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# New Zealanders' Working Time and Home Work Patterns: Evidence from the Time Use Survey

**by**
**Paul Callister and Sylvia Dixon**

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**August 2001**

**Labour Market Policy Group**

DEPARTMENT OF LABOUR
TE TARI MAHI

54-64 The Terrace, PO Box 3705, Wellington, NEW ZEALAND. Ph: 64-4-915-4742,
Fax: 64-4-915-4040
Internet: RESEARCH@LMPG.DOL.GOVT.NZ

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# New Zealanders' Working Time and Home Work Patterns: Evidence from the Time Use Survey

**by**

**Paul Callister**
**Research Fellow, Cornell University**

**and**

**Sylvia Dixon**
**Labour Market Policy Group,**
**Department of Labour**

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***Abstract***

This report uses data from the New Zealand Time Use Survey 1998/99 to analyse the timing and location of paid work. It provides a detailed picture of New Zealanders' paid working time patterns, focusing particularly on work that is undertaken at non-standard times, and work that is undertaken in workers' own homes. Results are given for sub-groups in the labour force as well as for all workers.

Around three-quarters of all paid working hours are undertaken within conventional business hours – between 8am and 6pm from Monday to Friday. Thus, paid work is concentrated within this core period. However, a very high proportion of workers perform some of their work outside core business hours. Working on the fringes of the standard business day is particularly common – for example, on an average weekday more than 40 percent of workers are at work before 8am, and about a quarter undertake some paid work in the evenings. Weekend work is also quite widespread – the data suggest that more than 40 percent of the employed undertake some paid work at some stage in the weekend. Night work, on the other hand, is uncommon. The pattern of working the majority of one's hours at conventional times of the day and week and a few hours outside it is far more common than the pattern of working the majority of one's hours at non-standard times.

Just under 10 percent of all the working hours of non-agricultural workers were performed at the worker's own home, demonstrating that working at home is an important feature of the labour market. Outside the agricultural sector homework episodes tend to be short, and a majority of the non-agricultural workers who recorded some work at home also worked in a workplace on the same day. Overall, the data suggest that the pattern of combining small amounts of work at home with a

conventional job in a workplace is far more common than the pattern of working predominantly from home.

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## Acknowledgements and disclaimers


- The views expressed in this paper do not necessarily represent the views of the Department of Labour.
- Access to the data used in the study was provided by Statistics New Zealand under conditions designed to give effect to the confidentiality provisions of the Statistics Act 1975. The results presented here were prepared by the authors, not by Statistics New Zealand.
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# Executive summary

### *Introduction*

Internationally there is much interest amongst policy makers and researchers in non-standard forms of work organisation. This includes non-standard working time arrangements and work done in non-standard locations such as the worker's own home.

The timing of paid work is important for a number of reasons. From an economic perspective, the ability of businesses to schedule labour inputs at the times that are optimal for utilising capital or technology, or for delivering services to customers, influences productivity performance. From a societal perspective, the timing of paid work has major implications for the timing of traffic flows and the consumption patterns of a wide range of services and amenities.

From the perspective of workers, the timing of a job's hours of work is an important attribute that can raise or lower well-being. As long as the majority of paid work takes place during daylight hours from Monday to Friday, people who work outside these times are likely to face reduced opportunities for social interaction with friends and family in their leisure time. Those who work at nights or on rotating shifts also face greater risks of experiencing health problems such as fatigue or sleeping difficulties. On the positive side, the potential benefits of non-standard working schedules to workers and their families include greater flexibility, allowing paid work to be more readily combined with other activities such as education or childcare; reduced travel-to-work times if traffic congestion can be avoided; and higher wage rates if penal rates are paid for evening, night or weekend work.

The potential implications of working from home are also quite wide-ranging. Working from home may provide workers with an opportunity to avoid commuting and to better control their own working patterns and work environment. On the other hand, working from home may represent an unwanted 'spillover' of paid work into family and leisure time. The location at which paid work is undertaken, at different times of the day and week, also has implications for transport usage and retailing patterns, and for the regulation of employment relations and health and safety at work.

A variety of methods and databases have been used to study both work scheduling and the location of work. These include small-scale qualitative studies, questions attached to regular household or population surveys, and time use diaries. This study utilises data from New Zealand's first national Time Use Survey (1998/99). It analyses the scheduling of paid work at different times of the day and week, and profiles the working time patterns of the main demographic and labour force groups. It also analyses the division of paid work between workplaces and homes, and describes patterns of involvement in home-based work.

### *Research objectives and study population*

The main objectives of the research were to explore the suitability of the New Zealand TUS for studying work scheduling and location issues; to measure and describe the scheduling of paid employment at different times of the day and week; and to describe the locations where work is undertaken, focusing particularly on work undertaken at home.

The findings of the study are pertinent to several questions of public interest. These include: to what extent has New Zealand moved to a '24-hour, 7-day economy'? To what extent is the requirement to work at 'unsocial' times of the day and week unevenly distributed or concentrated on particular groups of workers? How much paid work is undertaken within workers' homes, and by whom?

The population of study is employed people aged 15-64 years.

### *Data source*

The Time Use Survey (TUS) was conducted by Statistics New Zealand between July 1998 and June 1999. Households and individuals within households were randomly selected to take part in the survey. Respondents recorded their activities during two consecutive days in a time use diary. They also supplied information on their personal characteristics and household circumstances. Approximately 4,900 employed persons provided information on around 9,800 diary days, of which approximately 6,800 contained paid work.

Because only two days of time use information were collected from each person in the sample, we are unable to study the work schedules of individual workers over the week as a whole. People who worked at non-standard times on their diary days may have worked at standard times on other days of the week, and vice versa. We use the data mainly to analyse and compare the weekly working time patterns and location-of-work patterns of groups of workers, rather than individuals.

### *Working time patterns*

While New Zealand has a 24-hour, 7-day economy in a literal sense, the majority of paid work is still done at conventional times. In 1998/99, approximately three-quarters of all paid working hours were carried out in traditional business hours, between 8am and 6pm from Monday to Friday. Participation rates were much higher within these core business hours than at any other time of the week. For example, on a typical weekday, up to 84 percent of the males who worked that day, and up to 75 percent of the females, were at work in the late morning.

While most paid work is done at conventional times, a great many people – probably the majority – undertake *some* of their work outside of conventional business hours. Our analysis indicates that on weekdays, only 29 percent of the men and 51 percent of the women who worked that day carried out all of their paid work between the hours of 8am and 6pm. Typically however, the amount of work that is undertaken outside the standard times is relatively small. A key finding to emerge from this study is that

undertaking a few hours of work early in the morning, during the evening or on the weekend is a far more common than doing the majority of one's hours at unconventional times.

A substantial amount of the work that is undertaken outside the core hours of 8am to 6pm occurs on the boundaries of the core, that is early in the morning or in the early evening. On an average weekday, for example, 53 percent of the males who worked that day, and 29 percent of the females, were at work at some stage between 6am and 8am.

Weekend work is a significant feature of the labour market. About 13 percent of all paid working time was undertaken on the weekend. About 45 percent of all employed people who completed time use diaries on Saturdays reported that they did some paid work that day. The proportion working on Sundays was only slightly lower. As might be expected, however, work spells recorded on weekends were substantially shorter on average than those recorded on weekdays.

Participation in evening work (defined here as work carried out between 7pm and midnight, on any day of the week) was also relatively common. Only 6 percent of all paid working hours were undertaken in this time period. However, on an average day of the week 17 percent of the employed, and nearly 25 percent of those who were at work that day, reported that they did some work between 7pm and midnight.

In contrast night work (defined here as work undertaken between midnight and 5am) was relatively uncommon. Night work accounted for only 1.8 percent of all paid working hours, and just under 5 percent of employed people did some work in this time slot on an average day of the week.

Working time patterns appear to be quite strongly influenced by the production or service delivery requirements/customs, including the need for daylight, that prevail in the industry or occupation where a worker is employed. Working time variations across industries and occupations are reasonably large. However, most major occupational groups and industries contain some workers who work during the evenings, nights and weekends.

Workers in manual occupations and, connected to this, workers with lower levels of education, were more likely to be working in the early hours of the morning, before 8am. Workers in managerial, professional and technical occupations tended to start later in the day. On average men undertook more work than women in both the early morning and the late afternoon/evening, reflecting in part the fact that the average daily working hours of men are longer. Self-employed workers were also significantly more likely to undertake both evening work and weekend work than were employees.

Workers' working time patterns can be influenced by the constraints that are imposed by non-work responsibilities and tasks such as education, training and childcare. While these 'supply-side' factors are important in shaping work schedules at an individual level, at the group or aggregate level they are not as influential as one might expect. The working time patterns of women with young children, for example, are on average only marginally different from those of women without dependent children.

Overseas researchers have suggested that more skilled and more autonomous workers (including professionals and the self-employed) use their greater bargaining power to avoid evening and night work. We found evidence in the New Zealand data of an association between Mäori and Pacific ethnic status and higher rates of participation in night work. While we were unable to explore the reasons for these ethnic differences in night work, it is possible that ethnic differences in skills or bargaining power in the labour market may have contributed to their development. However, other dimensions of skill, such as level of education, did not appear to be inversely correlated with the likelihood of evening and night work. Considered overall, the distributional patterns are complex and do not suggest a simple or strong relationship between lower skill levels and the likelihood of working at unsocial times.

A good predictor of whether a particular labour force group does a lot of work at non-standard times is its average weekly working hours. Groups with relatively high average weekly hours (such as full-time males, the self-employed, managers, and machinery and plant operators) are more likely to be at work outside the core period.

***Work locations***

Just over 80 percent of the paid working hours that were recorded in the Time Use Survey were undertaken in workplaces. The second most important locational category was the worker's own home, accounting for just under 15 percent of paid working time. A further 3 percent was performed while travelling. Very little paid work was carried out in other locations such as at another person's home.

Much of the work that was recorded as home-based was carried out in the agricultural sector. Workers in the agricultural industry undertook only 4.3 percent of working hours performed in workplaces, but 60 percent of home-based working time. This is primarily due to farmers considering their farms to be 'home'.

If the agricultural industry is excluded from measures of home-based work, the magnitudes decline but remain significant. On an average day of the week, approximately 18 percent of non-agricultural workers undertook some paid work at their home. This accounted for nearly 10 percent of all paid working time in the non-agricultural sectors of the economy.

While agricultural workers undertook long spells of work at home, most of the non-agricultural home work was undertaken in relatively short shifts, lasting for less than two hours. Moreover, during weekdays, about two-thirds of the non-agricultural workers who worked from home also worked in a workplace on the same day. Analysis of the timing of home-based work also reveals that paid work is particularly likely to be undertaken from home if it is performed during the evening or on the weekend, suggesting a 'spillover' of work from regular jobs that are undertaken in workplaces. Taken together, these patterns suggest that in New Zealand the practice of combining small amounts of home-based work with longer spells of work in a conventionally-located job is far more common than the practice of working predominantly from home.

Home-based work is more common among the self-employed than among employees. Forty-four percent of non-agricultural employers and 52 percent of own-account workers recorded some paid work at home in their weekday diaries, compared with just 18 percent of employees. Workers in managerial, professional and technical occupations also carried out higher proportions of their paid work at home, on average, than did other occupational groups.

Workers with higher levels of education tended to undertake a greater proportion of their work at home than the less well educated. The differences were particularly strong in the late evening (8-10pm), when the proportion of paid work that was undertaken from home was 14 percent among workers with no formal qualifications but 40 percent among workers with post-school qualifications.

As many people do at least some of their paid work from home, simple analyses of work-family 'conflict' using data on total hours worked may lead to some incorrect conclusions about the time workers spend away from their families. Adding in information on work location can provide a better understanding of how people juggle work and family life in practice.

### *International comparisons*

The international comparisons we were able to make suggest that New Zealand's working time and home work patterns resemble, in broad terms, the patterns that have been reported for other OECD countries. For example, our estimates of the proportion of work that is carried out within core business hours, and the proportion of employed people undertaking some work at home, were very similar to those reported in a recent analysis of Canadian time use data.

Time use data have been collected in New Zealand once only. From repeated studies conducted in other countries, it is clear that aggregate working-time patterns change relatively slowly. The changes recorded in some other OECD countries during the 1990s have typically involved small increases in the frequency of evening and weekend work, and small reductions in the frequency of night work. However, two longer-term studies carried out in the US and the Netherlands question whether there has been any long-term increase in the proportion of work that is undertaken at non-standard times.

### *Policy implications*

This study was conducted without any systematic evidence on the working time preferences of New Zealanders. Knowing more about those preferences, and the degree to which individuals are also to find jobs that satisfy their hours of work preferences, would be helpful for assessing the implications of alternative working time arrangements for the well-being of workers and their families.

Overall, the evidence assembled here does not point to major disparities in the distribution of non-standard working time by skill level or by socio-economic status. Workers with a wide range of skill types and skill levels are involved to some degree in work at non-standard times. Still, there are some limitations to this evidence. The available data allow researchers to calculate average rates of participation in work at

non-standard times, for all workers and sub-groups of workers, but they do not show the extent to which some individuals are *persistently* working at non-standard times. The adverse consequences of working during evenings, nights or weekends are likely to be more severe for people who usually or always work at these times. An outstanding issue, which we are unable to properly explore with these data, is the extent to which the workers who are *regularly* required to work at non-standard times come from lower skilled or lower status groups.

Nearly 10 percent of paid work is done in workers' homes. This suggests a need for greater awareness of the fact that the responsibilities employers and employees have in managing health and safety extend beyond conventional workplaces and into home environments.

### *Future research*

There is considerable potential for further research using the currently available time use data. As one example, a further step in examining work scheduling patterns and the location of work could involve linking these variables to information on patterns of unpaid work. Analysis of the unpaid work data in conjunction with the paid work data could lead to a better understanding of which factors are important in influencing work scheduling and location decisions.

Undertaking a further time use survey in New Zealand would allow analysis of changes over time. However, given both the high cost of time use surveys and the fact that changes in patterns of work are not likely to be rapid, the gap between time use surveys could be ten years or more.

# 1. Introduction

In New Zealand and internationally there is much interest amongst both policy makers and researchers in non-standard work. While many aspects of non-standard work, such as part-time work or self-employment, have been relatively well researched, less attention has been paid to non-standard work scheduling patterns. And while there has been intense research interest in wage or earnings inequality, less attention has been given to inequality in non-wage employment conditions, such as the times of the day when work must be carried out.

Both the location of work and the time when work is undertaken can be important aspects of job quality. As an example, a cleaning job undertaken in daylight hours Monday to Fridays, although usually low paid, may be far preferable to one on the same rate of pay undertaken between midnight and 4 in morning. Similarly, a clerical worker undertaking a small amount of "catch-up" work at home in the evening may find this more enjoyable than working a full evening shift in an external workplace.

Concepts such as "standard hours", "working days", "weekends" and, with regards to travelling to and from workplaces, "rush hours" suggest that, at least in the past, paid work has not been evenly distributed over a 24-hour day or over a whole week. However, there is much debate as to whether work schedules have changed substantially over time and, if so, whether this is a positive trend.

On the one hand, having to work at non-standard times of the day or week is frequently viewed as a job 'disamenity' that most people would prefer to avoid. Working at non-standard hours may reduce the time a worker is able to spend with their family or interfere with their ability to socialise. Moreover, research on night work has pointed to a risk of adverse health effects, including sleeping difficulties and digestive disorders (Krausz *et al* 2000, Office of Technology Assessment 1991). Other researchers have suggested there may be a link between late night work or rotating schedules and marital instability (Presser, 2000). If jobs requiring work at non-standard times are indeed viewed negatively by most workers, then the distribution of such jobs across individuals and groups raises important welfare and equity issues.

On the other hand, higher wage rates are sometimes paid for work done at 'unsocial' hours, offering partial compensation and for some workers an incentive to work at these times. Non-standard work scheduling can also be seen in a positive light as providing ways for workers to combine work with other aspects of these lives, such as childcare, education or leisure. For example, if the cost of childcare is high relative to potential incomes, or if parents prefer parental care, couples may choose work non-overlapping shifts in order to minimise the use of paid childcare (Presser, 1994, 1995). Similarly, evening and weekend jobs may offer students with day-time classes during the week the opportunity to combine paid employment with full-time study or simply allow some people to enjoy leisure activities, such as surfing, during daylight hours but in "off-peak" periods.

As will be shown, there is increasing interest not only in when people work but why they work at particular times, including some attempt in international studies to

determine how much control workers have over their work schedules (e.g. Breedveld 1998, Golden 2000).

In parallel, there is also a concern about where work is being carried out. Much of the discussion of changes in work location is around the question of whether or not work at home provides more freedom for workers. On the one hand, working at home may represent a disruptive "spillover" of paid work into family time. On the other hand, it may provide an opportunity for workers to avoid commuting and to better control when and how they work, within their own environment.

The location at which paid work is undertaken, at different times of the day and week, also has implications for transport usage and retailing patterns, and for the regulation of employment relations and health and safety at work.

A variety of methods and databases have been used to study both work scheduling and the location of work. These include small-scale qualitative studies, questions attached to regular official collections of labour force data, and specialist large-scale surveys. However, in recent years in most industrialised countries, including New Zealand, Time Use Surveys have been carried out. These new data collections allow more detailed exploration of the scheduling and location of paid work.

In the paper, we firstly discuss international research on work scheduling and work location. In this section we discuss the methods used in such research and identify key themes emerging from it. In doing so, we particularly focus on time use surveys. We then outline how the New Zealand Time Use Survey (TUS) was carried out and describe the particular data that we draw on.

The following sections present the results of our research. First we examine work schedules. In particular, we focus evening, night and weekend work. This is followed by an analysis of where work is carried out, focusing primarily on work at home contrasting this with work in other locations. Thirdly, we look at the inter-linkages between the timing and location of work. Finally, we summarise the key points emerging from the analysis. This includes discussion of possible future research directions.

# 2. Research objectives

This report has six broad aims:

1. To explore the suitability of the New Zealand Time Use Survey for studying work scheduling and location issues.
2. To measure and describe the scheduling of paid employment at different times of the day and week.
3. To describe the locations where work is undertaken, focusing particularly on work undertaken at home.
4. To profile the work scheduling and work location arrangements of the major demographic and labour force groups.

5. To explore the association between socio-economic status and working time and locational arrangements.
6. To explore the association between childcare responsibilities and working time arrangements.

# 3. Previous research

## 3.1 Work schedules

***Survey instruments and other methodological issues***

In the past much of the literature on work scheduling has been based on case studies (e.g. McCloskey *et al* 1998). This is because both in New Zealand and internationally research on work scheduling has historically been hampered by a lack of suitable large-scale surveys that ask about timing of work. In 1995 Presser argued that the United States was the only country to have reliable data on work schedules. In the U.S. work schedule data has been collected as a supplement to the CPS on a number of occasions since the early 1980s. Various researchers have analysed that data (e.g. Hamermesh 1995). Other countries have recently added questions to their labour force surveys. For example, in 1993 the British LFS incorporated a new question asking employees whether they worked flexitime, annual hours, term-time working, job sharing, a nine-day fortnight or a four-and-a-half-day week (Watson 1994). While these surveys can provide some broad information on the incidence of non-standard work schedules (such as evening shifts), they often provide little detail on the actual hours worked during a day.

To fill this empirical gap, internationally there have been a number of specialist surveys that include questions on work scheduling. As examples, Akyeampong (1993) reports on the results of a Canadian study, Casey (1991) on a U.K. survey, Gittleman *et al* (1998) on a large-scale U.S. survey. In New Zealand a survey by Brosnan and Walsh (1996) provides data on trends in shift working. Internationally, time use surveys represent a new data source for empirical studies on work scheduling. There is now a small but growing literature based on time use survey data.

Breedveld (1998) argues there are advantages in using time use surveys rather than other survey instruments in analysing work schedules. He notes that time use surveys generally record current use of time so should be more accurate than surveys that rely on memory of historical events. Breedveld argues that data drawn from labour force surveys regarding the amount of work carried out in evenings, nights and weekends are problematic. The reasons for the unreliability of data include the fact that subjective categories are often used (such as “sometimes”, “often”, “never”) when referring to working non-standard hours, questionnaires often rely on retrospective answers, and that people may state “socially desirable” answers (p. 131).

There are methodological issues associated with particular survey instruments, as well as incompatibility problems between surveys. In much of the research on work scheduling, a first issue to be considered is what unit(s) of time to use. Setting the boundaries of the blocks of time to be recorded and analysed is essentially arbitrary,

and practices vary across surveys and researchers. For example, Hamermesh (1995) defined daytime hours as 6 a.m. – 7 p.m., evening 7-10 p.m., and night 10 p.m. - 2 a.m. In contrast Breedveld (1998) defined evenings as being from 7 p.m. to midnight, and night work from midnight to 6 in the morning. Some researchers do not define the boundaries used in their reported findings (e.g. Harkness 1999).

Social conventions in the country under study tend to influence these 'boundary' decisions. Harvey *et al* (2000) note in a study of time use carried out for the ILO that "core" hours in Canada and the Netherlands are seen as being from 8 a.m – 6 p.m. while for Norway and Sweden they are 7 a.m. – 4 p.m. Harvey (1996) divides days into four six-hourly time periods starting at midnight to 6 a.m. However, he also defines at "traditional" pattern of hours of working as being between 6 in the morning and 6 in the evening, with some work carried out by people in both in the morning and afternoon. In Australia, Bittman and Rice (1999) define unsociable hours of work as outside the hours of 9 a.m. – 5 p.m. Breedveld uses the term "scattered work" to describe work not carried out between 6am and 7pm, Monday to Friday. Reflecting on these differences between countries and between studies, Harvey *et al* (2000) suggest that further research is required to determine if a standard which applies to many countries can be devised, or if a standard should be set in relation to each country.

Another critical issue for data collection and analysis is identifying whether people infrequently, frequently, usually or always work at particular times. For example, people may occasionally undertake overtime in the evenings or weekends, or they may work rotating shifts but with the most common shift being a dayshift. If asked to record their *usual* hours of work, these less frequent events are unlikely to be recorded. Harkness (1999) notes there are major differences in British LFS data between measures of usual working hours and measures of the hours people sometimes work. For example, while 16 percent of employees reported "usually" working in the evenings in 1998, this proportion rose to over 50 percent if those who "sometimes" worked in the evening were also included. Similarly, only 6 percent regularly worked nights, but 20 percent of employees sometimes worked nights. Moreover, 40 percent of those regularly working nights and 34 percent working evenings worked different shifts at some other times.

Various studies focus on slightly different target populations. For example, in the US Hamermesh (1995) focussed on people working 20 or more hours per week, while in the Netherlands Breedveld (1998) excluded people working less than twelve hours per week. Some studies exclude self-employed workers (e.g. Hamermesh 1999a), or workers in the agricultural industry.

The time use survey literature notes other technical issues to be considered. For example, Harvey *et al* (2000) discuss the situation when diaries only cover one day or a couple of days of the week (as in New Zealand). This can raise problems of bias caused by left or right censoring. The starting times of work spells that were already underway when respondents began to complete their first diary day, and the finishing times of work spells that were still underway when respondents finished completing their last diary day, are not observed. Researchers cannot know the completed duration of these censored work spells. Harvey *et al* note that some countries have tried to reduce this problem by starting the diary day at 4 in the morning with the assumption that most

people would be asleep at this point. The New Zealand TUS is amongst those starting the diary day at 4am.

A more serious problem arises when the time use diaries do not cover the whole week. While individuals' work schedules for particular days can be analysed, it is impossible to study the schedules that individuals work during the week as a whole. People who work non-standard hours on their diary days may or may not work them on other days of the week, and vice versa. This means that the working time patterns of individuals cannot be characterised as 'standard', 'non-standard', or some other pattern. The distribution of paid working time over the week must be studied at the more aggregated level of demographic groups or populations. The New Zealand TUS is among those that collected diary data from each respondent for two days only.

It is important to appreciate that because time use diaries focus on a 'snapshot' of time that is of relatively short duration, the estimates they provide of infrequent events will often differ from the estimates that would be obtained if time use was measured over a longer period. For example, a high proportion of people might work some Saturdays over the course of a month, but on any particular Saturday fewer are working. The time use survey gives an estimate of the proportion working on Saturday – based on a cross-sectional sample of Saturdays – that is lower than the proportion of people who would be classified as 'participants' in Saturday work if we observed them over a more extended period of time. In other words, measures of participation in activities that vary in their frequency over time are not independent of the period of observation. This type of measurement issue is common to all cross-sectional survey data. Unfortunately, the New Zealand Time Use Survey does not allow us to explore the consequences of using a different period of observation.

How data is presented from time use surveys can also have some influence on the reported results. One measure often presented is how many people work in a particular time period. An alternative measure is how much work is carried out in a particular time period. Each on its own provides some useful information, but both are needed at times to provide a clearer picture of work patterns. For example, in the Netherlands Breedveld (1998) found that more men and more highly educated people were involved in work outside normal working hours than other groups but when measured on a time basis, these groups undertook less of their total working time in non-standard periods.[1]

### *Main research themes*

#### General themes [2]

The research literature suggests that in recent times there are many factors that influence when work is carried out during a day, during a week or during a year. Biological factors, such as the changing seasons and the patterns of night and day, have

[1] This paper does not show the actual times worked in minutes/hours of work, only the proportions.

[2] In this review section many of the finer details of each study are not discussed. As pointed out in some examples in the review, it is clear from the international studies that using even slightly different methodologies will produce variations in results. Therefore, while exact numbers are often presented, it is the general patterns rather than the detail that are important. In our results sections we make an attempt to provide some comparative data based on similar definitions and target populations.

always influenced when work has been carried out in primary sector industries. Technology has also increasingly been seen as influencing work patterns. For example, some industrial processes such as steel making require a 24 hour, 7 day a week operation. More recently, new information and communication technology, such as laptop computers and cellular phones, now allow working time to expand beyond the standard office working hours. The commercialisation of domestic services has also been identified as influencing when paid work is carried out with, for example, increased eating out requiring more employees to work early mornings, evenings and weekends. Government regulations have also been seen as historically having influence on working hours. For example, in the past women have been restricted from working at night, and in Europe shop trading hour legislation has been seen as influential in determining when work is carried out (Beckers and Breedveld 2000).

