

Chapter 3

Hours, Leisure and Wellbeing 1911-1981

Changes in working hours seems to us, to be among the most interesting and least investigated areas of labour economics. As we discussed in the previous chapter, the magnitudes involved have been very large: the working week has been reduced from around sixty to less than forty hours in about a century, paid holidays have more than doubled, and so on. It now seems amazing that people once worked ten hours a day and six days a week. All this should highlight the contribution made to the well-being of the ordinary people of this and other countries by the more than one-third reduction in working hours since 1850. But as we suggested in the previous chapter, this additional leisure has been purchased at the expense of potential output. As productivity has risen there has been a choice between continuing to work long hours, thus benefiting from the large additions to output, and being satisfied with a lower rate of growth of material well-being, accompanied by increased leisure. Australian workers seem to have chosen earlier than those in other countries to reduce their hours. Our rate of economic growth thus was slowed as a consequence of taking more of the benefits of potential material well-being as leisure. If we are trying to assess the standard of living of Australians in relation to other groups, we cannot ignore the contribution made by the reduction in the working week. In this Chapter we seek to assess just how important it has been relative to other factors which influence the amount of leisure people can expect to enjoy over their lifetimes.

The essential point is that both income and leisure should be seen as contributing to the well-being of workers (compare Withers (1977)). One's income probably influences the enjoyment one gets from leisure, and the fact that one is able to enjoy leisure may influence one's productiveness and ability to earn income. This complementarity complicates assessment, but while the trade off may

not be explicit, it is nonetheless real. We feel that the question of hours reductions is best seen in the context of its contribution to changes in the living standards of Australians.

3.1 Work and Well-being

One of the central interests of economists and perhaps all social scientists is the well-being of the citizenry. The argument that policy x is in the "public interest" is almost invariably raised in any policy debate. Despite this, or perhaps because of it, there is no general agreement on how one might measure general well-being or the public interest in any given situation. The issue has become submerged in technical controversy on social choice with no clear resolution in prospect. In the absence of any generally accepted alternative, gross domestic product per capita has tended to be used as the most widely accepted general guide to well-being.

In the Australian case, this has produced an interesting historical conundrum which is illustrated in Figure 3.1 : did Australian living standards stagnate between 1890 and 1940? McLean and Pincus (1982, 1983) have addressed this question directly. They point out that the long flat period between 1890 and 1940 coincides with some significant changes in hours of work, retirement age and life expectancy. Adjusting upward the GDP figures for that period to allow for the reduction in the labour supply arising from these social changes, McLean and Pincus calculate that GDP for that period might have grown by 1.7 percent per year without those changes, rather than the 0.6 percent implied in Figure 3.1. This compares more favourably with the 1.46 percent for 1861-1891 and 2.02 percent for 1938/39-1973-74 for the unadjusted growth rates for those periods. Unfortunately McLean and Pincus have not yet extended their adjustments to those periods. It is clear, however, that allowing for the voluntary reduction in labour supply below its potential can lead to substantial changes in perceived trends in well-being. Since we know that hours were reduced significantly in the 1870s and late 1940s, we can suggest that the potential growth rates for those periods would also have to be adjusted upward significantly.

Here we address the question of trends in the well-being of Australians arising from changes in hours, retirement and life expectancy, although from a different perspective. The basic question remains—how does one value gains in leisure? McLean and Pincus assumed implicitly that each additional hour of

Figure 3.1: Real GDP per capita 1860-1982
(1966/67 = 100)

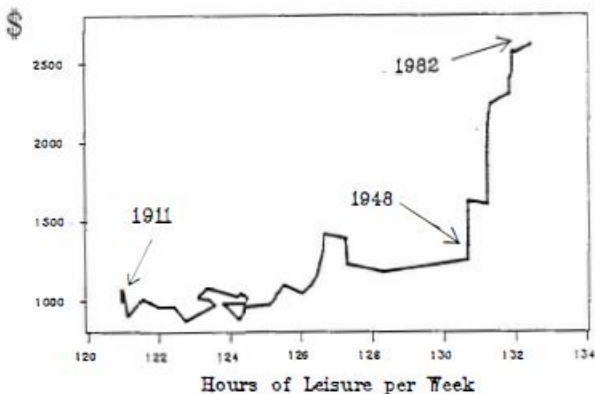


Source: Mclean and Pincus (1982) and ABS National Accounts.

leisure should be valued at the average wage received for each working hour. The value one should give to leisure for aggregation with income has been the subject of considerable academic debate (e.g. Nordhaus and Tobin (1972) and Usher (1980)) but remains moot. The appropriate measure is not obvious.

