5	N/A	-543.18	-459.51	-356.61
6	N/A	-493.22	-515.94	-442.86
7	N/A	-393.45	-568.32	-450.41
8	N/A	-408.57	-525.39	-444.01
9	N/A	-517.29	-370.60	-452.12
10	N/A	-224.44	-488.20	-462.70
11	N/A	-561.19	-454.34	-622.66
12	N/A	-513.05	-478.77	-580.51
13	N/A	-554.56	-526.90	-575.69
14	N/A	-443.62	-585.12	-541.47
15	N/A	-536.54	-588.02	-571.82
16	N/A	-471.89	-524.49	-600.71
17	N/A	-604.19	-553.09	-627.68
18	N/A	-596.37	-719.82	-688.53
19	N/A	-721.62	-656.39	-670.68
20	N/A	-713.09	-673.86	-750.18

Figure 3.13
Change in Annual Male Hours Worked:
Standardized Hours Minus Actual Hours Worked
(High Wage Standardization)



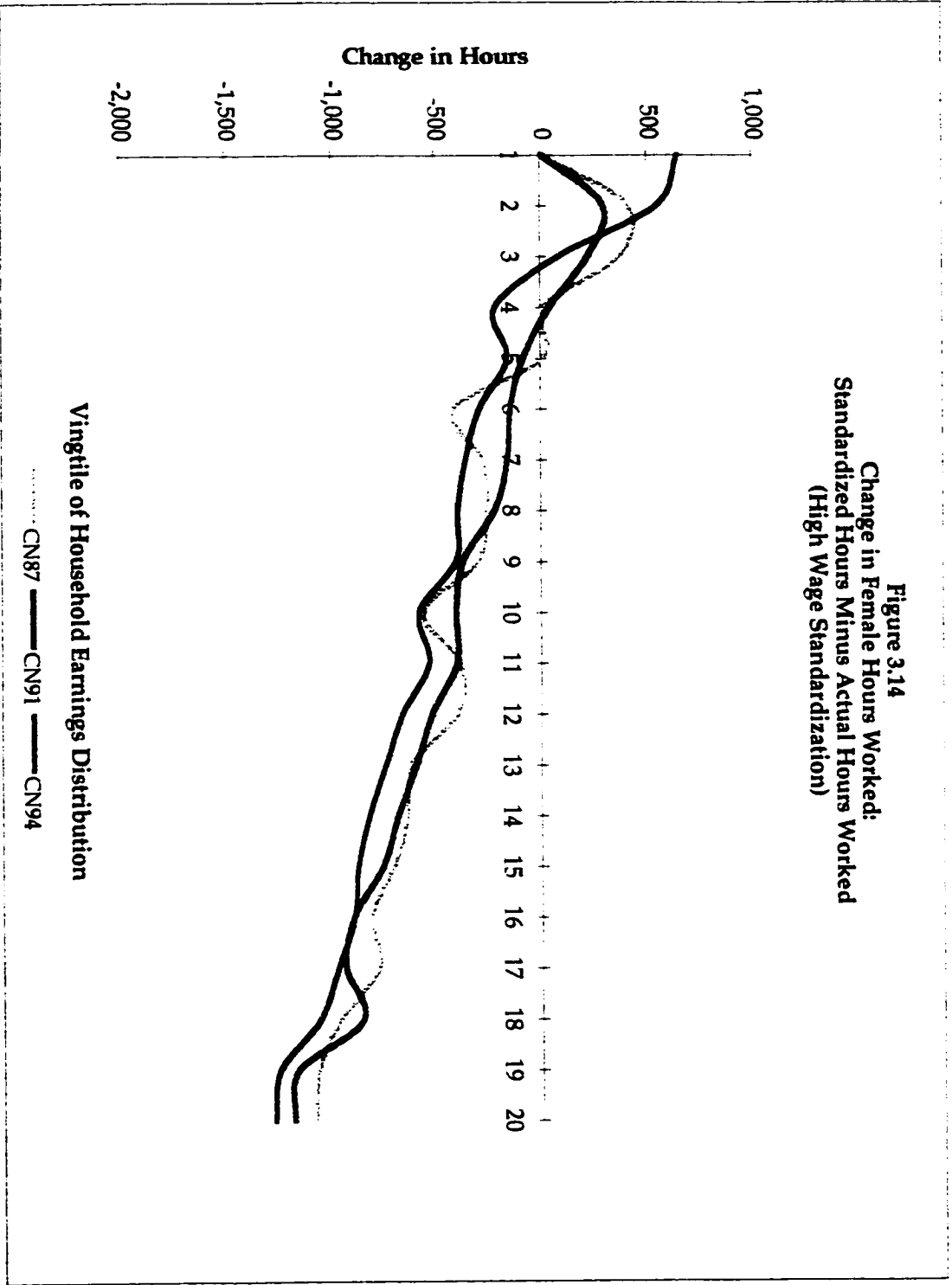
Vintile of Household Earnings Distribution

..... CN87 ——— CN91 - - - - CN94

Table 3.14
Change in Annual Hours Worked, Females; High Wage Earnings Distribution

Vingtile	CN75	CN87	CN91	CN94
1	N/A	0.00	0.00	640.57
2	N/A	405.68	290.19	543.91
3	N/A	369.51	221.94	84.37
4	N/A	12.37	42.33	-221.99
5	N/A	9.26	-89.72	-164.30
6	N/A	-415.24	-149.05	-295.82
7	N/A	-284.61	-165.24	-361.33
8	N/A	-263.50	-225.37	-398.40
9	N/A	-302.07	-373.67	-406.05
10	N/A	-554.57	-405.31	-581.09
11	N/A	-389.23	-400.81	-533.24
12	N/A	-398.58	-517.95	-662.75
13	N/A	-622.45	-594.11	-746.87
14	N/A	-635.69	-686.47	-829.34
15	N/A	-707.79	-760.48	-885.18
16	N/A	-819.35	-906.44	-905.34
17	N/A	-780.34	-946.21	-983.09
18	N/A	-971.57	-860.91	-1,066.70
19	N/A	-1,077.21	-1,168.98	-1,252.61
20	N/A	-1,088.80	-1,190.06	-1,276.33

Figure 3.14
Change in Female Hours Worked:
Standardized Hours Minus Actual Hours Worked
(High Wage Standardization)



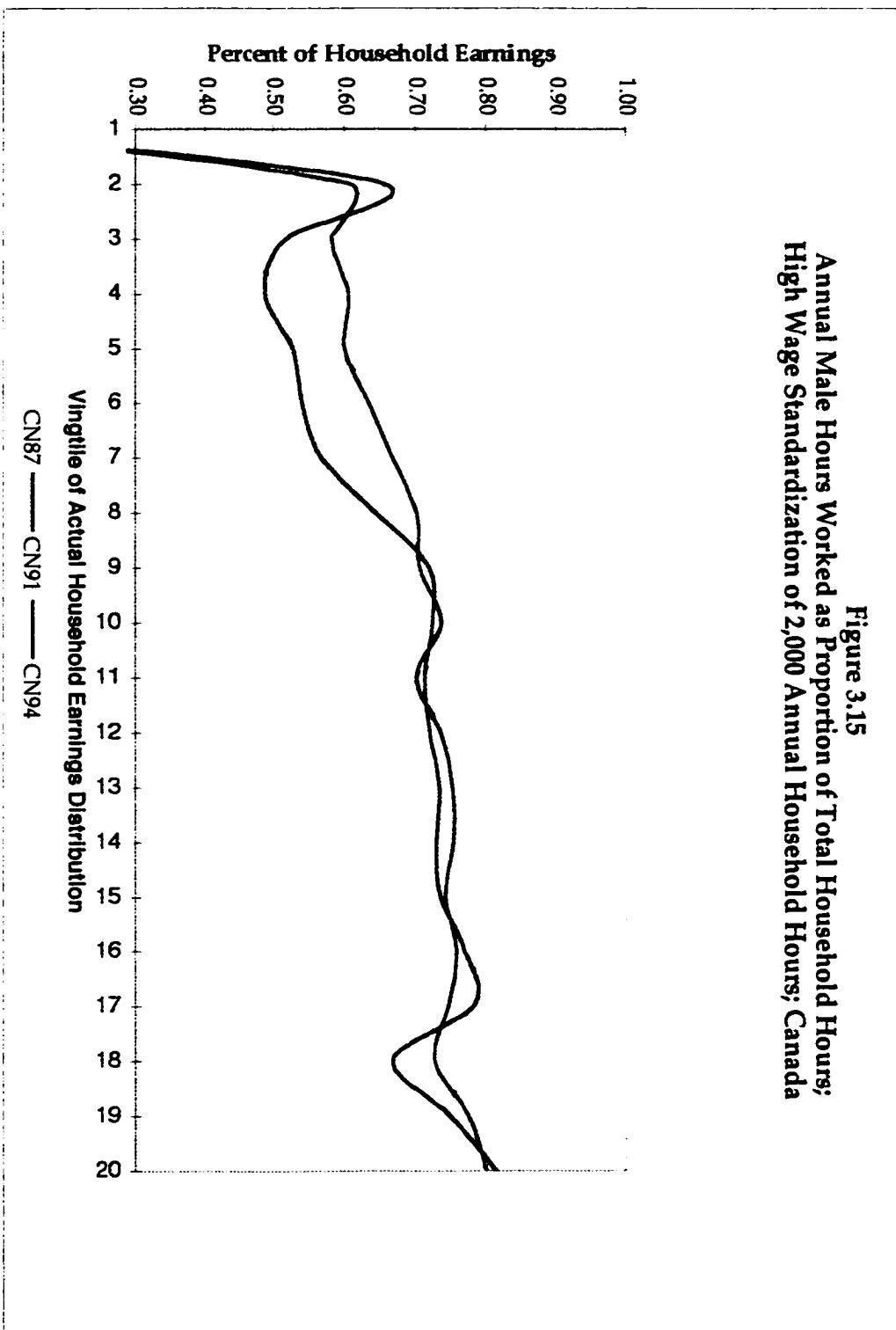
Vingtile of Household Earnings Distribution

..... CN87 ——— CN91 - - - - CN94

Table 3.15
Annual Male Hours Worked As Proportion of Total Household Hours;
High Wage Standardization; Economic Families, Canada

Vingilie	CN75	CN87	CN91	CN94
1	N/A	0.00	0.00	0.00
2	N/A	0.58	0.65	0.60
3	N/A	0.38	0.52	0.58
4	N/A	0.55	0.49	0.60
5	N/A	0.58	0.53	0.60
6	N/A	0.67	0.54	0.63
7	N/A	0.68	0.57	0.67
8	N/A	0.78	0.64	0.70
9	N/A	0.75	0.72	0.71
10	N/A	0.86	0.72	0.74
11	N/A	0.70	0.71	0.70
12	N/A	0.75	0.72	0.74
13	N/A	0.79	0.73	0.75
14	N/A	0.82	0.73	0.75
15	N/A	0.80	0.74	0.74
16	N/A	0.79	0.77	0.76
17	N/A	0.77	0.78	0.75
18	N/A	0.78	0.67	0.73
19	N/A	0.74	0.75	0.77
20	N/A	0.80	0.81	0.80

Figure 3.15
Annual Male Hours Worked as Proportion of Total Household Hours;
High Wage Standardization of 2,000 Annual Household Hours; Canada



males and females within the household at each point in the earnings distribution, and a change in the ratio of male to female hours worked.

The change in total male hours worked resulting from the High Wage standardization procedure for the years 1987, 1991 and 1994 is given in Table 3.13 and Figure 3.13 and the change in total female hours worked is given in Table 3.14 and Figure 3.14.

As can be seen in Figure 3.13 and Figure 3.14, the 2,000 hours are primarily allocated to husbands rather than wives throughout the earnings distribution, indicating that males predominantly have higher wages than females in most households. Table 3.15a shows the percent of the sample with couples where male average wages are greater than, less than or equal to female average wages.

The impact of this standardization procedure on the proportion of hours worked by husbands to total hours worked in the household at each point in the earnings distribution is given in Table 3.15 and graphically in Figure 3.15.

3.9.3 The Wife as a Second Earner Standardization

The Wife as a Second Earner (WSE) standardization is based on the notion of the wife being a supplementary earner for the household and uses this premise to allocate a standard number of hours worked (2,000 hours) to males and females within the household. If the husband's actual hours worked are equal to or greater than 2,000 hours the total standardized hours are allocated to the husband and no hours are allocated to the wife. If the husband's actual hours are less than 2,000 hours and the wife's hours are greater than zero, the actual hours of the husband are used and the difference in hours is allocated

to the wife. If the husband's hours are zero, and the wife's hours are greater than zero, the total standardized hours are allocated to the wife. If the husband's hours are less than 2,000 hours and the wife's hours are zero, the total standardized hours are allocated to the husband. If both the husband's and the wife's hours are zero, then zero hours are allocated to the household. The average hourly wages of the household head and spouse, computed using total reported earnings, weeks worked, and hours worked per week of the household head and spouse, are used to value their share of the standardized hours to calculate household earnings. This procedure results in a change in the average number of hours worked by males and females within the household at each point in the earnings distribution, and a change in the ratio of male to female hours worked.