Terms like the "24 hour economy" are now commonly used (Presser 1999).[3] They suggest that we are rapidly moving to a society where few people work "standard" hours. Yet, like discussions of "overwork" or job security where assertions are sometimes made about rapid changes, the international research literature shows a far more complex picture. In addition, a wide range of literature suggests there has always been a degree of unsocial working hours. Religious leaders worked on days when most other people were supposed to rest, night watchmen patrolled at night, musicians and actors tended to ply their trades in the evenings and weekend, while inn keepers provided evening services. For many workers on farms, work was carried out seven days a week, particularly in the planting and harvesting seasons.

Dealing with contemporary industrialised society, studies using data from labour force surveys do suggest that a significant number of people spend at least part of their working week outside of "standard" working hours. For example, Presser (1995) found that that only 31.5 percent of all employed Americans aged 18 and over, employed in non-agricultural occupations, worked regularly during the daytime, 35-40 hours per week, just five days a week from Monday through to Friday. For employed men the proportion was 29.5 percent and for employed women the proportion was 33.8 percent. When all hours of work were considered still only 54.2 percent of men and 56.0 percent of women worked only Monday through to Friday, in daylight hours.

Golden (2000), using data on start and finish times from the May 1997 CPS reports, that a significant number of people in the US do some work outside of standard hours. For example, that 28 percent of US workers were 'usually' at work at 7.30 a.m. and 40 percent were 'usually' still at work after 5 p.m. Hamermesh (1995), also using US labour force data, reported that nearly 20 percent of male American employees worked on Saturday and 8 percent on Sunday. In comparison, 14 percent of women worked on Saturday, and nearly 7 percent on Sunday. Rates of weekend work for the self-employed were substantially higher (43 percent for Saturday and 18 percent for Sunday). Hamermesh found that night work was relatively uncommon. Overall, Hamermesh found that 76 percent of male employees, 80 percent of female employees and 74 percent of the self-employed worked only between 6 am and 7 pm in their main

[3] A search of the internet using the term "24 hour economy" brings up many references. Some are articles/web sites promoting the concept (such as 24 hour trading by companies) while others argue its negative impacts.

job. In a later study, excluding the self-employed, Hamermesh (1999a) estimated that in 1991, 6.7 percent of men and 5.8 percent of women were at work at 3 a.m.

Based on Eurostat Labour Force Surveys, and using the wider definition of people who either usually or sometimes work at particular times, Beckers and Breedveld (2000) report that, on average in the E.C., 37 percent of workers worked evenings, 15 percent worked nights, 51 worked Saturdays and 28 percent worked on Sundays. They also note that the UK had the highest level of evening, night and weekend-work.

**Table 3.1: Percentage of those employed who sometimes undertake evening or night work in selected E.C. countries in 1997**

| | Evening | Night | Saturday | Sunday |
|---|---|---|---|---|
| Netherlands | 27 | 11 | 42 | 25 |
| West and Middle Europe | | | | |
| Belgium | 34 | 14 | 40 | 25 |
| Germany | 32 | 13 | 41 | 23 |
| France | 34 | 15 | 53 | 29 |
| Ireland | 35 | 21 | 60 | 36 |
| Luxemburg | 27 | 13 | 42 | 23 |
| Austria | 30 | 18 | 47 | 27 |
| United Kingdom | 57 | 24 | 65 | 45 |
| North Europe | | | | |
| Denmark | 39 | 15 | 47 | 37 |
| Finland | 50 | 20 | 40 | 29 |
| Sweden | 42 | 14 | 41 | 36 |
| South Europe | | | | |
| Greece | 65 | 14 | 64 | 33 |
| Italy | 29 | 13 | 62 | 22 |
| E.C. average * | 37 | 15 | 51 | 28 |

Source: Beckers and Breedveld (2000)
* Includes Spain and Portugal but data is not shown for these countries

However, when only those who usually work at particular times are counted these rates are substantially reduced. For example, the E.C. average for night work reduces to just over 5 percent (Breedveld 2001). Given that there are major differences between the numbers who usually work in the evenings and at night and those who usually work in these periods, it may be that there are quite major differences in the characteristics of the two populations. For example, there may be a core of relatively low skilled workers who regularly work at night, such as process workers in factories, and more skilled workers such as doctors and engineers who are occasionally rostered onto a night shift. This issue has yet to be explored in the international literature.

Harkness (1999) also used labour force data to study changes between two periods in the UK. Her data focus only on those who usually work at certain times. She found that in the period 1992 to 1998 there were only small changes in work schedules. The proportion of people who usually worked at night increased 6.0 to 6.4 percent, during evenings from 14.1 to 16.3 percent, on Saturdays from 21.2 to 21.9 percent and Sundays from 10.2 to 11.7 percent. These figures are of a similar magnitude to those reported in the U.S.

The time use data also shows a relatively high level of work outside standard hours. Using data from the US, Finland, Sweden and Canada, Harvey (1996) found that just over half of all workers worked a "traditional" day. The next biggest group, around a quarter, was those who worked over the morning/afternoon/evening period. This would include workers who undertook some overtime at the workplace as well as workers who took home some work. However, Harvey *et al* (2000) using slightly different measure of core hours found more variation between countries. They also note that in some countries there were substantial gender differences when considering who worked core hours but very little in others. There were also some differences in daily work patterns over the week. Using data from the Netherlands, they found that on Sundays people tended to work later in the day, so core hours were not so important.

Some studies focus on start and stop times for paid work episodes.[4] As an example, Harvey (1996) utilises Canadian data to show changes over two decades. In 1971 work starts peaked at 8 a.m. with secondary peaks at 10 a.m and mid-day. In the early 1990s few people started before 5 a.m., but starting times rose quickly to peak at 7-8 a.m (11 percent). There was a second peak of 12 percent at mid-day. There were also relatively few starts after 6 p.m. Overall, there was a lowering of peak starts between the two time periods and Harvey suggests work is spreading out through the day.

Bittman and Rice (1999) base their work on surveys of time use carried out in Australia in 1974, 1987, 1992 and 1997 and explore changes over time. They found evidence of the growth of paid work on weekends, particularly for women.

Not surprisingly, Harvey *et al* (2000) found a strong relationship between the scheduling and the duration of daily episodes of paid work. In order to work long hours even people who work during the daytime need to start early in the morning and/or work into the evenings so will have some work outside of standard hours.

Some studies do show some small recent growth in aspects of non-standard hours such as working in weekends (e.g. Harkness 1999). Using a number of Canadian time use surveys Harvey (1996) also shows a growing dispersion of start times with work starting both earlier and later in the day. This view is supported by US (Hamermesh 1995). However, further studies show a slight decline in other aspects of non-standard work such as night work (e.g. Hamermesh 1999a). Certainly none show any signs of a recent dramatic shift to a 24 hour society. Longer term studies also question any dramatic shift in when work is carried out. Breedveld (1998) shows that in 1995 55 percent of the Dutch population worked 1 percent or more of their time outside of the period from 6 a.m. to 7 p.m., Monday to Friday. This compared with 49 percent in 1975 and 53 percent for 1990. Breedveld also found that, in 1995, 87 percent of all work was performed from Monday-Friday between 6 am and 7 pm. In 1975 this percentage was 88 percent.[5] Taking a longer time perspective, however, Breedveld (1999) shows that in 1995 fewer people in the Netherlands worked non-standard hours than was the case in 1955 or 1962. People worked an average of 3.8 hours in the evenings, on Saturday afternoons and Sundays in 1955, as opposed to 2.2 hours in

[4] There are some definitional issues around what constitutes an "unbroken" work episode (see Harvey *et al* 2000).
[5] Personal communication.

1995. He notes that some jobs where non-standard working hours were common have declined in number (e.g. industrial shift work) while much of the new work takes place during the day on weekdays (e.g. jobs in the public service or in business services). Harkness (1999) also makes the point that while there has been some growth in service occupations that require work during evenings or at night, traditionally it has been manufacturing workers who have dominated non-standard hours and particularly night work. The decline in manufacturing is likely to have reduced the strength of any shift to night work. In further work, Breedveld (2001) found that in 1995 86.7 percent of all work in the Netherlands (excluding travel) was performed on Monday-Friday between 6 am and 7 pm. In 1975 this percentage was 88.4 percent.

Using U.S. data, Hamermesh (1999a) has produced a long-term series of the proportion of employees working in the evenings and at night.[6] These data also show that the proportion of people working in the evenings and at night declined between the early 1970s and the early 1990s (Table 3.2).

**Table 3.2: Proportion of US full-time employees at work at specified hours, 1973-1991**

| | Men | | | | Women | | | |
|---|---|---|---|---|---|---|---|---|
| | **1973** | **1978** | **1985** | **1991** | **1973** | **1978** | **1985** | **1991** |
| 3 a.m. | 0.084 | 0.094 | 0.079 | 0.067 | 0.064 | 0.076 | 0.079 | 0.058 |
| Noon | 0.825 | 0.834 | 0.864 | 0.852 | 0.819 | 0.820 | 0.847 | 0.829 |
| 9 p.m. | 0.143 | 0.142 | 0.128 | 0.129 | 0.128 | 0.131 | 0.115 | 0.113 |

Source: Hamermesh (1999a)

Hamermesh found that the decline was strongest amongst higher income workers and least amongst the lower paid. He also found that the changes were not due to demographic shifts or changes in industrial composition. Overall, he argues that increasing real incomes coupled with technological change has allowed more workers to move away from evening and night work.

Finally, Breedveld makes the point that although studies show that work schedules have changed less in recent years than many people imagine, other aspects of work have changed. For example, there is now more part-time work in most countries and including such work may alter some trends. He suggests that studying the intersection between changing work schedules and other aspects of work changes is important.

## Factors associated with non-standard hours

Various studies have identified the demographic and socio-economic characteristics of those who work standard and non-standard hours. In doing so, there is usually some attempt to determine why some groups might be working at particular times. However, in most of the studies, relatively simple descriptive statistics are provided rather than multivariate analyses. Therefore, while it is clear from other labour market research that variables such as age, education, income and occupation are often not operating independently the relative influence of each factor is often difficult to determine from the international literature on work schedules.

[6] The target population was those people working 20 or more hours per week and excludes the self-employed.

One set of theories suggest that many people do not want to work during evenings or on weekends, and that night work is avoided by most people if possible. This would suggest that people who do work in these time periods will tend to those with less negotiating power in the labour market. Studies exploring this hypothesis use low earnings or low education as proxy measures of lower negotiating power. However, for some people the choice to work evenings, nights or weekends could be a positive one. If, in fact, some of this work attracts a wage premia, then there will be a group who make this choice for economic reasons. Some people may also choose to work evenings of nights so as to have free time during daylight hours – for example, dedicated sportspeople. This group might also be more prepared to work weekends as time off during the working week may be preferable.

Based on labour force survey data, Hamermesh (1999a) provides evidence from both the US and Germany that low waged workers are indeed over-represented in evening or night work. Considering the US, and using CPS and BLS data on workers in both 1973 and 1991, he found that increasingly evening (7.30 pm -10.30 pm) and night (10.30 pm to 6.30 am) work that was undertaken by male workers, was carried out by workers in the bottom decile of earnings. Breedveld (1998) also found that night work was associated with lower levels of education.

However, complicating the link between low levels of education and evening work is the fact that many young people work in the evening (Breedveld 1999). Breedveld notes that many of these young people are studying so it is likely this type of work is a transitory phase for a significant number of these young people. Young people may be choosing to work during the evening during so that they can attend classes during the day.

Further complicating the 'choice' argument is the position of self-employed workers. Hamermesh (1995) hypothesises that self-employed people have more control over the timing of their work and so their work patterns might give a guide to preferred hours. Some researchers (e.g. Breedveld 1999) have found that non-standard work hours are common amongst the self-employed. However, other research shows the self employed are a diverse group, which includes both well-educated professionals who may be able to control their hours, and poorly educated people in occupations such as taxi driving or truck driving. The latter are likely to have far less control over their working time.

However, lending support to the choice argument, Breedveld (1999, p.138) found that well educated people who work non-standard hours do so for a smaller proportion of their working hours than do people with a low level of education. He suggests they have more say as to when they work, and are significantly more likely to do some of their work at home.

Industry and occupation appear to be very important in relation to who works at non-standard times. In the U.K., Harkness found that particular occupations were over-represented in evening and night work. In 1998 personal service workers made up 20.6 percent of evening workers as against 10 percent of day workers. At night two occupations were highly over-represented, personal services at 25.5 percent, and linked to the importance of manufacturing in night work machinery operators. At night, machinery operators represented 23.1 percent of the workforce as against 9.3 percent

of day workers. Associate professionals were also slightly over-represented in night work. This will include health professionals such as nurses. In the U.S., Cox and Presser (2000) have also reported very strong links between occupational demands and employment schedules.

Harkness found that weekend work was performed within all occupations. However, personal service workers were a particularly important group on both days, and on Saturday sales workers were over-represented.

Given the importance of both industry and occupation, the industrial and occupational structure of the economy will have an influence on when paid work is carried out. For example, night work is likely to be more prevalent in an economy with relatively high levels of employment in manufacturing, particularly if many plants carry out continuous operations. Given the dominance of manufacturing in night work, and the fact that in most industrialised countries men are more likely than women to work in this sector, it is not surprising that Harkness found men in the UK were almost twice as likely to work nights as women (ibid, p. 96). In a more agriculturally-based economy, work in the early hours of the morning or during the weekend is likely be more common.

The association between gender and work scheduling is complex. In the U.S., Presser (1995) found that overall males and females had similar rates of non-standard work days. In Britain, Harkness found that the group most likely to work standard hours were women in full-time work. In 1998 95.7 percent of female full-time workers worked days only. However, she does note that this group represented only 27.6 percent of all workers. In addition, although generally men as seen as having more choice in the labour market, for some of the reasons already discussed men were twice as likely to work in the unpopular night period than women.

The presence and age of dependent children, as well as family type, adds further complexity to who works at non-standard times. For example, Hamermesh (1995, 1996) found that in the U.S. women were more likely to work evenings and nights if they had young children. In a later paper, he found that couples, and particularly those with higher incomes, had a strong tendency to work similar shifts with the result that they had joint leisure (Hamermesh 2000).[7] However, children reduce the "jointness" of spouses' leisure, with the largest changes taking place among new mothers. Also in the U.S., Presser (1988, 1994) found that while couples often do work at similar times, a significant proportion of two parent families do have non-overlapping shifts. She found that one third of dual-earner married couples with pre-school children managed their childcare by having non-overlapping shifts. In a 1995 article, Presser notes that presence of children has little effect on the work schedules of men, but a greater effect for women. The strongest effect was for mothers with a child under five. Subsequently, Cox and Presser (2000) considered both family and occupational factors in non-standard work for mothers and found that job demands had the most impact on the schedules of never-married mothers, while it was caregiving preferences that had a major impact on the schedules of currently married mothers. Both Cox and Presser and

[7] As Hamermesh acknowledges these couples may not have actually consumed this leisure together. In addition, he does not consider that couples working the same shifts might actually work in the same workplace so be able to have a "jointness" of work time. US research suggests that the proportion of couples working in the same workplace is not insignificant (Moen and Sweet *forthcoming).*

Levine and Pittinsky (1997) point to the difficulties of sole parents working non-standard hours as they do not have a partner to look after the children and formal childcare is often not available in non-standard working times.[8]

Using UK labour force survey data, Harkness (1999 p. 105) found that partnered women with dependent children were more likely to work during evenings or at night than women with no children. In 1998, 17.8 percent of partnered women with children regularly worked in the evenings, while 5.7 percent worked at night.[9] This compared with 12.3 percent of partnered women without children working in evenings and 3.6 percent working at night. For single women with children the figures were 17.8 percent for evening work and 5.5 percent for night work. For single women without children they were 14.1 and 4.5 percent respectively. However, these differences are not all that great and, overall, the data shows the majority of women in both groups regularly worked during the day.[10]

The overseas research suggests that in the New Zealand context the standard variables such as gender, education, income, hours of work, family type and presence and age of children are all worth exploring.

Harvey *et al* (2000) make the important point that while time use surveys can provide a guide as to what factors are associated with non-standard work schedules, ultimately they do not inform us as to why people work particular hours. They suggest that the motivations to work particular hours needs to be explored more. In a 1995 Netherlands time use survey employees were asked about the amount of control they had over starting and stopping times (Breedveld 1998). This showed that half of the employees had hardly any control, one third had limited control and just over one tenth reported complete autonomy over their working time. As expected, higher educated people were more likely to have control over their working time, and men were more likely than women to have control. Breedveld suggests this has more to do with levels of education than gender.

Finally, in the U.S., Golden (2000) examined one aspect of control over starting and stopping time. This was the ability to alter daily schedules. Golden found that 27 percent of workers were able to alter their daily work schedules, up from 15 percent in 1991. She notes that the period from 1991 to the latter part of the 1990s was a time of tightening labour demand in the US, giving some workers more negotiating power. Access to such flexibility was higher in many of the higher skilled, growth industries. However, non-whites, women, the unmarried, relatively less-educated and public sector employees were less likely to have the ability to alter their daily work schedules.

[8] However, it may that the non-custodial parent undertakes childcare during non-standard hours. For example, it is quite common for children to stay with non-custodial fathers in weekends.
[9] These women may have also worked during the day.
[10] The work patterns of sole fathers were not analysed.

## 3.2 Location of work

***Survey instruments***

Overseas there have also been many small-scale studies of homeworking (e.g. Kiran 2000, Shamir 1992). In New Zealand, there has been some research on work location. For example, Loveridge (1993) used census data to estimate the number of homeworkers. In addition, Anderson *et al* (1994) provide some basic information on homeworkers. Also in New Zealand, Armstrong (1997) undertook a study of teleworkers.

Many of the studies on work location focus on people whose main, or only, work location is home.[11] They also tend to exclude farmers, many of whom see themselves as working at "home". Time use surveys instead examine work across a time period and there is the potential for people to work in a number of different locations over a day and/or over a week. For example, a manager may undertake some work related reading on a train trip to their workplace, they might then spend around eight hours at this workplace, undertake some more work while travelling home, and then later in the evening while at home undertake some further work.

As discussed in previous sections, even if someone worked at home on the days that they filled in the diary, this does not mean they did not work at a workplace or elsewhere at other times of the day. Equally, people who did not work at home on their diary days may have worked at home on other days of the week. Therefore time use surveys cannot provide an estimate of the number of people who *mainly* work at home. However, they do have the advantage that they can provide some links between work schedules and work locations. Some time use surveys, including New Zealand's, record a number of possible work locations including travelling and working at home.

In terms of travelling, people can be travelling as part of their work, or they can be working while travelling. They can also be travelling to and from their workplace but not working. For some people travelling will have been a central part of their job. Examples include truck drivers, taxi drivers and pilots. However, it is likely there are some boundary problems in the category of working while travelling. For example, a self employed plumber may not include time they spent travelling between jobs as being paid work time, whereas a plumber who is an employee may count this as paid work time.

There are also other definitional problems with work location. For example, a farmer who owns his or her property is likely to count their work on this property as working at "home", whereas a farm labourer undertaking exactly the same work is likely to classify this as time spent in a workplace.[12]

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[11] In studying at home work there is the issue of whether a person is working "from" home or "at" home. Someone, such as a real estate agent, could have a home based business but most of the time be working away from home, while travelling or in other peoples homes. In some surveys they would be classified as working from home. However, in time use surveys time away from home would not be counted as "home work". Work undertaken while travelling would be counted as such.

[12] On places like farms there are also boundary problems between paid and unpaid work. For example, some farmers' wives working in traditional roles may count much of their work such as cooking for

Finally, there is much interest in whether people are using new technologies to enable them to work outside of traditional workplaces. Harvey *et al* (1997) note that teleworking is a subset of working at home or can be undertaken while travelling.

### *Main research themes*

Most research suggests that relatively few people work mainly from home. For example, in New Zealand Loveridge (1993) using 1991 census data found that approximately 3 percent of the non-farm workforce appeared to be working at home. This is based on the question about how people travelled to work. If they did not travel to their workplace from their home, then they were classified as working from home. She argues that this type of home work appears to be associated with minority groups with limited access to the labour market. However, she also suggests some of the "minority groups", such as women with young children are relatively large. Overall, the proportion of women in the general workforce was 41 percent in 1991, but women made up 62 percent of those working at home. Anderson *et al* (1994) also point to more women than men working mainly at home. In their survey of enterprises, they found that 4.7 percent of workplaces used home workers.

A larger group of people undertake *some* work from home. Data from Canadian and European time use surveys indicate that between about 2 and 14 percent of the population worked from home at some time during the hours they recorded in the diary (Harvey *et al* 1997). This is equivalent to between 5 and 27 percent of those who actually worked on a diary day. However, less than half of these people only worked from home. The researchers also found an increase in home based work in Canada between 1971 and 1992 and in Norway between 1980 and 1990. This study found that it was workers in the age group 45-64 who tended to work from home. However, married people aged 25-64 who had no children had the highest probability of only working from home. The least likely to work from home were people aged 15-24 and single parents aged 45-64. The researchers also found that some people classified as unemployed undertook paid work from home.

Harvey (1996) explored start times for people working at home, in the workplace, other places and while travelling. He found that people working while travelling tended to start work earlier than others. However, he suggests that this should not be surprising as many were on the way to their workplace. He also found that although there was an initial peak around 8 a.m., the start times for people working at home did not have such marked peaks. In particular, his data show a significant number of people working at home started their work in the evening.

Various researchers make the point that in order to better understand why people work in particular locations and whether this is positive, a wide range of background information is needed. Traditionally, home has been seen as a refuge from paid work and terms like "spillover" portray paid work interfering with home life. However, in the U.S. and primarily discussing white collar workers, Hochschild (1997) argues that there are now many women, who like men before them, want to be at their paid workplaces

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shearing gangs as unpaid work, others may classify themselves as being "unpaid family workers" and therefore employed, while a further group may view themselves as being self employed.

to get away form the pressures of home life. She suggests that home can be a place of unrewarding work and conflict. She suggests that this partly explains the long hours many Americans put in at their workplaces. Breedveld (1999: 138) has a more benign view of work at home, particularly when length of work and type of job are also considered.

> Obviously there is no comparison, between driving a draughty bus until midnight and finishing up some paperwork over a cup of coffee in one's living-room. Going out to patrol a half-empty shopping mall is not the same as filling the gap between dinner and late-night television with some reading and writing.

Working from home does appear to offer a chance to combine paid work and family life. But the literature paints a complex picture (Callister and Podmore 1995 p. 109, Kiran 2000). For some parents, particularly mothers with low levels of education, home working can mean "sweated" labour producing goods at piece rates with the children simply getting in the way, whereas for high skilled "teleworkers" it can offer a chance to work around school hours, to have a sick child at home while still getting on with paid work or to ease back into the workforce after a period of parental leave.

# 4. Data source and measures

## 4.1 The New Zealand Time Use Survey

The New Zealand Time Use Survey was conducted by Statistics New Zealand under contract to the Ministry of Women's Affairs. The data collection was conducted over a twelve-month period from July 1998 to June 1999. The survey population is defined as the civilian, usually resident, non-institutionalised population aged 12 years and over residing in private households. The survey instruments comprised a 48-hour diary, a personal questionnaire and a household questionnaire.[13]

Diary respondents were asked to record their activities over a 48-hour period, using paper schedules that were divided into five-minute time slots. This included information on what activities were being carried out (primary and secondary) and where they were taking place. Interviewers then asked respondents some questions to gather further information about the activities undertaken. Each diary day was from 4am in one day to 4am of the next day.

The interviewer administered the Household Form and Questionnaire at the first interview. The respondent was then left with the diary. The interviewers then administered the personal questionnaire and diary questions at follow-up interviews. The personal questionnaire obtained detailed information on the respondent including demographic, labour force and education data. As will be shown, the way survey was undertaken had some impact on the results.

The sample was allocated evenly across the 12 months of the survey period to minimise the seasonal effects, and was also balanced across days in the week. The survey had a response rate of 72 percent and an achieved sample size of 8,522 respondents. The sample selection procedure included a separate Mäori screening sample to boost the Mäori sample size and improve the reliability of Mäori population estimates. While up to two people could be randomly selected within each household there was no attempt to determine the work patterns of all family/household members. Consequently, it is not possible to explore the interdependency of working hours within couples.

Each respondent in the survey was assigned a unique survey weight that adjusted for differences in the probability of selection, and for non-response, and calibrated the sample totals to the population benchmarks. Age, sex and ethnicity benchmarks were obtained from 1996 census data adjusted for births, deaths and migration. The labour force benchmarks were obtained from HLFS data for the four quarters that the TUS was collected.

[13] The household data collection was divided into two parts. The first was the household form. This was used for identifying and selecting eligible respondents. It also collected demographic data about the household. The second part was the household questionnaire. This collected information in topics such as home ownership and use of appliances. We did not use data from the latter questionnaire.

## 4.2 Study population and variable definitions

While the Time Use Survey covered all people aged 12 or older, the analysis in this paper is confined to working-aged people, aged 15-64 years. Around 4,900 employed people aged between 15 and 64 provided information on about 9,800 diary days, of which approximately 6,800 contained paid work. As we were using unit record data, we could identify records that seemed to be incorrectly completed. Eight diary day records in which respondents reported more than 18 hours of paid work per day were excluded from the data set.[14]

In the New Zealand time use survey labour force activities were coded to five subcategories. These were work for pay or profit, education or training in work time, job search activities, travel associated with labour force activity, and other labour force activity not elsewhere classified. We included the first two subcategories, 'work for pay or profit' and 'education or training in work time' in our definition of paid work for this study, and excluded the other subcategories. We made no distinction between primary and secondary jobs, or between work coded as a primary or a secondary activity.