Faced with these problems of aggregating measures of time spent in work and leisure with income measures, we prefer to explore time-use patterns themselves in some detail to see what they can tell us about well-being gains taken in the form of leisure. Rather than trying to place money values on additional leisure we simply try to calculate the additional hours of leisure people have enjoyed as a result of hours reductions, and changes in their labour force participation and in their life expectancy. In this way we can compare the alterations of income-versus-leisure gains without the necessity for aggregation. We do however provide some money aggregates for contrast.

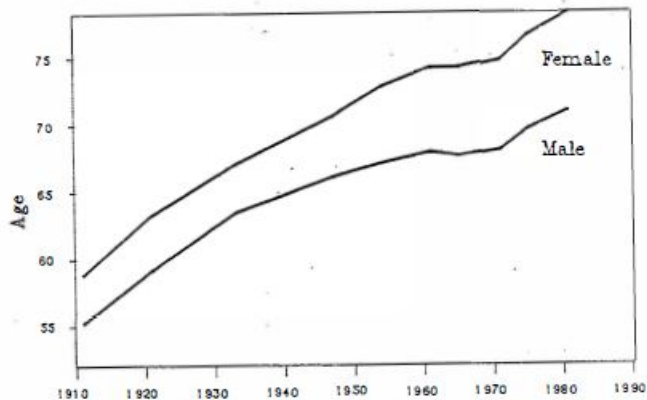
Figure 3.2: Real GDP per capita and 'leisure'



Sources: GDP per capita figures from McLean and Pincus (1982), leisure series from Chapter 2.

Figure 3.2 provides a first impression. The relationship between income and leisure (here 168 minus standard male working hours) appears to change quite dramatically in the middle of this century. If we think of shifts in a north-easterly direction as indicating gains in well-being, the relative contributions of income and leisure to well-being seem to have changed, with leisure contributing more in the first half and income more in the second. If this reflects a change in preferences for income and leisure it renders even more perilous their aggregation with a fixed utility function as attempted by Usher (1980).

Figure 3.3: Life expectancy
Life Expectancy at Birth



Source: Australian Year Book, 1982, p.104. Life Expectancy at birth.

3.2 Life Expectancy

Changes in working hours are not the only way in which we get more leisure. One of the most important contributors to improvement in welfare over time is increased life expectancy. Between the censuses of 1911 and 1981 the average Australian male has enjoyed an increased lifespan of 16 years while females have added 19 years. It is difficult to know how to weight additional years of life in a measure of living standards, but these extra years of life may well constitute the greatest single improvement to our well-being. One can ask counter-factually—how much money would you need to be given now to forgo the last 16 or 19 years of your life? Compare that amount with your expected lifetime expenditure, and you have some idea of the value of those years of life.

Figure 3.3 presents the life expectation at birth of individuals. These are calculated assuming that the age-specific death rates at that time continued throughout their lifetime. Two features stand out: the fact that women enjoy much greater life expectancies than men, and that life expectancy has increased markedly for both genders. Women lived six percent longer than men at the turn of the century and now live 10 percent longer. If years of life are as highly prized as we suggested above, then it is clear that, *ceteris paribus*, women are much better off than men. For both genders, lives are more than 25 percent longer now than

they were at the start of the century, although the rate of increase of life expectancy may have slowed.

Accounting for the contribution by this increased span of existence to our well-being is difficult. It is important, however, because much of the increase was gained in the pre-1950 period when per capita income was growing slowly. A well-being trend derived from the GDP figures but augmented by the extra years of life may look quite different from the raw figures presented in Figure 3.1. Imputing a value to those years can be done by seeing how much people have been willing to pay at different times for those improved age-specific survival rates, or by the shorthand method of evaluating their expected lifetime consumption streams. Following McLean and Pincus, we try the latter course. Extra years of life are valued at the additional consumption one would expect to have over the expanded lifetime. To measure the life expectancy of individuals at the various census dates, we are assuming that the age-specific death rates at that census continued throughout their lives. Our length of life measure thus relates to a fictitious person who lives all the years of his or her life on a cross-sectional basis in the year of the census. This simplifies drastically our decision on how to measure lifetime consumption, but biases the welfare measure downwards when consumption is growing. We simply take per capita consumption in the year of the census and multiply it by the years of expected life to produce expected lifetime consumption. In effect we have assumed a zero rate of time discount and a zero rate of growth.

Table 3.1 presents a comparison of indices of GDP per capita with expected lifetime consumption for males and females, all to indices based at 100 in 1891. The results suggest that GDP/capita measures significantly understate improvements in well-being from 1891 to 1933, compared to measures which allow for the value of longer lives. Rather than living standards remaining constant over that period, our measures suggest they rose by some 30 percent. Our figures also suggest that females enjoy a well-being advantage over males of some 10 percent as a result of their longer lives. Since the per capita consumption figures are not gender-specific, they may over or under-state female consumption relative to males. The growth rate for well-being from 1891-1947 for the GDP measures was about 0.4 percent per year, rising to about 2.0 percent after that. Our lifetime consumption measures go from 0.8 percent per year in the earlier period to around 2.5 percent more recently.