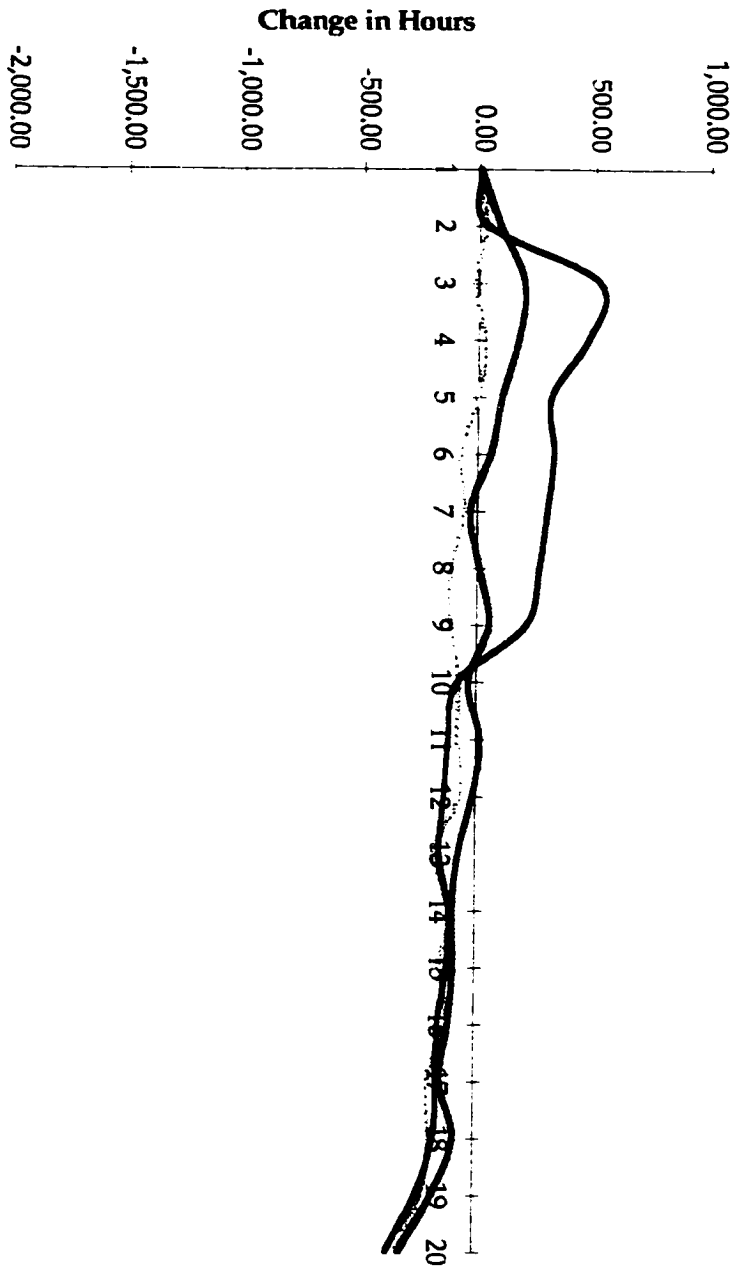
Table 3.16 and Figure 3.16 show the change in total male hours worked and Table 3.17 and Figure 3.17 show the change in total female hours worked as a result of the WSE standardization procedure. Since male and female earnings can not be identified in the 1975 data set results of the Wife as a Second Earner standardization procedure are given for the years 1987, 1991, and 1994.

Table 3.18 shows the impact on the proportion of male hours worked to total household hours within the household at each point in the earnings distribution as a result of the WSE standardization procedure. This can be seen in Figure 3.18. As can be seen in Figure 3.18, this standardization procedure allocates almost all of the 2,000 hours to males, especially in the upper portion of the distribution, where average annual males hours worked approach and exceed 2,000 hours, leaving the wife with little to zero hours.

Table 3.16
Change in Annual Hours Worked: Males; WSI Barrings Distribution

Vingtile	CN75	CN87	CN91	CN94
1	N/A	0.00	0.00	0.00
2	N/A	25.73	85.67	31.23
3	N/A	-20.33	190.86	517.40
4	N/A	24.40	165.54	467.06
5	N/A	-2.31	97.58	308.90
6	N/A	-78.57	51.55	319.26
7	N/A	-59.25	-33.25	293.16
8	N/A	-114.79	5.08	263.16
9	N/A	-116.41	50.03	208.28
10	N/A	-77.82	-38.72	-82.31
11	N/A	-83.98	13.54	-123.06
12	N/A	-71.43	-16.10	-139.94
13	N/A	-183.28	-76.61	-159.14
14	N/A	-117.56	-99.30	-114.93
15	N/A	-157.94	-94.61	-123.63
16	N/A	-121.54	-115.36	-161.71
17	N/A	-209.87	-150.82	-166.50
18	N/A	-197.20	-89.61	-177.90
19	N/A	-228.26	-181.69	-254.65
20	N/A	-340.60	-324.21	-382.67

Figure 3.16:
Change in Annual Male Hours Worked:
Standardized Hours Minus Actual Hours Worked
(Wife as A Second Earner Standardization)



Vingtile of Household Earnings Distribution

..... CN87 ——— CN91 ——— CN94

Table 3.17
 Change in Annual Hours Worked, Females; WSE Earnings Distribution

Vingtile	CN75	CN87	CN91	CN94
1	N/A	0.00	0.00	0.00
2	N/A	72.03	-76.11	-9.12
3	N/A	-288.02	-263.17	-128.75
4	N/A	-482.46	-414.12	-404.93
5	N/A	-476.11	-573.37	-552.89
6	N/A	-543.63	-676.91	-662.80
7	N/A	-689.55	-655.36	-708.69
8	N/A	-522.96	-727.66	-767.93
9	N/A	-688.79	-778.13	-805.35
10	N/A	-686.18	-844.23	-947.89
11	N/A	-852.49	-856.23	-1,022.40
12	N/A	-830.74	-967.59	-1,095.39
13	N/A	-989.20	-1,032.81	-1,155.83
14	N/A	-957.59	-1,167.24	-1,251.25
15	N/A	-1,083.92	-1,250.21	-1,327.85
16	N/A	-1,164.98	-1,310.00	-1,340.92
17	N/A	-1,170.53	-1,346.03	-1,441.23
18	N/A	-1,368.34	-1,489.28	-1,575.86
19	N/A	-1,569.63	-1,641.75	-1,667.17
20	N/A	-1,460.13	-1,537.69	-1,642.26

Figure 3.17:
Change in Female hours Worked:
Standardized Hours Minus Actual Hours Worked
(Wife as a Second Earner Standardization)

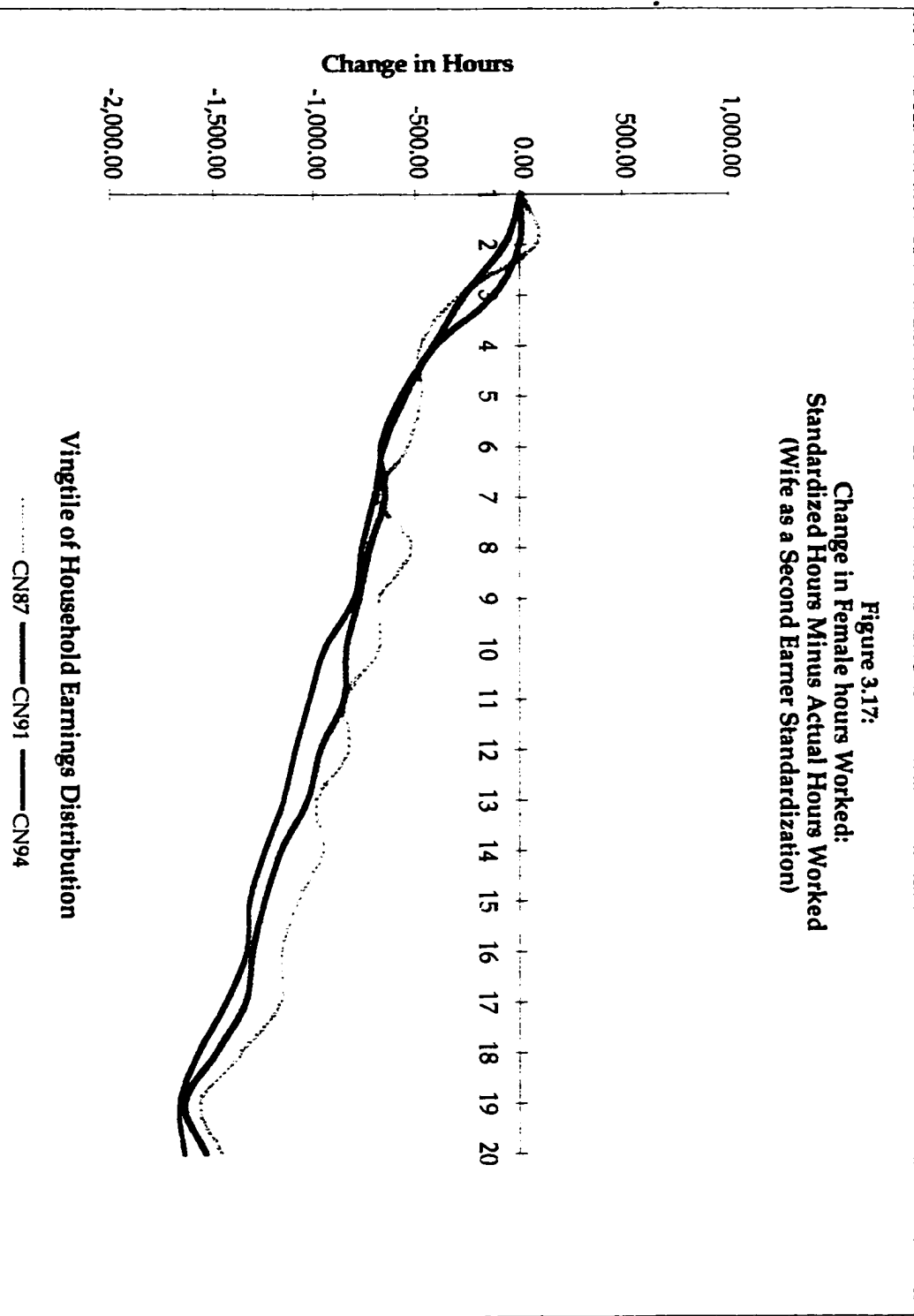
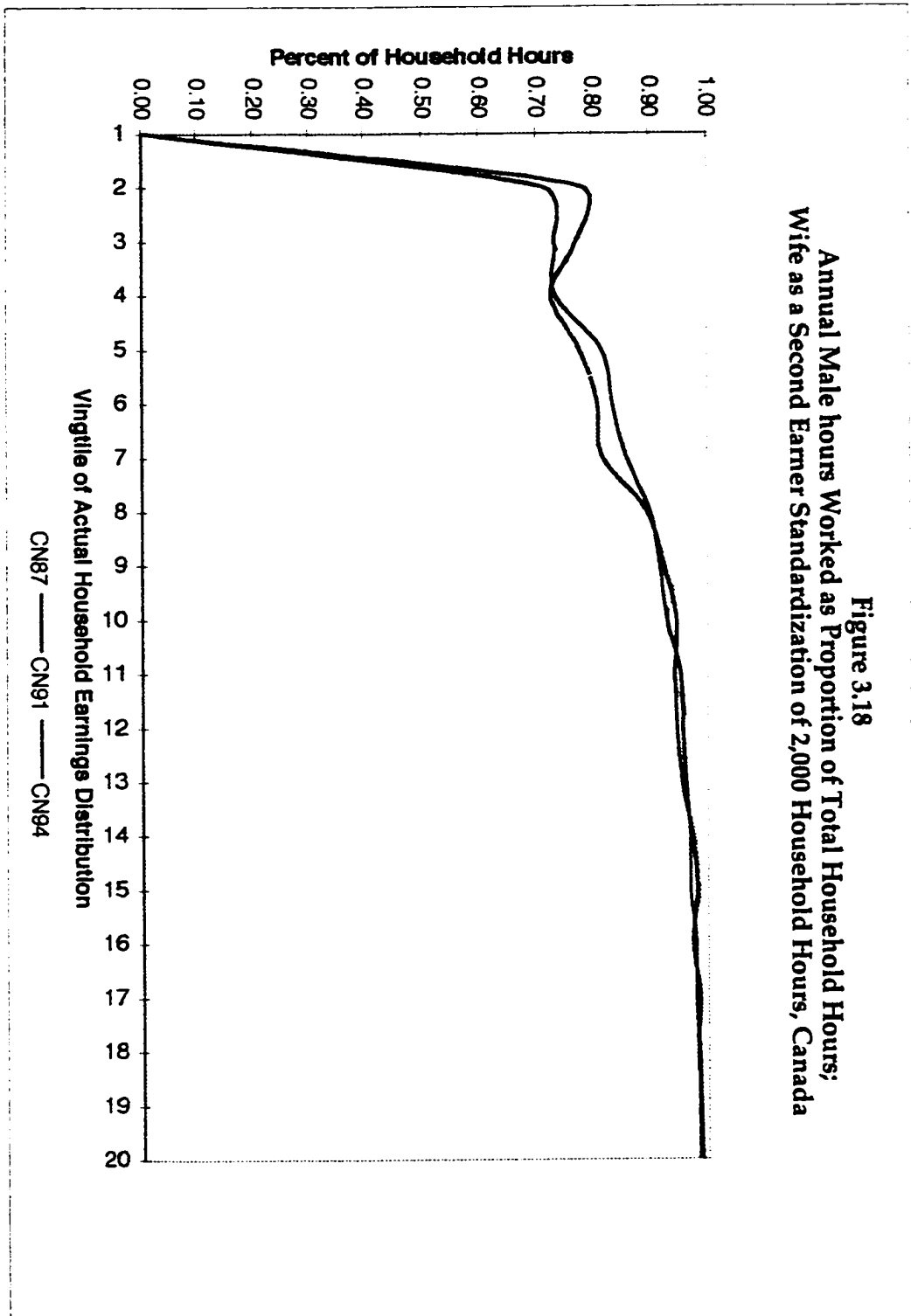


Table 3.18
Annual Male Hours Worked As Proportion of Total Household Hours;
Wife as a Second Earner Earnings Distribution; Economic Families, Canada

Vingtile	CN75	CN87	CN91	CN94
1	N/A	0.00	0.00	0.00
2	N/A	0.69	0.78	0.71
3	N/A	0.73	0.77	0.73
4	N/A	0.81	0.73	0.73
5	N/A	0.83	0.78	0.81
6	N/A	0.85	0.81	0.83
7	N/A	0.88	0.81	0.86
8	N/A	0.91	0.89	0.90
9	N/A	0.95	0.92	0.91
10	N/A	0.93	0.94	0.93
11	N/A	0.93	0.94	0.95
12	N/A	0.97	0.95	0.96
13	N/A	0.97	0.95	0.96
14	N/A	0.98	0.97	0.97
15	N/A	0.99	0.98	0.97
16	N/A	0.96	0.97	0.98
17	N/A	0.97	0.98	0.98
18	N/A	0.98	0.98	0.98
19	N/A	0.99	0.98	0.98
20	N/A	0.98	0.99	0.98

Figure 3.18
Annual Male hours Worked as Proportion of Total Household Hours;
Wife as a Second Earner Standardization of 2,000 Household Hours, Canada



3.10 Standardized Distribution of Earnings

We can now turn to examining the trend in real earnings over time, adjusted for differences spent in the labour market. The resulting earnings distributions for each of the standardization procedures represent earnings for comparable households which have been standardized for differences in prices, family size, and time spent in the paid labour market.