Work for pay or profit includes work undertaken by employers, employees, the self-employed, and unpaid family workers. Overtime work is included. So is the time workers spend having morning and afternoon breaks at work.[15] Lunch breaks may also have been recorded as work if respondents did not enter specific information on what they were doing at this time.[16]

In total there were thirteen possible work location categories. These were: at home; at another person's home; workplace or place of study; public or commercial or service area; bush, beach or wilderness; marae or other significant site to Mäori; other area; travelling by foot or bicycle; travelling by private transport; travelling by public transport; travel other; unidentifiable; and not stated. The response rate was too low for many of these locations to enable useful analysis. Therefore, in most tables we focus on two categories, work at home and work within a workplace.

While the questions collecting most of the variables were similar to those used other New Zealand surveys, the question on hours worked per week had an important difference. People were asked how many hours per week they usually worked, but were also permitted to tick a box indicating that they did not have usual hours. This resulted in a large number of responses, nearly 10 percent of the sample, in which the value of weekly hours worked was missing. Consequently, about 10 percent of

[14] This decision was questioned by one of the paper's referees, who noted that people could be at their workplace for long periods and be paid but actually asleep some of the time. For example, at night a house surgeon may be on call ready for an emergency but be asleep until this happens. In theory, these people should have recorded "sleeping" as their activity but they may have recorded the time as working.

[15] As will be seen in some of the graphs, there are very small dips in activity rates around times of morning and afternoon tea. This suggests that some people did record these periods as non-work times.

[16] Around 40 percent of the diaries of weekday workers do not have an interval without paid work during the middle of the day, suggesting that many lunch breaks may have been recorded as paid work. See section 5.1 for further details.

employed people in the sample cannot be classified as either full-time or part-time workers.

Hourly or weekly earnings were not recorded in the survey. Instead yearly income, measured in broad bands, was collected. In addition, the data on highest level of education was coded by Statistics New Zealand into four broad groups: no qualifications; school qualifications; both school and post-school qualifications, and post-school qualifications only. Because it is difficult to see a meaningful distinction between the latter two groups, we collapsed them into a single 'post-school qualifications' category.

### 4.3 Measures of working time patterns and their interpretation

There are a variety of ways of portraying working time patterns. We have chosen to use a mix of graphs and tables. Graphs of the distribution of paid work over the day have the advantage that arbitrary time boundaries do not distort the underlying patterns. However, numerical measures of the intensity of time use within particular 'blocks' of time have the advantage that the patterns of different groups can be more easily summarised and compared.

A number of different statistical measures can be derived to summarise patterns of participation in work over a 24-hour period. The three types of measures we make greatest use of in this paper are:

- The percentage of workers – those who worked on a given day – who worked within in a given time slot (not necessarily continuously).
- The average minutes of paid work that were undertaken in a given time slot by each employed person – including those who did not actually do any work on the day.
- The percentage of all minutes/hours of paid work that were done in each time slot.

The first measure has been used in other published studies of working time patterns (eg Hamermesh, 1995 and 1999). It is easy to understand and enables simple comparisons of the working time patterns of different groups of workers.

The second variable is the most popular measure of time use in the literature on time use patterns in general. It captures variations in the amount of work done by participants, as well as variations in the rate of participation in paid work. It has the advantage of being less sensitive to the period of observation adopted in the data collection (in this case, two days per person) than measures that use 'participants' as their base. The set of people who are employed does not change much from day to day, unlike the set of people who participate in work. This may lead to more stable estimates of a group's involvement in paid work when underlying sample sizes are relatively small.

The third measure provides an indication of the *relative importance* of each time period in relation to total work effort. This measure can be useful when groups with different 'base' hours of work per week are compared. For example, part-time workers perform a higher proportion of their total working hours during evenings than do full-timers.

However, measured in average minutes per person, the evening work time of part-timers is lower.

Because only two days of diary information were collected from each person, the weekly work schedules of individuals are not observed and cannot be analysed. People who worked at non-standard times on their diary days may have worked at standard times on other days of the week, and vice versa. It would be misleading to characterise individuals in the sample as standard or non-standard workers on the basis of the data available. Similarly, the people who worked solely or mainly at home on their diary days may not have done so on other days of the week, so we are unable to characterise individuals in the sample as 'home workers'. We use the TUS to study the average working time and location-of-work patterns of groups of workers, defined by their personal and job characteristics (eg males, Mäori, sales and service workers).

It is important to bear in mind that the group averages may conceal widely varying patterns of work on the part of individuals. Two groups of workers may have similar levels of involvement in work at a particular time of day, but very different patterns of involvement at the level of individuals. The following hypothetical example illustrates this. Suppose we are comparing two groups of workers, sales workers and professionals, each of which has a 'participation in evening work' rate of 20 percent (based on the fact that 20 percent of the diary days of each group include work undertaken between 7pm and midnight). In the case of the sales worker group, 20 percent of the workers work every evening, while the other 80 percent never work in the evening. In the case of the professionals, 100 percent do evening work sometimes, but only for one day in five on average. It would be misleading to state that '20 percent of professionals undertake evening work' as 100 percent are involved, to some degree. A correct interpretation is that *on an average day*, 20 percent of professionals are at work in the evening.

### 4.4 Sampling errors

The Time Use Survey had a complex, clustered sample design. Participating households were drawn from selected strata and within each strata, from clusters of households (PSUs). Within each household, only one or two adults were selected to participate. In addition, there were two samples: a primary sample and a Mäori screening sample. The function of the latter was to boost the number of Mäori who were sampled.

All estimates that were calculated for this report are weighted estimates. The weights calculated by Statistics New Zealand for each sample member have three functions: a) to adjust for differences in the probability of selection; b) to adjust for non-response patterns; and c) to calibrate sample totals to population benchmarks.

The survey's complex sample design complicates the estimation of sampling errors. On request, Statistics New Zealand calculated standard errors, using a jackknife estimation procedure, for a number of key estimates produced in this study. Those estimates included measures of participation or time worked during evenings, nights and weekends, for all workers and for demographic and occupational and industry sub-groups. They also included measures of the proportion of paid working time that was

performed at home. The objective was to identify statistically significant group differences in means and proportions. Information on these sampling error estimates is given in Tables 5.30, 5.31, 5.34 and 6.7.

# 5. Working time patterns

## 5.1 An overview of working time patterns

From the survey data it was estimated that there were 1.69 million employed persons in the age group 15 to 64 years, in an average week between July 1998 and June 1999. Approximately 71 percent of the diary days completed by employed respondents in the TUS contained paid work episodes. From the survey data it was estimated that around 61.3 million hours of paid work were undertaken in an average week.[17]

Table 5.1 gives four summary measures of the distribution of work across the week.

**Table 5.1: Working time and participation in work by day of week**

| | Percentage of all paid work time | Percentage of employed people who were at work | Average hours per person, all employed* | Average hours per person, if working on that day |
|---|---|---|---|---|
| Sunday | 6.1 | 42.2 | 2.1 | 5.0 |
| Monday | 16.6 | 80.7 | 6.2 | 7.7 |
| Tuesday | 17.4 | 83.6 | 6.6 | 7.9 |
| Wednesday | 17.8 | 82.3 | 6.4 | 7.8 |
| Thursday | 18.2 | 83.5 | 6.4 | 7.7 |
| Friday | 16.7 | 81.8 | 6.1 | 7.5 |
| Saturday | 7.2 | 45.3 | 2.5 | 5.6 |
| All days | **100.0** | **71.0** | **5.2** | **7.3** |

*This includes people who recorded being employed but did not work on their diary days

The first column shows the distribution of diary hours across the week. Approximately 87 percent of paid work was carried out during weekdays. The remaining 13 percent – a significant fraction – was carried out on the weekend.[18] If employment had been evenly spread throughout the week, we would have expected 29 percent of work to be carried out during the weekend.

The second column contains estimates of the proportion of people who indicated they were employed (in the personal questionnaire) who were at work on each day of the week. During a typical weekday, more than 80 percent of the employed did some paid work. On Saturdays and Sundays, the percentages were 45 and 42 percent respectively.

The third column shows the average number of hours worked on each day by all employed people. This includes people did not work on their diary days. Finally, the fourth column estimates the average hours of participants – those who undertook some

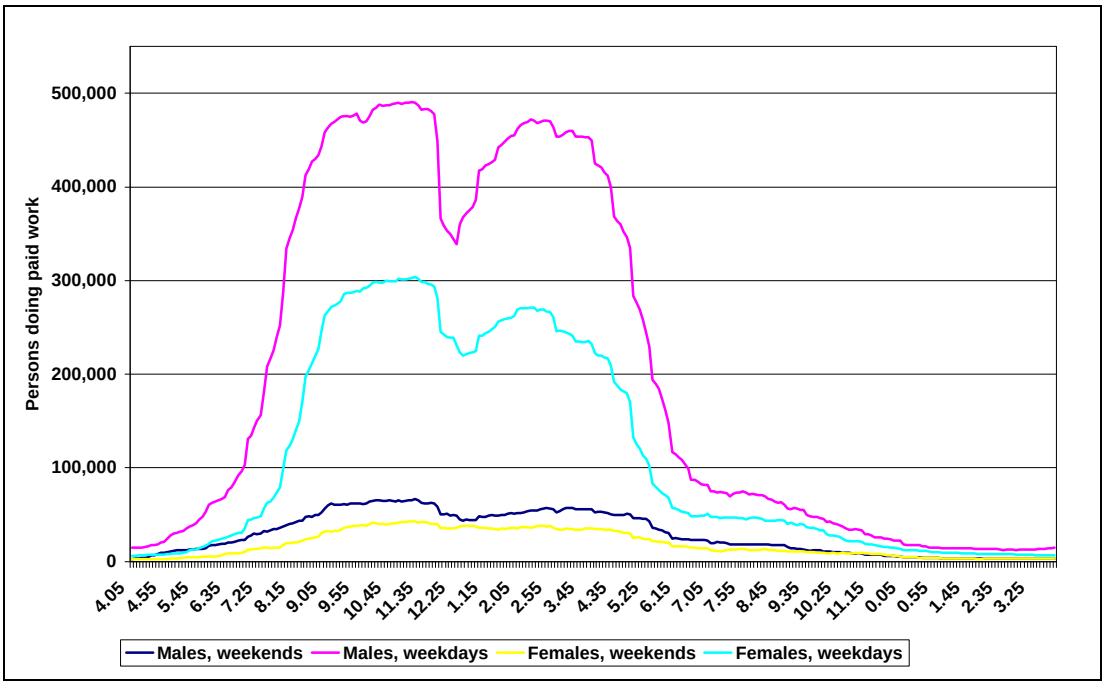
[17] As points of comparion, the Household Labour Force Survey (HLFS) estimate of aggregate actual weekly hours worked on an average week in the March 1996 quarter was 57.8m. This is actual worked hours, not the usual hours and only private dwellings were covered in the survey. In comparison the census, also in March 1996, showed a total of 69.6m hours work. This figure was for usual hours and includes non-private dwellings.

[18] Recall that we define the day as starting and finishing at 4am, and therefore work undertaken between midnight on Friday and 4am on Saturday morning, for example, is counted as Friday.

paid work. On weekdays, participants worked an average of around 7.7 hours, while on weekends, participants undertook just over 5 hours on average.

Figure 5.1 provides a first overview of how paid work is distributed across the day. It plots the number of men and women who were at work in five-minute time slots during an average weekday/weekend. Note on this graph and the following ones the time period begins at 4am one morning and finishes at 4am the next. This means, for example, that the data showing the Sunday work patterns actually do not start until 4am on Sunday morning and do not finish until 4am Monday morning.

**Figure 5.1: Number of people at work at each time of the day**




A number of patterns emerge from Figure 5.1. These include:

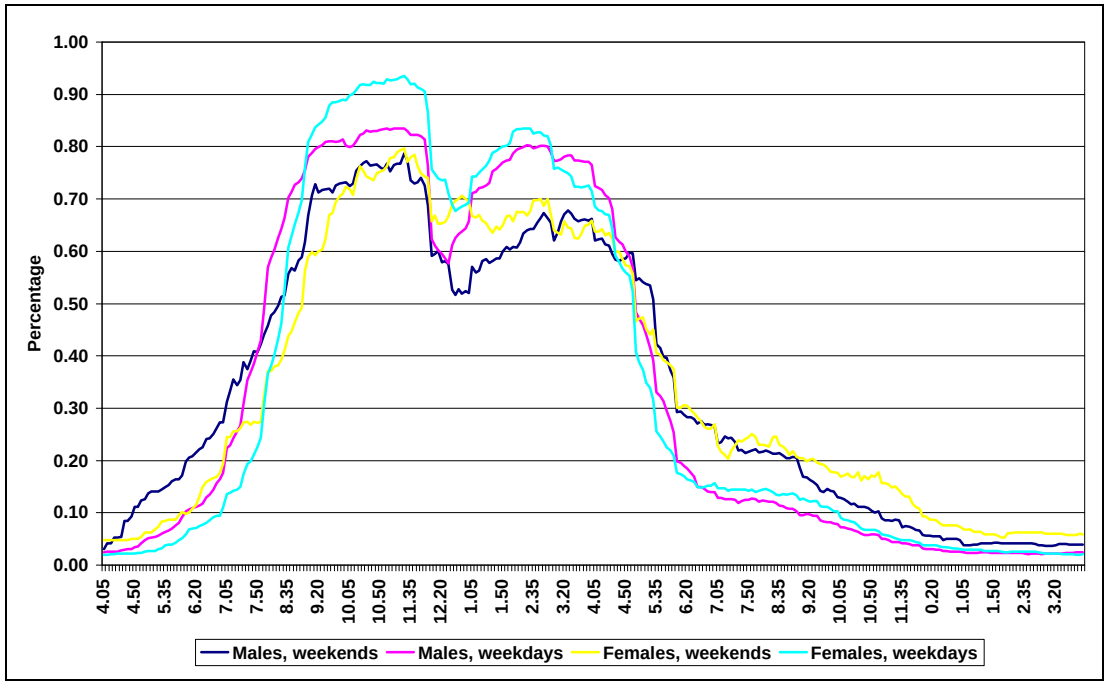
- Paid work was heavily concentrated between the hours of 7am and 6pm. From midnight to the early hours of the morning very little paid work was undertaken.
- For both men and women on both weekdays and weekends, the peak time for working was in the morning, with a slightly lower peak in the afternoon.
- The distribution of work across the day was much less peaked on weekends than on weekdays.
- In both the weeks and the weekends more men than women were working at any given time, reflecting both differences in employment rates and differences in daily hours of work.

The dips visible in the middle of the day reflect some people recording their lunch breaks as non-work periods. However, a significant proportion of people working during the day did not record a non-work spell in the middle of the day. For example, if we consider weekday diaries in which some paid work was undertaken both between 9 a.m. and 11 a.m. and between 3 p.m. and 5 p.m., we find that in 37 percent of these

diaries, work was recorded continuously from 11 a.m. through to 3 p.m. This may be higher than the true percentage of workers who do not take a lunch break from work. It suggests the possibility that the Time Use Survey estimates of paid working time are upwardly biased.

Figure 5.2 shows the distribution of the total working time (in minutes) undertaken by all men and women across the hours of the day. Because these are within-group percentage distributions, gender differences in employment and activity rates are controlled for. The lines plotted suggest that the working hours of women were more concentrated within the 'standard' hours of 8am to 6pm than those of men. In addition a greater proportion of weekend than weekday work was carried out in the evenings.

**Figure 5.2: Distribution of each group's working time**




Figures 5.3, 5.4 and 5.5 provide an overview of the hours worked by women and men on weekdays, Saturday and Sunday. Each graph shows the proportion *of those people who worked on a given day* who were at work in each five minute period over the 24 hours. A number of broad patterns are apparent.

- A smaller fraction of women than men were at work at most hours of the day. This reflects the lower average daily hours worked by women.
- The fraction of weekend workers who were at work at any given hour of the day was much lower that the corresponding fraction of weekday workers – reflecting the shorter hours typically worked on weekends.
- The patterns of work undertaken on Saturdays and Sundays were similar, although participation in work was a little higher on Saturday mornings.

**Figure 5.3: Percentage of weekday workers at work, by gender**

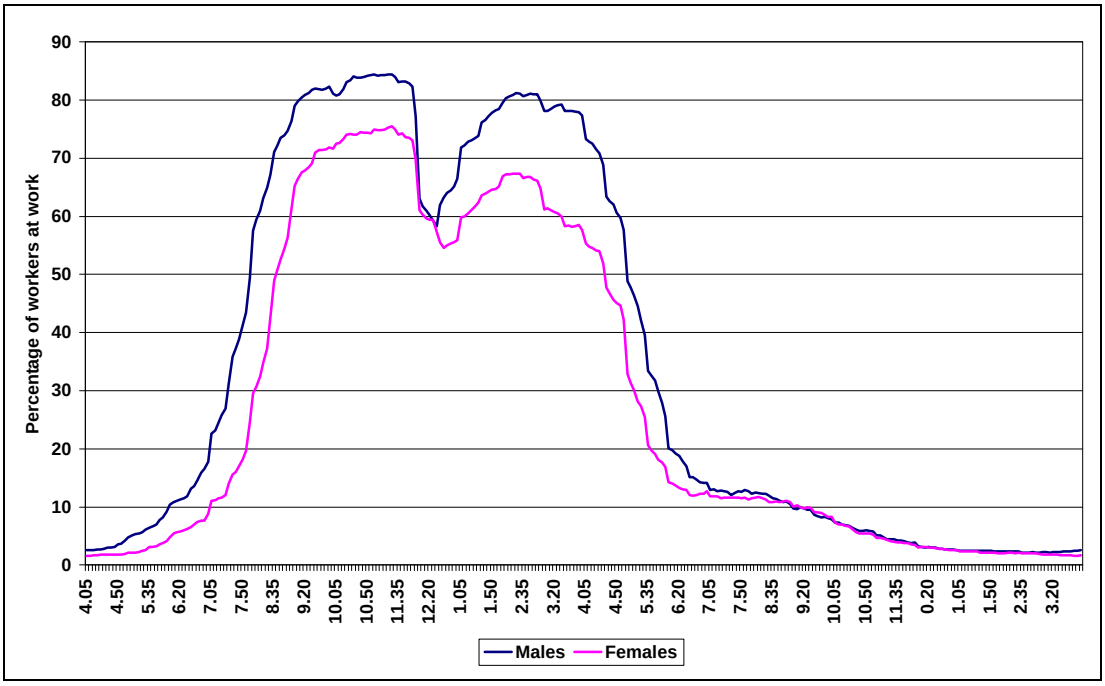



**Figure 5.4: Percentage of Saturday workers at work, by gender**

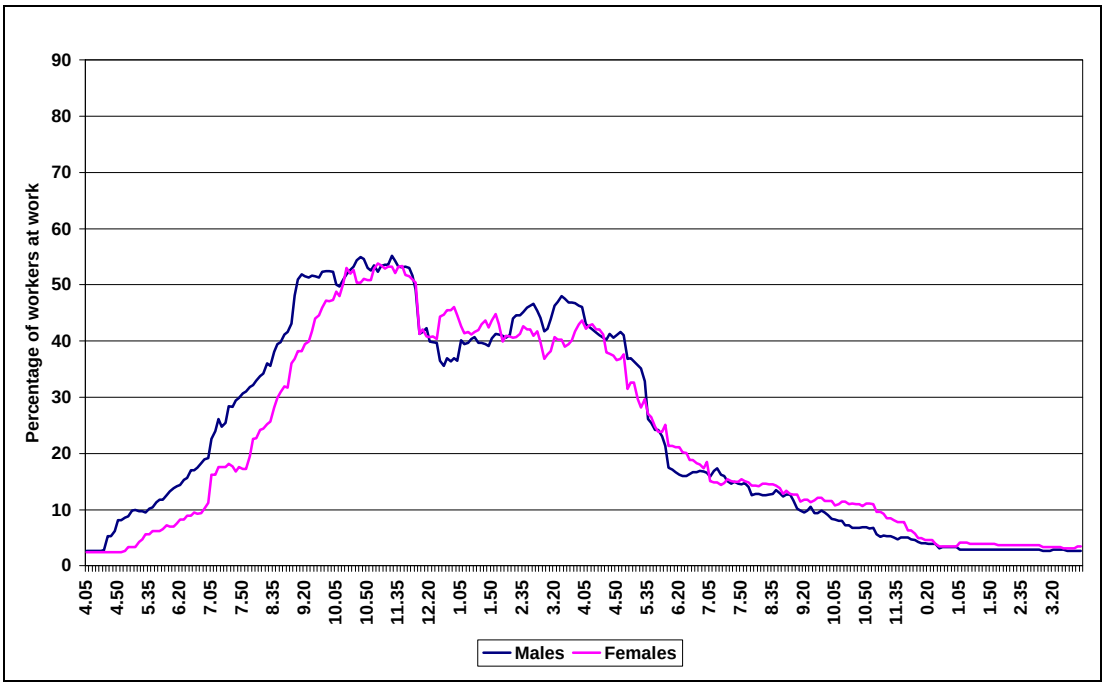
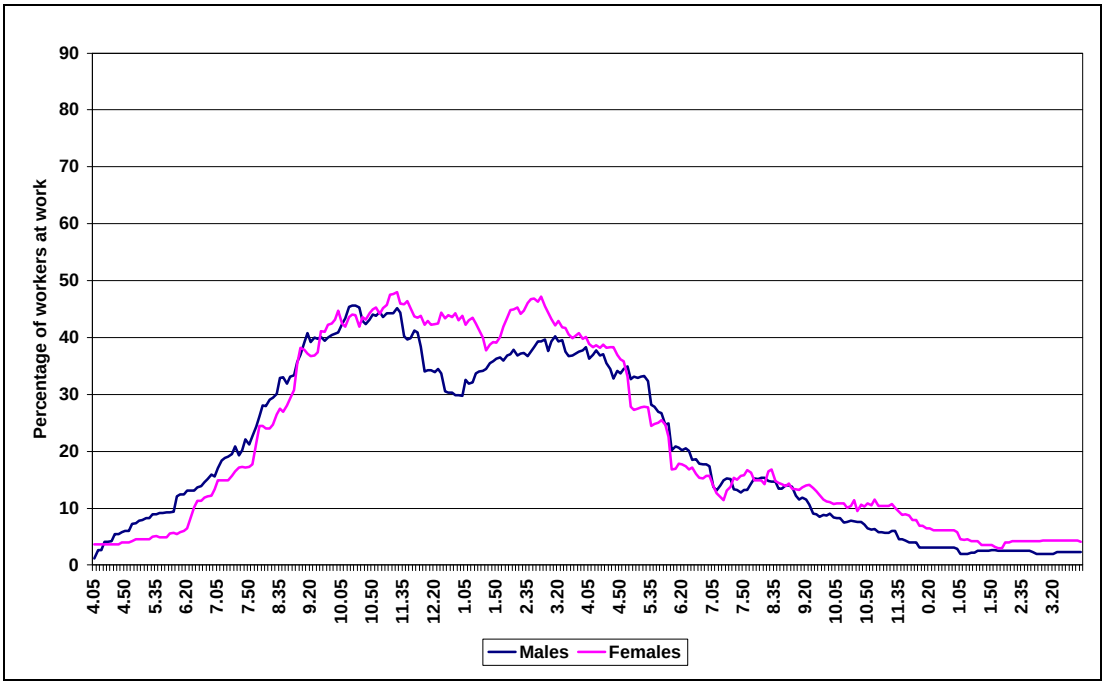


**Figure 5.5: Percentage of Sunday workers at work, by gender**




As a further summary statistic, we calculated the proportion of work recorded in the time diaries that was undertaken during Monday to Friday between 8 am. and 6 pm. If work was evenly spread over the whole week and across 24 hours then just under 30 percent of work would be undertaken in these "standard" hours. In fact, 74.2 percent of work was undertaken in this time. Of the remaining working time, 10 percent was carried out on weekends between 8am and 6pm, and the remaining 15.8 percent during evenings, nights, and in the early hours of the morning.

## 5.2 Daily work schedules

In this section we provide a more detailed description of daily work schedules using a range of demographic and socio-economic variables. Based on the initial graphs of the distribution of paid work over the day, we chose to divide days into 8 time periods. It should be noted that some are two-hour periods while others are four-hour periods. The two-hour periods cover times of rapidly changing employment rates.

For brevity, we focus on two key measures of working time patterns: a) the percentage of workers (those who worked on a given day) who were at work in each time slot; and b) the proportion of all working time that was done within each time slot. Tables A1 to A3 in Appendix 1 give parallel estimates of the average minutes worked by each employed person in each period. Fortunately, when we analyse differences in the intensity and timing of paid work effort across different groups of workers, results derived from the 'participation rate' estimates and the 'average minutes worked' estimates are generally very consistent.

### *Days of the week*

Table 5.2 gives estimates of the percentage of workers who worked within each time band on a particular day of the week. For example, from the first row of the table, 68.3 percent of those who reported doing paid work on a Sunday spent at least some time working between midday and 4 pm (not necessarily continuously). Table 5.3 shows the proportion of all working hours that were carried out within each time band.