Table 3.1: Various measures of wellbeing
(all values in real terms at 1966/67 prices or indices 1891 base)

	GDP/cap	Male Consumption	Female Consumption
1891	100	34173 (100)	36823 (100)
1901	89	33253 (97)	35676 (97)
1911	117	45071 (132)	48043 (130)
1921	106	42588 (125)	45536 (124)
1933	102	46755 (137)	49406 (134)
1947	129	56463 (165)	60307 (164)
1954	153	66895 (196)	72578 (197)
1961	178	78418 (229)	85694 (233)
1971	201	103716 (304)	113920 (309)
1981	243	159608 (467)	175344 (476)

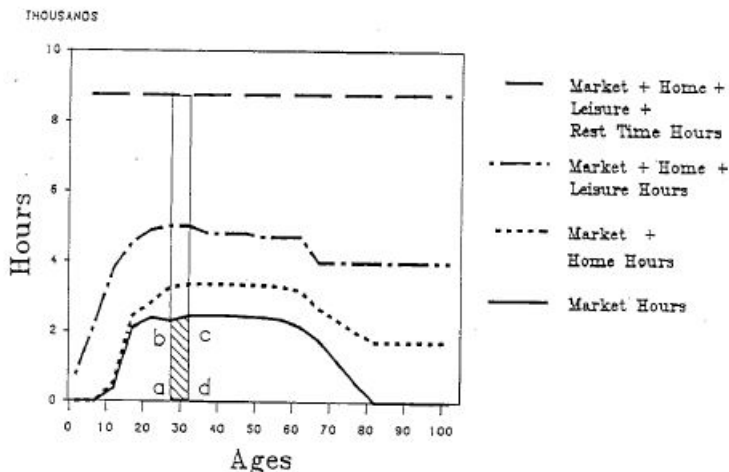
Sources: GDP per capita and Consumption per capita from McLean and Pincus (1982) except for 1981 figures from National Accounts and 1981 Census. Life expectancies from 1982 ABS Year Book. Note that the first three Censuses relate to Life Tables for the previous decades.

3.3 A Note on Method

In the analysis that follows in this Chapter, we employ two particular techniques borrowed from other disciplines. The first comes from home economics, and concerns the uses people of different ages make of their time. Of the (168 x 52) hours available in any year, people of different ages spend, then doing different sorts of things. Young people and old people seem to spend more time resting than do people of other ages. People in the middle of their lives spend more time in market work. The work involved in the house tends to be more stable once a separate household is established. Basically, then, we are looking at how people of different ages allocate their time between market work, work in the home, in leisure and at rest. This is illustrated in Figure 3.4.

Figure 3.4 can be decomposed into parts which are useful for the subsequent analysis. The shaded section represents the average time spent in various activities by people between the ages of 30 and 31 who were in this sample at a point in time. One might also say for a person of twenty-nine years of age that the shaded area indicates the expected uses he or she will make of their time over the next year if they live. Thus 'abcd' represents the hours of market work one expects a thirty-year-old to work if he or she survives the period. It is the

Figure 3.4: Example of the uses of time: hours per year



Source: 1911 male data, methods described in text.

total hours of market work we expect from a thirty-year-old. In a similar manner, we can calculate the hours of house work, leisure and rest time he or she will have.

We next make a greater leap of faith. We assume that the patterns traced out in Figure 3.4 form the expected lifelong use of time made by an infant born in the survey year. The inspiration for this comes from the demographer's concept of life expectancy. Life expectancy can be defined as the expected years of life of any individual who enjoyed the age-specific mortality rates of individuals prevailing over the period of construction of the life tables. In our case we can say that Figure 3.4 traces the expected pattern of time use of an individual born in the survey year who enjoyed the age-specific time-use patterns of individuals in the survey year. Implicitly we have treated schooling as a leisure activity.

But even this is not enough—these are conditional probabilities. We have assumed to this stage that our individuals do not die. Expected time-use patterns are conditional upon survival. To obtain unconditional estimates we use (where E

Figure 3.5: Survival and life use

Figure 5a

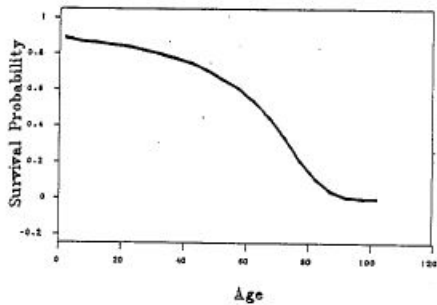
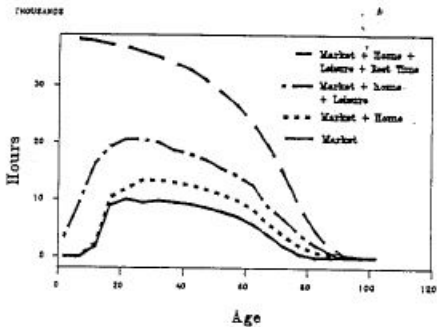