The earnings distributions for each of the standardization procedures are presented in Tables 3.19 to 3.22. Earnings are presented for each vingtile of the actual earnings distribution and represent the same composition of families within each vingtile as in the actual earnings distributions. Earnings have been adjusted for differences in prices and are valued in 1994 dollars for all years. Earnings have also been equivalized to adjust for differences in family size and hours worked.

The results of the standardization process are presented in the following order:

- Proportional Hours Standardization;
- High Wage Standardization; and the
- Wife as a Second Earner Standardization

3.10.1 Proportional Hours Standardization

Standardizing total household hours worked in proportion to actual hours worked by husbands and wives resulted in two separate standardization processes:

- 1) Standardizing hours to a common number of hours (2,000 hours per year) based on the proportion of the hours worked by husband and wife to total household hours worked, for each household within a given earnings distribution; and
- 2) Establishing a common set of hours worked based on the average number of household hours worked in each vingtile of the distribution of earnings in 1975.

To understand both procedures, perhaps it is best to work through the process by which both procedures would address the following question. Suppose a household was told it could only supply a fixed amount of hours. How would these hours be determined and allocated to husband and wife within the household?

The first procedure assumes a given amount of hours would be allocated based on the proportion of hours contributed to total household labour supply by husband and wife given in the data. The quantity of household hours selected in this study is 2,000 hours per year.

The second procedure determines the hours to be the average number of hours worked in each vingtile of the distribution in 1975, and then allocates these hours based on the husband and wife's proportion of total household hours.

The results of the first proportional hours standardization procedure is given in Table 3.19 and shown in Figure 3.19 below. As can be seen in Figure 3.19, the 1975 adjusted earnings lie above the adjusted earnings of 1994 throughout the bottom half of the earnings distribution up to the 15th vingtile (i.e., the

bottom 75% of the household earnings distribution) and then lies very close to the adjusted 1994 earnings in the upper region of the distribution. Once earnings are adjusted for the variations in the amount of time spent in the workplace, the earnings distribution of 1994 (or at least in the bottom 75% of the earnings distribution) no longer lies above the earnings of previous years. This would suggest that not only were Canadian families at least as well-off in 1975 as they are today, but in fact they were better off (obtaining a higher standard of living) once we account the differences in time spent working between the earnings distributions. Not only does the hours-adjusted 1975 earnings distribution lie above the 1994 distribution, but also, the distributions of 1991 and 1987 lie above adjusted 1994 earnings throughout the bottom of the distribution (up to the 14th vingtile). In the top half of the earnings distribution all three adjusted earnings distributions are indistinguishable from the adjusted 1994 earnings distribution.

Table 3.19
Annual Household Earnings Standardized for Differences in Prices, Family Size and
and Hours of Paid Labour; Proportional Hours Standardization;
Canada 1975-1994 (Valued in 1994 Dollars)

Vingtile	CN75	CN87	CN91	CN94
1	2,273	0	0	0
2	5,874	1,512	1,519	14
3	7,341	3,471	4,078	1,708
4	9,235	5,137	6,039	3,865
5	9,893	7,311	7,461	5,695
6	10,558	8,387	8,652	7,138
7	11,800	8,973	9,560	8,522
8	11,943	10,353	10,236	9,702
9	12,978	11,249	11,878	10,796
10	12,802	11,728	12,002	11,386
11	13,838	12,564	13,320	12,130
12	13,913	13,108	13,506	12,746
13	14,476	13,176	14,611	13,394
14	14,832	14,133	14,229	14,298
15	15,263	14,644	15,110	15,545
16	15,825	16,227	15,442	15,951
17	16,310	16,913	17,050	17,276
18	18,057	17,875	18,664	18,510
19	19,261	19,220	19,874	20,350
20	27,489	26,379	29,621	27,103

Figure 3.19: Total Annual Household Pre-Tax Earnings Standardized for Differences in Prices, Family Size and Hours of Paid Labour; Proportional Hours Standardization; 2,000 Hours; Canada, 1975-1994; (Valued in 1994 Dollars Cdn.)

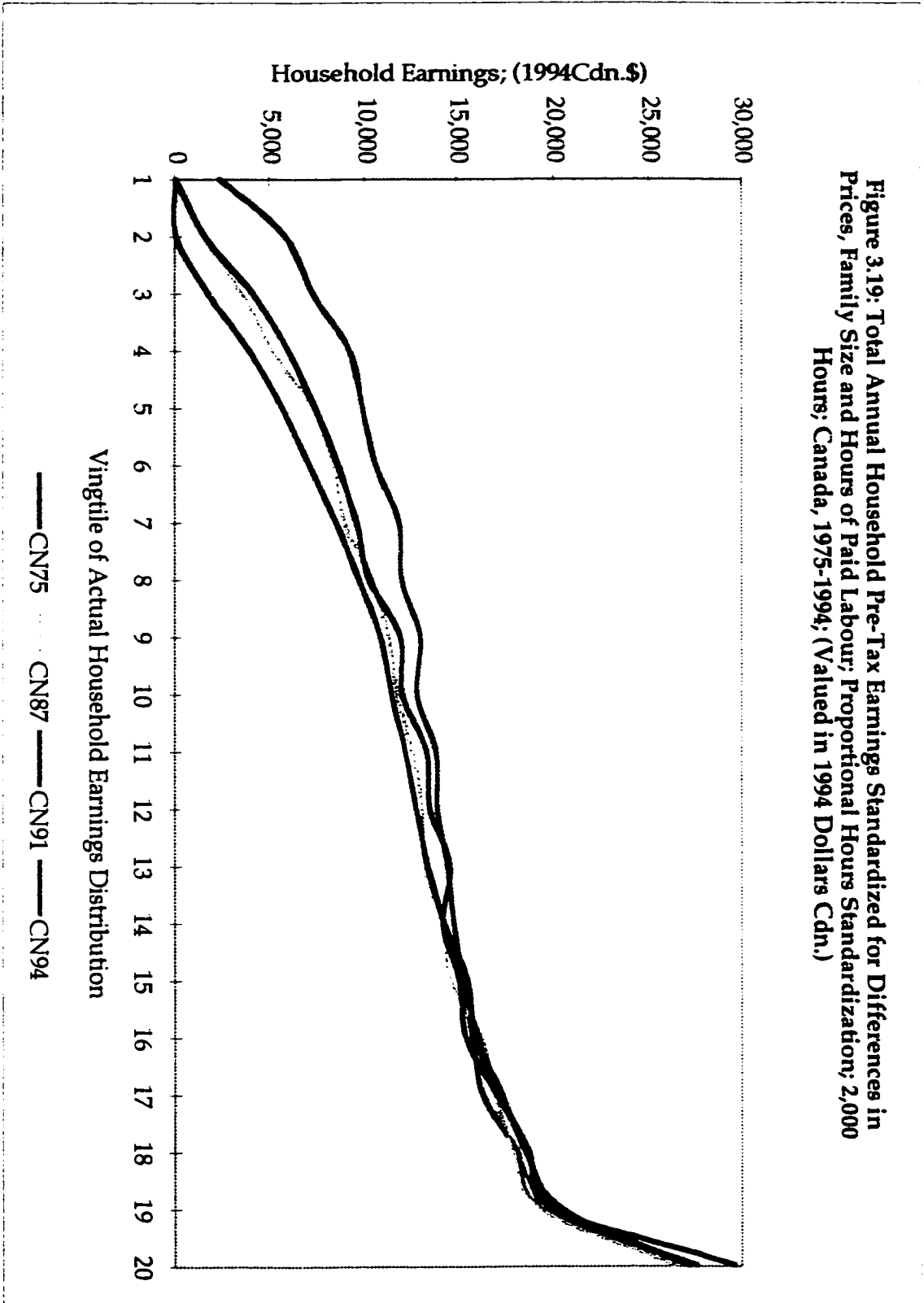
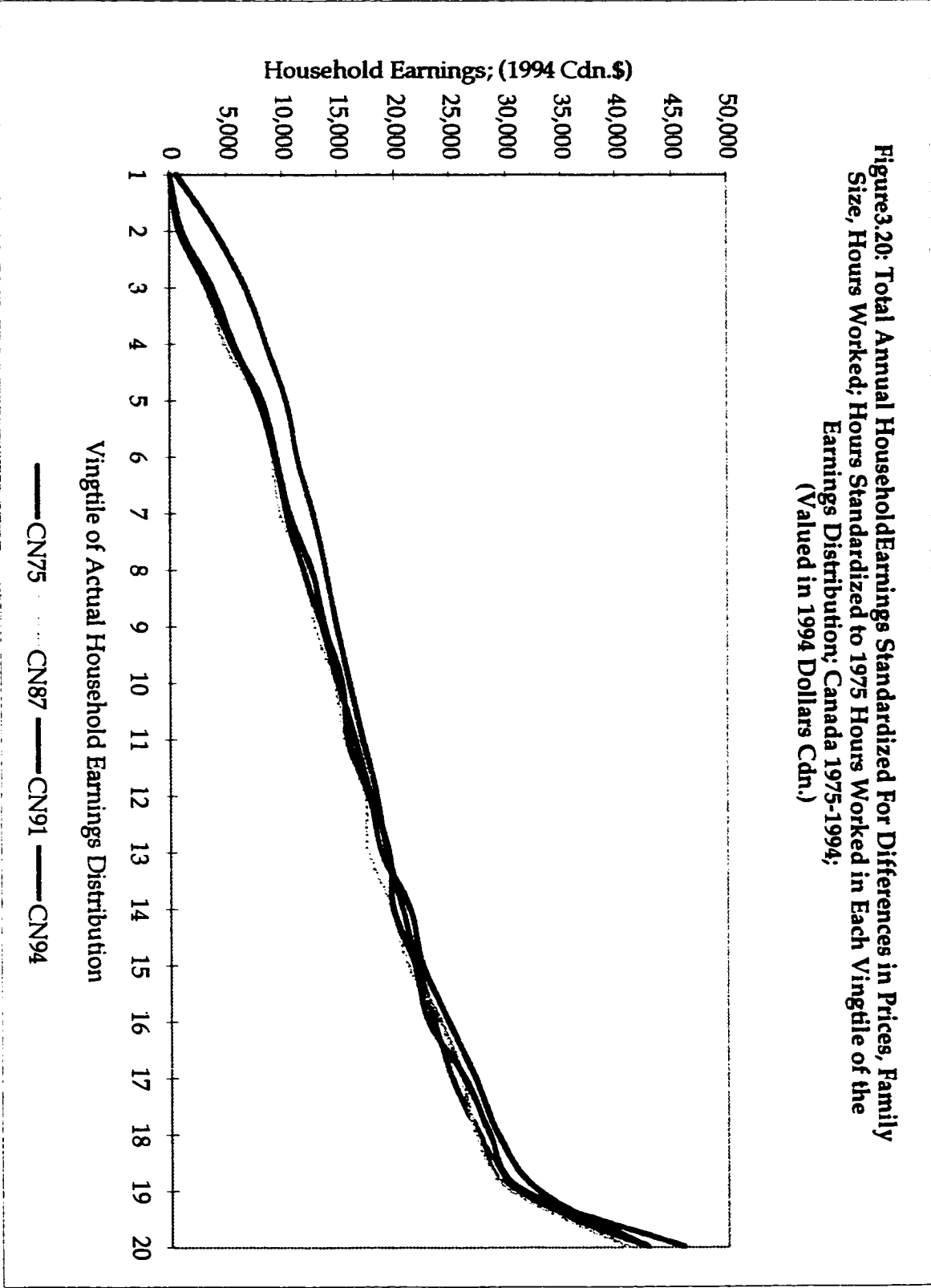


Table 3.20
Annual Household Earnings Standardized For Differences in Prices, Family size, and Hours of Paid Labour;
Hours Worked Standardized to 1975 Hours Worked in Each Vintile of the Earnings Distribution
Proportional Hours Standardization; Canada: 1975-1994, (Valued in 1994 Dollars)

Vintile	CN75	CN87	CN91	CN94
1	616	0	0	0
2	3,915	1,008	1,012	809
3	6,608	3,125	3,671	3,303
4	8,507	4,732	5,563	5,407
5	10,344	7,645	7,801	8,133
6	11,364	9,028	9,313	9,440
7	12,806	9,738	10,376	10,639
8	13,929	12,075	11,937	12,671
9	14,867	12,886	13,606	13,846
10	16,003	14,661	15,003	15,362
11	17,087	15,514	16,448	15,861
12	18,330	17,270	17,795	17,665
13	19,248	17,519	19,426	18,744
14	20,616	19,645	19,779	21,307
15	21,949	21,060	21,729	22,422
16	23,435	24,031	22,869	24,759
17	25,042	25,968	26,178	27,123
18	27,420	27,142	28,341	29,087
19	30,262	30,196	31,225	32,678
20	42,571	40,851	45,872	42,627

Figure 3.20: Total Annual Household Earnings Standardized For Differences in Prices, Family Size, Hours Worked; Hours Standardized to 1975 Hours Worked in Each Quintile of the Earnings Distribution; Canada 1975-1994; (Valued in 1994 Dollars Cdn.)