**Table 5.2: Percentage of workers who were at work during each time-of-day band**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Mean hours worked |
|---|---|---|---|---|---|---|---|---|---|
| Sun | 8.6 | 27.6 | 68.6 | 68.3 | 50.6 | 32.1 | 26.1 | 5.2 | 5.0 |
| Mon | 7.4 | 41.4 | 87.1 | 91.2 | 74.5 | 28.4 | 19.2 | 3.7 | 7.7 |
| Tues | 8.5 | 44.4 | 89.7 | 91.4 | 74.1 | 27.1 | 19.9 | 3.4 | 7.9 |
| Wed | 9.2 | 43.6 | 89.4 | 89.1 | 71.6 | 23.6 | 19.1 | 4.2 | 7.8 |
| Thurs | 6.8 | 42.8 | 87.7 | 89.4 | 70.5 | 26.1 | 21.2 | 4.3 | 7.7 |
| Fri | 7.4 | 42.6 | 88.2 | 88.4 | 66.8 | 24.5 | 16.0 | 4.0 | 7.5 |
| Sat | 10.8 | 32.8 | 74.3 | 70.8 | 53.7 | 27.2 | 19.7 | 5.3 | 5.6 |

**Table 5.3: Percentage of working time carried out within each time-of-day band**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Total |
|---|---|---|---|---|---|---|---|---|---|
| Sun | 2.3 | 6.1 | 31.1 | 30.6 | 12.8 | 6.4 | 8.2 | 2.7 | 100.0 |
| Mon | 0.9 | 4.5 | 37.3 | 36.5 | 12.2 | 3.8 | 3.8 | 1.0 | 100.0 |
| Tues | 1.0 | 4.8 | 37.7 | 35.9 | 12.1 | 3.5 | 3.9 | 1.0 | 100.0 |
| Wed | 1.1 | 5.0 | 38.0 | 35.2 | 12.0 | 3.1 | 4.1 | 1.5 | 100.0 |
| Thurs | 1.0 | 4.5 | 37.9 | 35.4 | 11.8 | 3.6 | 4.4 | 1.3 | 100.0 |
| Fri | 1.0 | 4.8 | 38.9 | 35.5 | 11.0 | 3.7 | 3.9 | 1.2 | 100.0 |
| Sat | 2.2 | 6.7 | 33.4 | 30.1 | 12.5 | 5.9 | 6.9 | 2.4 | 100.0 |

A number of patterns emerge from these tables. These include:

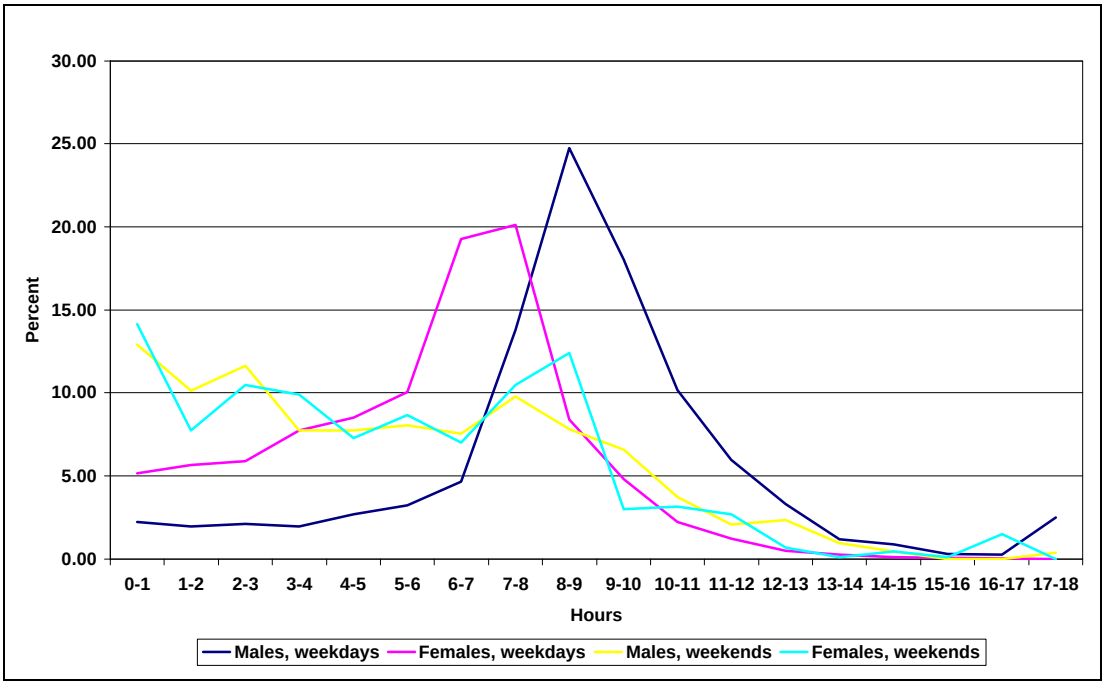
- During the week around 85 percent of work was carried out between 8 a.m. and 6 p.m. In the weekend this proportion was around 75 percent.
- During the week over 40 percent of diaries recorded an episode of work between 6 am and 8 am. Even amongst Saturday workers, nearly a third were at work in this time slot. This suggests a significant number of people start work relatively early. On weekdays, the average employed person did about 18 minutes of work before 8am (see Table A1, Appendix 1).
- The proportion of workers who undertook some work at night and in the evenings was generally much higher than the proportion of working hours carried out in these periods. For example, on weeknights about 20 percent of time diaries had some work recorded between 8 p.m. and midnight but only 4 percent of all weekday work was carried out in this period. Similarly, while 4-5 percent of workers performed some work between midnight and 4am, the total hours recorded represented only 1-2 percent of all paid working time. This indicates

that many people who work at these 'unsocial' times of the day perform relatively short episodes of work.

### *Gender and hours of work*

Figure 5.6 shows the duration of time that was typically worked by men and women on weekdays and weekends. It shows the most common daily hours for men during the week were in the 8-9 range, while for women the peak was in the 6-8 hours range. However, in the weekend daily hours were typically much shorter. Approximately 42 percent of weekend work episodes lasted for no more than 4 hours, compared with just 13 percent of weekday work episodes. In addition, there was less of a difference between women and men.

**Figure 5.6: Total hours of work recorded in individual diary days**




The following tables focus on patterns of work during weekdays only. Table 5.4 gives the percentage of men and women working in each time band while Table 5.5 gives the distribution of each group's working hours across the day.

**Table 5.4: Percentage of male and female workers who undertook some work within each time-of-day band (weekdays only)**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Mean hours worked | % diary days | Sample size (persons) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Males | 10.1 | 52.8 | 90.3 | 91.9 | 78.1 | 28.7 | 19.5 | 4.3 | 8.4 | 59.1 | 1878 |
| Females | 4.6 | 28.7 | 85.7 | 86.9 | 61.9 | 21.9 | 18.4 | 3.4 | 6.7 | 40.9 | 1666 |

**Table 5.5: Percentage of working time undertaken within each time-of-day band (weekdays only), by gender**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Total |
|---|---|---|---|---|---|---|---|---|---|
| Males | 1.1 | 5.5 | 37.4 | 35.2 | 12.3 | 3.5 | 3.7 | 1.2 | 100.0 |
| Females | 0.7 | 3.2 | 38.9 | 36.6 | 11.0 | 3.6 | 4.6 | 1.3 | 100.0 |

In the early morning there were large differences between men and women. Men were more than twice as likely to be working between 4 am and 6 am. The male rate was still almost double the female rate in the 6 am to 8 am period.[19] In this period over half the diaries for men had a work episode recorded. However, the proportion of work carried out in these early morning hours was much lower. For example, only around 1 percent the hours worked by males on weekdays were performed between 4 am and 6 am, and around 5.5 percent were worked between 6 am and 8 am. This reflects the rapidly rising participation rate over this period, with most workers starting closer to 8am than to 6 am.

Males were also more likely to be at work during the late afternoon and early evening than were women. In part this is a reflection of the fact that men simply tended to work longer hours – 1.7 hours longer on an average weekday. However, the gender differences in the likelihood of working during the evening or at night were less pronounced.

**Table 5.6: Percentage of full-time and part-time workers who undertook some work within each time-of-day band (weekdays only)**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Mean hours worked | % diary days | Sample size (persons) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Part-time male | 7.9 | 25.3 | 59.2 | 61.5 | 51.5 | 26.9 | 21.0 | 4.4 | 4.6 | 3.7 | 116 |
| Full-time male | 10.2 | 54.7 | 92.4 | 94.0 | 79.9 | 28.8 | 19.4 | 4.2 | 8.8 | 50.1 | 1599 |
| Part-time femal | 4.7 | 16.1 | 71.7 | 69.1 | 36.1 | 20.3 | 17.8 | 2.6 | 4.3 | 10.2 | 445 |
| Full-time femal | 4.6 | 32.9 | 90.3 | 92.8 | 70.4 | 22.5 | 18.7 | 3.7 | 7.8 | 26.8 | 1049 |

**Table 5.7: Percentage of working time undertaken within each time-of-day band (weekdays only), by sex and weekly hours**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Total |
|---|---|---|---|---|---|---|---|---|---|
| Part-time male | 0.8 | 5.9 | 32.0 | 28.5 | 14.8 | 7.2 | 7.9 | 2.8 | 100.0 |
| Full-time male | 1.1 | 5.5 | 38.0 | 35.8 | 12.2 | 3.2 | 3.2 | 1.0 | 100.0 |
| Part-time female | 1.3 | 3.4 | 39.5 | 33.6 | 8.8 | 5.4 | 6.2 | 1.9 | 100.0 |
| Full-time female | 0.6 | 3.2 | 39.0 | 37.4 | 11.4 | 3.2 | 4.0 | 1.2 | 100.0 |

Tables 5.6 and 5.7 provide a finer breakdown. They show that for both women and men, a smaller proportion of part-time than full-time workers were at work at any given time between 8 am to 6 pm – reflecting in large part the shorter duration of the work spells that are undertaken by part-time employees. Full-time males were much more likely to be at work in the early hours of the morning (between 4am and 8am)

[19] On average men also did more than double the minutes of work that were done by women – see Table A2 in the Appendix.

than were the other three groups. Males (both part-time and full-time) were also more likely than females to be working during the late afternoon slot of 4-6pm.

Evening and night work made up a larger share of the total working time of part-time workers. However, if we consider absolute amounts of work, it is clear that full-timers on average did significantly more minutes of work per person within these timeslots (see Table A2 in the Appendix).

### *Age*

Tables 5.8 and 5.9 give a breakdown of working patterns by broad ten-year age groups. The strongest pattern to emerge is that young workers (15-24) were the least likely to work be at work between 8 a.m. and 6 p.m. This is not surprising given the high rate of participation in schooling (including tertiary education) amongst young people. The distribution of each group's working hours across the day shows less variation by age, but nevertheless late afternoon and early evening work is somewhat more important for the youngest age group.

**Table 5.8: Percentage of weekday workers in each age group who undertook some work within each time-of-day band**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Mean hours worked | % diary days | Sample size (persons) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-24 | 8.0 | 36.7 | 77.3 | 80.6 | 72.3 | 26.1 | 15.2 | 2.7 | 7.0 | 14.1 | 414 |
| 25-34 | 9.1 | 43.9 | 89.6 | 91.7 | 75.3 | 24.2 | 15.3 | 4.0 | 8.0 | 24.6 | 913 |
| 35-44 | 6.5 | 40.2 | 90.4 | 91.8 | 70.0 | 26.6 | 22.1 | 4.6 | 7.8 | 27.5 | 1002 |
| 45-54 | 8.2 | 45.1 | 90.7 | 92.3 | 71.6 | 25.7 | 19.6 | 3.4 | 7.8 | 24.2 | 834 |
| 55-64 | 7.6 | 52.0 | 90.4 | 87.2 | 64.5 | 28.7 | 24.5 | 4.6 | 7.5 | 9.7 | 381 |

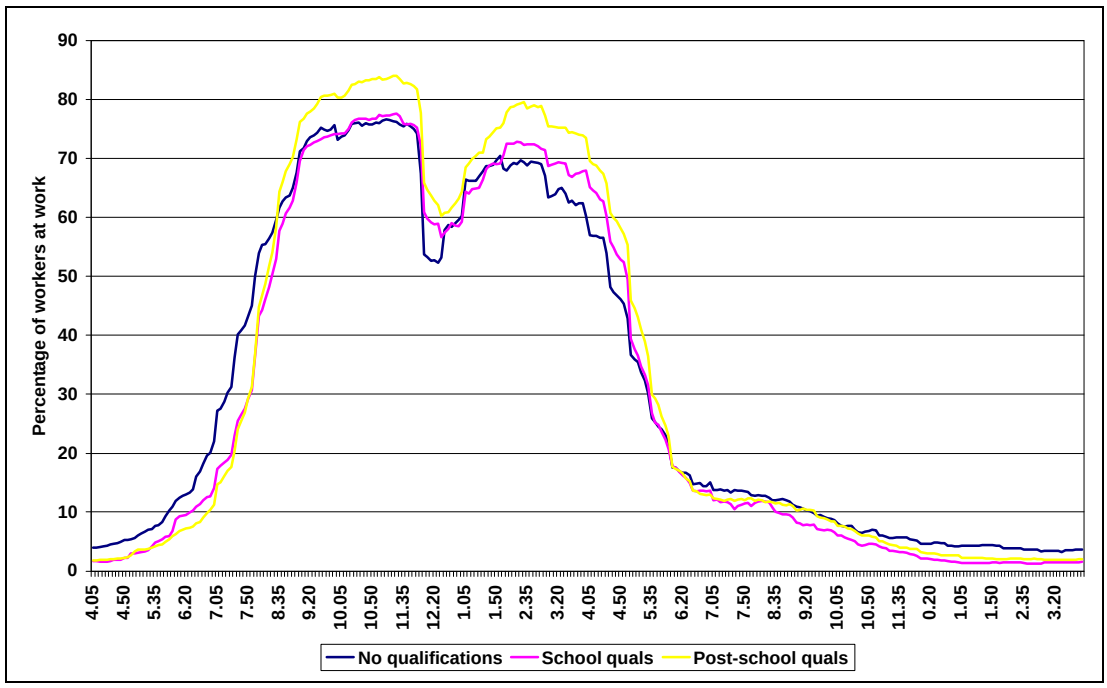
**Table 5.9: Percentage of working time undertaken within each time-of-day band (weekdays only), by age group**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Total |
|---|---|---|---|---|---|---|---|---|---|
| 15-24 | 0.9 | 4.7 | 35.3 | 35.9 | 13.5 | 4.7 | 4.0 | 1.0 | 100.0 |
| 25-34 | 1.1 | 4.8 | 38.4 | 36.0 | 12.0 | 3.2 | 3.4 | 1.1 | 100.0 |
| 35-44 | 0.8 | 4.1 | 38.2 | 35.8 | 11.6 | 3.4 | 4.5 | 1.6 | 100.0 |
| 45-54 | 1.1 | 4.9 | 38.3 | 35.8 | 11.6 | 3.4 | 4.1 | 1.0 | 100.0 |
| 55-64 | 0.9 | 5.7 | 39.1 | 34.1 | 10.7 | 3.8 | 4.3 | 1.4 | 100.0 |

### *Education*

Figure 5.7 graphs the proportion of workers in each educational group who were at work at each time period during weekdays. The similarities between groups are very strong. However, the graph does suggest that a slightly higher proportion of workers with low levels of eduction were at work both early in the morning and at night. The working hours of people with post-school qualifications are more concentrated within the 'core' period of 8 am to 6 pm.

**Figure 5.7: Percentage of weekday workers at work, by educational level**




Tables 5.10 and 5.11 provide summary statistics by education. These also suggest that workers with no formal qualifications were the most likely to be working at night and in the early hours of the morning.[20] For example, 5.6 percent of people with no qualifications were working at night (carrying out 2.1 percent of their work time) versus 3.9 percent (1.1 percent of work time) of those with post school qualifications. The educational-group differences in night work are not large, however, and may not be statistically significant.

**Table 5.10: Percentage of weekday workers in each qualification group who undertook some work within each time-of-day band**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Mean hours worked | % diary days | Sample size (persons) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No qualifications | 12.2 | 53.3 | 86.6 | 86.1 | 63.4 | 24.7 | 17.7 | 5.6 | 7.7 | 19.3 | 718 |
| School qualifications | 7.3 | 39.8 | 85.7 | 87.2 | 70.6 | 23.8 | 17.2 | 2.8 | 7.3 | 27.6 | 919 |
| Post-school qualifications | 6.5 | 40.7 | 90.6 | 92.8 | 74.9 | 27.4 | 20.5 | 3.9 | 8.0 | 52.2 | 1873 |

**Table 3: Percentage of working time undertaken within each time-of-day band (weekdays only), by level of qualifications**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Total |
|---|---|---|---|---|---|---|---|---|---|
| No qualifications | 1.6 | 6.9 | 37.1 | 33.4 | 10.5 | 3.8 | 4.5 | 2.1 | 100.0 |
| School qualifications | 0.9 | 4.8 | 38.1 | 36.3 | 12.0 | 3.6 | 3.6 | 0.8 | 100.0 |
| Post-school | 0.8 | 3.9 | 38.2 | 36.3 | 12.3 | 3.4 | 4.0 | 1.1 | 100.0 |

[20] It should also be remembered that poorly educated workers are also less likely to have a job anyway.

Workers with post-school qualifications had the highest rate of participation in evening work. However, measures of the average minutes undertaken by employed people in each educational group suggest that the least qualified and most highly qualified groups did similar amounts of work, while the middle group did less (see Table A2 in the Appendix). Given that workers with post-school qualifications worked the highest number of hours (8.0 on average), these patterns suggest that the evening work spells undertaken by the more highly educated tended to be shorter.

### *Ethnic group*

The results given in Tables 5.12 and 5.13 suggest higher rates of participation in night work among Mäori and Pacific Island peoples than among Päkehä. Evening work was also somewhat more important, as a fraction of total working time, for the Pacific Island group. This result should to be treated with caution, however, given the small sample of Pacific Island peoples.

**Table 5.12: Percentage of people in each ethnic group who undertook some work within each time-of-day band (weekdays only)**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Mean hours worked | % diary days | Sample size (persons) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Päkehä | 7.5 | 43.0 | 89.9 | 90.8 | 72.7 | 25.7 | 18.5 | 3.1 | 7.7 | 80.5 | 2626 |
| Mäori | 11.0 | 46.2 | 82.3 | 84.6 | 60.3 | 24.2 | 20.8 | 8.2 | 7.6 | 10.7 | 662 |
| Pacific Island | 10.1 | 50.6 | 79.4 | 83.2 | 74.1 | 34.2 | 21.7 | 11.5 | 8.2 | 3.5 | 83 |
| Other | 5.0 | 27.6 | 84.0 | 92.3 | 76.8 | 29.7 | 23.1 | 3.1 | 7.7 | 4.2 | 138 |

**Table 5.13: Percentage of working time undertaken within each time-of-day band (weekdays only), by ethnic group**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Total |
|---|---|---|---|---|---|---|---|---|---|
| Päkehä | 0.9 | 4.6 | 38.5 | 36.2 | 12.0 | 3.4 | 3.6 | 0.9 | 100.0 |
| Mäori | 1.6 | 6.1 | 36.1 | 33.8 | 10.1 | 3.9 | 5.7 | 2.7 | 100.0 |
| Pacific Island | 1.9 | 6.1 | 32.7 | 29.9 | 12.0 | 5.4 | 7.6 | 4.6 | 100.0 |
| Other | 0.7 | 2.7 | 35.8 | 36.2 | 13.8 | 4.6 | 5.7 | 0.4 | 100.0 |

### *Income*

Tables 5.14 and 5.15 explore the relationship between work patterns and annual income, grouping income levels into broad bands. In these tables income will tend to reflect hours of work, so the low-income work patterns will tend to have similarities to those exhibited by part-time workers. Similarly, the majority of those in the high income group are likely to be full-time workers. High income workers tended to have higher rates of participation in evening work than did the other two groups. However, night work participation rates did not vary much across these broad income groups.

**Table 5.14: Percentage of weekday workers in each income group who undertook some work within each time-of-day band**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Mean hours worked | % diary days | Sample size (persons) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $1-$25,000 | 8.0 | 36.7 | 81.1 | 82.3 | 60.1 | 24.3 | 18.3 | 4.2 | 6.6 | 35.8 | 1332 |
| $25- $40,000 | 8.2 | 49.6 | 93.4 | 94.6 | 75.7 | 22.7 | 16.0 | 3.9 | 8.3 | 32.4 | 1134 |
| $40,000+ | 7.3 | 44.2 | 93.2 | 95.0 | 81.9 | 31.2 | 23.4 | 3.4 | 8.6 | 28.4 | 964 |

**Table 5.15: Percentage of working time undertaken within each time-of-day band (weekdays only), by level of annual income**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | |
|---|---|---|---|---|---|---|---|---|---|
| $1-$25,000 | 1.1 | 4.7 | 37.5 | 34.3 | 11.6 | 4.4 | 4.8 | 1.6 | 100.0 |
| $25- $40,000 | 1.0 | 5.1 | 39.1 | 36.9 | 11.1 | 2.8 | 3.0 | 1.1 | 100.0 |
| $40,000+ | 0.8 | 4.3 | 37.5 | 35.9 | 13.0 | 3.4 | 4.3 | 0.9 | 100.0 |

***Employment status***

Table 5.16 suggests that many employers start early, with a high proportion also working between 4pm and midnight. This will partially reflect the relatively long hours that tend to be put in by this group. The group most likely to start early are the self-employed (without employees). This group also has relatively high rates of participation in evening work. Included in the self-employed are agricultural workers such as farmers who tend to start work early.[21]

Overall, employees were most likely to be night workers. They are the group least likely to have control over their working hours. While unpaid workers in family businesses appeared the least likely to be at work early in the morning and at night the very small sample size suggests this result should be treated with considerable caution.

**Table 5.16: Percentage of weekday workers who undertook some work within each time-of-day band, by employment status**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Mean hours worked | % diary days | Sample size (persons) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Employee | 7.1 | 42.2 | 87.8 | 89.2 | 69.9 | 22.2 | 17.2 | 4.3 | 7.7 | 76.5 | 2777 |
| Employer | 9.9 | 51.1 | 94.0 | 94.5 | 81.9 | 44.4 | 31.7 | 2.1 | 8.7 | 8.8 | 280 |
| Self employed | 11.3 | 44.7 | 91.5 | 92.9 | 75.1 | 34.1 | 21.6 | 3.4 | 7.6 | 13.1 | 434 |
| Unpaid family worker | 2.0 | 16.5 | 59.8 | 69.0 | 60.3 | 33.7 | 18.4 | 0.8 | 4.1 | 1.6 | 50 |

[21] Measures of average minutes worked in each time slot indicate that the self-employed tend to put in more working time at most times of the day, with the exception of nights.

**Table 5.17: Percentage of working time undertaken within each time-of-day band (weekdays only), by employment status**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | |
|---|---|---|---|---|---|---|---|---|---|
| Employee | 0.9 | 4.5 | 38.6 | 36.0 | 11.2 | 3.3 | 4.0 | 1.5 | 100.0 |
| Employer | 0.9 | 5.3 | 35.4 | 34.4 | 13.8 | 4.8 | 4.9 | 0.4 | 100.0 |
| Self employed | 1.3 | 5.8 | 36.4 | 34.6 | 13.8 | 3.8 | 3.7 | 0.6 | 100.0 |
| Unpaid family worker | 0.1 | 4.1 | 35.8 | 37.1 | 14.3 | 4.8 | 3.3 | 0.4 | 100.0 |

A breakdown (not shown) of the self-employed by occupational group suggests that the working schedules of the self-employed were very much influenced by type of job. For example, 64 percent of self-employed agricultural workers undertook some work between 6 a.m. and 8 a.m., compared with only 26 percent of technical workers. In addition, agricultural workers were over-represented amongst the self-employed, making up 28 percent of the sample.

***Hours in diary day***

Tables 5.18 and 5.19 show the hours recorded in the diary in relation to when people were working. It is not surprising that a relatively high proportion of people who worked 12 hours or more per day were working in each of the time slots. Working long hours means that a person has to work a significant proportion of the 24 hours diary period. Of potentially greater interest are the people who have recorded short hours in their diary.[22] The table suggests that relatively low proportions of workers with short hours of work on their dairy days worked early in the morning, in the evening and especially at night. However, at the same time, schedules involving short daily hours were not so concentrated with the "core" period as were the schedules of people working closer to a "standard" day.

The high proportion of long hour workers who worked at night might partially reflect the nature of night work. Included in this group will be people with non-standard weekly schedules, such as those working four days at twelve hours and then three days off.

**Table 5.18: Percentage of weekday workers who undertook some work within each time-of-day band, by the hours recorded in the diary**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Mean hours worked | % diary days | Sample size (persons) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Up to 4 hours in diary | 4.3 | 14.2 | 54.9 | 50.2 | 26.6 | 15.2 | 13.8 | 0.5 | 2.2 | 13.1 | 518 |
| Up to 7 hours in diary | 5.0 | 18.8 | 71.5 | 71.2 | 36.4 | 17.5 | 15.6 | 2.0 | 4.1 | 29.9 | 1176 |
| 10 or more hrs in diary | 20.6 | 72.6 | 95.3 | 97.6 | 94.7 | 67.2 | 44.5 | 10.1 | 11.4 | 18.4 | 592 |
| 12 or more hrs in diary | 34.1 | 76.4 | 92.4 | 96.1 | 94.3 | 87.1 | 68.8 | 21.1 | 13.2 | 5.0 | 169 |

[22] People who recorded short hours in their particular diary days may have been working long hours during the whole week.

**Table 5.19: Percentage of working time undertaken within each time-of-day band (weekdays only), by the hours recorded in the diary**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Total |
|---|---|---|---|---|---|---|---|---|---|
| Up to 4 hours in diary | 2.2 | 4.9 | 41.8 | 27.3 | 11.6 | 5.7 | 6.3 | 0.1 | 100.0 |
| Up to 7 hours in diary | 1.2 | 3.8 | 41.1 | 34.3 | 9.2 | 4.3 | 5.0 | 1.1 | 100.0 |
| 10 or more hrs in diary | 1.8 | 6.9 | 31.0 | 30.7 | 14.0 | 6.6 | 6.9 | 2.2 | 100.0 |
| 12 or more hrs in diary | 2.8 | 7.3 | 26.4 | 25.9 | 12.9 | 9.2 | 11.1 | 4.4 | 100.0 |

***Occupation and industry***

First, Table 5.20 shows the percentage of workers in each occupational group who were working within each time-of-day band. Table 5.21 then shows the distribution of total working hours across each time band. Finally, Table 5.22 shows the occupational composition of the workers who reported working within each time band.