Figure 5b



Source: 1911 male data, sources described in text.

indicates expectation and P probability)

$$E(\text{hours doing } y) = (\text{hours doing } y \text{ if surviving}) \times P(\text{surviving})$$

for any particular age group. To measure expected hours spent over a lifetime doing y we then add the numbers of hours for each age bracket. Graphically the transformation is shown in Figure 3.5. The conditional time use chart of Figure 3.4 is multiplied by the survival probabilities (life tables) of Figure 3.5a to produce the unconditional life-use chart of Figure 3.5b. The area contained by the outermost frontier in this diagram gives the total number of hours such a person is expected to live. Thus by measuring the areas of the various regions of Figure 3.5b we can measure life expectancy, work life expectancy, housework expectancy and leisure expectancy of "Australians" at that point in history. To compare lives at different periods we must construct a series of figures such as Figure 3.5b.

The objective of the next section is to put actual numbers on the shapes depicted in Figure 3.5b. This involves establishment of time-use profiles for life, market work, home work and maintenance time to allow the calculation of leisure hours as a residual. Rusicka (1973) employed this method to calculate work-life expectancy in years for males between 1933 and 1966.

3.4 Participation Rates for Market Work

Labour force participation rates are available directly at each Census and these provide our starting data. Keating (1973) has worked with these series to provide conceptual consistency across the period 1911 to 1961. There was a substantial conceptual change at the 1966 Census in measuring participation, and we have preferred to work with figures from the ABS Labour Force Survey for the later periods, since this seems to allow for greater consistency. Labour force participation rates are contained in Table 3.2

Around 95 percent of males are in the labour force by age 20-24 and remain there to 50-54 years of age. There has been a secular decline in the labour force participation rates for males younger and older than that. Broadly, the typical male working life has become more concentrated between the ages of 20 and 55. For females the picture is somewhat different. The labour force participation rates for females between 15 and 19 increased until 1954, but has declined since then. For women aged above that, there has been a secular increase in labour force participation rates for all ages through to 55-59. For all the different age groups

Table 3.2: Market work participation rates: various censuses
(as percentage of individuals in gender and age class)

	1911	1921	1933	1947	1954	1961	1971	1981
Males								
10-14	15	10	3	3	2	2	0	0
15-19	85	86	73	81	80	69	57	62
20-24	95	97	96	94	97	95	91	91
25-29	96	98	98	97	97	98	97	95
30-34	97	98	98	98	99	99	97	95
35-39	97	98	97	98	98	99	98	95
40-44	97	97	97	98	98	98	98	95
45-49	96	97	96	97	97	98	95	91
50-54	95	96	95	94	96	96	95	91
55-59	93	93	92	91	92	93	91	81
60-64	86	86	83	80	80	80	77	51
65-69	72	71	48	50	49	40	32	16
70+	44	40	24	23	22	18	12	7
Females								
10-14	5	4	2	2	2	1	0	0
15-19	43	48	47	67	68	64	53	57
20-24	40	43	50	50	49	51	60	71
25-29	26	25	30	24	26	27	41	52
30-34	18	18	20	18	22	24	41	53
35-39	17	16	17	18	22	27	48	58
40-44	15	15	16	19	23	28	48	58
45-49	15	16	16	19	25	28	42	49
50-54	15	15	16	17	22	26	42	49
55-59	15	13	15	15	18	22	29	30
60-64	13	11	10	10	12	13	17	12
65-69	10	8	7	7	7	7	5	3
70+	5	4	3	3	3	3	2	1

Sources: Keating (1973) p.326 for years to 1961 then ABS Labour Force surveys various years.

there is a smaller percentage of women in the work force than of men. Readers should note that the definition of participation rates includes the unemployed. For our purpose this amounts to the assumption that the unemployed spend the hours they once spent working in the task of looking for work, not on leisure or in household activities.

3.5 Life Patterns

In the Appendix to Maddock and Carter [1983] we describe in some more detail the data sources we employ to arrive at what we call the life patterns of Australians over the period 1911 to 1981. Figure 3.6 shows some of these patterns pictorially. In any year of one's life there are some 8760 hours to be occupied. The line marked _____ shows the number of hours at each age the average male used in 1911 (Fig 3.6a) doing market work. The area below that line (marked 'market') gives the total number of hours of market work such a man would have done over his lifetime. The line marked '.....' indicates the hours of house work plus market work done by such a person, so that the area between this and the frontier below it indicates total house work. To these categories 'market' work and 'home' work one simply adds time spent in 'leisure' at various ages to produce the next frontier marked - - - -. The area thus enclosed measures lifetime leisure. To this we add 'maintenance' i.e. sleeping, eating and so on, to arrive at the -'-'-'-' line which is the total hours available to such a person in the course of his life.