The results of the second Proportional Hours type of standardization procedure produces similar results and are given in Table 3.20 and shown in Figure 3.20. The 1975 adjusted earnings function again lies above the adjusted earnings of 1994 throughout the bottom half of the earnings distribution (up to the 13th vingtile). The result of this standardization implies that if, at each vingtile of the earnings distribution, households are constrained to work not only an equal amount of hours within each specific vingtile, but the average hours households worked in 1975 within that vingtile, the bottom 65% of households in each of the earnings distributions for the years 1987, 1991 and 1994 lie below the earnings distribution for 1975. This would suggest that, if households in the years since 1975 worked the same number of average hours within each vingtile as did households in 1975, Canadian families in the years subsequent to 1975 have not obtained a higher standard of living in the bottom 65 percent of the earnings distribution. In other words, in leveling the playing field in terms of hours worked across time periods, Canadian households in the bottom 65 percent of the earnings distribution in the years subsequent to 1975 have not kept pace with the bottom 65 percent of households in 1975 in terms of household earnings.

The earnings distributions of 1991 and 1987 are indistinguishable from the 1994 adjusted earnings, especially in the bottom half of the distribution with the 1994 earnings distribution lying above that of 1987 and 1991 in the upper portion of the distribution. This result implies that the additional hours worked in 1994 over previous years has not resulted in an increase in economic well-being, especially at the bottom of the earnings distribution. Households are supplying increasing hours in order to maintain their standard of living, and if we adjust earnings in terms of these additional

hours, valued at the wages households receive for their labour time (assuming a proportionate combination of husband and wife's supply of household labour), we see that the bottom 65 percent of households are not maintaining the standard of living that the bottom 65 percent of households did in 1975 in Canada.

Both types of proportional hours standardizations methods resulted in comparable, if not higher, levels of earnings in the years prior to 1994 as compared to 1994. Once earnings are adjusted for the variations in the amount of time spent in the workplace, the earnings distribution of 1994 no longer lies above that of 1994. This would suggest that not only were Canadian households at least as well-off in 1975 as they are today for the bottom 65% of the earnings distribution, but in fact they were better off (obtaining a higher standard of living) once we account the differences in time spent working between the earnings distributions.

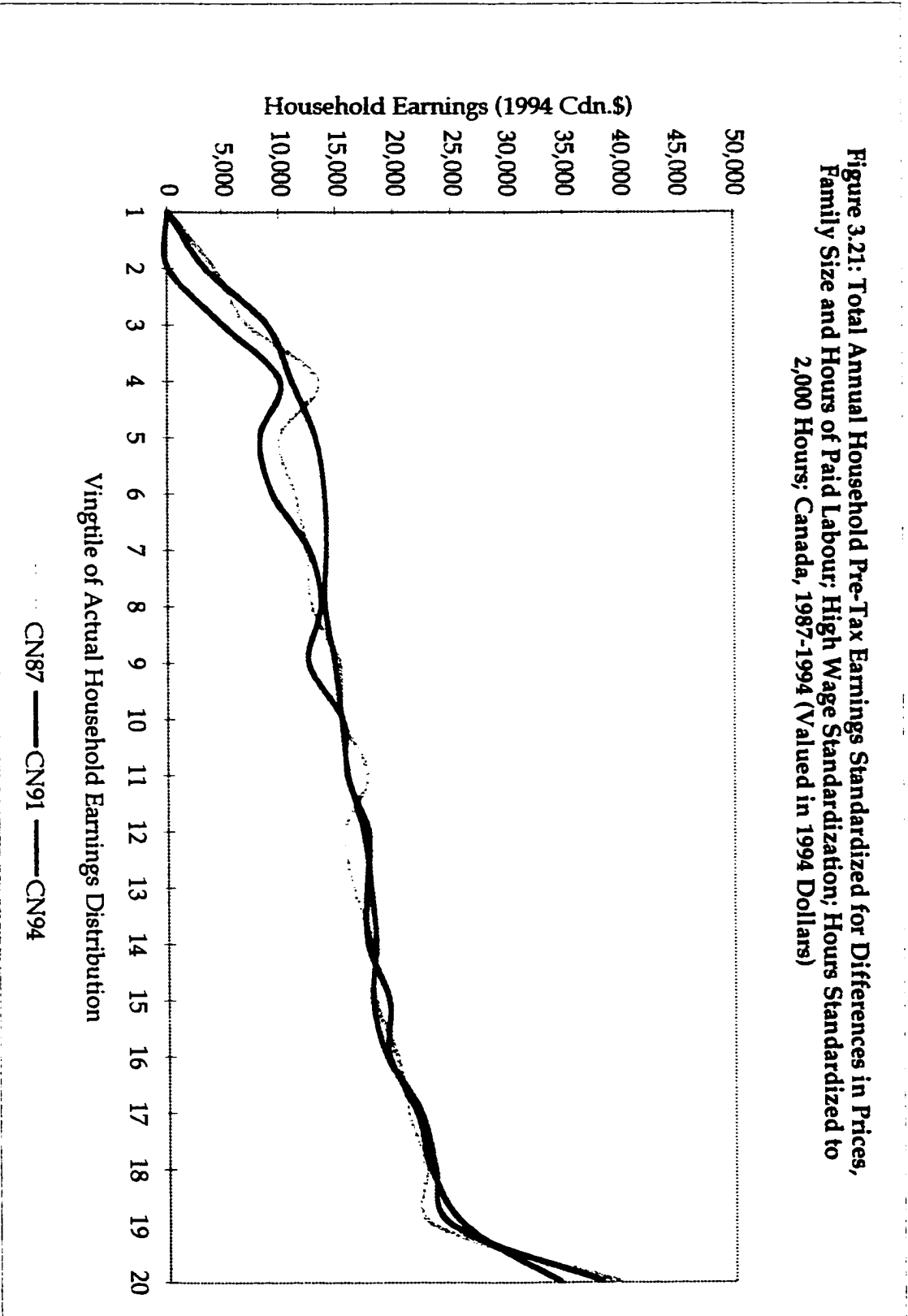
3.10.2 The High Wage Standardization

The results of the High Wage Standardization procedure are presented in Table 3.21 and shown in Figure 3.21 below. This procedure resulted in the 1987 and 1991 distributions lying above the 1994 distribution at the bottom of the distribution and being indistinguishable from the 1994 distribution in the middle and upper portions of the earnings distribution. This standardization procedure implies that if households worked the same number of hours, and allocated their resources such that the higher wage earner between husband and wife, supplied these hours, then households below the median in the 1994 distribution are not as well off as they were in 1991, under these assumptions. As well, households in the bottom 35% of the earnings

Table 3.21
Annual Household Earnings Standardized for Differences in Prices, Family Size and Hours of Paid Labour;
High Wage Standardization: Canada, 1987-1994 (Valued in 1994 Dollars)

Vingtile	CN87	CN91	CN94
1	0	0	0
2	4,293	3,415	40
3	7,168	8,923	4,948
4	13,414	11,088	10,071
5	9,950	13,145	8,316
6	11,299	13,975	9,387
7	12,371	14,137	12,593
8	12,759	14,032	13,625
9	15,290	14,839	12,493
10	15,487	15,432	15,534
11	17,724	15,989	15,884
12	15,704	17,347	17,769
13	16,483	17,955	17,599
14	18,022	18,371	17,660
15	18,300	18,061	19,514
16	20,175	19,284	19,480
17	21,100	22,183	21,853
18	22,627	23,416	23,062
19	23,182	24,868	26,050
20	39,730	38,176	34,504

Figure 3.21: Total Annual Household Pre-Tax Earnings Standardized for Differences in Prices, Family Size and Hours of Paid Labour; High Wage Standardization; Hours Standardized to 2,000 Hours; Canada, 1987-1994 (Valued in 1994 Dollars)



distribution in 1994 would not be as well off as they were in either 1987 or 1991.

Again, if when earnings are standardized for hours worked, it is assumed households supply labour such that the higher wage earner works in the labour market and the other does not, as under the High Wage standardization procedure, then households in 1994 are worse off than were house in 1987 and 1991 in the bottom 35% of the earnings distribution. Also, households in the top 65% of the 1994 earnings distribution are no better off than in the top 65% of households in the 1987 and 1991 earnings distributions.

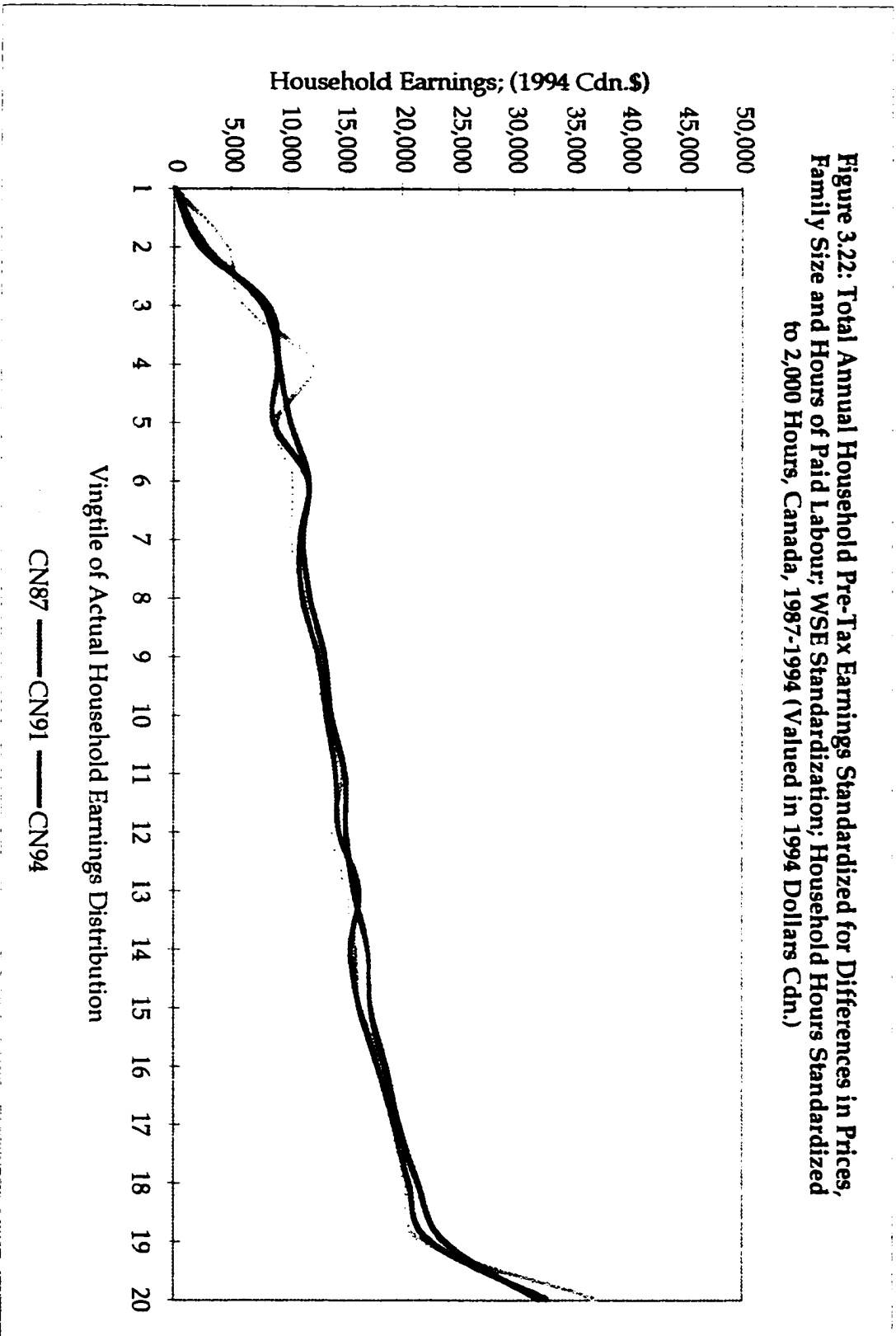
3.10.3 The Wife as a Second Earner Standardization

The results of the Wife as a Second Earner standardization procedure are presented in Table 3.22 and shown in Figure 3.22. This standardization procedure resulted in the 1987 and 1991 earnings distributions lying predominantly below, but very close to the 1994 earnings functions throughout most of the earnings distribution, (i.e., from the 5th vingtile to the 19th vingtile), except in the lower half of the distribution where the adjusted 1987 earnings shows some fluctuation around the adjusted 1994 earnings function. Once household earnings have been standardized for differences in prices, family size, and hours worked, and if it assumed households organize themselves in such a way that wives act as supplementary or secondary earners, household earnings in 1994 are not that much higher in 1994 over 1987 and 1991 does not result in significant increases in economic well-being.

Table 3.22
 Annual Household Earnings Standardized for Differences in Prices, Family Size and Hours of Paid Labour;
 Wife As a Second Earner Standardization;
 Canada, 1987-1994 (Valued in 1994 Dollars)

Vingtile	CN87	CN91	CN94
1	0	0	0
2	4,596	2,739	2,248
3	5,930	7,743	8,191
4	12,103	8,997	9,181
5	8,904	8,696	10,187
6	10,337	11,731	11,869
7	10,169	11,002	11,280
8	11,460	11,212	11,973
9	12,461	12,760	13,320
10	13,267	13,423	13,898
11	14,852	14,277	15,160
12	13,899	14,589	15,239
13	15,178	16,355	15,870
14	16,040	15,582	17,069
15	16,402	16,358	17,374
16	18,540	17,978	18,653
17	19,197	19,380	19,720
18	20,310	20,603	21,436
19	21,691	22,442	23,691
20	37,154	32,699	32,061

Figure 3.22: Total Annual Household Pre-Tax Earnings Standardized for Differences in Prices, Family Size and Hours of Paid Labour; WSE Standardization; Household Hours Standardized to 2,000 Hours, Canada, 1987-1994 (Valued in 1994 Dollars Cdn.)



3.11 Earnings Inequality

This section examines the pre-tax labour market earnings of married couples across in Canada over time (1975 to 1994) to determine how equally or unequally these earnings are distributed, and to what extent differences in the measures of inequality over time are due to differences in hours worked.

Differences in inequality measures of the distribution of labour market earnings of married couples are first determined using actual pre-tax earnings.¹⁰⁵ The pre-tax earnings distribution is then standardized for differences in family size, and inequality measures are compared to those using actual earnings. This comparison is done to determine the impact of differences in family size over time on the inequality of married couples' equivalized earnings.