**Table 5.20: Percentage of weekday workers in each occupational group who undertook some work within each time-of-day band**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Mean hours worked | % diary days | Sample size (persons) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Managerial | 3.4 | 39.1 | 96.2 | 95.5 | 81.6 | 30.0 | 24.0 | 2.3 | 8.3 | 14.4 | 513 |
| Professional | 4.0 | 30.8 | 89.8 | 93.4 | 75.6 | 26.6 | 24.6 | 4.0 | 7.9 | 14.4 | 524 |
| Technical | 1.7 | 28.2 | 91.5 | 91.2 | 72.5 | 25.9 | 18.9 | 3.5 | 7.5 | 12.0 | 453 |
| Clerical | 2.3 | 30.1 | 90.0 | 90.2 | 68.3 | 16.3 | 10.6 | 1.2 | 7.0 | 11.7 | 442 |
| Service & sales | 7.6 | 28.4 | 78.2 | 79.5 | 61.1 | 29.6 | 23.7 | 5.9 | 6.7 | 12.4 | 454 |
| Agricultural | 20.0 | 64.0 | 87.3 | 91.3 | 76.7 | 32.5 | 13.3 | 0.2 | 7.6 | 10.9 | 322 |
| Trades | 7.7 | 71.5 | 96.5 | 95.7 | 76.1 | 16.2 | 11.5 | 2.3 | 8.7 | 10.1 | 325 |
| Operatives | 18.3 | 67.4 | 86.5 | 90.2 | 65.5 | 28.9 | 19.4 | 9.4 | 8.9 | 7.8 | 277 |
| Elementary | 16.5 | 48.6 | 70.1 | 74.0 | 53.5 | 25.9 | 24.7 | 12.3 | 6.9 | 6.1 | 218 |

**Table 5.21: Percentage of working time undertaken within each time-of-day band (weekdays only), by occupational group**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Total |
|---|---|---|---|---|---|---|---|---|---|
| Managerial | 0.3 | 2.9 | 38.2 | 37.4 | 13.5 | 3.6 | 3.8 | 0.2 | 100.0 |
| Professional | 0.7 | 2.2 | 38.5 | 37.5 | 12.1 | 2.9 | 4.8 | 1.4 | 100.0 |
| Technical | 0.2 | 2.3 | 39.6 | 38.1 | 12.0 | 3.3 | 3.9 | 0.8 | 100.0 |
| Clerical | 0.3 | 2.8 | 42.1 | 38.5 | 11.0 | 2.6 | 2.2 | 0.4 | 100.0 |
| Service & sales | 1.4 | 3.9 | 34.0 | 32.6 | 12.4 | 6.3 | 6.9 | 2.5 | 100.0 |
| Agricultural | 1.7 | 9.7 | 36.6 | 33.5 | 13.7 | 3.1 | 1.7 | 0.0 | 100.0 |
| Trades | 0.8 | 6.3 | 41.4 | 36.9 | 10.3 | 1.9 | 2.0 | 0.5 | 100.0 |
| Operatives | 2.4 | 8.7 | 34.7 | 32.5 | 9.6 | 3.9 | 5.1 | 2.9 | 100.0 |
| Elementary | 2.5 | 7.6 | 32.7 | 28.4 | 10.2 | 5.6 | 7.9 | 5.1 | 100.0 |

Combined, the three tables show a number of important patterns:

- People in jobs that require manual skills, including farmers, trades people, plant and machinery operators and elementary workers tended to start early with a significant number working before 8 am. A significant proportion of their working time was also undertaken early in the morning. Agricultural workers undertook nearly 10 percent of their working time between 6am and 8am.
- Agricultural, forestry and fishing occupations also had the highest proportion of workers at work between 6 and 8 in the evening, but this proportion declines substantially in the next time period.
- In general, the pattern for professional and managerial workers was to start later than manual workers, but to continue working later in the evening.
- Occupations that were over-represented in night work were sales and service workers, plant and machinery operators, elementary workers and professionals. The 'elementary' group includes cleaners. However, in all these occupations it was still the case that relatively few workers were at work between midnight and 4am.

**Table 5.22: Occupational distribution of those people who undertook some work within each time-of-day band**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am |
|---|---|---|---|---|---|---|---|---|
| Managerial | 4.4 | 9.7 | 15.6 | 16.3 | 17.7 | 16.0 | 14.5 | 2.7 |
| Professional | 10.8 | 7.0 | 15.1 | 15.6 | 15.1 | 12.0 | 17.6 | 16.3 |
| Technical | 2.2 | 5.5 | 12.1 | 12.4 | 11.7 | 10.7 | 11.3 | 7.1 |
| Clerical | 3.3 | 6.4 | 11.8 | 11.5 | 9.9 | 7.9 | 5.8 | 3.8 |
| Service & sales | 15.4 | 9.0 | 9.7 | 9.9 | 11.4 | 19.3 | 18.6 | 21.8 |
| Agricultural | 18.6 | 22.0 | 10.3 | 10.1 | 12.4 | 9.5 | 4.5 | 0.3 |
| Trades | 9.0 | 15.1 | 12.5 | 11.8 | 9.9 | 6.1 | 5.7 | 4.5 |
| Operatives | 22.4 | 16.6 | 8.2 | 8.2 | 7.3 | 9.9 | 11.4 | 21.0 |
| Elementary workers | 13.9 | 8.7 | 4.7 | 4.3 | 4.7 | 8.6 | 10.6 | 22.6 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Although not tested in our research, in the US, Presser (1995) reports that there can be much variation in work schedules within these broad occupational groups. For example, she found that sales representatives in mining, manufacturing and wholesale trade were far more likely to work during standard times than other sales representatives. Similarly, amongst the wider group "labourers" construction workers stood out as working at times that daylight was available.

Tables 5.23 and 5.24 show the patterns of work just by industry. The transport and communication sector stands out particularly in terms of both the proportion of people working outside of standard hours and the amount of work carried out in these periods. Agriculture, forestry and fishing, and the manufacturing sector, also had relatively high rates of participation in work outside standard times.

**Table 5.23: Percentage of weekday workers who were working within each time-of-day band, by industry of employment**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Mean hours worked | % diary days | Sample size (persons) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Agriculture | 20.9 | 64.9 | 86.5 | 90.6 | 76.4 | 33.2 | 14.1 | 0.5 | 7.6 | 10.1 | 299 |
| Mining | 4.7 | 73.9 | 93.5 | 93.1 | 64.7 | 29.9 | 0.0 | 0.0 | 8.9 | 0.3 | 10 |
| Manufacturing | 12.3 | 59.2 | 89.1 | 92.0 | 67.7 | 22.3 | 18.5 | 5.9 | 8.5 | 14.4 | 487 |
| Electricity, etc | 0.0 | 57.1 | 88.6 | 85.6 | 82.7 | 10.8 | 8.5 | 2.3 | 7.7 | 0.6 | 26 |
| Construction | 1.8 | 70.1 | 98.2 | 97.6 | 83.5 | 20.4 | 12.0 | 0.5 | 8.8 | 6.2 | 207 |
| Retail trade etc | 5.3 | 36.2 | 86.9 | 87.1 | 76.0 | 29.1 | 20.4 | 2.9 | 7.6 | 21.4 | 729 |
| Communication & transport | 16.7 | 49.2 | 87.5 | 89.1 | 77.4 | 30.8 | 19.8 | 8.3 | 8.5 | 7.1 | 246 |
| Business services etc | 2.2 | 27.4 | 90.8 | 92.6 | 78.7 | 27.7 | 22.1 | 4.3 | 7.9 | 13.0 | 468 |
| Social, community services etc | 4.4 | 30.1 | 86.9 | 87.8 | 59.7 | 21.8 | 20.7 | 4.6 | 6.9 | 26.6 | 1057 |

**Table 5.24: Percentage of working time undertaken within each time-of-day band, by industry of employment (weekdays only)**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Total |
|---|---|---|---|---|---|---|---|---|---|
| Agriculture | 1.7 | 10.1 | 36.3 | 32.8 | 14.0 | 3.2 | 1.9 | 0.1 | 100.0 |
| Mining | 1.1 | 6.9 | 38.9 | 37.6 | 11.9 | 3.6 | 0.0 | 0.0 | 100.0 |
| Manufacturing | 1.3 | 6.5 | 37.8 | 35.2 | 9.7 | 3.1 | 4.5 | 1.9 | 100.0 |
| Electricity, etc | 0.0 | 3.1 | 43.7 | 39.2 | 9.9 | 1.6 | 1.9 | 0.5 | 100.0 |
| Construction | 0.2 | 5.3 | 41.5 | 38.4 | 11.1 | 2.2 | 1.2 | 0.0 | 100.0 |
| Retail trade etc | 0.7 | 3.7 | 36.3 | 36.1 | 13.3 | 4.6 | 4.5 | 0.7 | 100.0 |
| Communication & transport | 2.4 | 6.3 | 35.0 | 33.2 | 12.9 | 3.9 | 3.9 | 2.5 | 100.0 |
| Business services etc | 0.3 | 2.1 | 37.9 | 36.9 | 13.0 | 3.7 | 5.0 | 1.0 | 100.0 |
| Social, community services etc | 0.8 | 2.8 | 40.0 | 36.1 | 10.4 | 3.3 | 4.7 | 1.8 | 100.0 |

### *Parental status*

Finally, in many overseas studies, parental status and family type have been shown to be important factors influencing work schedules. Table 5.25 shows the proportion of men and women in each parental status group who were at work in each time band, while Table 5.26 gives the distribution of working hours across the day. It should be noted that for the sole father categories the number of people in the sample was very small. The results for this group should be treated with much caution.

**Table 5.25: Percentage of weekday workers who undertook some work within each time-of-day band, by parental status**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Mean hours worked | % diary days | Sample size (persons) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Male, joint parent | 11.6 | 52.4 | 92.3 | 94.5 | 80.1 | 30.5 | 22.2 | 5.8 | 8.7 | 24.9 | 757 |
| Male, sole parent | 7.9 | 41.0 | 91.9 | 98.4 | 72.6 | 19.8 | 20.6 | 7.1 | 7.7 | 0.9 | 33 |
| Male, not a parent | 9.0 | 53.4 | 88.8 | 89.9 | 76.8 | 27.5 | 17.5 | 3.0 | 8.2 | 33.4 | 1088 |
| Female, joint parent | 5.7 | 27.4 | 84.8 | 85.0 | 52.8 | 21.7 | 22.2 | 4.0 | 6.4 | 14.9 | 555 |
| Female, sole parent | 1.7 | 19.1 | 78.9 | 81.9 | 48.8 | 16.2 | 14.3 | 3.1 | 5.5 | 2.6 | 131 |
| Female, not a parent | 4.3 | 30.6 | 87.0 | 88.6 | 69.2 | 22.7 | 16.5 | 3.1 | 7.1 | 23.5 | 980 |

**Table 5.26: Percentage of weekday work that took place within each time-of-day band, by parental status**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | |
|---|---|---|---|---|---|---|---|---|---|
| Male, joint parent | 1.4 | 5.6 | 36.7 | 34.9 | 12.3 | 3.3 | 4.2 | 1.5 | 100.0 |
| Male, sole parent | 1.0 | 4.8 | 40.6 | 36.8 | 10.3 | 2.1 | 3.8 | 0.6 | 100.0 |
| Male, not a parent | 0.9 | 5.5 | 37.9 | 35.4 | 12.4 | 3.6 | 3.3 | 0.9 | 100.0 |
| Female, joint parent | 1.0 | 3.5 | 39.5 | 35.3 | 9.3 | 3.7 | 5.7 | 1.9 | 100.0 |
| Female, sole parent | 0.4 | 2.4 | 41.1 | 39.6 | 10.0 | 2.5 | 2.8 | 1.2 | 100.0 |
| Female, not a parent | 0.5 | 3.2 | 38.4 | 37.2 | 12.0 | 3.7 | 4.1 | 1.0 | 100.0 |

A number of patterns emerge from the two tables. These include:

- Partnered fathers and men without dependent children were more likely than other groups to be working before 8am.
- Despite the lower rates of early work by women, just over a quarter of parented mothers, just under a fifth of sole mothers and just under a third of women without dependent children recorded working in the period 6am to 8am.
- Men without dependent children tended to work longer hours than women without children, leading to higher rates of employment both in the early hours of the morning and in the evening.
- In the early evening there were few differences between the proportion of partnered mothers with children and women without children working. However, late evening work was more common amongst partnered mothers.
- Sole mothers were less likely to work during evenings than partnered mothers.

Some of these patterns are likely to reflect underlying hours of work. For example, partnered fathers tend to work longer hours than other men so will tend to have higher rates of work both in the morning and early evening. The later start for both partnered and sole mothers will in part reflect higher rates of part-time work amongst this group. The greater ability of sole fathers to work outside normal hours than sole and partnered mothers is also puzzling. It may be partly due to the fact that male sole parents tend to

have older children so they can leave them at home while they work. However, these estimates are based on a very small sample of sole fathers.

Research indicates that age of youngest child is particularly important in influencing patterns of work for mothers. Tables 5.27 and 5.28 show patterns of work for women by age of youngest child. Two of the main patterns to emerge are:

- There were no major differences in work patterns of partnered women by age of child. Mothers with a child under five tended to work shorter hours than those whose youngest child was over five, but accounting for this, the distribution of work across the day was similar.
- Those sole mothers who were employed and had a child under five years of age had a tendency to start work later than those with a school age child. They also tended to undertake more of their work in the late afternoon or evening.

**Table 5.27: Percentage of women who undertook some work within each time-of-day band, by parental status and age of youngest child**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Mean hours worked | % diary days | Sample size (persons) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Female, joint parent, child<5 | 6.2 | 23.4 | 74.4 | 77.1 | 56.1 | 21.8 | 22.9 | 4.4 | 5.6 | 10.1 | 202 |
| Female, joint parent, child 5+ | 5.5 | 28.9 | 88.8 | 88.1 | 51.5 | 21.6 | 21.9 | 3.9 | 6.7 | 26.2 | 363 |
| Female, sole parent, child<5 | 0.0 | 14.0 | 54.2 | 77.7 | 61.9 | 29.0 | 24.8 | 6.4 | 5.0 | 1.7 | 37 |
| Female, sole parent, child 5+ | 2.3 | 21.0 | 87.7 | 83.4 | 44.1 | 11.6 | 10.5 | 1.9 | 5.7 | 4.7 | 94 |
| Female, no children | 4.3 | 30.6 | 87.0 | 88.6 | 69.2 | 22.7 | 16.5 | 3.1 | 7.1 | 57.3 | 980 |

**Table 5.28: Percentage of weekday work that was undertaken within each time-of-day band, women by parental status and age of youngest child**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | |
|---|---|---|---|---|---|---|---|---|---|
| Female, joint parent, child<5 | 1.2 | 3.5 | 36.1 | 34.5 | 10.8 | 4.7 | 7.0 | 2.2 | 100.0 |
| Female, joint parent, child 5+ | 1.0 | 3.5 | 40.6 | 35.5 | 8.9 | 3.4 | 5.3 | 1.9 | 100.0 |
| Female, sole parent, child<5 | 0.0 | 1.7 | 30.5 | 42.0 | 12.5 | 5.7 | 4.9 | 2.8 | 100.0 |
| Female, sole parent, child 5+ | 0.5 | 2.6 | 44.3 | 38.9 | 9.2 | 1.5 | 2.2 | 0.8 | 100.0 |
| Female, no children | 0.5 | 3.2 | 38.4 | 37.2 | 12.0 | 3.7 | 4.1 | 1.0 | 100.0 |

Finally, another way of assessing work schedules across the day relative to known periods of relatively abundant childcare (such as school hours) is to measure the proportion of work carried out between 9am and 3pm by people in each parental status. Table 5.29 shows that sole mothers undertook the highest proportion of their work during these hours, but the differences between them and other women were not

great. In addition, while there were some difference between men and women these were also not all that large.

**Table 5.29: Percentage of weekday work time that was undertaken between 9am and 3pm, by sex and parental status**

| | % |
|---|---|
| Male, joint parent | 53.9 |
| Male, sole parent | 55.7 |
| Male, not a parent | 56.4 |
| | |
| Female, joint parent | 60.2 |
| Female, sole parent | 65.6 |
| Female, not a parent | 59.5 |

## 5.3 Evening and night work

In this section we examine the frequency and distribution of evening and night work. Evening work is defined as work undertaken between 7 p.m. and midnight, on any day of the week. Night work is defined as work undertaken between midnight and 5 a.m. These definitions were chosen after a review of the definitions used in previous research on evening and night work.

We begin by presenting a range of simple univariate measures of the magnitude and distribution of evening and night work. We then use logistic regression methods to further explore the relative influence of worker and job characteristics on the likelihood that a worker undertakes evening or night work.

The time devoted to evening/night work and its distribution across the labour force can be measured in a number of different ways. The measures considered here are:

1. the percentage of working hours that were undertaken during the evening/night;
2. the percentage of employed people who reported evening/night work in their diaries;
3. the proportion of workers (those undertaking paid work on their diary days) who reported evening/night work;
4. the average number of hours that were worked in this time period by each employed person (including those who did not work at all);
5. the average number of hours worked in this time period by participants.

Results for evening work are given in Table 5.30. Some of the groups considered in the previous section are now excluded because the number of respondents who reported evening work was very small.

## Table 5.30: Measures of the frequency of evening work, for all workers and key labour force groups

| | % workg hours done during evgs | % empd workg in evg | % workers workg in evg | Avge mins, empd persons | Avge mins, participants |
|---|---|---|---|---|---|
| All persons | 6.2 | 17.4 | 24.5 | 19.3 | 111.3 |
| Males | 5.8 | 19.0 | 25.2 | 20.5 | 108.0 |
| Females | 7.0 | 15.4 * | 23.5 | 17.9 | 116.5 |
| Males, part-time | 11.9 | 14.4 * | 27.2 | 17.3 | 119.7 |
| Males, full-time | 5.1 | 19.3 | 24.5 | 19.7 | 102.1 |
| Females, part-time | 8.9 | 11.4 * | 21.7 | 12.3 * | 107.9 |
| Females, full-time | 6.3 | 17.8 | 23.9 | 21.0 | 117.9 |
| 15-24 years | 6.7 | 13.6 | 21.3 | 17.4 | 128.5 |
| 25-34 years | 5.4 | 14.7 | 20.5 | 17.6 | 120.2 |
| 35-44 years | 6.7 | 19.7 | 27.6 | 21.0 | 106.5 |
| 45-54 years | 6.1 | 18.5 | 24.9 | 19.8 | 107.5 |
| 55-64 years | 6.8 | 21.7 | 29.7 | 21.1 | 97.3 |
| No qualifications | 6.3 | 15.2 | 22.0 | 18.8 | 123.7 |
| School qualifications | 5.7 | 15.3 | 22.1 | 16.6 | 108.5 |
| Post-school qualifications | 6.5 | 19.4 | 26.7 | 21.2 | 109.1 |
| Pakeha | 5.7 | 17.1 | 24.0 | 17.8 | 104.3 |
| Mäori | 8.3 | 17.3 | 26.1 | 23.9 | 137.7 * |
| Pacific Islander | 9.2 | 21.6 | 26.2 | 36.3 | 168.7 * |
| Other | 8.5 | 20.6 | 29.6 | 25.8 | 125.0 |
| Employee | 6.1 | 15.1 | 21.9 | 18.4 | 122.4 |
| Employer | 7.3 | 32.6 * | 37.4 * | 30.1 * | 92.4 * |
| Self employed (no employees) | 6.3 | 22.9 * | 29.8 * | 20.2 | 88.4 * |
| Annual income $1-25,000 | 7.2 | 14.5 * | 22.6 | 17.6 * | 121.3 |
| Ann income $25-40,000 | 5.0 | 17.5 | 22.9 | 17.9 | 102.6 |
| Ann income $40,000+ | 6.5 | 21.8 | 28.5 | 23.7 | 108.7 |
| Male, joint parent | 6.2 | 21.9 * | 27.9 | 23.6 | 107.8 |
| Male, no dependent children | 5.5 | 17.0 | 23.2 | 18.5 | 108.9 |
| Female, joint parent | 8.1 | 17.0 | 26.3 | 19.2 * | 113.2 |
| Female, sole parent | 5.0 | 10.8 | 17.8 | 9.8 * | 91.0 |
| Female, no dependent children | 6.6 | 14.9 | 22.3 | 18.0 | 121.0 |
| Managerial | 6.6 | 23.6 * | 30.8 * | 23.7 * | 100.6 |
| Professional | 7.2 | 22.6 * | 30.9 * | 23.3 * | 103.3 |
| Technical | 6.0 | 16.3 * | 23.7 * | 17.3 * | 106.1 |
| Clerical | 3.7 | 9.5 | 14.6 | 9.8 | 103.6 |
| Service & sales | 10.4 | 18.0 * | 28.9 * | 25.8 * | 143.4 * |
| Agricultural & fisheries | 3.2 | 17.5 * | 20.7 | 11.4 | 65.2 |
| Trades | 2.9 | 10.7 | 14.5 | 10.6 | 99.0 |
| Plant and machine operators | 7.1 | 17.1 * | 24.0 * | 25.5 * | 148.8 * |
| Elementary occupations | 10.6 | 17.9 * | 27.9 * | 25.7 * | 143.5 |
| Agriculture | 3.5 | 17.9 | 21.2 | 12.3 | 68.8 * |
| Manufacturing | 6.0 | 15.7 | 21.8 | 20.9 | 133.2 |
| Construction | 2.3 | 11.8 * | 16.4 * | 8.2 * | 69.3 |
| Retail trade etc | 7.6 | 17.8 | 25.8 | 23.0 | 129.0 |
| Communication & transport | 6.1 | 18.6 | 25.8 | 21.3 | 114.5 |
| Business services etc | 7.3 | 18.7 | 27.5 | 22.0 | 117.8 |
| Social, comm services etc | 7.1 | 18.0 | 26.2 | 19.1 | 106.0 |

Estimates marked * are significantly different from those of the reference group.

Reference groups for identifying statistical significance are as follows:

Males, full-time workers, post-school qualifications, Pakeha, employees, annual income $40,000 or more, trades occupational group, finance insurance and business industry group.

Sampling errors were not calculated for age groups, or for the estimates in column 1.

Key points emerging from the results in Table 5.30 include:

- On an average day of the week, around 17 percent of all employed people, and about 25 percent of those who were at work that day, carried out some paid work between 7pm and midnight.
- The proportion of working time undertaken between 7pm and midnight was much smaller – about 6 percent of all working hours. The average amount of time worked by those who participated in evening work was just under 2 hours. (Note that some of the time we are classifying as 'evening work' will represent a continuation of work shifts that were begun during the day.)
- Part-time workers performed a larger share of their total working hours during the evening. However, part-time employed men/women were somewhat less likely that full-time employed men/women to undertake evening work.
- Participation in evening work is weakly correlated with age.
- Variations by educational group and level of annual income were relatively minor. Workers with post-school qualifications and those in the highest income group were a little more likely to work during the evening. However, those participants in evening work who had low levels of education tended to work a little longer on average. Few of these educational and income group differences are statistically significant.
- Mäori and Pacific Island workers appear to undertake more evening work than Päkehä, on average. This particularly clear from the estimates of average minutes per employed person. Evening work participation rates were also higher among workers in the Pacific and 'other' ethnic groups. Because the sample sizes for the latter minority ethnic groups are relatively small, few of the differences in the estimates in Table 5.30 are statistically significant.
- Self-employed workers reported higher rates of participation in evening work than did employees. On an average minutes per person basis, their involvement in evening work was higher. However, the employees who participated in evening work tended to do somewhat longer spells of work per person.
- The managerial and professional occupational groups reported the highest rates of participation in evening work. However, participation rates were also quite high within the technical and associate professional, services and sales, agricultural, transport and machine operatives, and elementary occupational groups. The transport and machine operatives and elementary occupational groups had the highest levels of involvement in evening work when considered in terms of average minutes per person. The clerical, agricultural, forestry and fishing, and trades occupational groups were the least involved in evening work.
- Participation rates were similar across of the one-digit industry groups shown in Table 5.30, with the exception of construction, in which evening work was much rarer.

Night work was relatively infrequent across all the main labour force groups (see Table 5.31). Note that our definition of night work – work undertaken between midnight and 5am – will include the start of some 'day' shifts that began very early in the morning, and the finish of some 'evening' shifts that extended past midnight. We have excluded a number of labour force groups from the table because of the small sizes of the underlying samples of night workers. Because of the relative infrequency of night

work, estimates of its distribution are more affected by measurement error than are estimates of evening or weekend work.