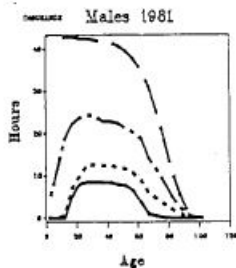
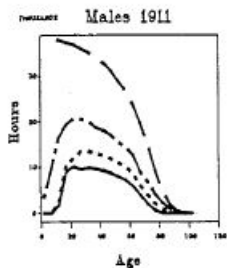
We have obtained the total hours available to individuals (their life expectancy) from official Life Tables and work hours from participation rates and the hours series discussed in Chapter Two (both modified to allow for part-time work). Maintenance and home work hours are derived from recent surveys of time use patterns, and extended backwards by reference to long-run trends derived from US surveys, since there are no pre-1970 surveys of time-use by Australians. Leisure is then calculated as a residual. We believe that the life expectations and hours of market work are quite reasonable estimates, while the home work and maintenance times are merely informed guesses. We have not yet assessed the sensitivity of our results to these assumptions.

The changes over time are fairly clear. The life curve for both males and females has shifted outward considerably. An important part of this is at very young ages, reflecting declines in infant mortality, but both frontiers have also become closer to rectangular, suggesting important reductions in death rates for young adults as well. Hours of market work for males have fairly clearly fallen, while those for females have increased. No trend in home work hours by either gender is immediately obvious, while leisure has clearly increased for both, though males seem to have gained more than females.

Figure 3.6: Lives and work 1911, 1981

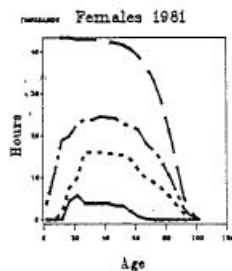
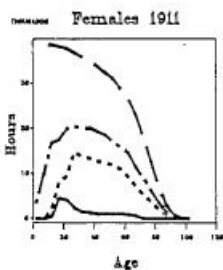
a. Males 1911

b. Males 1981



c. Females 1911

d. Females 1981



Legend

- Market + Home + Leisure + Rest Time
- · - · Market + Home + Leisure Hours
- · · · Market + Home Hours
- Market Hours

Source: Described in text.

3.6 Worklife Expectancy

Table 3.5 presents the principal results. Women have gained an additional 173,000 hours of life, almost twenty years, between 1911 and 1981. Of this, almost half is spent in maintenance activities, 9 percent on increased market work, 14 percent on additional work in the home, and around 27 percent has been added to leisure time. This additional leisure is equivalent to some ten normal years without any obligation to work at home or in the market.

For men the result is rather different. They have only gained an additional 143,000 hours, i.e. around sixteen years. They reduced their market work and increased their home work in quantities which almost offset one another, allowing them to increase their total leisure by almost half the total hours added over the seventy years. Men then have gained some sixteen additional years of life without being obligated to spend any of it in home or market work.

The most notable feature of the leisure trends is the sharp difference between the patterns for males and females. By our measures, females enjoyed about 10 per cent more leisure than males in 1911. Over the seven decades they gained another 45 percent of life-time leisure, but managed to lose relative to males, who won for themselves an increase of more than 75 percent. By 1981 males had established a 10 percent margin of leisure over that of women.

Most of this difference in trends in leisure arises from the well-known phenomenon that women who work in the market do not reduce their hours of work in the home to offset completely the market hours—they thus do more hours of work than full-time house workers (Broom (1982)). With rising trends in the labour force participation of females, especially since World War II, women have cut into the leisure they might otherwise have enjoyed.

But if women have chosen to work instead of taking additional leisure, does that mean that our concern with falling standard hours of work has been a very masculine preoccupation? There certainly is some asymmetry of attitude. When men reduce their hours of work, we regard that as a good thing because it increases their leisure, but when women increase their hours of work we can also regard that as a good thing, as allowing them to lead fuller lives. One should also note that despite their longer lives (see Section 3.2 above) women enjoy less leisure by our count than do men—some 10 percent less!