To facilitate an analysis of the extent to which married couples earnings inequality is impacted by differences in hours worked over time, inequality measures are estimated for each of the procedures used to adjust earnings for to a standardized number of hours worked.¹⁰⁶ A comparison is then made between the inequality measures derived for couples' earnings under each procedure used to standardize hours worked and inequality measures using actual earnings, adjusted only for family size.

¹⁰⁵ The pre-tax earnings distribution for married couples is the same distribution described by the sample selection criteria in Section 3.3. The actual pre-tax earnings distribution is unadjusted for differences in prices over time since these are constant values and do not affect the measures of inequality selected.

¹⁰⁶ The pre-tax earnings distribution for married couples is the same distribution used to standardize hours worked, described by in Section 3.9. The earnings distribution is adjusted for cross-country differences in family size and hours worked, as described in each of the three procedures used in Section 3.9.

Table 3.23 presents computed measures of inequality for each of the earnings distributions. Inequality is measured using three measures: the Atkinson inequality index, (with $\epsilon = 0.5$); the Gini coefficient; and the Theil inequality index. These all belong to the same group of inequality measures and are insensitive to relative changes in the earnings scale. The Atkinson index is sensitive to inequality changes in the lowest part of the income distribution, the Theil index is sensitive to changes in the top part of the distribution, and the Gini coefficient is sensitive to inequality changes around the median.

Table 3.23 presents estimates for each level of standardization of the household earnings distribution to facilitate an analysis of the effect of standardization adjustments on inequality patterns. The rank order of each of the inequality coefficients under each standardization procedure is also presented in Tables 3.23.

Looking at Table 3.23, and examining actual real household earnings which are standardized for differences in prices over time using a CPI index, we see that the household earnings inequality has increased in each of the years examined subsequent to 1975, with inequality being greatest in 1994, followed by 1991, 1987 and 1975 respectively. All three indices of inequality maintain this ranking.

When household earnings are further standardized for differences in family size, we see an increase in overall measures of inequality, (similar to the results from the cross-country analysis in Chapter 2 of this paper). As can be seen in Table 3.23, the ranking of countries under each of the inequality indices used is maintained when household earnings are "equivalized" for family size. Again, Canada 1994 shows the highest degree of inequality with

Canada 1975 showing the lowest degree of inequality under all three inequality indices.

Examining the resulting earnings distributions once household earnings have been standardized for differences in hours worked, the rank order of household earnings inequality in Canada over time is, however, no longer preserved.

3.11.1 Proportional Hours Standardization

One noticeable feature of standardizing for hours worked under the three standardization procedures in Canada over time is that household earnings inequality, as measured by the Gini index (Table 3.23), decreased for the years 1987 to 1994, as compared to the Gini index derived from standardized for family size only. Using the Atkinson index, however, there is a decrease in earnings inequality for the years 1991 and 1994, but an increase in inequality for 1987. Using the Theil index, there is an increase in earnings inequality for all three years examined. This would imply that there may be some evidence that increased earnings inequality is due to an increased polarization of hours worked, as measured by the Gini coefficient, (and by the Atkinson coefficient for the years 1991 and 1994), assuming couples supply labour as was assumed under the Proportional Hours standardization procedure.

These results indicate that if couples supply labour such that husband and wife each supply labour in a constant proportion to one another, and all households worked the same amount of total hours, earnings inequality increases at the top of the earnings distribution, as measured by the Theil index. These results also indicate that current hours worked by couples smooth out household earnings at the top of the earnings distribution.

Table 3.23

Comparison of Household Earnings Inequality Measures; Canada 1975-1994
Household Heads Older Than 21 and Less Than 65 Yr, Married Couples

Canadian Inequality Measures; Actual Household Earnings; Married Couples:

Year	Gini	Theil	Atkinson*
Canada,1975	0.3134 (4)	0.1776 (4)	0.1023 (4)
Canada,1987	0.3724 (3)	0.2560 (3)	0.1634 (3)
Canada,1991	0.3993 (2)	0.2982 (2)	0.1835 (2)
Canada,1994	0.4058 (1)	0.3071 (1)	0.1969 (1)

Canadian Inequality Measures; Household Earnings Adjusted for Family Size:

Year	Gini	Theil	Atkinson*
Canada,1975	0.3338 (4)	0.1967 (4)	0.1111 (4)
Canada,1987	0.4021 (3)	0.2892 (3)	0.1429 (3)
Canada,1991	0.4259 (2)	0.3313 (2)	0.1970 (2)
Canada,1994	0.4278 (1)	0.3315 (1)	0.2072 (1)

Canadian Inequality Measures; Proportional Hours Standardization:

Year	Gini	Theil	Atkinson*
Canada,1975	N/A	N/A	N/A
Canada,1987	0.3857 (1)	0.3507 (3)	0.1686 (1)
Canada,1991	0.3849 (2)	0.3973 (1)	0.1661 (3)
Canada,1994	0.3820 (3)	0.3928 (2)	0.1677 (2)

Canadian Inequality Measures; Wife as a Second Earner Standardization:

Year	Gini	Theil	Atkinson*
Canada,1975*	N/A	N/A	N/A
Canada,1987	0.4402 (3)	0.3767 (3)	0.2506 (3)
Canada,1991	0.4723 (1)	0.4396 (1)	0.2849 (1)
Canada,1994	0.4634 (2)	0.4166 (2)	0.2778 (2)

Canadian Inequality Measures; High Wage Standardization:

Year	Gini	Theil	Atkinson*
Canada,1975*	N/A	N/A	N/A
Canada,1987	0.3841 (3)	0.3375 (3)	0.1649 (3)
Canada,1991	0.4061 (1)	0.3464 (2)	0.1803 (2)
Canada,1994	0.3942 (2)	0.3484 (1)	0.1824 (1)

* Inequality indices not available for Canada 1975 under the Wife as a Second Earner and High Wage Standardization procedures due to lack of information on the breakdown of head and spouse earnings.

Atkinson*: Epsilon=0.5

3.11.2 Wife as a Second Earner

The Wife as a Second Earner standardization procedure generated the greatest increase in inequality. Under this standardization procedure, wives are treated as a supplementary earners and supply paid labour hours only if their husband's hours worked is less than the standardized number of hours.

The most striking result using the Wife as a Second Earner procedure, is that couples' earnings inequality increases for all three indices across all three years examined. This results implies that even if the variation in hours worked is removed, the earnings inequality increases if we assume husbands and wives supply labour in the manner assumed under the Wife as a Second Earner standardization procedure.

As can be seen in Table 3.23, the Gini and Atkinson coefficients produce the same ranking of household earnings inequality in Canada over time with the greatest level of household earnings inequality, in 1991, followed by the 1987 and 1994, respectively. Looking at the Theil index, the largest increases in inequality in again occurs in 1991 in the lower tail of the distribution, ranking Canada 1991 as having the greatest level of household earnings inequality, followed by 1994 and 1987, respectively.

3.11.3 High Wage Earner Standardization

The High Wage Earner procedure resulted in lower measures of inequality as compared to those obtained from standardizing couples' earnings for differences in family size only, as measured by the Gini index for 1987 to 1994. Since the Gini is sensitive to the distribution of earnings at the median, this implies that if couples supplied labour such that the higher wage earner

worked (and there is no variance in the number of hours worked), then earnings inequality would be reduced, due to the distribution of wages at the median of the earnings distribution. This may offer some evidence of increased earnings inequality being attributable to increased polarization in hours worked, (assuming couples supplied labour such that the higher wage earner worked). However, when we observe the influence of the upper and lower tails, as measured through the Atkinson and Theil index, we see this is not so clear-cut.

The Atkinson index shows couples' earnings inequality being reduced in 1991 and 1994, (but increased in 1987) under the High Wage standardization process. This may also offer some evidence of increased inequality due to increased variance in hours worked for the years 1991 and 1994.¹⁰⁷

The Theil index increases under the High Wage procedure over the Theil obtained using couples' earnings which have been standardized for family size only, for 1987, 1991 and 1994.

3.12 Conclusion

The results of adjusting earnings for differences in time spent working, indicate that levels of economic well-being may not have increased for Canadian families as much as implied by earnings alone. As Canadian households devote increasing resources into paid labour in order to maintain a standard of living, are they really better off?

¹⁰⁷ Again assuming that couples supply labour such that the higher wage earner only works a common number of hours across families.

Three standardization procedures used to adjust household earnings for differences over time in the amount of resources households in Canada are devoting to paid labour based on simplified assumptions regarding household labour supply. Adjustments to household earnings for changes in hours worked were done in addition to standardizing for inflationary forces and changes in family size which occurred over this period. over time in Canada.

The results of the analysis in this paper have shown that for a vast majority of Canadians, (the bottom 65 percent of the earnings distribution), not only are they no better off than they were twenty years earlier, they are, in fact, worse off, when we take account of the significant increase in household hours spent earning income. Once hours worked are standardized, the variation in earnings arises solely from wages. This raises some concern that the distribution of wages has not kept pace with standards of living in the bottom half of the earnings distribution.

While it is recognized that during the 1980's in Canada, transfer payments (social security, unemployment insurance benefits) played a significant role in alleviating income inequality in Canada (see. Osberg, Erksoy and Phipps, 1994), wage distributions (undistorted by the transfer payments), are often examined in order to understand earnings (from market sources) inequality. The work done in Canada by Juhn, Murphy and Topel (1991) and Kuhn and Robb (1996) indicate that structural changes have caused shifts in the distribution of wages, inducing greater hours worked in order to maintain a standard of living. Xu (1996), used generalized Lorenz (GL) dominance criteria to rank wage distributions over time in Canada using data from the Canadian Labour Market Activity Survey (LMAS) during the period 1986-1990. This

analysis showed the wage distributions have improved from 1986 to 1987, in the sense of GL dominance (wage distribution in 1987 shows a higher level and smaller inequality). However, the study showed a similar change did not occur in the period after 1987.

While the results in this study are preliminary, they do raise concern about the use of standard monetary measures as comparisons of economic well-being over time periods, without taking into account changes in the household time devoted to earnings.

Economists often, (e.g., see R. Harris) use measures such as the standard constant dollar measure of produced goods and services - the GDP per person as a proxy for economic well-being. While the procedures used in this paper do not represent highly sophisticated household bargaining models,¹⁰⁸ the results imply that the use of standard monetary measures, such as GDP or incomes, even when adjusted for purchasing power, may not be appropriate proxies for measures of economic well-being since they mask the differences in time spent acquiring earnings. Often, little, to no acknowledgment is given to the economic impacts associated with changes in the availability of one of couples' most valuable productive resources - their time.

Harris (1997) argues that changes in GDP do not measure the reductions in working time which have occurred over this century. Rather than comparing current hours worked to those at the beginning of this century, an examination of average household hours worked in Canada since the early

¹⁰⁸ However, without cross-country information on the relative bargaining position within the family, more sophisticated models were not possible.

1970s shows dramatic increases in annual hours worked over the twenty years which follow. Measures such as output per capita may be seriously overstating the level of economic-well-being associated with earned household incomes.

Appendix A

Supporting Tables and Figures For Chapter 2

Figure A1.1: Cross Country Comparison of Annual Male Pre-Tax Earnings Standardized for Differences in Prices and Family Size; Married Couples (Valued in 1991 US\$)

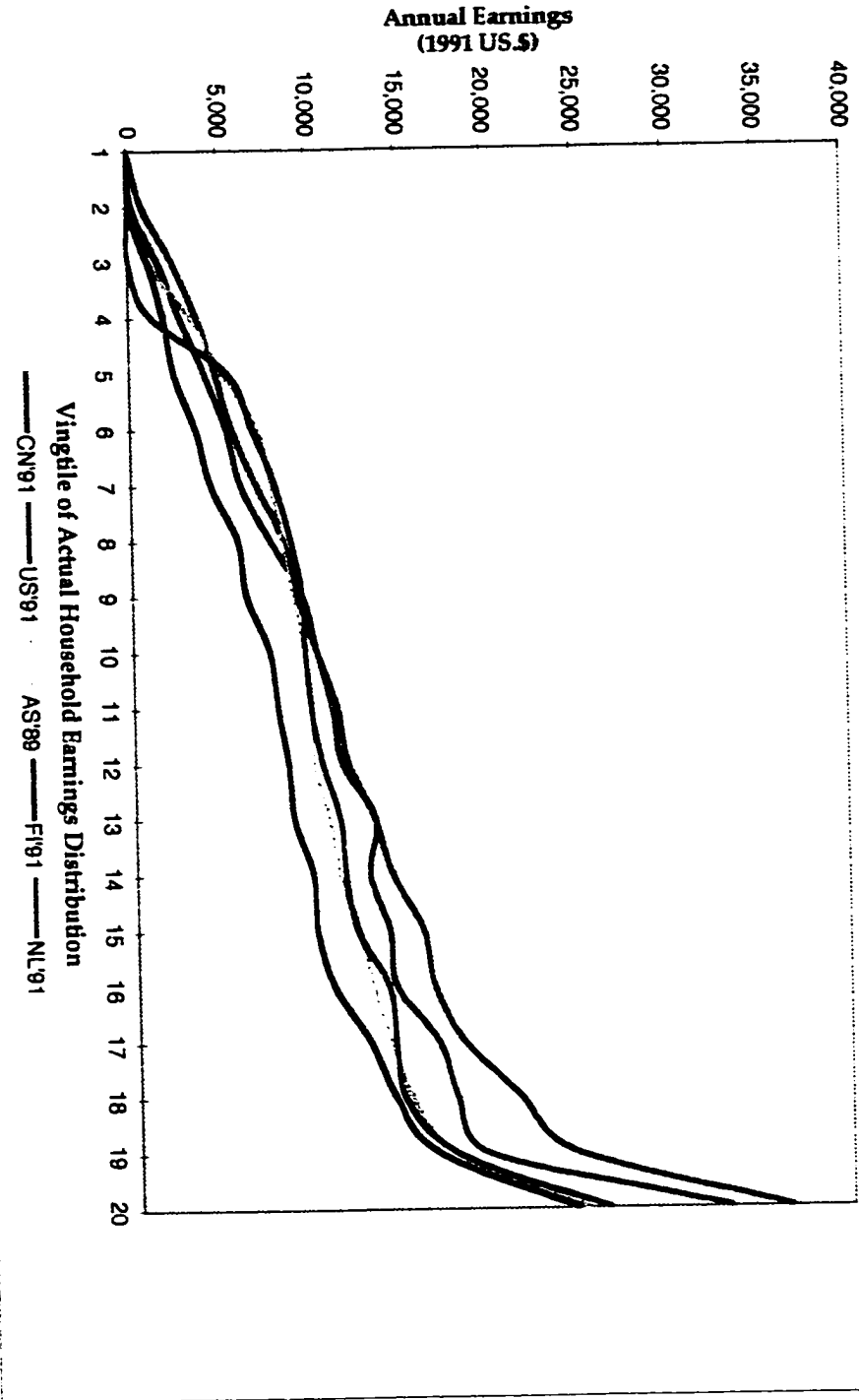


Table A1-1a
Annual Hours Worked, Males, Canada, 1991

	Actual	WSE	Proportional	High Wage
1	0	0	0	0
2	1,069	1,154	1,444	1,299
3	1,419	1,610	1,313	1,036
4	1,340	1,506	1,153	973
5	1,511	1,609	1,186	1,052
6	1,593	1,644	1,195	1,077
7	1,700	1,667	1,244	1,132
8	1,805	1,810	1,312	1,279
9	1,809	1,859	1,318	1,438
10	1,937	1,899	1,339	1,449
11	1,880	1,893	1,317	1,426
12	1,919	1,903	1,281	1,440
13	1,995	1,918	1,278	1,468
14	2,045	1,946	1,250	1,460
15	2,061	1,966	1,231	1,473
16	2,064	1,949	1,203	1,540
17	2,121	1,970	1,212	1,568
18	2,053	1,963	1,147	1,333
19	2,153	1,971	1,098	1,497
20	2,301	1,977	1,191	1,627