**Table 5.31: Measures of the frequency of night work, all workers and demographic groups**

| | % workg hours wkd at night | % empd workg at night | % workers workg at night | Agve mins, empd persons | Agve mins, participants |
|---|---|---|---|---|---|
| All persons | 1.8 | 4.8 | 6.8 | 5.5 | 114.4 |
| Males | 1.7 | 6.0 | 7.9 | 6.1 | 102.0 |
| Females | 1.9 | 3.4 * | 5.2 * | 4.8 | 142.3 * |
| Males, full-time | 1.5 | 6.0 | 7.7 | 5.7 | 95.3 |
| Females, part-time | 2.5 | 2.5 * | 4.7 | 3.5 | 140.8 |
| Females, full-time | 1.8 | 3.9 | 5.2 | 5.9 | 151.8 |
| 15-24 years | 1.5 | 4.4 | 6.9 | 3.8 | 85.6 |
| 25-34 years | 1.7 | 5.1 | 7.1 | 5.6 | 110.2 |
| 35-44 years | 2.2 | 4.8 | 6.8 | 6.9 | 141.7 |
| 45-54 years | 1.5 | 4.6 | 6.2 | 5.0 | 108.0 |
| 55-64 years | 1.9 | 5.3 | 7.3 | 5.9 | 110.3 |
| No qualifications | 2.6 | 5.9 | 8.6 | 7.8 | 131.3 |
| School qualifications | 1.3 | 4.3 | 6.2 | 3.7 | 86.1 |
| Post-school qualifications | 1.8 | 4.8 | 6.6 | 5.8 | 121.5 |
| Pakeha | 1.5 | 4.4 | 6.2 | 4.7 | 105.5 |
| Mäori | 3.4 | 7.1 * | 10.7 * | 9.9 * | 138.3 |
| Pacific Islander | 5.3 | 11.9 * | 14.5 | 20.8 * | 174.9 * |
| Employee | 2.1 | 5.0 | 7.3 | 6.3 | 126.4 |
| Employer | 0.6 | 3.0 | 3.5 * | 2.3 * | 77.2 |
| Self employed (no employees) | 1.1 | 5.4 | 7.0 | 3.4 * | 62.8 |
| Annual income $1-25,000 | 2.0 | 4.5 | 7.0 | 4.9 | 108.3 |
| Ann income $25-40,000 | 1.8 | 5.1 | 6.8 | 6.4 | 123.9 |
| Ann income $40,000+ | 1.5 | 5.0 | 6.6 | 5.5 | 109.1 |
| Male, joint parent | 2.2 | 7.6 | 9.7 | 8.5 | 111.3 |
| Male, no dependent children | 1.4 | 4.9 | 6.7 | 4.6 | 94.3 |
| Female, joint parent | 2.8 | 3.6 | 5.5 | 6.6 | 185.1 * |
| Female, no dependent children | 1.4 | 3.3 | 5.0 | 3.7 | 112.7 |
| Managerial | 0.8 | 3.5 | 4.6 | 3.0 | 84.2 |
| Professional | 2.0 | 4.3 | 5.8 * | 6.6 | 155.2 |
| Technical | 1.0 | 2.9 | 4.2 | 2.9 | 100.9 |
| Clerical | 0.9 | 1.5 | 2.4 | 2.4 | 157.2 |
| Service & sales | 3.1 | 5.2 * | 8.4 * | 7.7 * | 146.4 |
| Agricultural & fisheries | 0.4 | 5.8 | 6.9 | 1.5 | 26.1 |
| Trades | 0.7 | 3.6 | 4.8 | 2.5 | 71.0 |
| Plant and machine operators | 3.7 | 11.9 * | 16.8 * | 13.5 * | 112.7 |
| Elementary occupations | 6.3 | 9.5 * | 14.7 * | 15.2 * | 161.0 |
| Agriculture | 0.5 | 6.0 | 7.1 | 1.9 | 31.7 * |
| Manufacturing | 2.5 | 6.9 * | 9.6 * | 8.7 | 126.7 |
| Retail trade etc | 1.2 | 3.8 | 5.5 | 3.5 * | 91.3 * |
| Communication & transport | 4.3 | 11.3 * | 15.7 * | 15.0 * | 133.0 |
| Business services etc | 1.3 | 3.1 | 4.5 | 4.0 | 128.7 |
| Social, comm services etc | 2.4 | 4.4 | 6.4 | 6.6 | 148.6 |

Estimates marked * are significantly different from those of the reference group.

Reference groups for identifying statistical significance are as follows:

Males, full-time workers, post-school qualifications, Pakeha, employees, annual income $40,000 or more, trades occupational group, finance insurance and business industry group.

Sampling errors were not calculated for age groups, or for the estimates in column 1.

- On an average day of the week, approximately 5 percent of all employed persons, and 7 percent of those who undertook some paid work, reported carrying out some paid work between midnight and 5am. However, only 1.8 percent of all working hours were undertaken in this time slot.
- Night work participation rates were higher among men than among women.
- The likelihood of undertaking night work does not appear to be very strongly correlated with age, or level of qualifications, or level of annual income. However, it is higher among Mäori and Pacific Island peoples than Päkehä. Most of the estimated differences in night work rates and average minutes worked at night by ethnic group are statistically significant.
- Night work was relatively more common among workers in the 'plant and machine operators' and 'elementary' occupational groups. Participation rates were also higher in the communication and transport industry group than elsewhere in the economy.

A number of previous researchers (Hamermesh, 1995 and 1999a; Harkness, 1999) have suggested that jobs requiring evening and night work are disproportionately undertaken by less skilled or lower waged workers. For example, Hamermesh presents evidence suggesting that among male employees in the US and in Germany, the probability of working during the evening or at night is inversely correlated with both educational level and wage rates. Breedveld (1998) also found that night work was associated with lower levels of education in the Netherlands. One possible explanation for this pattern is that educational level is an index of skill-based bargaining power in employment relationships. Those with skills that are in demand select only jobs with the hours that they prefer, or negotiate their preferred hours of work with their employers. Another explanation (Hamermesh, 1999a) is that jobs requiring evening and night work are relatively unattractive to workers and therefore tend to be accompanied by compensating wage premia (or 'penalty rates'). Workers with higher incomes or higher earnings capacity can afford to forego those wage premia and select jobs with more desirable schedules. Lower income workers are more likely to be attracted to the jobs that offer higher wage rates.

Note that these explanations for a higher frequency of evening and night work among lower-waged workers rest on the assumption that there is at least some scope for worker preferences to influence the organisation and timing of work. If the organisation and timing of work is largely determined by technological or production requirements, or by patterns of customer demand, then any positive association that exists between lower skill levels and participation in evening and night work could be regarded as incidental. Adopting this alternative perspective, the working time patterns of differently-skilled workers would be viewed as the outcome of differences in the nature of the work that is undertaken, rather than differences in skill-related or income-related bargaining power.

The univariate statistics presented above for New Zealand suggest that evening work is, if anything, slightly more common among workers with higher levels of education and higher annual incomes. Night work is not strongly correlated with educational level in these statistics, although night work participation rates are somewhat higher among workers who lack educational qualifications. In addition there is a suggestion in

the data of a relationship between night work and minority ethnic status. Mäori and Pacific Island peoples appear to have higher average levels of involvement in evening and night work than Päkehä.

To explore these relationships more carefully, we estimated a series of logistic regressions in which the probability of working during the evening or at night was modelled as a function of workers' personal attributes, weekly hours of work, occupational group and industry of employment. There is no measure of wages or earnings in the New Zealand Time Use Survey, which prevents us from exploring the relationship between earnings and the likelihood of working at these 'unsocial' times of the day directly.

We excluded the self-employed from the sample for this investigation. Typically, self-employed workers are able to set their own hours of work relatively autonomously. Interest lies in exploring the extent to which differences between employees in skill level, and hence in potential earnings and bargaining power in the labour market, are associated with differences in evening and night work participation rates.

The sample was restricted to employees who undertook paid work on one or both of their diary days. We created a single record for each worker in the sample, and evening/night work indicator variables that were set to 1 or 0 according to whether or not the worker worked during the evening/night on one or both of their working days. We are modelling the probability that evening/night work was undertaken, conditional upon the individual working at all.[23] The basic model is:

$$\log\left[\frac{p_i}{1-p_i}\right] = a + b_1 X_i + b_2 H_i + e_i$$

where $p_i$ is the probability that $y_i=1$, i.e. that the individual worked during the evening/night; X is a vector of demographic controls, including age and age squared, level of education, ethnic group, and age of youngest child; and H is a vector of hours of work dummies designed to control for the influence of working extended weekly hours on the likelihood of working during the evening or at night. Educational level is captured by dummy variables for 'no qualifications' and post-school qualifications; school-level qualifications is the omitted category. Ethnic group is captured by dummy variables for members of the Mäori, Pacific Islander, and 'other non-Päkehä' ethnic groups. The 'preschool child' indicator variable is set to 1 if the worker is the parent of child aged 0-4 years. The 'school-aged child' indicator is set to 1 if the worker has children aged between 5 and 17 years, but none aged less than 5 years.

In subsequent equations, control variables for occupation and industry of employment are also included. For ease of interpreting the coefficients, occupation is entered into the regressions using nine 1-digit NZSCO categories. Industry groups are defined at

[23] Ordered logisitic regression models were also estimated in which the dependent variable took on three values, according to whether the respondent worked on 100%, 50% or none of their recorded working days. The results obtained were similar to those reported here, and therefore we opted for the greater simplicity of a binary dependent variable in which performing any work during the evening/night is treated as a positive outcome.

two-digit level using ANZSIC codes. However, it was necessary to merge together some of the smaller industries, giving a total of 21.

Men and women are treated separately in the regressions. We estimate two models in each case. The first uses the individual attribute and hours of work variables only, and the second also incorporates occupational and industry of employment controls. Tables 5.32 and 5.33 give the estimates obtained for men and women respectively. Results are given in the form of odds ratio estimates. The odds ratios shown for each group gives the predicted odds of a positive outcome (working in the evening or working at night) for that group, relative to the predicted odds of the omitted group, and controlling for the average effects of the other variables included in the model. For example, the odds ratio estimate of 1.72 for post-school qualified males shown in the second column of Table 5.32 indicates that the odds of working in the evening for men with post-school qualifications are 1.72 times higher than the odds of the omitted educational group, men with school qualifications – after controlling for the effects of mean differences in age, ethnicity, fatherhood, and weekly hours of work. Variables whose coefficient estimates were statistically significant, using a 5 percent error threshold, are marked with an asterisk.

**Table 5.32: Logistic regression estimates on participation in evening and night work: male employees**

| | | Evening work | | Night work | |
|---|---|---|---|---|---|
| | | Model 1 | Model 2 | Model 1 | Model 2 |
| | Means | Odds Ratios | Odds Ratios | Odds Ratios | Odds Ratios |
| Age | 36.151 | 0.944 | 0.953 | 1.097 | 1.128 |
| Age squared /100 | 14.501 | 1.085 | 1.070 | 0.890 | 0.864 |
| No qualifications | 0.191 | 0.620 * | 0.606 | 0.881 | 0.695 |
| Post-school qualifications | 0.529 | 1.039 | 1.063 | 1.186 | 1.481 |
| Maori | 0.121 | 1.300 | 1.445 * | 2.460 * | 2.447 * |
| Pacific Islander | 0.041 | 1.284 | 1.389 | 3.098 * | 2.743 * |
| Other minority ethnicity | 0.051 | 1.207 | 0.988 | 0.548 | 0.457 |
| Preschool child | 0.185 | 1.097 | 1.175 | 1.403 | 1.508 |
| School-aged child | 0.206 | 1.523 * | 1.534 * | 1.541 | 1.457 |
| Weekly hours 45-49 | 0.143 | 1.019 | 1.052 | 0.917 | 1.082 |
| Weekly hours 50-59 | 0.196 | 1.333 | 1.444 * | 0.579 | 0.728 |
| Weekly hours 60 or more | 0.132 | 2.647 * | 2.906 * | 1.686 | 1.837 |
| **Occupational group** | | | | | |
| Managerial | 0.141 | | 3.269 * | | 1.851 |
| Professional | 0.129 | | 3.314 * | | 1.462 |
| Associate prof, technical | 0.110 | | 2.740 * | | 1.427 |
| Clerical | 0.076 | | 2.420 * | | 2.029 |
| Sales and service | 0.116 | | 4.628 * | | 5.615 * |
| Agricultural, trades | 0.218 | | 1.000 | | 1.000 |
| Plant and machine operators | 0.124 | | 2.249 * | | 3.025 * |
| Elementary | 0.083 | | 3.923 * | | 6.982 * |
| Industry controls | | | Yes | | Yes |
| Undertook evening work | 0.276 | | | | |
| Undertook night work | 0.064 | | | | |
| Psuedo $R^2$ | | 0.032 | 0.085 | 0.050 | 0.156 |
| Sample size | 1560 | | | | |

* The underlying coefficient estimate is statistically significant at 5% error level.
The omitted occupational groups are primary sector and trades workers. The omitted industries are agriculture and mining.

The evening work results for males in Table 5.32 indicate that the predicted likelihood of evening work *rises* with level of education, in contrast to the hypothesised negative relationship. Men without formal qualifications are less likely to undertake evening

work than are those with school or post-school qualifications. The predicted likelihood of working in the evening is higher for men with school-aged children and is particularly high for those who work for 60 or more hours a week. Occupational and industry dummies are included in Model 2. The omitted occupational groups, agricultural workers and trades workers, have relatively low evening work participation rates, and all of the estimated odds ratios for the other occupational groups are significantly higher. Note that the variations in odds ratios across these 1-digit occupational groups are not correlated with level of skill in any obvious way. For example, the likelihood of working in the evening is high for both professionals and workers in elementary occupations.

The night work regressions for male employees are shown in the last two columns of Table 5.32. The predicted odds ratio for Mäori men is 2.4 times higher than that of Päkehä, and the predicted odds ratio for Pacific men is 2.7 times higher. These ethnic effects are statistically significant. The variations in coefficients by level of education are relatively small and are not significant. Turning to the extended model, the predicted odds ratios are particularly high for male employees in three relatively unskilled occupational groups: sales and service; plant and machine operators (a group that includes drivers); and elementary workers.

There are a number of possible explanations for these patterns. One is that some types of work simply require higher levels of night work, due to the nature of the goods or services under production. This has little to do with the skill level of the workers carrying out each type of work. Another is that the coefficients for occupational group are measuring skills that are uncorrelated with the educational measures in the regression but influence working time patterns. The occupational effects could be picking up differences in the ability of differently-skilled workers to refuse jobs that require evening work, or negotiate more congenial hours of work with their employer. They might also be picking up income-related differences in the incentives that workers have to work at undesirable times of the day, in order to earn higher wages through penal time rates. The latter two hypotheses are also potential explanations for the higher predicted likelihood of night work among Mäori and Pacific male workers.

Results for female employees are given in Table 5.33. Only the basic model was estimated for female participation in night work because the small sample of women engaged in night work inhibited estimation of a full model with a full set of occupational and industry controls. These estimated odds ratios indicate that women with post-school qualifications have a higher predicted likelihood of working in both the evening and at night, controlling for the effects of other variables. Evening work is positively associated with post-school qualifications, motherhood, and extended weekly hours of work. In the extended evening work model, none of the occupational coefficients estimated were significantly different from zero. In addition the relative sizes of the odds ratios for occupations does not suggest a negative relationship between occupational skill level and evening work.

The night work estimates indicate that both unqualified and post-school qualified females have higher predicted odds of working at night than the omitted group of women with school-level qualifications. Mäori and Pacific women also have significantly higher predicted rates of involvement in night work than Päkehä.

**Table 5.33: Logistic regression estimates on participation in evening and night work: female employees**

| | | Evening work | | Night work |
|---|---|---|---|---|
| | | Model 1 | Model 2 | Model 1 |
| | Means | Odds Ratios | Odds Ratios | Odds Ratios |
| Age | 37.145 | 0.937 | 0.944 | 0.920 |
| Age squared /100 | 15.246 | 1.091 | 1.081 | 1.139 |
| No qualifications | 0.195 | 0.992 | 0.977 | 2.719 * |
| Post-school qualifications | 0.480 | 1.724 * | 1.444 * | 2.725 * |
| Maori | 0.130 | 1.145 | 1.142 | 1.923 * |
| Pacific Islander | 0.027 | 1.361 | 1.495 | 3.235 * |
| Other minority ethnicity | 0.036 | 0.815 | 0.698 | 0.398 |
| Partnered with preschool child | 0.104 | 1.568 * | 1.704 * | 2.121 |
| Partnered with school-aged child | 0.229 | 1.559 * | 1.637 * | 1.999 |
| Sole mother with preschool child | 0.018 | 1.026 | 1.046 | 4.014 |
| Sole mother with school-aged child | 0.051 | 0.713 | 0.694 | 0.558 |
| Weekly hours 45-49 | 0.057 | 1.380 | 1.288 | 2.176 |
| Weekly hours 50-59 | 0.093 | 2.361 * | 2.574 * | 1.863 |
| Weekly hours 60 or more | 0.043 | 9.111 * | 10.246 * | 2.841 |
| **Occupational group** | | | | |
| Managerial | 0.102 | | 1.843 | |
| Professional | 0.190 | | 2.482 | |
| Associate prof, technical | 0.127 | | 1.537 | |
| Clerical | 0.219 | | 1.084 | |
| Sales and service | 0.220 | | 1.972 | |
| Agricultural, trades | 0.038 | | 1.000 | |
| Plant and machine operators | 0.036 | | 2.448 | |
| Elementary | 0.065 | | 1.512 | |
| Industry controls | | | Yes | |
| Undertook evening work | 0.266 | | | |
| Undertook night work | 0.051 | | | |
| Psuedo $R^2$ | | 0.070 | 0.119 | 0.069 |
| Sample size | 1575 | | | |

* The underlying coefficient estimate is statistically significant at 5% error level.

The omitted occupational groups are primary sector and trades workers.

The omitted industries are agriculture, forestry and fishing and mining.

Summarising these results, there is little evidence in any these regressions of a significant inverse relationship between level of educational attainment on the one hand, and evening work or night work on the other. The occupational coefficients suggest that among male employees, night work is relatively concentrated on lower-skilled males. However, the occupational coefficients for evening work do not follow this pattern.

These findings do not provide strong support for the hypothesis that evening and night work are disproportionately undertaken by lower-skilled workers. They suggest that factors not directly correlated with skill level, such as working time arrangements in the industry of employment, may be more important in accounting for variations across workers in rates of evening or night work.

However, the predicted likelihood of working at night is higher for Mäori and Pacific Islanders than for Päkehä. This is true for both genders. We cannot rule out the

possibility that ethnic differences in bargaining power in the labour market – linked perhaps to differences in unmeasured skills – play some role in generating these ethnic differentials.

## 5.4 Weekend work

Working on the weekend has the potential to affect a worker's quality of life by limiting their ability to socialise or spend time with their family. In this section we present measures of the frequency and distribution of paid work on Saturdays and Sundays, for all workers and for key demographic and labour force groups. The measures considered are:

1. The percentage of paid working hours undertaken on these days;
2. The percentage of all employed people who reported doing paid work on an average Saturday or a Sunday.[24]
3. The hours of work undertaken on average by employed people on Saturdays and Sundays (counting both participants and non-participants).
4. The average number of hour worked by participants in Saturday or Sunday work.

Measures of workers' involvement in Saturday and Sunday work are influenced by the period of observation. For example, the proportion of workers who have worked on Saturdays at some stage during a given month (or year) is likely to be higher than the fraction who are observed at work on a randomly selected Saturday.

Results for Saturdays are presented in Table 5.34. Results for Sundays are presented in Table 5.35. Although more work is undertaken on Saturdays than Sundays, and the participation rates are generally higher, there is considerable similarity in the levels and patterns of work that are evident on these two days. Information on the sampling errors of the estimates is given for Saturdays only.

A surprisingly high proportion of weekend diaries had some paid work recorded in them. Our estimates indicate that 45 percent of all employed people were at work on a Saturday, and 42 percent undertook some work on a Sunday. However, the work spells that were recorded on Saturdays and Sundays were on average shorter than those recorded on weekdays. Approximately 7.2 percent of all working time was carried out on Saturdays and 6.1 percent on Sundays – only around half of what would be expected if paid work was evenly distributed across all seven days of the week.

Examination of the variations by demographic group and job characteristics suggests the following points:

- On both Saturdays and Sundays, working men were somewhat more likely than working women to be at work. On Saturdays, men worked for longer than women on average.

[24] We calculate this using the diaries of employed people that were completed on Saturdays and Sundays.

## Table 5.34: Measures of paid work undertaken on Saturdays

| | % all wkg time | % empd at work | Avge hours, all empd | Avge hours, participants |
|---|---|---|---|---|
| All persons | 7.2 | 45.3 | 2.5 | 5.6 |
| | | | | |
| Males | 7.2 | 51.0 | 2.9 | 5.7 |
| Females | 7.2 | 38.4 * | 2.1 * | 5.4 |
| | | | | |
| Males, part-time | 13.9 | 51.5 | 2.4 | 4.7 |
| Males, full-time | 6.0 | 50.6 | 2.9 | 5.7 |
| Females, part-time | 11.2 | 35.2 | 1.8 | 5.1 |
| Females, full-time | 5.5 | 39.1 | 2.2 | 5.6 |
| | | | | |
| 15-24 years | 10.7 | 53.7 | 3.4 | 6.2 |
| 25-34 years | 6.9 | 41.3 | 2.4 | 5.9 |
| 35-44 years | 5.8 | 41.8 | 2.1 | 5.1 |
| 45-54 years | 6.5 | 48.3 | 2.5 | 5.1 |
| 55-64 years | 8.3 | 45.3 | 2.7 | 5.9 |
| | | | | |
| No qualifications | 6.2 | 44.0 | 2.3 | 5.1 |
| School qualifications | 8.6 | 49.1 | 2.9 | 5.8 |
| Post-school qualifications | 6.7 | 43.6 | 2.4 | 5.6 |
| | | | | |
| Pakeha | 7.4 | 46.0 | 2.6 | 5.6 |
| Mäori | 5.6 | 38.5 | 2.1 | 5.4 |
| Pacific Islander | 6.2 | 46.9 | 3.3 | 7.1 |
| Other | 7.1 | 50.0 | 2.8 | 5.5 |
| | | | | |
| Employee | 6.5 | 39.3 | 2.3 | 5.8 |
| Employer | 9.0 | 75.4 * | 4.4 * | 5.9 |
| Self employed (w'out employees) | 9.4 | 64.6 * | 3.2 * | 5.0 |
| | | | | |
| Annual income $1-25,000 | 9.1 | 46.3 | 2.6 | 5.7 |
| Ann income $25-40,000 | 5.8 | 41.4 | 2.5 | 6.0 |
| Ann income $40,000+ | 6.0 | 46.4 | 2.3 | 5.0 |
| | | | | |
| Male, joint parent | 5.3 | 46.9 | 2.6 * | 5.6 |
| Male, no dependent children | 8.8 | 53.8 | 3.1 | 5.8 |
| Female, joint parent | 4.8 | 33.8 | 1.5 | 4.3 |
| Female, sole parent | 6.3 | 31.2 | 1.6 | 5.0 |
| Female, no dependent children | 8.9 | 41.9 | 2.5 | 5.9 |
| | | | | |
| Managerial | 8.4 | 49.2 | 2.9 * | 6.0 |
| Professional | 4.6 | 36.5 | 1.6 | 4.3 |
| Technical | 4.3 | 31.7 | 1.4 | 4.4 |
| Clerical | 5.5 | 33.1 | 1.9 | 5.7 |
| Service & sales | 12.1 | 53.1 * | 3.7 * | 7.0 |
| Agricultural & fisheries | 10.4 | 78.1 * | 4.4 * | 5.7 |
| Trades | 5.7 | 45.5 | 2.5 | 5.5 |
| Plant and machine operators | 7.5 | 47.1 | 3.0 | 6.3 |
| Elementary occupations | 3.4 | 33.2 | 1.0 | 3.0 |
| | | | | |
| Agriculture | 11.3 | 74.5 * | 4.2 * | 5.6 |
| Manufacturing | 4.1 | 36.0 | 1.7 | 4.8 |
| Construction | 5.8 | 41.2 | 2.2 | 5.4 |
| Retail trade etc | 10.3 | 54.3 * | 3.6 * | 6.6 * |
| Communication & transport | 8.0 | 49.7 | 3.3 * | 6.7 |
| Business services etc | 4.2 | 32.3 | 1.5 | 4.5 |
| Social, comm services etc | 5.9 | 36.5 | 1.8 | 4.9 |

Estimates marked * are significantly different from those of the reference group.
Reference groups for identifying statistical significance are as follows:
Males, full-time workers, post-school qualifications, Pakeha, employees, annual income $40,000 or more, trades occupational group, finance insurance and business industry group.
Sampling errors were not calculated for age groups, or for the estimates in column 1.