Table 3.5: Historical patterns of the use of time
(Thousands of hours)

	1911	1921	1933	1947	1954	1961	1971	1981
Females								
Maintenance	273	293	310	325	334	340	342	358
Market	20	20	22	24	24	25	33	36
Home	118	129	137	146	150	153	143	143
Leisure	108	117	123	130	134	137	141	155
Total	519	559	592	625	642	655	659	692
Males								
Maintenance	258	276	295	306	309	315	315	331
Market	95	97	98	92	88	86	81	74
Home	37	40	46	47	48	50	49	54
Leisure	97	109	122	137	145	148	155	171
Total	487	522	561	582	590	599	600	630

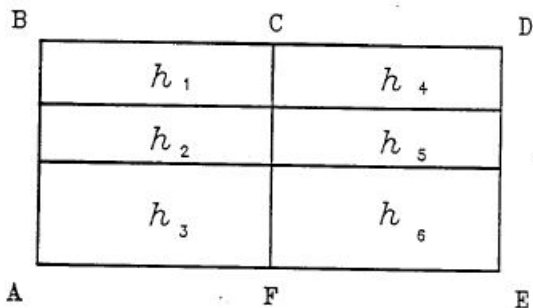
Source: Description in text. Note that education is included in leisure.

If we consider for a moment a typical household of one male and one female worker we can ask how much market work they have to do to support themselves through life. In 1911 the household worked 115,000 hours in the market to support 1,006,000 hours of life. By 1981 this had fallen marginally to 110,000 hours of market work to provide for 1,322,000 hours of consumption. Whereas a couple had to work 11 percent of their life hours in the market in 1911, by 1981 this had fallen to around 8 percent. Total hours of house work had not, however, changed its relative position, tending to increase marginally its share of life-hours.

3.7 Contributions to Leisure

From the material contained in the life patterns we are able to understand the relative importance of different factors in explaining changes in leisure. We can ask, for example, how much of the increase in female leisure between 1911 and 1921 arose because of increases in their life expectancy, assuming that the allocation of their time in 1921 had followed the 1911 pattern. But their leisure can also be increased because they chose to spend a lesser proportion of their time working. Figure 3.7 provides an illustrative example.

Figure 3.7: Explaining increased leisure



Assume a woman's life hours in 1911 are represented by the box ABCF in Figure 3.7 which is just the sum of the areas h_1 , h_2 and h_3 . Let's say she uses $h_1 + h_2$ hours working in the market and h_3 in leisure (ignore maintenance time and house work in the example). If her life doubles in 1921 to be the new larger box ABDE, how many hours of leisure would she have had? If we assume that the proportion of her life devoted to work remained the same, she would have worked $h_4 + h_5$ hours and added h_6 to her leisure. We call this area (h_6) the contribution to leisure made by an increase in life expectancy between 1911 and 1921. But leisure can also be augmented by changing the proportion of time spent working. If she lowered this proportion and worked only $h_1 + h_4$ instead of $h_1 + h_2 + h_4 + h_5$, that reduction $h_2 + h_5$ is said to have arisen from a change in her hours of work. Thus she gained h_6 of leisure due to the increased life expectancy, and $h_2 + h_5$ as a result of a reduction in time spent at work.

By employing this technique we can split the gains in leisure up into their components. We can go even further, and see to what extent the change in hours of work were a result of changes in standard working hours and which as a result of a change in participation rates. We follow these principles to arrive at the results contained in Table 3.6. Note that we have reduced all gains down to an annual average basis to allow for comparison of the different periods, because the Censuses on which the data are based have been held irregularly.

Table 3.6: Origins of leisure changes
(Changes in hours on an annual average basis)

	Leisure Gain	From Life	From Hours	From Participation	From Home
Males					
1911-1921	1225.5	696.0	562.0	-83.5	51.0
1921-1933	1117.5	667.0	135.4	469.1	-154.0
1933-1947	1070.0	372.1	740.3	-49.2	6.7
1947-1954	1131.4	312.1	827.8	-30.7	22.1
1954-1961	510.0	267.8	42.8	285.7	-86.4
1961-1971	651.0	13.5	201.5	329.0	107.0
1971-1981	1642.0	810.0	239.5	681.0	-88.5
Total gain	75064.8	32467.7	28113.2	15990.0	-1509.3
Average gain	1072.4	463.8	401.6	228.4	-21.6
Females					
1911-1921	914.0	780.0	137.5	-15.5	12.0
1921-1933	545.8	575.0	33.7	-120.4	57.5
1933-1947	487.5	460.7	110.3	-141.4	57.8
1947-1954	619.2	489.2	235.0	-229.2	124.2
1954-1961	350.7	363.5	25.0	-126.4	88.5
1961-1971	437.0	92.0	76.5	-801.5	1070.0
1971-1981	1422.5	728.0	138.0	-367.5	924.0
Total gain	47898.9	35318.7	7288.6	-17759.2	23048.1
Average gain	683.4	504.6	104.1	-253.7	329.3

Source: Described in text.

For males most of the contribution to leisure gains has come from increased life expectancy, with reductions in hours of work being important in the first part of the century and participation rates being more important more recently. The pattern is quite different for females. Until recently, additions to life expectancy have been the principal source of leisure gains. Reductions in standard hours have played little part. Consistently increasing labour force participation rates have reduced female leisure. The big contributions made in recent years have come from reduced hours of home work, evidenced especially over the period 1965-1975.