Table A1-1b
Annual Hours Worked, Females; Canada, 1991

Vingillie	Actual	WSE	Proportional	High Wage
1	0	0	0	0
2	411	335	556	701
3	742	479	687	964
4	984	570	847	1,027
5	1,038	465	814	948
6	1,072	395	805	923
7	1,034	378	756	868
8	946	218	688	721
9	936	158	682	562
10	956	112	661	551
11	975	119	683	574
12	1,078	110	719	560
13	1,126	93	722	532
14	1,226	59	750	540
15	1,288	37	769	527
16	1,367	57	797	460
17	1,379	33	788	433
18	1,528	38	853	667
19	1,672	31	853	503
20	1,563	25	809	373

Table A1-2a Annual Hours Worked, Males; United States, 1991				
	Actual	WSE	Proportional	High Wage
1	74	122	1,870	1,874
2	994	1,172	1,240	775
3	1,453	1,426	1,267	1,138
4	1,757	1,600	1,315	1,196
5	1,760	1,605	1,236	1,356
6	1,906	1,713	1,256	1,305
7	1,923	1,761	1,265	1,368
8	2,021	1,799	1,251	1,459
9	2,001	1,803	1,291	1,500
10	2,107	1,867	1,261	1,566
11	2,102	1,868	1,255	1,588
12	2,128	1,870	1,255	1,638
13	2,172	1,897	1,192	1,543
14	2,214	1,935	1,212	1,623
15	2,220	1,937	1,226	1,650
16	2,301	1,951	1,172	1,533
17	2,259	1,944	1,175	1,518
18	2,343	1,961	1,183	1,677
19	2,349	1,958	1,179	1,595
20	2,494	1,955	1,279	1,640

Table A1-2b Annual Hours Worked, Females; United States, 1991				
Vingtile	Actual	WSE	Proportional	High Wage
1	5	73	130	126
2	609	828	760	1,225
3	841	574	733	862
4	916	400	685	804
5	1,087	395	764	644
6	1,130	287	744	695
7	1,117	239	735	632
8	1,209	201	749	541
9	1,100	197	709	500
10	1,234	133	739	434
11	1,247	132	745	412
12	1,263	130	745	362
13	1,472	103	808	457
14	1,440	65	788	377
15	1,402	63	774	350
16	1,627	49	828	467
17	1,585	56	825	482
18	1,620	39	817	323
19	1,637	42	821	405
20	1,405	45	721	360

Table A1-3a Annual Hours Worked, Males; Australia, 1989				
	Actual	WSE	Proportional	High Wage
1	0	0	0	0
2	516	486	1,462	620
3	1,774	1,680	1,390	1,854
4	1,889	1,815	1,436	1,139
5	1,978	1,851	1,497	1,435
6	1,999	1,888	1,554	1,540
7	2,102	1,906	1,558	1,589
8	2,108	1,899	1,559	1,551
9	2,161	1,934	1,534	1,626
10	2,215	1,951	1,539	1,612
11	2,203	1,948	1,408	1,368
12	2,162	1,953	1,356	1,434
13	2,228	1,942	1,345	1,423
14	2,207	1,944	1,268	1,493
15	2,252	1,970	1,264	1,414
16	2,242	1,980	1,223	1,557
17	2,285	1,942	1,224	1,435
18	2,300	1,963	1,181	1,426
19	2,392	1,976	1,196	1,533
20	2,479	1,964	1,223	1,578

Table A1-3b Annual Hours Worked, Females, Australia, 1989				
Vingtile	Actual	WSE	Proportional	High Wage
1	0	0	0	0
2	190	144	538	380
3	779	365	610	1,146
4	742	202	564	861
5	665	162	503	566
6	574	119	446	460
7	596	103	442	411
8	596	111	441	449
9	656	73	466	374
10	663	57	461	388
11	926	56	592	632
12	1,027	53	644	566
13	1,084	66	655	577
14	1,275	60	732	507
15	1,311	33	736	586
16	1,426	22	777	443
17	1,449	63	776	565
18	1,594	39	819	574
19	1,607	26	804	467
20	1,576	40	777	422

Table A1-4a Annual Hours Worked, Males; Finland, 1991				
	Actual	WSE	Proportional	High Wage
1	0	0	0	0
2	32	186	1,007	778
3	386	882	799	806
4	597	866	725	790
5	681	920	723	727
6	913	1,137	924	961
7	1,099	1,325	1,054	1,056
8	1,360	1,577	1,174	1,232
9	1,423	1,567	1,087	1,193
10	1,722	1,798	1,190	1,416
11	1,807	1,835	1,131	1,413
12	1,856	1,868	1,083	1,444
13	1,864	1,900	1,060	1,449
14	1,907	1,932	1,060	1,593
15	1,903	1,923	1,035	1,516
16	1,936	1,934	1,042	1,527
17	1,894	1,918	1,038	1,564
18	1,967	1,938	1,041	1,522
19	1,952	1,947	1,047	1,570
20	2,008	1,943	1,078	1,664

Table A1-4b
Annual Hours Worked, Females;Finland, 1991

Vingille	Actual	WSE	Proportional	High Wage
1	0	0	0	0
2	31	185	993	222
3	581	1,277	1,201	1,194
4	1,050	1,266	1,275	1,210
5	1,204	1,203	1,277	1,273
6	1,063	969	1,076	1,039
7	988	802	946	944
8	956	509	826	768
9	1,196	474	913	807
10	1,172	227	810	584
11	1,388	178	869	587
12	1,573	144	917	556
13	1,652	107	940	551
14	1,692	71	940	407
15	1,776	79	965	484
16	1,779	69	958	473
17	1,753	86	962	436
18	1,810	64	959	478
19	1,777	55	953	430
20	1,719	59	922	336

Table A1-5a Annual Hours Worked, Males; Netherlands, 1991				
	Actual	WSE	Proportional	High Wage
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	495	902	1,121	1,024
5	1,434	1,544	1,441	1,478
6	1,753	1,751	1,692	1,698
7	1,899	1,894	1,783	1,836
8	1,963	1,952	1,764	1,832
9	1,947	1,917	1,842	1,848
10	1,959	1,960	1,699	1,784
11	1,900	1,889	1,593	1,685
12	1,903	1,937	1,522	1,784
13	1,975	1,949	1,529	1,689
14	1,823	1,848	1,393	1,585
15	2,003	1,944	1,399	1,602
16	1,973	1,943	1,437	1,643
17	1,946	1,942	1,288	1,725
18	1,962	1,913	1,274	1,584
19	1,975	1,939	1,365	1,651
20	2,066	1,959	1,346	1,692

Table A1-5b Annual Hours Worked, Females, Netherlands, 1991				
Vingtille	Actual	WSE	Proportional	High Wage
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	389	993	879	976
5	557	470	559	522
6	319	255	308	302
7	231	113	217	164
8	262	50	236	168
9	167	90	158	152
10	347	41	301	216
11	485	118	407	315
12	597	67	478	216
13	609	53	471	311
14	795	157	607	415
15	860	59	601	398
16	774	59	563	357
17	1,076	61	712	275
18	1,119	93	726	416
19	919	62	635	349
20	1,004	43	654	308

Table A1-6a					
Total Annual Hours Worked; Males; WSB Earnings Distribution					
Vingtile	CN'91	US'91	AS'89	FI'91	NL'91
1	0.00	122.01	0.00	0.00	0.00
2	1,154.25	1,171.91	485.54	186.19	0.00
3	1,609.64	1,425.66	1,679.73	881.51	0.00
4	1,506.00	1,600.42	1,815.30	865.58	902.42
5	1,608.70	1,604.56	1,851.00	920.41	1,543.82
6	1,644.48	1,713.30	1,887.89	1,137.29	1,751.01
7	1,666.60	1,761.36	1,906.13	1,324.86	1,893.95
8	1,809.84	1,798.53	1,898.55	1,576.83	1,951.89
9	1,858.66	1,803.49	1,934.12	1,566.59	1,917.17
10	1,898.70	1,866.67	1,951.38	1,797.68	1,960.34
11	1,893.41	1,868.27	1,948.22	1,834.96	1,888.97
12	1,903.10	1,869.86	1,952.71	1,867.61	1,936.66
13	1,918.14	1,897.17	1,941.76	1,900.39	1,948.92
14	1,946.06	1,935.41	1,943.94	1,931.56	1,847.86
15	1,966.21	1,936.67	1,969.51	1,923.04	1,944.48
16	1,948.79	1,950.69	1,979.96	1,933.88	1,942.94
17	1,969.77	1,943.73	1,942.15	1,918.04	1,941.50
18	1,963.41	1,960.58	1,963.00	1,937.64	1,913.27
19	1,971.24	1,957.86	1,975.74	1,947.49	1,939.26
20	1,976.89	1,954.99	1,963.58	1,943.43	1,959.46
Average	1,710.69	1,707.16	1,749.51	1,469.75	1,559.20

Table A1-6b
Total Annual Hours Worked: Females; WSH Earnings Distribution

Vingille	CN'91	US'91	AS'89	FI'91	NL'91
1	0.00	73.34	0.00	0.00	0.00
2	335.00	828.09	144.14	185.08	0.00
3	478.68	574.34	365.24	1,277.10	0.00
4	570.36	399.58	201.63	1,266.17	993.07
5	464.74	395.44	161.92	1,202.69	470.17
6	395.15	286.70	118.83	969.45	255.03
7	378.35	238.64	102.58	801.81	112.51
8	218.34	201.47	111.45	509.26	49.96
9	157.51	196.51	72.68	474.06	90.19
10	111.86	133.33	56.50	227.34	41.08
11	119.05	131.73	55.65	177.75	117.72
12	109.93	130.14	52.70	144.09	66.51
13	93.45	102.83	65.92	106.99	52.69
14	58.99	64.59	60.22	71.42	157.06
15	37.47	63.33	33.14	79.45	59.08
16	56.78	49.31	21.87	68.56	58.75
17	32.68	56.27	62.54	85.90	60.52
18	38.43	39.42	39.37	64.01	92.51
19	30.69	42.14	26.05	54.74	62.48
20	25.13	45.01	39.52	59.14	42.73
Average	185.63	202.61	89.60	391.25	139.10

Table A1-7a
Total Annual Hours Worked: Males; Proportional Hours Earnings Distribution

Vingille	CN'91	US'91	AS'89	FR'91	NL'91
1	0.00	1,870.11	0.00	0.00	0.00
2	1,444.33	1,240.07	1,462.42	1,007.26	0.00
3	1,313.30	1,266.74	1,389.88	798.93	0.00
4	1,153.11	1,314.66	1,435.74	725.45	1,120.91
5	1,185.55	1,236.47	1,496.73	722.66	1,440.95
6	1,195.45	1,255.65	1,553.93	924.11	1,692.06
7	1,243.69	1,265.20	1,558.26	1,053.64	1,783.36
8	1,312.19	1,251.18	1,559.11	1,174.46	1,764.32
9	1,318.11	1,290.76	1,534.21	1,086.72	1,841.60
10	1,339.15	1,261.22	1,539.16	1,190.13	1,699.08
11	1,316.83	1,255.46	1,407.91	1,131.21	1,593.24
12	1,280.87	1,254.91	1,356.11	1,082.67	1,522.29
13	1,278.27	1,191.90	1,345.41	1,060.23	1,528.61
14	1,250.38	1,211.90	1,267.64	1,059.71	1,392.59
15	1,230.89	1,225.90	1,264.07	1,034.66	1,399.05
16	1,203.26	1,171.61	1,222.54	1,042.24	1,436.64
17	1,212.01	1,175.43	1,223.76	1,038.48	1,288.18
18	1,146.70	1,182.58	1,181.43	1,041.40	1,273.65
19	1,097.51	1,178.78	1,196.19	1,046.73	1,364.95
20	1,191.07	1,279.39	1,222.75	1,077.65	1,345.70
Average	1,185.63	1,269.00	1,310.86	964.92	1,274.36

Table A1-7b
Total Annual Hours Worked, Females; Proportional Hours Earnings Distribution