## Table 5.35: Measures of paid work undertaken on Sundays

| | % all wkg time | % empd at work | Mean hours (all empd) | Mean hours (participants) |
|---|---|---|---|---|
| All persons | 6.1 | 42.2 | 2.1 | 5.0 |
| | | | | |
| Males | 5.5 | 44.4 | 2.2 | 4.9 |
| Females | 7.1 | 39.4 | 2.1 | 5.2 |
| | | | | |
| Males, part-time | 9.8 | 39.4 | 1.7 | 4.3 |
| Males, full-time | 4.8 | 44.1 | 2.2 | 5.1 |
| Females, part-time | 10.4 | 35.7 | 1.6 | 4.5 |
| Females, full-time | 5.5 | 42.2 | 2.4 | 5.6 |
| | | | | |
| 15-24 years | 10.0 | 47.4 | 2.8 | 5.8 |
| 25-34 years | 5.0 | 38.8 | 1.9 | 4.9 |
| 35-44 years | 5.6 | 38.5 | 1.9 | 4.8 |
| 45-54 years | 4.8 | 41.2 | 1.9 | 4.6 |
| 55-64 years | 7.9 | 54.4 | 2.8 | 5.1 |
| | | | | |
| No qualifications | 6.0 | 38.7 | 2.1 | 5.4 |
| School qualifications | 6.4 | 41.4 | 2.1 | 5.2 |
| Post-school qualifications | 5.8 | 43.1 | 2.1 | 4.8 |
| | | | | |
| Pakeha | 6.0 | 42.6 | 2.1 | 4.9 |
| Mäori | 7.0 | 39.5 | 2.2 | 5.7 |
| Pacific Islander | 4.8 | 44.6 | 2.8 | 6.2 |
| Other | 7.8 | 44.1 | 2.4 | 5.4 |
| | | | | |
| Employee | 5.6 | 37.5 | 2.0 | 5.2 |
| Employer | 7.0 | 59.6 | 3.0 | 5.0 |
| Self employed (w'out employees) | 7.1 | 53.8 | 2.5 | 4.6 |
| | | | | |
| Annual income $1-25,000 | 8.4 | 43.7 | 2.3 | 5.3 |
| Ann income $25-40,000 | 4.8 | 39.7 | 2.0 | 5.1 |
| Ann income $40,000+ | 4.3 | 40.2 | 1.7 | 4.3 |
| | | | | |
| Male, joint parent | 4.2 | 42.0 | 2.0 | 4.8 |
| Male, no dependent children | 6.7 | 45.8 | 2.3 | 5.0 |
| Female, joint parent | 6.4 | 41.2 | 2.1 | 5.0 |
| Female, sole parent | 5.6 | 37.7 | 1.6 | 4.3 |
| Female, no dependent children | 7.7 | 38.6 | 2.1 | 5.4 |
| | | | | |
| Managerial | 6.1 | 45.5 | 2.5 | 5.4 |
| Professional | 5.9 | 44.9 | 2.1 | 4.7 |
| Technical | 3.0 | 26.3 | 0.9 | 3.6 |
| Clerical | 4.1 | 26.4 | 1.3 | 4.8 |
| Service & sales | 10.3 | 49.8 | 2.9 | 5.8 |
| Agricultural & fisheries | 9.4 | 69.5 | 3.8 | 5.5 |
| Trades | 2.7 | 32.5 | 1.1 | 3.5 |
| Plant and machine operators | 6.2 | 38.1 | 2.5 | 6.6 |
| Elementary occupations | 5.8 | 43.1 | 1.6 | 3.7 |
| | | | | |
| Agriculture | 10.6 | 69.2 | 3.9 | 5.6 |
| Manufacturing | 3.6 | 31.0 | 1.5 | 4.9 |
| Construction | 5.0 | 35.8 | 1.8 | 5.1 |
| Retail trade etc | 8.1 | 49.4 | 2.7 | 5.5 |
| Communication & transport | 4.4 | 33.1 | 1.8 | 5.3 |
| Business services etc | 4.8 | 32.5 | 1.5 | 4.7 |
| Social, comm services etc | 5.1 | 38.5 | 1.6 | 4.2 |

- Rates of participation in weekend work did not vary much between part-time and full-time workers. However, weekend work made up a larger fraction of the total working time of part-timers. For example, around 11 percent of the working hours of part-time employed females were carried out on Saturdays, compared with 6 percent of the working hours of full-time employed females.
- Young people (aged 15-24 years) were somewhat more likely to work on the weekend than were older workers, and weekend work represented a larger fraction of their total working time.
- Participation in weekend work did not vary a great deal by educational level, ethnic group, or level of annual income.
- Self-employed workers reported substantially higher levels of participation in weekend work than did employees. For example, 75 percent of employers, and 65 percent of self-employed people without employees, reported doing some paid work on a Saturday. The measures of working time carried out on the weekend do not vary so much by status in employment. Nevertheless, there is a suggestion in the data that self-employed workers do somewhat more work on Saturdays and Sundays, and carry out a higher proportion of their total working time on weekends.
- Workers with dependent children were a little less likely to be at work on the weekend than were workers without dependent children. However, these differences are generally not statistically significant.
- People working in the agricultural, forestry and fishing industries, and in agricultural, forestry and fishing occupations, recorded much higher levels of weekend work than other occupational and industry groups. Levels of weekend work in the wholesale and retail trade, restaurants and hotels industry sector, and within the services and sales occupational groups, were also higher than average.

Overall, the patterns in these data suggest that industry and occupation of employment, and to a lesser extent status in employment, are important determinants of participation in weekend work.

## 5.5 Does New Zealand have a 24-hour, 7-day economy? Summary measures of working time patterns

There are marked differences between the proportion of people who undertake some work outside of standard hours, and the percentage of total work that is carried out at non-standard times. For example, while an estimated 45 percent of employed people did some paid work on a Saturday, only 7.2 percent of the week's total working time was undertaken on this day. While an estimated 17 percent of employed people worked during the evening on their diary day, only 6.2 percent of working hours were carried out in this time period.

Table 5.36 summarises the allocation of paid working time between 'standard' and 'non-standard' times of the day and week for all workers and different demographic groups. Just under three-quarters of all working hours were carried out between 8am and 6pm on weekdays. Ten percent were performed at weekends during daytime hours, and approximately 15 percent were carried out between 6pm and 8am.

Part-time workers stand out as a group whose paid work is more likely to be done outside standard times. For example, about one-third of the working hours of part-time employed women, and 40 percent of the working hours of part-time men, were done outside the 'standard' period. Less educated and non-Päkehä workers undertook relatively more of their work outside core times than better educated workers and Päkehä. For all of these groups, however, conventional working hours predominated over unconventional.

Much of the variation across demographic and labour force groups is likely to reflect differences in the job profiles of each group. For example, prime-aged and self-employed males are over-represented in sectors such as farming. Young people working part-time are over-represented in shops and cafes. Men are over-represented in the transportation industries, whereas women are over-represented amongst health service staff. The nature of the employment relationship is also of some importance. Self-employed workers work longer hours than employees, on average; and they are more likely do some of their work during the evening and at the weekend.

**Table 5.36: The allocation of working hours between standard and non-standard times of the day and week, by demographic group**

| | Percentage of working hours undertaken | | |
|---|---|---|---|
| | Mon-Friday 8am-6pm | Sat-Sun 8am-6pm | All days 6pm-8am |
| All workers | 74.2 | 10.0 | 15.8 |
| Males | 74.2 | 9.5 | 16.3 |
| Females | 74.1 | 10.8 | 15.1 |
| | | | |
| Males, part-time | 57.5 | 17.2 | 25.3 |
| Males, full-time | 75.9 | 8.9 | 15.2 |
| Females, part-time | 64.1 | 17.4 | 18.5 |
| Females, full-time | 77.0 | 9.0 | 13.9 |
| | | | |
| 15-24 years | 67.3 | 15.4 | 17.3 |
| 25-34 years | 76.1 | 9.1 | 14.9 |
| 35-44 years | 75.8 | 8.3 | 16.0 |
| 45-54 years | 75.9 | 8.6 | 15.5 |
| 55-64 years | 70.3 | 12.8 | 16.9 |
| | | | |
| No qualifications | 71.1 | 9.4 | 19.5 |
| School qualifications | 73.3 | 11.8 | 14.9 |
| Post-school qualifications | 75.9 | 9.0 | 15.1 |
| | | | |
| Pakeha | 75.1 | 10.1 | 14.8 |
| Mäori | 69.9 | 9.0 | 21.1 |
| Pacific Island peoples | 66.4 | 8.6 | 25.1 |
| Other ethnicity | 73.1 | 11.2 | 15.7 |
| | | | |
| Employee | 75.4 | 9.0 | 15.6 |
| Employer | 70.3 | 12.8 | 16.9 |
| Self employed (w'out employees) | 70.8 | 12.5 | 16.8 |

**Table 5.37: The allocation of working hours between standard and non-standard times of the day and week, by occupation and industry**

| | Percentage of working hours undertaken | | |
|---|---|---|---|
| | Mon-Friday 8am-6pm | Sat-Sun 8am-6pm | All days 6pm-8am |
| Managerial | 76.2 | 10.7 | 13.1 |
| Professional | 78.9 | 7.2 | 13.9 |
| Technical | 83.1 | 5.5 | 11.4 |
| Clerical | 82.8 | 7.8 | 9.4 |
| Service & sales | 61.3 | 17.1 | 21.6 |
| Agricultural & fisheries | 67.2 | 15.0 | 17.8 |
| Trades | 81.1 | 7.3 | 11.6 |
| Plant and machine operators | 66.4 | 9.8 | 23.8 |
| Elementary occupations | 64.7 | 6.4 | 28.9 |
| | | | |
| Agriculture etc | 64.9 | 16.7 | 18.4 |
| Manufacturing | 76.3 | 5.6 | 18.0 |
| Construction | 81.1 | 9.5 | 9.4 |
| Retail trade etc | 70.0 | 14.1 | 15.9 |
| Communication & transport | 71.0 | 8.2 | 20.7 |
| Business services etc | 79.9 | 6.8 | 13.3 |
| Social, comm services etc | 77.0 | 8.0 | 15.0 |

Table 5.37 provides similar information on the allocation of weekly working time within broadly-defined occupational and industry groups. The variations apparent suggest that a major driver of when people work is their industry of employment, and to a lesser degree, their occupation. For example, the agricultural industry can be characterised as a 'seven-day-a-week' operation. Workers employed in this industry report a particularly high level of weekend work. However, they tend not to work at night. Other industries also exhibit distinctive patterns of work during the day and week. For example, the transport and communications industry group contains a higher than average share of business activities that operate through the night. Some of the non-standard hours worked reflect industries adapting to consumer demands. An example is overnight delivery of documents, a service demanded by workers who generally work standard days.

Although only around one quarter of paid working time is carried out outside conventional business hours, far more than one quarter of workers do some of their paid work outside these times. Table 5.38 analyses working days in terms of schedule 'types', focusing on weekdays. Results suggest that more than 60 percent of working days from Monday to Friday involve *some* work outside the core period. Most of that is done on the boundaries of the core: if we extend our window of 'daylight hours' to cover 6am till 7pm, we have accounted for the majority (71 percent) of working days. The remaining 29 percent mostly involve a combination of work during daylight hours and work after 7pm. Very few people work solely during evenings or nights (on weekdays, only 1.3 percent of working days conformed to this type).

**Table 5.38: Percentage of weekday working days with different combinations of working times recorded.**

| | All workers % | Males % | Females % |
|---|---|---|---|
| Core hours only: 8am to 6pm | 38.0 | 29.4 | 50.5 |
| Mornings only: 8am to 12 noon | 2.7 | 1.5 | 4.3 |
| Afternoons only: 12 noon to 6pm | 3.4 | 2.4 | 4.8 |
| Extended core hours: 6am to 7pm only | 70.8 | 68.3 | 74.3 |
| Core hours plus evening / night /early morning | 28.0 | 30.6 | 24.2 |
| Evening / night / early morning only (7pm to 6am) | 1.3 | 1.1 | 1.4 |

To summarise, New Zealand is still a considerable way from being a 24-hour, 7-day society as far as paid work is concerned. Approximately three-quarters of paid working hours are carried out in traditional, daylight working hours, between 8am and 6pm from Monday to Friday. Yet, at the same time, a great many people undertake *some* of their work outside of these hours. Rates of participation in evening and weekend work are relatively high. The key point to note is that undertaking a few hours of work during the evening or on the weekend is far more common than doing the majority of one's hours at non-conventional times.

## 5.6 Factors influencing working time patterns

Much economic activity requires that individuals and businesses interact. The importance of these interactions explains why a large fraction of work tends to be concentrated within particular times – traditionally, during daylight hours from Monday to Friday. Yet some work activities have always taken place outside these times. Biological and seasonal factors have always influenced the timing of work in agricultural industries. Essential services, such as emergency health care, the police and fire services, communication and transport are operated on a 24-hour basis. Some manufacturing processes are also organised on a continuous basis, for technological reasons or to better utilise capital resources. Many service industries operate outside conventional business hours in order to better match the delivery of services to the timing of consumer demand.

Working time patterns vary quite substantially across industries and occupations, as described in the preceding sections. This is consistent with the notion that business and employer requirements play a significant role in shaping working time patterns.

Worker preferences are also likely to play some role. Some workers are unable to work during the traditional times or prefer to work outside them. Others are likely to prefer a degree of flexibility in their starting and finishing times or their days of work, increasing the likelihood that some portion of their working time falls outside the core business hours.

Jobs that require significant amounts of work to be done outside standard hours offer a range of possible benefits and drawbacks. On the positive side, these jobs may be attractive when there are no other jobs available, when higher wages are paid, or when they enable workers to schedule their paid work around other activities such as childcare or education. The official surveys of wages and earnings in New Zealand do not measure the wage differentials ('penalty rates') that workers receive for work done

at unconventional times. Using information drawn from the analysis of collective employment contracts (Harbridge et al, 1999, p.35-37), we estimate that at least 14 percent of all employees in 1998/99 were eligible to receive wage premia if they worked outside the standard working hours specified in their employment contract. The most common rate of penal time pay provided for in collective employment contracts was 1.5 times the wage for the first three hours and 2 times the wage for subsequent hours (ibid, p. 36).

On the negative side, people who work at unsocial times are likely to face reduced opportunities for social interaction in their leisure time. Time with spouses, family members and friends may be restricted in duration or more difficult to arrange. International research suggests that those who work at nights or on rotating shifts also face greater risks of experiencing health problems such as fatigue, difficulties sleeping, and loss of appetite (Finn, 1981, pp32-33).

Unfortunately, there is no reliable information available on the hours of work preferences of New Zealand workers, or the extent to which they are able to satisfy their preferences. Patterns in the TUS working time data suggest that supply-side factors do play at least some role. For example, young people (aged 15-24) worked a larger proportion of their total working time on weekends and during evenings than did older workers. This pattern may reflect young people's need to work outside the hours when schools and universities operate. It could also be influenced to some degree by the scheduling of the types of jobs that are open to young people.

It is worth recalling that a very high proportion of workers perform at least a few hours of paid work outside core business hours. In part, this a consequence of the 'spillover' of any overtime hours that are worked by full-timers. Groups with relatively high average weekly hours (such as full-time males, employers, managers, agricultural workers, and machinery and plant operators) are more likely to do some of their hours of work outside the core period, simply because their total hours cannot be so easily fitted into a standard working work. Flexible work scheduling arrangements, in which employees on regular daytime shifts are given some latitude to choose their start and finish times, may also be playing some role. By increasing the likelihood that start and end times will fall outside conventional business hours, the spread of flexible scheduling may have contributed to a rise in the proportion of paid working hours that are classified as 'non-standard'.

## 5.7 International comparisons

International comparisons are invariably constrained by data consistency issues. However, the following tables provide some idea of how New Zealand's working time patterns compare with those of other countries that have undertaken time use surveys.

Firstly, consider the proportion of working days in which paid work was undertaken *only* within 'core hours'. Table 5.39 suggests that the situation in New Zealand was particularly close to that of Canada, within around 40 percent of working days starting and finishing between 8am and 6pm. However, the broad patterns in New Zealand for both men and women are not out of line with any of the countries shown.

**Table 5.39: International comparison of the percentage of workers who worked core hours only**

| | Sweden 1991 7am-4pm | Netherlands 1995 8am-6pm | Norway 1990 7am-4pm | Canada 1992 8am-6pm | NZ 1999 8am-6pm |
|---|---|---|---|---|---|
| Males | 28 | 47 | 48 | 36 | 31 |
| Females | 35 | 67 | 52 | 51 | 50 |
| Total | 31 | 55 | 51 | 42 | 39 |

Source: Derived from Harvey *et al* (2000) and New Zealand Time Use Survey data
Note: This comparison should be treated only as a guide, due to differences in measures and definitions.

Table 5.40 compares the proportion of full-time employees in New Zealand and the United States who were at work at three specific times of the day: 3am, noon and 9pm. The key point to emerge is that participation rates in the two countries were surprisingly similar. However, a lower proportion of New Zealand employees worked at night than was the case in the United States.

**Table 5.40: The proportion of full-time men and women employees at work at 3am, noon and 9 pm in New Zealand and the US[25]**

| | US 1991 | | New Zealand 1999 | |
|---|---|---|---|---|
| | Men | Women | Men | Women |
| 3 a.m. | 6.7 | 5.8 | 3.0 | 3.2 |
| Noon | 85.2 | 82.9 | 84.3 | 83.2 |
| 9 p.m. | 12.9 | 11.3 | 12.1 | 13.6 |

Source: Hamermesh (1999) and data derived from the New Zealand Time Use Survey

[25] Full-time is defined here as 20 or more hours per week, for comparison with the results given in Hamermesh (1999).

# 6. The location of paid work

## 6.1 An overview of work locations and home work patterns

This section focuses on the location of work. In order to provide an initial overview of the amount of work that is carried out in different locations, Table 6.1 shows the average minutes of work that were undertaken in each location by employed working-aged people. Nearly 15 percent of all paid working hours were carried out at home. The majority of working hours, 81.5 percent, were carried out in a workplace. In total, 2.9 percent of working was done while travelling, with the vast majority being undertaken while travelling by private transport.

**Table 6.1: Percent of paid work carried out in each location**

| Location of work | % of work carried out in each location |
|---|---|
| At home | 14.6 |
| At other peoples home | 1.0 |
| Workplace or place of study | 81.5 |
| Public or commercial or service area | 0.6 |
| Bush, beach or wilderness | 0.1 |
| Marae or other significant site to Mäori | 0.0 |
| Other area | 0.0 |
| Travelling by foot or bicycle | 0.2 |
| Travelling by private transport | 2.3 |
| Travelling by public transport | 0.3 |
| Travel other | 0.0 |
| Unidentifiable | 0.0 |
| Not stated | 0.0 |
| Total | 100.0 |

Table 6.2 focuses on work at home and provides some overall summary data, by day of week. Around 15 percent of all paid working hours were reported as taking place at the worker's own home. Twenty-two percent of the diary days of employed people included some work undertaken at home. However, on average these spells of home work were relatively short.

**Table 6.2: Home working time and participation in home work by day of week**

| | % of all paid work time | % of employed persons who worked at home | Average hours worked at home by all employed persons* | Average hours worked at home by those who did some home work |
|---|---|---|---|---|
| Sunday | 28.8 | 19.5 | 0.61 | 3.1 |
| Monday | 13.9 | 23.9 | 0.87 | 3.6 |
| Tuesday | 12.1 | 24.2 | 0.80 | 3.3 |
| Wednesday | 11.9 | 21.2 | 0.76 | 3.6 |
| Thursday | 14.1 | 25.3 | 0.91 | 3.6 |
| Friday | 12.6 | 19.9 | 0.77 | 3.9 |
| Saturday | 22.6 | 18.3 | 0.57 | 3.1 |
| All days | **14.6** | **21.7** | **0.75** | **3.5** |

*This includes people who recorded being employed but did not work on their diary days

Workers in the agricultural industry dominate home work - they undertook 59.9 percent of all home-based working hours. Excluding the agricultural industry[26] from the analysis reduces the percentage of working time that was undertaken at home to 9.7 percent, and the proportion of employed people who undertook some work at home to 18.4 percent. Excluding the agricultural industry also reduces the average time worked at home by participants by just under one hour, from 3.5 hours to 2.7. This reflects the fact that the paid work spells of farmers and other agricultural workers were relatively long.

**Table 6.3: Home working time and participation in home work outside the agricultural industry**

| | % of all paid work time | % of employed persons who worked at home | Average hours worked at home by all employed persons* | Average hours worked at home by those who did some home work |
|---|---|---|---|---|
| Sunday | 22.7 | 16.5 | 0.44 | 2.7 |
| Monday | 8.3 | 19.6 | 0.51 | 2.6 |
| Tuesday | 7.6 | 20.7 | 0.50 | 2.4 |
| Wednesday | 7.8 | 18.4 | 0.50 | 2.7 |
| Thursday | 9.9 | 22.4 | 0.64 | 2.8 |
| Friday | 7.4 | 16.1 | 0.45 | 2.8 |
| Saturday | 17.5 | 15.1 | 0.41 | 2.7 |
| All days | **9.7** | **18.4** | **0.49** | **2.7** |

*This includes people who recorded being employed but did not work on their diary days

**Figure 6.1: Duration of weekday episodes of paid work, by location.**

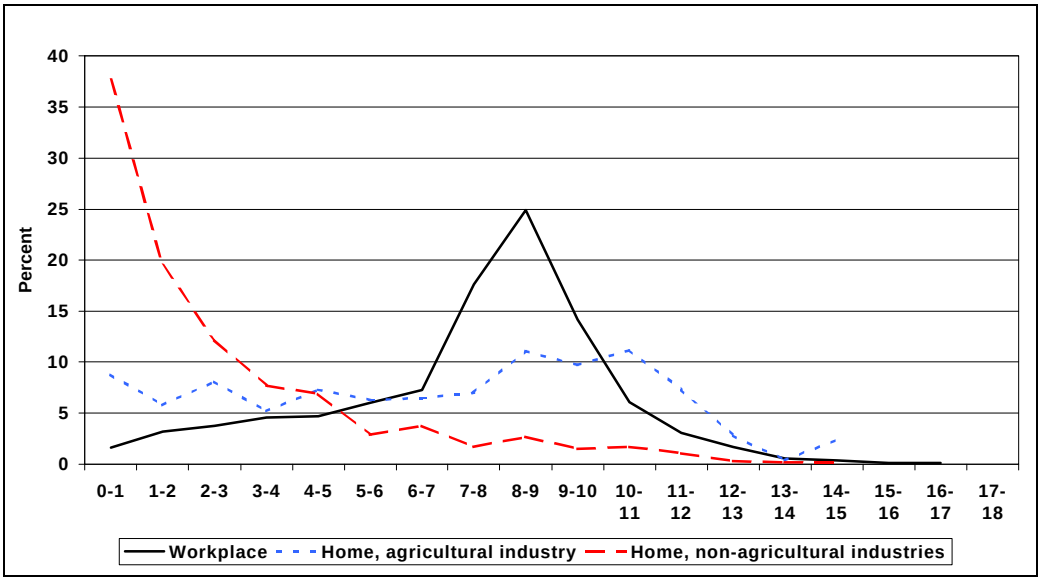



Figure 6.1 illustrates the difference between agricultural and non-agricultural workers in the average duration of episodes of work undertaken from home. On weekdays, more than 55 percent of non-agricultural diary days containing home work had no more than two hours of home work recorded, and more than three-quarters had no more than 4 hours recorded. The median duration of working time recorded at home

[26] Defined as ANZSIC code 'A01'.

on weekdays by non-agricultural workers was 1.7 hours. In contrast, the distribution of work spells undertaken in workplaces peaks in the 8-9 hours category.

A high proportion of non-agricultural home work is performed by people who work at workplaces on the same day. Table 6.4 shows the proportion of weekday diaries that had working time recorded, grouped into the following four locational categories: workplace but not at home; home but not at a workplace; both workplace and home; and neither. It shows that a higher proportion of diaries had a combination of home and workplace work recorded, than the proportion in which the work was carried out solely from home (or a combination of home and other non-standard locations).[27] When agriculture is excluded, work was undertaken solely at home in only around 8 percent of weekday diaries.

**Table 6.4: Proportion of working days with work in each location or combination of locations, weekdays only**

| | Workplace only* | Home only* | Workplace and home* | Other locations | Total |
|---|---|---|---|---|---|
| All industries | 70.3 | 13.1 | 14.7 | 1.9 | 100.0 |
| Non-agricultural industries | 74.2 | 8.3 | 15.5 | 2.0 | 100.0 |

* A small proportion may have included time worked at other non-standard locations.

This point is reinforced if we consider the distribution of total hours of work (Table 6.5). Focusing on the diaries of non-agricultural workers and including all days of the week, only 6 percent of working hours were undertaken at home by people who did not work in a workplace that day. Four percent of working hours were done at home by people who also carried out some work in a workplace on the same day.

**Table 6.5: Percentage of working time that was carried out by workers with different locational combinations on a single day**

| | Workplace only* | Home only* | Workplace and home* | | Other locations | Total |
|---|---|---|---|---|---|---|
| | | | Workplace | Home | | |
| **All days of the week** | | | | | | |
| All diaries | 69.7 | 10.9 | 11.9 | 3.7 | 3.9 | 100.0 |
| Agricultural diaries | 31.2 | 58.5 | 5.6 | 2.6 | 2.1 | 100.0 |
| Non-agricultural diaries | 73.7 | 5.9 | 12.5 | 3.8 | 4.1 | 100.0 |
| **Weekdays only** | | | | | | |
| All diaries | 70.7 | 9.3 | 12.6 | 3.6 | 3.8 | 100.0 |
| Agricultural diaries | 29.6 | 61.0 | 5.3 | 2.0 | 2.0 | 100.0 |
| Non-agricultural diaries | 74.5 | 4.5 | 13.3 | 3.8 | 4.0 | 100.0 |

* A small proportion may have included time worked at other non-standard locations.

Home work is also quite strongly associated with self-employment: the participation rates of the self employed are substantially higher. Forty-four percent of employers and

[27] It is also possible for people to work in other combinations of workplaces over a day. For example, they may spend some time travelling while working, work at a Marae for some period, then work in another workplace and finally spend some time working at home.

52 percent of own-account workers recorded some work undertaken at home in their weekday diaries, compared with just 18 percent of employees (see Table 6.6).

**Table 6.6: Participation in home work on weekdays**

| | Employees | Employers | Self-employed without employees | All workers |
|---|---|---|---|---|
| | *Percentage of working days with each locational pattern* | | | |
| Workplace only | 80.5 | 52.7 | 43.5 | 74.2 |
| Home only | 4.9 | 16.4 | 26.4 | 8.3 |
| Workplace and home | 13.1 | 27.5 | 25.6 | 15.5 |
| All work at other locations | 1.5 | 3.4 | 4.6 | 2.0 |

* Workers in the agricultural industry are excluded from this table

While the rest of this section focuses on working at home, some analysis was undertaken of working while travelling. Despite the upsurge of cell phones and laptop computers amongst people in managerial positions, in fact very little of their recorded work time was carried out while travelling. Male managers undertook only 1.5 percent of their work time while travelling. For females it was a mere 0.8 percent.[28] Men in elementary occupations carried out the highest share of their work while travelling, at 10.8 percent. Included in this group are jobs such as street cleaning and rubbish collection. Next highest ranking were plant and machinery workers at 9.8 percent, sales and service people at 4.6 percent, and associate professionals at 4.1 percent. Some of these workers are likely to be professional drivers such as taxi drivers, couriers, truck drivers or airline pilots. Working while travelling was far less common amongst female workers. Associate professionals were the occupational group doing the highest share, at 3.3 percent.

## 6.2 Variations in the amount of work done at home

There were some significant variations across groups in the labour force in the percentage of paid working time that was carried out at home. The following two tables give estimates firstly for all sectors of the economy and secondly for non-agricultural workers.

[28] It is possible they did not record brief events such as making a work-related phone call while travelling as work time.