The role played by reductions in hours is thus not clear cut. For men it had a big impact from 1911 to 1954 as would be expected, but for women even those changes have had little effect on leisure.

Table 3.7: Money values for classes of activity

	Males			Females			GDP Capita	'c' as Index	'f' as Index
	Market	Leisure	a+b	Market	Leisure	d+e			
	a	b	c	d	e	f	g	h	i
1911	65	69	134	8	44	52	100	100	100
1921	69	82	151	9	53	62	91	113	119
1933	68	105	173	11	70	81	87	129	156
1947	67	110	177	15	79	94	110	132	181
1954	80	132	212	16	88	104	131	158	200
1961	83	147	230	18	96	114	152	172	218
1970	92	178	271	27	116	143	172	201	274
1981	103	251	354	47	214	261	208	264	502

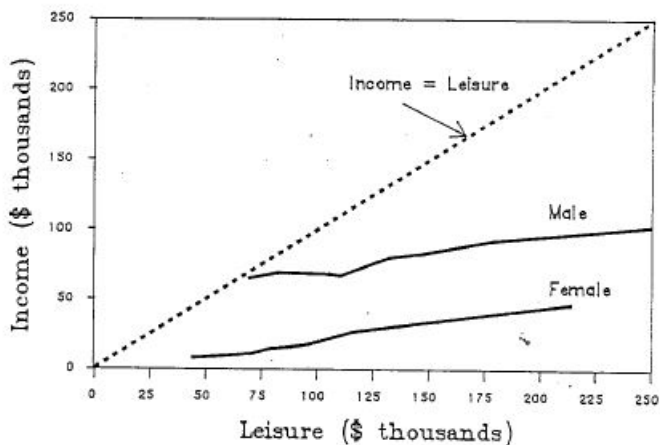
Source: Hourly wage rates from M. Butlin (1977) and ABS Wage Rates, hours per activity from Table 3.5, GDP per capita from Table 1 with new base. Note that market hours have been adjusted downward in this table because hours in the workforce but unemployed have been valued at a zero market wage. We have assumed that unemployment rates from M. Butlin (1977) apply to both genders and all ages.

3.8 Aggregating Work and Leisure

We discussed earlier the desire of economists to find some overall measure of well-being, and especially some of the devices they have chosen to add income or consumption measures together with indicators of leisure gains. From Table 3.5 above we have the hours devoted to different activities. The metric we have chosen for aggregation is the average minimum hourly wage for males and for females. It allows us to 'value' hours used for any purpose and where appropriate to add them together. Table 3.7 indicates some of the possibilities. Columns 'a' and 'd' evaluate hours of work at market wages for males and females respectively, and 'b' and 'e' evaluate hours of leisure at those same wages. The value for income plus leisure for males is then given in column 'c' while 'f' presents the same data for females.

Comparing columns 'c' and 'f' suggests that males tended to become better off relative to females throughout the period, with the exception of the most recent period. Columns 'h' and 'i' which simply represent the data in 'c' and 'f' as indices to base 100 suggest a considerable gain in female well-being between 1911 and 1947, a

Figure 3.8: Income leisure trade-off 1911-1981



Source: Described in text—from Table 3.7.

smaller but significant gain for males. These contrast sharply with the well-known small gain by the GDP measure—this is clearly due to increased leisure (check columns 'b' and 'd'). The sheer size of the relative increase in female wellbeing in the last ten years dominates all other effects.

The last point we propose to address here is the proposition raised in relation to Figure 3.2—did the trade-off between income and leisure change in mid-century? Figure 3.8 produces a more refined version of this trade-off. On the vertical axis we again have income, here measured as the monetary value of market hours i.e. column

'a' in Table 3.7, while the horizontal axis presents the monetary value of leisure hours (column 'b'). This historical choice between income earned and income forgone by males is marked 'males' in the diagram. The 'female' line compares the columns 'd' and 'e' in the same way. Movement in a north-westerly direction indicates an increase in income, and in this case time flows in the same direction. Interestingly the mid-century change in the trade-off disappears. Rather than a post-1950 preference for income over leisure, both males and females have shown a relatively constant preference to 'spend' their potential income on buying additional leisure rather than taking the income. There seems to be no difference in the marginal trade-offs of males and females.

3.9 Conclusion

Clearly, hours reductions have contributed significantly to the increase in leisure enjoyed. From the calculations presented in Table 3.6, we can assess the dimensions of the gains. For males, increases in life expectancy and reduction in hours have contributed similar amounts to leisure gains. Changes in labour force participation have been about half as important, and changes in house work have had little effect. The contribution to female leisure from life expectancy has been about the same as it was for males, but the other factors make quite different contributions. Most importantly, for this work changes in standard hours have had only a small effect, being roughly one-quarter as important as it was for men.