Vingille	CN'91	US'91	AS'89	PI'91	NL'91
1	0.00	129.89	0.00	0.00	0.00
2	555.67	759.93	537.58	992.74	0.00
3	686.70	733.26	610.12	1,201.07	0.00
4	846.89	685.34	564.26	1,274.55	879.09
5	814.45	763.53	503.27	1,277.34	559.05
6	804.55	744.35	446.07	1,075.89	307.94
7	756.31	734.80	441.74	946.36	216.64
8	687.81	748.82	440.89	825.54	235.68
9	681.89	709.24	465.79	913.28	158.40
10	660.85	738.78	460.84	809.87	300.92
11	683.17	744.54	592.09	868.79	406.76
12	719.13	745.09	643.89	917.33	477.71
13	721.73	808.10	654.59	939.77	471.39
14	749.62	788.10	732.36	940.29	607.41
15	769.11	774.10	735.93	965.34	600.95
16	796.74	828.39	777.46	957.76	563.36
17	787.99	824.57	776.24	961.52	711.82
18	853.30	817.42	818.57	958.60	726.35
19	852.57	821.22	803.81	953.27	635.05
20	808.93	720.61	777.25	922.35	654.30
Average	711.87	731.00	589.14	935.08	425.64

Table A1-8a
Total Annual Hours Worked, Males; High Wage Earnings Distribution

Vingille	CN'91	US'91	AS'89	PI'91	NL'91
1	0.00	1,873.92	0.00	0.00	0.00
2	1,298.70	774.55	619.69	777.80	0.00
3	1,036.21	1,137.94	1,853.75	806.21	0.00
4	973.19	1,195.90	1,138.70	789.71	1,024.32
5	1,051.61	1,356.39	1,434.50	726.64	1,477.85
6	1,076.99	1,305.40	1,539.58	960.83	1,697.70
7	1,131.53	1,367.76	1,589.03	1,056.10	1,835.92
8	1,279.37	1,459.07	1,550.84	1,232.22	1,831.82
9	1,438.03	1,499.53	1,626.33	1,192.94	1,848.40
10	1,449.22	1,566.47	1,612.05	1,416.21	1,784.39
11	1,425.53	1,587.55	1,368.47	1,413.15	1,684.72
12	1,440.43	1,637.64	1,433.81	1,444.28	1,784.23
13	1,467.85	1,542.96	1,422.59	1,448.56	1,688.70
14	1,460.24	1,623.07	1,492.78	1,593.10	1,584.97
15	1,472.80	1,650.30	1,414.28	1,516.27	1,602.23
16	1,539.66	1,532.61	1,557.00	1,526.89	1,643.01
17	1,567.50	1,517.54	1,434.86	1,564.13	1,725.44
18	1,333.20	1,677.23	1,426.03	1,521.95	1,584.14
19	1,496.54	1,594.86	1,533.29	1,570.38	1,651.06
20	1,627.24	1,639.94	1,578.45	1,663.67	1,691.94
Average	1,278.29	1,477.03	1,381.30	1,211.05	1,407.04

Table A1-8b
Total Annual Hours Worked, Females, High Wage Earnings Distribution

Vingtile	CN'91	US'91	AS'89	FI'91	NI'91
1	0.00	126.08	0.00	0.00	0.00
2	701.30	1,225.45	380.31	222.20	0.00
3	963.79	862.06	1,146.25	1,193.79	0.00
4	1,026.81	804.10	861.30	1,210.29	975.68
5	948.39	643.61	565.50	1,273.36	522.15
6	923.01	694.60	460.42	1,039.17	302.30
7	868.47	632.24	410.97	943.90	164.08
8	720.63	540.93	449.16	767.78	168.18
9	561.97	500.47	373.67	807.06	151.60
10	550.78	433.53	387.95	583.79	215.61
11	574.47	412.45	631.53	586.85	315.28
12	559.57	362.36	566.19	555.72	215.77
13	532.15	457.04	577.41	551.44	311.30
14	539.76	376.93	507.22	406.90	415.03
15	527.20	349.70	585.72	483.73	397.77
16	460.34	467.39	443.00	473.11	356.99
17	432.50	482.46	565.14	435.87	274.56
18	666.80	322.77	573.97	478.05	415.86
19	503.46	405.14	466.71	429.62	348.94
20	372.76	360.06	421.55	336.33	308.06
Average	621.71	522.97	518.70	638.95	292.96

Table A1-9a
Total Annual Hours Worked; Males; High Wage Farmings Distribution

Vingille	CN'91	US'91	AS'89	PI'91	NI'91
1	0.00	1,873.92	0.00	0.00	0.00
2	1,298.70	774.55	619.69	777.80	0.00
3	1,036.21	1,137.94	1,853.75	806.21	0.00
4	973.19	1,195.90	1,138.70	789.71	1,024.32
5	1,051.61	1,356.39	1,434.50	726.64	1,477.85
6	1,076.99	1,305.40	1,539.58	960.83	1,697.70
7	1,131.53	1,367.76	1,589.03	1,056.10	1,835.92
8	1,279.37	1,459.07	1,550.84	1,232.22	1,831.82
9	1,438.03	1,499.53	1,626.33	1,192.94	1,848.40
10	1,449.22	1,566.47	1,612.05	1,416.21	1,784.39
11	1,425.53	1,587.55	1,368.47	1,413.15	1,684.72
12	1,440.43	1,637.64	1,433.81	1,444.28	1,784.23
13	1,467.85	1,542.96	1,422.59	1,448.56	1,688.70
14	1,460.24	1,623.07	1,492.78	1,593.10	1,584.97
15	1,472.80	1,650.30	1,414.28	1,516.27	1,602.23
16	1,539.66	1,532.61	1,557.00	1,526.89	1,643.01
17	1,567.50	1,517.54	1,434.86	1,564.13	1,725.44
18	1,333.20	1,677.23	1,426.03	1,521.95	1,584.14
19	1,496.54	1,594.86	1,533.29	1,570.38	1,651.06
20	1,627.24	1,639.94	1,578.45	1,663.67	1,691.94

Table A1-9b
Total Annual Hours Worked; Females; High Wage Earnings Distribution

Vingille	CN'91	US'91	AS'89	FI'91	NI'91
1	0.00	126.08	0.00	0.00	0.00
2	701.30	1,225.45	380.31	222.20	0.00
3	963.79	862.06	1,146.25	1,193.79	0.00
4	1,026.81	804.10	861.30	1,210.29	975.68
5	948.39	643.61	565.50	1,273.36	522.15
6	923.01	694.60	460.42	1,039.17	302.30
7	868.47	632.24	410.97	943.90	164.08
8	720.63	540.93	449.16	767.78	168.18
9	561.97	500.47	373.67	807.06	151.60
10	550.78	433.53	387.95	583.79	215.61
11	574.47	412.45	631.53	586.85	315.28
12	559.57	362.36	566.19	555.72	215.77
13	532.15	457.04	577.41	551.44	311.30
14	539.76	376.93	507.22	406.90	415.03
15	527.20	349.70	585.72	483.73	397.77
16	460.34	467.39	443.00	473.11	356.99
17	432.50	482.46	565.14	435.87	274.56
18	666.80	322.77	573.97	478.05	415.86
19	503.46	405.14	466.71	429.62	348.94
20	372.76	360.06	421.55	336.33	308.06

Table A1.9a
 Cross Country Comparison of Male Annual Pre-Tax Earnings Standardized For Differences in Prices;
 Married Couples; Actual Earnings distribution
 (Valued in 1991 US Dollars)

Vingtile	CN'91	US'91	AS'89	FI'91	NL'91
1	0	9	0	0	0
2	576	1,770	112	158	0
3	3,880	5,785	2,633	2,262	0
4	6,605	9,058	8,086	4,021	2,797
5	9,447	11,413	12,547	5,289	11,961
6	12,235	13,213	16,430	7,686	16,690
7	14,244	16,004	18,522	9,824	19,732
8	18,546	19,127	20,074	12,675	21,749
9	22,234	22,381	22,052	13,710	23,169
10	24,701	24,125	23,903	16,924	23,805
11	26,782	26,804	24,149	17,830	23,921
12	28,168	29,079	24,869	18,768	24,954
13	30,375	30,363	26,283	19,758	26,564
14	31,600	33,997	26,889	21,788	26,072
15	33,963	37,114	29,217	23,081	27,456
16	35,373	38,454	30,294	25,137	30,656
17	39,935	41,820	32,947	28,610	30,414
18	41,765	49,911	34,847	32,276	32,248
19	45,914	56,757	40,746	39,689	39,425
20	76,881	81,437	60,333	57,339	59,114

Table A1.9b
 Cross Country Comparison of Annual Female Pre-Tax Earnings Standardized For Differences in Prices
 Married Couples; Actual Earnings Distribution
 (Valued in Nominal Dollars)

Vingtile	CN'91	US'91	AS'89	FI'91	NL'91
1	0	19	0	0	0
2	1,568	2,447	257	179	0
3	4,359	4,413	4,490	3,571	0
4	6,699	5,424	5,867	6,774	2,733
5	8,227	6,920	5,000	8,642	4,233
6	8,952	8,145	3,943	8,313	3,033
7	9,948	8,714	4,124	8,427	2,047
8	8,586	8,790	4,934	7,870	1,812
9	8,038	8,536	5,283	9,489	1,788
10	8,328	9,978	5,794	8,877	2,725
11	9,199	10,198	7,797	10,792	4,403
12	10,655	11,112	9,336	12,458	5,164
13	11,317	13,373	10,183	13,749	5,395
14	13,298	13,514	12,181	14,122	7,943
15	14,425	14,432	12,806	15,779	8,674
16	16,648	17,902	14,697	16,922	7,914
17	16,427	20,448	15,717	17,675	11,143
18	20,590	20,701	18,273	20,372	13,409
19	25,255	26,066	19,419	22,371	11,593
20	29,335	28,682	25,187	26,952	15,635

Table A1.10a
 Cross Country Comparison of Male Annual Pre-Tax Earnings Standardized For Differences in Prices and Family Size;
 Married Couples; (Valued in 1991 US Dollars)

Vintage	CN'91	US'91	AS'89	FI'91	NL'91
1	0	5	0	0	0
2	240	824	43	79	0
3	1,630	2,463	1,118	1,091	0
4	2,809	3,752	3,421	1,882	1,235
5	4,134	4,745	5,117	2,464	5,419
6	5,297	5,617	7,020	3,586	6,746
7	6,062	6,951	7,769	4,420	8,038
8	7,707	8,474	8,415	5,874	8,898
9	9,511	9,247	8,987	6,312	9,507
10	10,292	10,307	9,568	7,570	9,609
11	11,106	11,384	9,956	7,992	9,889
12	11,600	11,942	9,986	8,562	10,534
13	13,359	13,359	10,854	8,846	11,466
14	13,043	14,283	11,388	9,909	11,744
15	14,072	15,988	12,424	10,073	12,293
16	14,392	16,570	13,108	10,994	13,965
17	16,764	18,250	14,063	12,898	14,321
18	17,815	21,517	15,244	14,289	14,788
19	19,454	24,409	17,559	16,640	17,703
20	32,982	36,389	25,045	24,521	26,215

Table A1.10b
 Cross Country Comparison of Annual Female Pre-Tax Earnings Standardized For Differences in Prices and Family Size,
 Married Couples; Actual Earnings Distribution
 (Valued in Nominal Dollars)

Vingille	CN'91	US'91	AS'89	FI'91	NL'91
1	0	8	0	0	0
2	664	1,089	110	82	0
3	1,912	2,059	1,911	1,688	0
4	2,836	2,518	2,641	3,306	1,336
5	3,513	3,077	2,269	4,248	2,269
6	3,974	3,814	1,867	3,908	1,565
7	4,445	3,933	1,916	4,069	1,009
8	3,613	4,025	2,275	3,814	824
9	3,595	3,831	2,395	4,534	864
10	3,672	4,580	2,596	4,206	1,360
11	4,185	4,575	3,415	4,996	2,214
12	4,673	4,907	4,092	5,780	2,546
13	4,975	6,170	4,625	6,210	2,619
14	5,675	6,048	5,541	6,422	3,940
15	6,271	6,518	5,833	6,949	4,470
16	6,910	8,167	6,778	7,585	4,074
17	7,224	9,412	7,203	8,063	5,864
18	9,056	9,448	8,489	9,009	6,660
19	11,115	11,548	8,891	9,377	5,907
20	13,035	13,084	11,199	11,452	7,671

Number of Children	Netherlands	Finland	U.S.	Canada	Australia
0	50.50	46.10	43.30	44.10	41.00
1	14.90	22.10	22.40	19.60	19.70
2	24.50	22.40	22.60	25.10	24.60
3	8.20	7.30	8.50	8.50	11.00
4	1.50	1.50	2.20	2.20	2.70
5	0.30	0.30	0.70	0.30	0.60
6	0.10	0.10	0.10	0.10	0.20
7	0.00	0.10	0.10	0.00	0.10
8	0.00	0.10	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	4	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00

Appendix B
Supporting Tables for Chapter 3

Vingtile	Actual	WSE	Proportional	High Wage
1	404.74	N/A	1,493.75	N/A
2	1,081.56	N/A	1,622.61	N/A
3	1,435.37	N/A	1,594.57	N/A
4	1,539.79	N/A	1,671.57	N/A
5	1,749.04	N/A	1,672.79	N/A
6	1,809.80	N/A	1,681.46	N/A
7	1,837.70	N/A	1,693.24	N/A
8	1,878.94	N/A	1,611.07	N/A
9	1,908.79	N/A	1,666.35	N/A
10	1,987.67	N/A	1,590.08	N/A
11	1,925.85	N/A	1,559.61	N/A
12	2,003.73	N/A	1,520.81	N/A
13	1,980.29	N/A	1,489.40	N/A
14	2,034.93	N/A	1,463.99	N/A
15	2,040.51	N/A	1,418.91	N/A
16	2,089.60	N/A	1,411.04	N/A
17	2,069.84	N/A	1,348.10	N/A
18	2,065.56	N/A	1,360.30	N/A
19	2,144.52	N/A	1,364.98	N/A
20	2,260.71	N/A	1,459.79	N/A