Derivation of time-use data

The problem of deriving this data can be split into two components (i) finding reasonable estimates of the uses made of their time by people of different ages at a point in history and (ii) finding reasonable historical time series to infer from the point observations to historic trends.

In 1976 the Victorian Department of Health ran a survey of time use by people in some Victorian suburbs. Table 8 presents the principle results. Since we have substantial independent information on market work we ignore the hours of market work contained here except to check its rough consistency with ABS labour market data. Again since we calculate leisure as a residual the numbers here are not important for our purposes.

Rest time, the time spent in personal maintenance which respondents to the survey were unable to assign to specific work or leisure activities is of considerable interest to our study. With small modifications these have been taken directly over to Table 9 to produce the full data series for 'rest' used in the study. We altered the female figures for the 10-14 and 15-19 age categories closer to the male numbers for those ages since the large difference presented in the survey results is inherently implausible. House work was broken up into three categories—that done by full time market workers, part-time market workers and people who spent no time in market work. Krupinski indicates in his text that this should be done noting that adult women in those categories do 55, 45 and 40 hours of house work respectively. This difference is supported in evidence produced by Hull (1982). Using that data for the core ages 20-59 we then tail off the categories in ways which produce (weighted by labour force percentages in those categories) results consistent with Table 8. We go through a similar procedure for males although since almost all do market work between ages 20 and 55 and almost none do market work before 15 or after 65 the results are not sensitive to the values chosen.

Table 8: Use of Time, Melbourne 1976

Hours of Activity	Age					
	12-17	18-24	25-34	35-49	50-64	65+
FEMALES						
Market Work	4.5	25.3	16.2	20.3	11.3	1.4
Home Work	7.0	26.4	47.2	47.5	48.9	45.4
Leisure	59.7	38.0	30.4	28.4	32.5	37.2
Rest time	96.8	78.3	74.2	71.8	75.5	84.0
MALES						
Market Work	11.7	38.1	42.8	42.4	35.0	6.4
Home Work	2.3	6.2	13.5	12.8	17.2	26.3
Leisure	73.8	50.8	40.0	38.4	37.9	44.8
Rest time	80.2	72.9	71.7	74.4	77.9	90.5

Source: Krupinski (1979), pp.64,66,67.

Deriving trends

We assume no tendency for age specific rest time to have varied over the period 1911-1981.

Housework is somewhat different. There is no long run Australian data on hours spend doing house work. On the other hand a wealth of evidence exists in the USA to indicate that full-time houseworkers, rural and urban, made no change to the hours they spent doing housework over the period 1930-1965 (Snooks (1983)). From 1965 to 1975 hours spend doing housework seem to have fallen for all categories of houseworkers (by around 10 percent). We thus assume no trend in the levels of housework done (on an age and work category specific basis) until 1965 then a 10 percent drop to 1975 then stability at the new level for Australian housework.

Hours worked by full time workers are those produced in Carter and Maddock (1982) modified upward to allow for the proportion of the workforce which is self-employed and for that engaged in agriculture.

Hours by part-time workers came from the ABS Labour Force surveys from 1964 to 1982. Prior to that we assumed hours worked by part-timers were those worked in 1964.

Table 9: Modified Uses of Time, 1976
(hours per week)

	Females				Males			
	R	HN	HP	HF	R	HN	HP	HF
Age	154	0	0	0	154	0	0	0
0. 4	126	0	0	0	126	0	0	0
5. 9	95	7	0	0	95	3	0	0
10.14	91	20	10	5	81	10	7	5
15.19	79	30	15	10	74	15	10	7
20.24	75	55	45	40	72	35	20	15
25.29	75	55	45	40	72	35	20	15
30.34	72	55	45	40	76	35	20	15
35.39	72	55	45	40	76	35	20	15
40.44	72	55	45	40	76	35	20	15
45.49	76	55	45	40	78	35	20	15
50.54	76	55	45	40	78	35	20	15
55.59	76	55	45	40	78	35	20	15
60.64	85	50	40	35	92	35	20	15
65.69	85	45	35	30	92	30	15	10
70.74	85	45	35	30	92	30	15	10
75.79	85	45	35	30	92	30	15	10
80.84	84	45	35	30	92	30	15	10
85.89	85	45	35	30	92	30	15	10
90.94	85	45	35	30	92	30	15	10
95.99	85	45	35	30	92	30	15	10

Sources and Notes: Described in text. R = hours of down time, HN = home work hours by non-market worker, HP = home work hours by part-time market worker, HF = home work hours by full-time market worker.

While good figures have been produced in Keating (1973) and other places for the total labour force the distinction between part and full time workers is harder to make. We have made linear interpolations between the 1947 ABS survey and the first period we use after the Labour Force surveys, 1971. Before that we assume the 1947 figures applied.