Table A2.1b				
Annual Hours Worked, Females; CN75H				
Vingtile	Actual	WSE	Proportional	High Wage
1	137.17	N/A	506.25	N/A
2	251.55	N/A	377.39	N/A
3	364.95	N/A	405.43	N/A
4	302.54	N/A	328.43	N/A
5	342.12	N/A	327.21	N/A
6	342.85	N/A	318.54	N/A
7	332.93	N/A	306.76	N/A
8	453.59	N/A	388.93	N/A
9	382.20	N/A	333.65	N/A
10	512.42	N/A	409.92	N/A
11	543.80	N/A	440.39	N/A
12	631.35	N/A	479.19	N/A
13	678.89	N/A	510.60	N/A
14	745.04	N/A	536.01	N/A
15	835.66	N/A	581.09	N/A
16	872.19	N/A	588.96	N/A
17	1,000.92	N/A	651.90	N/A
18	971.36	N/A	639.70	N/A
19	997.69	N/A	635.02	N/A
20	836.59	N/A	540.21	N/A

Vingtile	Actual	WSE	Proportional	High Wage
1	0.00	0.00	0.00	0.00
2	1,069.08	1,094.81	1,429.66	1,167.83
3	1,539.23	1,518.90	1,282.22	768.84
4	1,632.01	1,656.41	1,297.93	1,104.85
5	1,702.54	1,700.23	1,343.80	1,159.36
6	1,828.00	1,749.43	1,368.36	1,334.78
7	1,861.86	1,802.61	1,334.08	1,355.25
8	1,975.38	1,860.59	1,478.54	1,566.81
9	2,026.60	1,910.19	1,437.63	1,509.31
10	1,951.58	1,873.76	1,404.51	1,727.14
11	1,965.49	1,881.51	1,332.35	1,404.30
12	2,015.39	1,943.96	1,384.37	1,502.34
13	2,129.75	1,946.47	1,340.73	1,575.19
14	2,077.14	1,959.58	1,349.09	1,633.52
15	2,136.72	1,978.78	1,317.20	1,600.18
16	2,055.92	1,934.38	1,249.33	1,584.03
17	2,152.84	1,942.97	1,272.16	1,548.65
18	2,164.34	1,967.14	1,213.22	1,567.97
19	2,206.00	1,977.74	1,161.41	1,484.38
20	2,305.15	1,964.55	1,212.63	1,592.06

Table A2.2b				
Annual Hours Worked, Females; CN87H				
Vingtile	Actual	WSE	Proportional	High Wage
1	0.00	0.00	0.00	0.00
2	426.49	498.52	570.34	832.17
3	861.65	573.63	717.78	1,231.16
4	882.78	400.32	702.07	895.15
5	831.38	355.27	656.20	840.64
6	843.81	300.18	631.64	665.22
7	929.36	239.81	665.92	644.75
8	696.69	173.73	521.46	433.19
9	792.76	103.97	562.37	490.69
10	827.43	141.25	595.49	272.86
11	984.93	132.44	667.65	595.70
12	896.24	65.50	615.63	497.66
13	1,047.26	58.06	659.27	424.81
14	1,002.17	44.58	650.91	366.48
15	1,107.61	23.69	682.80	399.82
16	1,235.32	70.34	750.67	415.97
17	1,231.69	61.16	727.84	451.35
18	1,403.60	35.26	786.78	432.03
19	1,592.83	23.20	838.59	515.62
20	1,496.74	36.61	787.37	407.94

Vingtile	Actual	WSE	Proportional	High Wage
1	0.00	0.00	0.00	2,000.00
2	1,068.58	1,154.25	1,444.33	1,298.70
3	1,418.78	1,609.64	1,313.30	1,036.21
4	1,340.46	1,506.00	1,153.11	973.19
5	1,511.12	1,608.70	1,185.55	1,051.61
6	1,592.93	1,644.48	1,195.45	1,076.99
7	1,699.85	1,666.60	1,243.69	1,131.53
8	1,804.76	1,809.84	1,312.19	1,279.37
9	1,808.63	1,858.66	1,318.11	1,438.03
10	1,937.42	1,898.70	1,339.15	1,449.22
11	1,879.87	1,893.41	1,316.83	1,425.53
12	1,919.20	1,903.10	1,280.87	1,440.43
13	1,994.75	1,918.14	1,278.27	1,467.85
14	2,045.36	1,946.06	1,250.38	1,460.24
15	2,060.82	1,966.21	1,230.89	1,472.80
16	2,064.15	1,948.79	1,203.26	1,539.66
17	2,120.59	1,969.77	1,212.01	1,567.50
18	2,053.02	1,963.41	1,146.70	1,333.20
19	2,152.93	1,971.24	1,125.61	1,496.54
20	2,301.10	1,976.89	1,191.07	1,627.24

Vingtile	Actual	WSE	Proportional	High Wage
1	0.00	0.00	0.00	0.00
2	411.11	335.00	555.67	701.30
3	741.85	478.68	686.70	963.79
4	984.48	570.36	846.89	1,026.81
5	1,038.11	464.74	814.45	948.39
6	1,072.06	395.15	804.55	923.01
7	1,033.71	378.35	756.31	868.47
8	946.00	218.34	687.81	720.63
9	935.64	157.51	681.89	561.97
10	956.09	111.86	660.85	550.78
11	975.28	119.05	683.17	574.47
12	1,077.52	109.93	719.13	559.57
13	1,126.26	93.45	721.73	532.15
14	1,226.23	58.99	749.62	539.76
15	1,287.68	37.47	769.11	527.20
16	1,366.78	56.78	796.74	460.34
17	1,378.71	32.68	787.99	432.50
18	1,527.71	38.43	853.30	666.80
19	1,672.44	30.69	874.39	503.46
20	1,562.82	25.13	808.93	372.76

Vingtile	Actual	WSE	Proportional	High Wage
1	0.00	0.00	0.00	1,359.43
2	555.40	586.63	1,376.52	1,204.53
3	1,380.82	1,462.64	1,292.25	1,159.37
4	1,386.15	1,464.93	1,154.76	1,207.38
5	1,553.62	1,626.67	1,232.59	1,197.01
6	1,706.81	1,664.96	1,246.45	1,263.95
7	1,782.29	1,712.40	1,267.75	1,331.88
8	1,844.56	1,795.65	1,297.88	1,400.55
9	1,863.03	1,828.89	1,303.65	1,410.91
10	1,935.61	1,853.30	1,271.84	1,472.91
11	2,024.67	1,901.61	1,283.10	1,402.01
12	2,050.84	1,910.90	1,264.68	1,470.33
13	2,079.91	1,920.77	1,251.99	1,504.22
14	2,048.11	1,933.18	1,215.20	1,506.64
15	2,058.08	1,934.45	1,190.67	1,486.26
16	2,118.36	1,956.65	1,208.40	1,517.65
17	2,122.24	1,955.74	1,175.51	1,494.56
18	2,143.80	1,965.90	1,141.77	1,455.27
19	2,220.27	1,965.62	1,131.84	1,549.59
20	2,350.78	1,968.11	1,167.65	1,600.60

Vingtile	Actual	WSE	Proportional	High Wage
1	0.00	0.00	0.00	640.57
2	251.56	242.44	623.48	795.47
3	756.26	627.51	707.75	840.63
4	1,014.61	609.68	845.24	792.62
5	967.29	414.40	767.41	802.99
6	1,031.87	369.07	753.55	736.05
7	1,029.45	320.76	732.25	668.12
8	997.85	229.92	702.12	599.45
9	995.14	189.79	696.35	589.09
10	1,108.18	160.29	728.16	527.09
11	1,131.23	108.83	716.90	597.99
12	1,192.42	97.03	735.32	529.67
13	1,242.65	86.82	748.01	495.78
14	1,322.70	71.45	784.80	493.36
15	1,398.92	71.07	809.33	513.74
16	1,387.69	46.77	791.60	482.35
17	1,488.53	47.30	824.49	505.44
18	1,611.43	35.57	858.23	544.73
19	1,703.02	35.85	868.16	450.41
20	1,675.73	33.47	832.35	399.40

Appendix C

Technical Appendix: Inequality Indices

Appendix C

The three measures of inequality used in this study include the following:

Gini Coefficient

The Gini coefficient is equal to the ratio of the area enclosed by the Lorenz Curve and the diagonal line of perfect equality. Alternatively, the Gini coefficient can be thought of as the expected difference (in a relative sense) between two incomes, drawn at random from the income distribution. The formula for the Gini index is given by

$$G = [1/(2n^2\mu)] \sum_{i=1}^n \sum_{j=1}^n |y_i - y_j|$$

where $|.$ represents the "absolute value of" the difference between random y_i and random y_j . The Gini coefficient can also be written in the following form (which is the form which was used in the estimation procedure for this thesis):

$$G = 1 + (1/2n) - [2/(n^2\mu)] \sum_{i=1}^n (n - i + 1) y_i$$

where n is the number of households or individuals in the distribution, y_i is the income (or earnings) measure, and μ is the mean income (earnings) measure. Individual's income (earnings) is ranked in ascending order.

Theil Index

The formula for Theil's "entropy" index, T , is as follows:

$$T = (1/n) \sum_{i=1}^n (y_i / \mu) \log (y_i / \mu)$$

where n is the number of households or individuals in the distribution, y_i is the income (or earnings) measure, and μ is the mean income (earnings) measure.

Atkinson Index

The formula for the Atkinson index is as follows:

$$A_E = 1 - \left[\frac{1}{n} \sum_{i=1}^n (y_i/\mu)^{1-e} \right]^{1/(1-e)} \quad e \neq 1; e \geq 0$$

$$= 1 - \exp \left[\frac{1}{n} \sum_{i=1}^n \log_e (y_i/\mu) \right]; e = 1;$$

where $\exp[\cdot] = e^{(\cdot)}$, n is the number of households or individuals in the distribution examined, y_i is the income (or earnings) measure, and μ is the mean income (earnings) measure.

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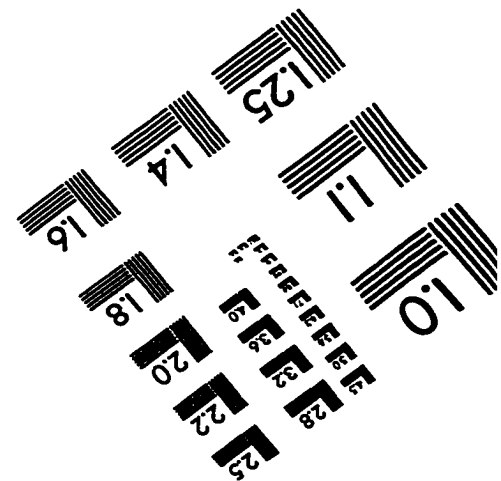
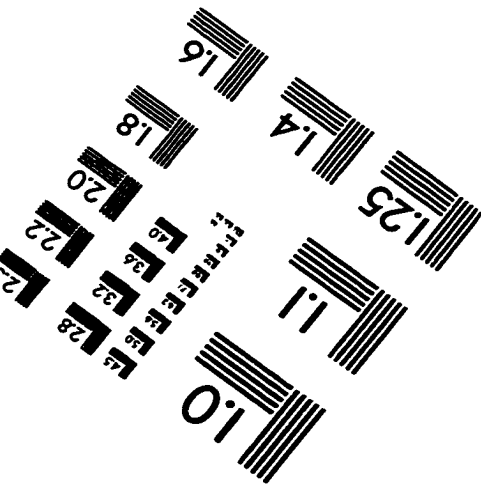
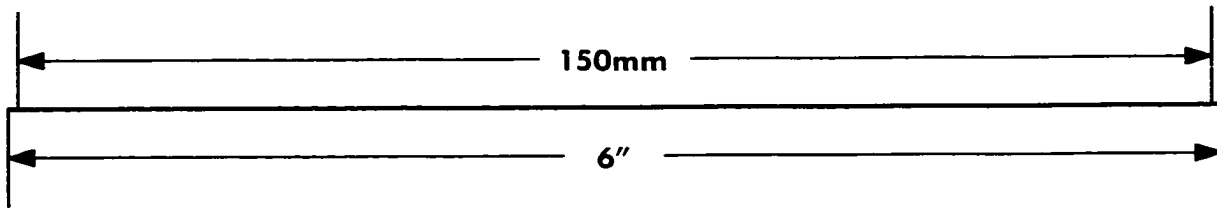
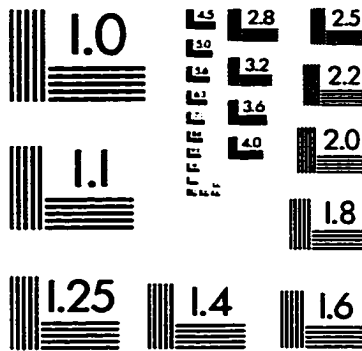
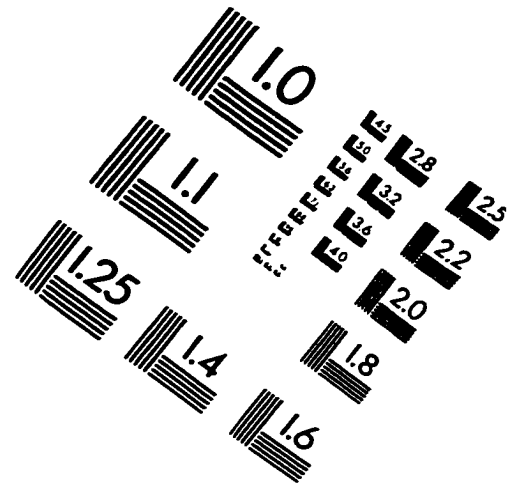
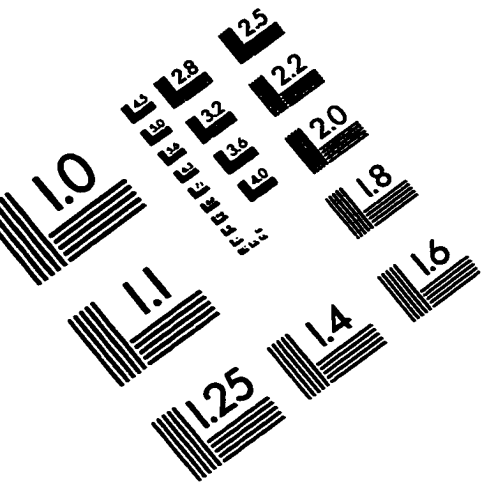
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IMAGE EVALUATION TEST TARGET (QA-3)



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