**Table 6.7: Percentage of working time that was carried out at home, by demographic characteristics**

| | All industries | Excluding agriculture |
|---|---|---|
| All persons | 14.6 | 9.7 |
| Males | 15.4 | 9.1 |
| Females | 13.1 | 10.5 * |
| 15-24 years | 8.5 | 5.0 |
| 25-34 years | 12.3 | 6.7 |
| 35-44 years | 15.6 | 11.4 |
| 45-54 years | 16.1 | 10.7 |
| 55-64 years | 22.6 | 16.6 |
| Pakeha | 16.2 | 10.3 |
| Mäori | 8.8 | 8.3 |
| Pacific Island peoples | 2.9 | 3.1 * |
| Other ethnicity | 10.7 | 9.1 |
| No qualifications | 14.5 | 8.0 |
| School qualifications | 14.7 | 9.2 |
| Post-school qualifications | 14.7 | 10.5 |
| Employee | 7.9 | 6.4 |
| Employer | 28.0 | 19.1 * |
| Self employed (w'out employees) | 40.1 | 25.1 * |
| Family worker | 44.6 | 23.3 |
| Annual income $1-25,000 | 15.5 | 9.5 |
| Annual income $25-40,000 | 13.3 | 8.2 |
| Annual income $40,000+ | 14.1 | 11.4 |
| Male, joint parent | 15.2 | 8.8 |
| Male, sole parent | 25.4 | 21.3 |
| Male, no dependent children | 15.3 | 9.1 |
| Female, joint parent | 16.2 | 11.9 |
| Female, sole parent | 12.1 | 8.3 |
| Female, no dependent children | 11.5 | 10.0 |

* Estimate is significantly different from the estimate given for the reference group. Reference groups are males; full-time workers; Pakeha; workers with post-school qualifications; employees; workers with annual incomes of $40,000 or more; is not a parent of dependent children.

Table 6.7 indicates that men carried out slightly more of their paid work at home than women. In line with patterns reported in other countries, the proportion of working time spent at home increases with age. In part this association with age is likely to be linked to the effects of occupational differences.

The estimates show little variation in the proportion of work carried out at home by broad income group or by educational level. In contrast, as already discussed the differences were very strong when employment status was considered. On average, self

employed people did a considerable proportion – 20 to 25 percent – of their work at home. Unpaid family workers spent an equally high proportion of their working time at home.[29] Unpaid family workers are often living in same household as self-employed people, and supporting them in their business, so the similarity is not surprising.

There were major differences between Päkehä, Mäori and Pacific peoples, with the latter groups undertaking less work at home. While any underlying reasons for these differences have not been explored, factors such as age, occupation and employment status are likely to be important. For example, Mäori and Pacific peoples are under-represented amongst farmers and the self-employed. The differences between Päkehä and the other ethnic groups diminish when the agricultural industry is excluded.

Finally, when parental status was considered there were also some differences in the proportion of work undertaken at home. Sole fathers stand out as the group with the highest amount of work carried out at home. However, this result is based a very small sample.

Table 6.8 tabulates the proportion of working time carried out at home by the various occupational and industry groups (not excluding agricultural workers). It shows that agricultural workers were highly over-represented amongst those working at home. But managerial, professional and technical workers also undertook over a tenth of their work at home.

**Table 6.8: Percentage of working time that was carried out at home, by occupational and industry group**

| | |
|---|---|
| **Occupations** | |
| Managerial | 12.7 |
| Professional | 13.3 |
| Technical | 12.6 |
| Clerical | 6.5 |
| Service & sales | 6.7 |
| Agricultural | 53.1 |
| Trades | 7.7 |
| Operatives | 6.7 |
| Elementary occs | 5.4 |
| | |
| **Industries** | |
| Agriculture | 54.7 |
| Manufacturing | 6.4 |
| Construction | 8.5 |
| Retail trade etc | 8.8 |
| Communication & trans | 6.3 |
| Business services etc | 13.5 |
| Social, comm services etc | 12.0 |

[29] This is a small group so results should be treated with caution.

## 6.3 How home work and workplace work are combined

During weekdays, slightly more people combined work at a workplace with work at home than simply worked at home. Both the quantity of work done at home and the patterns of combining home and workplace work vary in interesting ways across sectors of the labour market.

Table 6.9 gives information on the work location patterns a selected range of industries. Not surprisingly, agriculture stands out on its own in terms of the time workers spent working at home, with 63.4 percent of the diaries containing home work only (or a combination of home and other non-standard locations). The industry with the next highest proportion of weekday diaries containing home work only is communication services, at 14.2 percent.

The table reinforces the point that outside agriculture, relatively few people work only at home. A somewhat higher proportion of workers in a range of industries combined workplace and home work on the same day. Here, the educational industry stands out, with 28.8 percent of weekday working days showing this pattern. It may reflect teachers preparing lessons or marking in the evening, as well as tertiary lecturers working parts of their days from home.

In Table 6.9 the column "work at other locations" is dominated by work undertaken while travelling. As previously discussed, it is not surprising that work at other locations is so much higher amongst workers in the transport and communication industries.

**Table 6.9: Proportion of diaries with work in each combination of locations by selected industry, weekdays only**

| | Workplace only* | Home Only* | Workplace and home* | Work at other locations | Total |
|---|---|---|---|---|---|
| Agriculture | 29.7 | 63.4 | 6.3 | 0.6 | 100.0 |
| Manufacturing (all industries) | 81.0 | 5.4 | 11 | 2.5 | 100.0 |
| General construction | 77.0 | 4.6 | 18.4 | 0.0 | 100.0 |
| Transport (excl services to transport) | 72.0 | 5.5 | 10.8 | 11.7 | 100.0 |
| Communication services | 69.7 | 14.2 | 8.1 | 8.0 | 100.0 |
| Finance, insurance, bus services | 70.1 | 11.1 | 17.1 | 1.6 | 100.0 |
| Government administration | 75.2 | 7.5 | 15.4 | 1.8 | 100.0 |
| Education | 63.0 | 7.6 | 28.8 | 0.7 | 100.0 |
| Health services | 74.0 | 7.9 | 16.9 | 1.2 | 100.0 |
| Community services | 74.0 | 10.2 | 13.7 | 2.2 | 100.0 |
| All recreation services (3 branches) | 67.0 | 11.8 | 19.5 | 1.6 | 100.0 |
| | | | | | |
| All industries | 70.3 | 13.1 | 14.7 | 1.9 | |
| Non-agricultural industries | 74.2 | 8.3 | 15.5 | 2.0 | |

* A small proportion may have included time worked at other non-standard locations.

The significance of home work may also be assessed in terms of the average duration of work spells. In Tables 6.10 and 6.11, we break down the 'home only' and 'both home

and workplace' categories by the amount of working time that was carried out in each location.

**Table 6.10: Distribution of weekday working days containing home work by combination of locations and hours at each location**

| | Home only | | | Workplace plus home | | | |
|---|---|---|---|---|---|---|---|
| | **< 2 hours** | **2 - <7 hours** | **7+ hours** | **< 2 hrs home** | **2 - <7 hrs home** | **7+ hrs home** | **Diaries with home work as % of all diaries** |
| All industries | 3.6 | 4.4 | 5.1 | 9.3 | 5.2 | 0.2 | 27.8 |
| Non-agricultural industries | 3.3 | 2.9 | 2.1 | 9.9 | 5.4 | 0.2 | 23.8 |

Considering those working solely at home, there is a reasonable proportion of long-duration work episodes as well as a fair share of short-duration episodes. If diaries that recorded both workplace and home work on the one day are considered, it is clear that the majority of homework episodes were under two hours long, and very few were more than 7 hours in duration. This suggests a pattern where work at home is a "spillover" from work in the main workplace. For example, managers may bring home some paper work from the office. Or a self-employed trades worker may undertake some work in the evening at home catching up on accounts.

**Table 6.11: Distribution of weekday working days containing home work by combination of locations and hours at each location, selected industries**

| | Home only | | | Workplace plus home | | | | |
|---|---|---|---|---|---|---|---|---|
| | < 2 hours | 2 - <7 hours | 7+ hours | < 2 hrs home | 2 - <7 hrs home | 7+ hrs home | Total home work | Diaries with home work as % of all diaries |
| Agriculture | 9.3 | 29.6 | 52.1 | 5.0 | 3.4 | 0.6 | 100 | 69.7 |
| Manufacturing (all industries) | 8.5 | 12.2 | 12.2 | 40.9 | 25.6 | 0.6 | 100 | 16.4 |
| General Construction | 9.1 | 2.6 | 8.3 | 49.1 | 30.0 | 0.9 | 100 | 23.0 |
| Transport (excl services to transport) | 27.6 | 6.1 | 0.0 | 47.9 | 18.4 | 0.0 | 100 | 16.3 |
| Communication services | 38.6 | 22.0 | 3.1 | 24.7 | 11.7 | 0.0 | 100 | 22.3 |
| Finance, insurance, bus services | 14.2 | 14.9 | 10.3 | 33.7 | 25.5 | 1.4 | 100 | 28.2 |
| Government Administration | 16.2 | 7.4 | 9.2 | 39.7 | 27.5 | 0.0 | 100 | 22.9 |
| Education | 12.9 | 6.0 | 1.9 | 52.5 | 26.1 | 0.5 | 100 | 36.4 |
| Health Services | 14.1 | 9.3 | 8.5 | 59.3 | 7.7 | 1.2 | 100 | 24.8 |
| Community Services | 16.7 | 16.7 | 9.2 | 30.1 | 25.1 | 2.1 | 100 | 23.9 |
| All recreations services (3 branches) | 8.9 | 18.5 | 10.2 | 37.1 | 20.4 | 4.8 | 100 | 31.3 |

Reviewing the patterns that exist in selected industries, agriculture once again stands out as having a large proportion of long-duration spells of home work. The manufacturing sector also has a reasonably high proportion of diaries containing

homework episodes of 7 or more hours, at 12.2 percent. However, as the final column shows, relatively few working days of manufacturing workers record any time working at home. For most industry groups, the most common pattern was that of working at home for less than 2 hours in combination with working at a workplace. Transport and communication both have a reasonable large share of working days in which only work at home, undertaken for less than two hours, was recorded.

These findings suggest that studies that focus only on people who undertake *most* of their work from home miss out on important aspects of working from home.

Tables 6.12 and 6.13 rework the data by occupation. Workers in the agricultural industry are excluded. The lower-skilled non-manual occupations and the manual occupations contained the highest proportions of workers who worked only in workplaces. Professionals, followed by the technical and managerial groups, were the groups most likely to combine workplace and home work. As we have previously seen, they are also highly likely to be undertaking work in the evenings (or weekends). This suggests that for many in these occupational groups work carried out in the workplace does "spill over" into the home. Whether working at home is a deliberate strategy for people working long hours to keep their hours in the workplace and thus away from the family down, or is simply that the pressure of work means work is simply spreading into home life, is not known. Another possibility is that tasks requiring more intense concentration, such as report writing and work-related reading, can be better carried out at home than in the workplace.

**Table 6.12: Proportion of diaries with work in each combination of locations by occupational group, weekdays only**

| | Workplace Only* | Home Only* | Workplace and home* | Work at other locations | Total |
|---|---|---|---|---|---|
| Managerial | 71.2 | 9.5 | 18.1 | 1.2 | 100.0 |
| Professional | 65.3 | 8.1 | 25.8 | 0.9 | 100.0 |
| Technical | 67.0 | 12.3 | 19.1 | 1.6 | 100.0 |
| Clerical | 84.1 | 6.0 | 9.6 | 0.3 | 100.0 |
| Service & sales | 78.9 | 7.7 | 11.4 | 2.0 | 100.0 |
| Trades | 79.3 | 4.3 | 15.1 | 1.3 | 100.0 |
| Plant and machine operators | 77.9 | 7.2 | 9.1 | 5.9 | 100.0 |
| Elementary occupations | 77.2 | 7.1 | 8.6 | 7.1 | 100.0 |

Note: Workers in the agricultural industry are excluded.
* A small proportion may have included time worked at other non-standard locations.

**Table 6.13: Proportion of diaries with work in each combination of locations by occupational group, weekdays only**

| | Home only | | | Workplace plus home | | | | |
|---|---|---|---|---|---|---|---|---|
| | < 2 hours | 2 - <7 hours | 7+ hours | < 2 hrs home | 2 - <7 hrs home | 7+ hrs home | Total home work | Diaries with home work as % of all diaries |
| Managerial | 10.9 | 12.7 | 10.9 | 40.9 | 23.2 | 1.4 | 100 | 27.6 |
| Professional | 10.6 | 6.2 | 7.1 | 46.9 | 28.0 | 1.2 | 100 | 33.9 |
| Technical | 13.4 | 17.9 | 8.0 | 39.3 | 20.1 | 1.3 | 100 | 31.4 |
| Clerical | 19.1 | 15.3 | 3.8 | 36.3 | 24.8 | 0.6 | 100 | 15.7 |
| Service & sales | 17.8 | 16.8 | 5.8 | 41.4 | 17.8 | 0.5 | 100 | 19.1 |
| Trades | 6.2 | 5.2 | 10.8 | 49.0 | 27.8 | 1.0 | 100 | 19.4 |
| Plant and machinery operators | 14.8 | 15.4 | 14.2 | 36.4 | 19.1 | 0.0 | 100 | 16.2 |
| Elementary occupations | 33.5 | 5.7 | 6.3 | 38.6 | 15.8 | 0.0 | 100 | 15.7 |

Note: Workers in the agricultural industry are excluded.

In all occupational groups the most common home working arrangement was to undertake less than 2 hours of work at home in combination with time in a workplace. For just under half of trades workers who undertook work at home, this was the arrangement. Nearly 47 percent of professionals who undertook some work at home also fitted this category. However, a significant proportion of the diary days containing home work in each occupational group involved between 2 and 7 hours of work at home.

Self-employed workers can be expected to have greater opportunities than waged or salaried workers to carry out their work at home, given that they 'create their own jobs'. This raises the question of how important home work is for employees. Table 6.14 gives data on the work location patterns of employees in five selected occupational groups (defined at a two-digit level). We selected the five occupations that recorded the highest average minutes of work undertaken from home on weekdays. The fraction of paid working time that was undertaken from home in these occupations on weekdays ranged from 6 to 12 percent. The fraction of employees who worked at home for 7 or more hours on weekdays was no higher than 3 percent in any of these occupations. As an alternative work location, home appears to plays a relatively minor role, in the working lives of most employees.

**Table 6.14: Waged and salaried workers with relatively high levels of involvement in home work**

| | Average minutes at home | Average minutes at workplace | Percentage of work undertaken at home | % days with 4+ hours at home | % days with 7+ hours at home | Total average minutes worked |
|---|---|---|---|---|---|---|
| Teachers | 44 | 316 | 12.2 | 3.5 | 1.0 | 360 |
| Physical science professionals | 36 | 428 | 7.8 | 7.8 | 3.0 | 464 |
| Other associate professionals | 36 | 352 | 9.2 | 6.0 | 2.2 | 387 |
| Other professionals | 32 | 424 | 7.0 | 4.5 | 3.0 | 455 |
| Corporate managers | 28 | 410 | 6.4 | 4.7 | 1.2 | 438 |

Note: The data are for non-agricultural employees and weekdays only.

## 6.3 Times of the day when home work is undertaken

The distribution of home work across the day is explored in this section. Given the disproportionate impact of agricultural workers on home work patterns, the results in this section exclude the agricultural industry.

Figure 6.2 plots the proportion of non-agricultural workers who were working at home or in a workplace at different times of the day (considering weekdays only). In the core business hours far more people were working in a workplace, but this difference narrows substantially in the early morning and in the evening. Figure 6.2 also shows that in contrast to the two peaks of work for those in the workplace (that is mid morning and early afternoon) there is an extra peak for people working at home. This peak is around 8.30 to 9.30pm.

**Figure 6.2: Percentage of workers working at home and in the workplace at different times of day (weekdays only)**

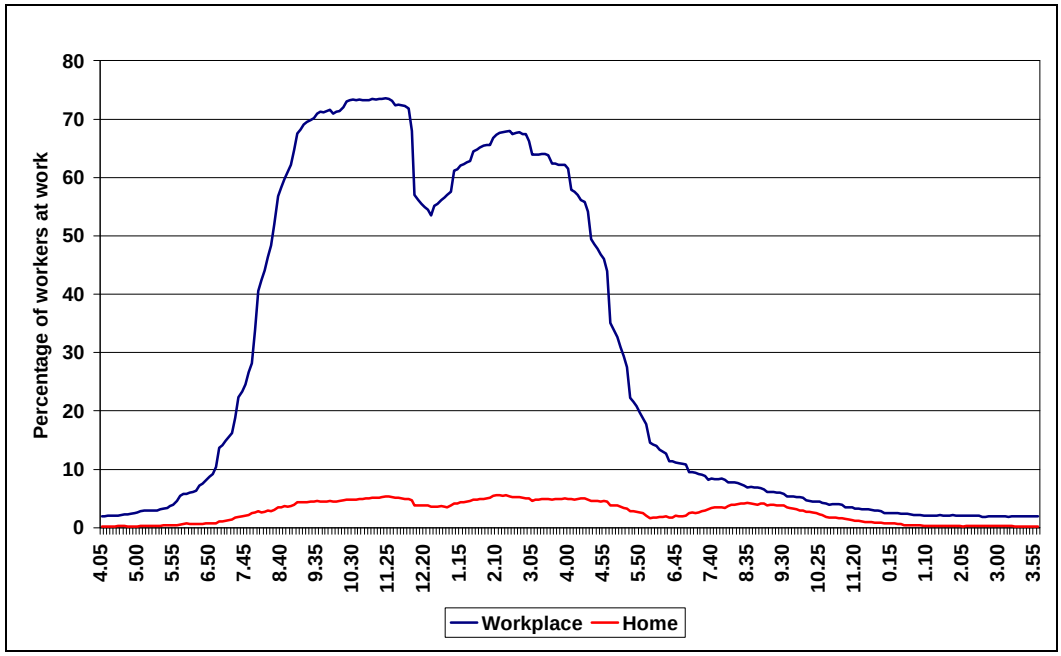



Table 6.15 summarises the distribution of home-based working time across the hours of the day on each day of the week. There is a pronounced evening peak on all days but Saturday. These patterns suggest that many people who work elsewhere during the day take work home to do in the evening. In addition, some undertake some work at home on Sunday evenings in preparation for the next week. It should be noted however that some workers who primarily work from home have jobs that require them to work during the evenings – such as telemarketers or survey researchers.

**Table 6.15: Percentage distribution of home-based working time across the day (non-agricultural workers)**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am | Total |
|---|---|---|---|---|---|---|---|---|---|
| Sunday | 1.4 | 3.6 | 26.0 | 24.0 | 12.1 | 8.8 | 19.7 | 4.3 | 100.0 |
| Monday | 1.0 | 3.7 | 26.1 | 26.0 | 12.0 | 9.0 | 18.0 | 4.3 | 100.0 |
| Tuesday | 1.3 | 3.6 | 24.1 | 25.1 | 12.5 | 9.6 | 21.5 | 2.5 | 100.0 |
| Wednesday | 0.9 | 3.6 | 28.0 | 29.9 | 12.7 | 6.1 | 18.3 | 0.5 | 100.0 |
| Thursday | 0.3 | 2.9 | 26.9 | 32.9 | 12.2 | 6.8 | 16.1 | 1.8 | 100.0 |
| Friday | 0.7 | 3.2 | 29.5 | 31.4 | 12.1 | 7.6 | 14.0 | 1.5 | 100.0 |
| Saturday | 1.1 | 5.1 | 27.1 | 33.2 | 16.5 | 6.9 | 8.6 | 1.5 | 100.0 |
| All days | 0.9 | 3.6 | 26.8 | 29.1 | 12.8 | 7.8 | 16.7 | 2.3 | 100.0 |

The remaining tables show home-based working time (measured in minutes) as a percentage of all the working hours that were recorded in each time band. Table 6.16 reinforces the point that home-based work makes up a significant proportion of all paid work during the evenings, and particularly the late evening. However, it is still the case that around two-thirds of evening work is done outside the home.

**Table 6.16: Home-based working time as a percentage of all paid working time reported in each time-of-day band, by day of week**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am |
|---|---|---|---|---|---|---|---|---|
| Sunday | 11.6 | 10.6 | 15.3 | 14.3 | 17.2 | 25.1 | 44.1 | 29.7 |
| Monday | 8.2 | 5.9 | 5.0 | 5.1 | 7.0 | 17.1 | 33.6 | 31.1 |
| Tuesday | 8.5 | 4.8 | 4.2 | 4.5 | 6.7 | 17.6 | 35.6 | 15.8 |
| Wednesday | 5.5 | 4.8 | 4.8 | 5.6 | 6.9 | 12.9 | 29.2 | 2.2 |
| Thursday | 3.1 | 5.8 | 6.3 | 8.2 | 9.2 | 16.9 | 32.7 | 11.8 |
| Friday | 4.9 | 4.3 | 4.8 | 5.6 | 7.0 | 12.9 | 22.9 | 7.8 |
| Saturday | 6.9 | 10.9 | 11.5 | 15.6 | 18.6 | 16.6 | 17.7 | 9.2 |
| All days | 9.5 | 8.7 | 7.1 | 7.9 | 10.6 | 19.0 | 32.9 | 13.9 |

Note: Workers in the agricultural industry are excluded.

Table 6.17 focuses on weekdays and shows the proportion of work carried out at home in each time band by non-agricultural workers according to their level of education. In general, well-educated people were likely to undertake a greater proportion of their work at home. The differences were particularly large in the late evening when workers with no qualifications undertook about 14 percent of their work at home, but this proportion was 40 percent among workers with post-school qualifications.

**Table 6.17: Home-based working time as a percentage of all paid working time reported in each time-of-day band, by educational level (weekdays only)**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am |
|---|---|---|---|---|---|---|---|---|
| No qualifications | 1.7 | 3.4 | 4.3 | 4.6 | 5.4 | 11.4 | 13.9 | 7.3 |
| School qualifications | 11.2 | 3.6 | 4.6 | 5.4 | 5.5 | 12.6 | 26.6 | 18.0 |
| Post-school qualifications | 6.2 | 7.1 | 5.5 | 6.5 | 8.9 | 18.6 | 39.5 | 13.4 |

Note: Workers in the agricultural industry are excluded.

Higher-income people undertook a greater share of their evening work at home than those with lower annual incomes. However, this pattern reverses for night work.

**Table 6.18: Home-based working time as a percentage of all paid working time reported in each time-of-day band, by annual income level (weekdays only)**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am |
|---|---|---|---|---|---|---|---|---|
| $1-$25,000 | 5.5 | 4.7 | 4.8 | 5.9 | 6.9 | 11.8 | 20.3 | 17.3 |
| $25- $40,000 | 7.4 | 3.6 | 4.5 | 5.4 | 7.2 | 18.7 | 33.2 | 9.9 |
| $40,000+ | 5.0 | 7.9 | 5.8 | 6.4 | 8.0 | 18.9 | 43.1 | 8.6 |

Note: Workers in the agricultural industry are excluded.

Table 6.19 shows the share of working time carried out at home by the parental status of the workers. Sole fathers did the highest proportion of their day, evening and night work at home. However, the sample of sole fathers in the survey was very small. In the later evening (8-12 pm) fathers undertook a greater proportion of their work at home than men without dependent children. This pattern was also apparent for women. Assumptions that just because a group works long hours its members spend little time with their families could be incorrect.[30] Potentially, some of the extended hours are worked at home.

**Table 6.19: Home-based working time as a percentage of all paid working time reported in each time-of-day band, by family status (weekdays only)**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am |
|---|---|---|---|---|---|---|---|---|
| Male, joint parent | 11.8 | 6.5 | 4.8 | 5.4 | 7.6 | 20.8 | 36.7 | 4.9 |
| Male, sole parent | 0.0 | 0.4 | 14.3 | 14.7 | 20.9 | 49.7 | 73.0 | 100.0 |
| Male, not a parent | 6.1 | 7.0 | 6.5 | 6.3 | 7.7 | 13.5 | 26.4 | 12.9 |
| Female, joint parent | 4.8 | 10.6 | 6.8 | 9.0 | 14.4 | 18.9 | 37.8 | 17.5 |
| Female, sole parent | 0.0 | 32.2 | 4.9 | 5.5 | 8.5 | 8.1 | 39.2 | 12.7 |
| Female, not a parent | 5.4 | 6.8 | 5.7 | 7.1 | 9.1 | 19.5 | 30.2 | 18.6 |

Note: Workers in the agricultural industry are excluded.

Finally, Table 6.20 considers the timing of home-based work by occupation. In both very early mornings and late evenings, people in managerial, professional and technical occupations did a higher proportion of their working time from home than was the case for other occupations. For example, 61 percent of the time professionals spent working in the late evening was carried out at home. At night, technical workers and sales and service workers undertook a significant proportion of their total working at home.

[30] This could be investigated further by use time use data to analyse any time recorded while at home as both work time and time spent caring for children. However, the time use data does not indicate the quality of possible interaction with family members.

**Table 6.20: Home-based working time as a percentage of all paid working time reported in each time-of-day band, by occupational group (weekdays only)**

| | 4-6 am | 6-8 am | 8-12 noon | 12-4pm | 4-6 pm | 6-8 pm | 8-12 pm | 12-4am |
|---|---|---|---|---|---|---|---|---|
| Managerial | 22.1 | 7.8 | 7.9 | 8.1 | 8.9 | 21.6 | 49.9 | 15.1 |
| Professional | 16.6 | 14.5 | 5.6 | 7.2 | 10.4 | 27.1 | 61.0 | 10.6 |
| Technical | 11.2 | 17.4 | 7.4 | 8.8 | 13.1 | 27.8 | 43.0 | 28.4 |
| Clerical | 1.6 | 3.2 | 3.4 | 4.5 | 6.6 | 11.0 | 26.0 | 7.0 |
| Service & sales | 9.8 | 6.4 | 5.5 | 5.9 | 6.9 | 12.1 | 14.6 | 19.7 |
| Trades | 1.2 | 6.4 | 4.6 | 5.6 | 8.4 | 18.9 | 32.5 | 1.9 |
| Operatives | 0.0 | 2.8 | 5.3 | 4.9 | 4.4 | 11.8 | 12.3 | 12.5 |
| Elementary occupations | 8.8 | 2.1 | 2.6 | 3.6 | 1.9 | 4.2 | 5.7 | 3.5 |

Note: Workers in the agricultural industry are excluded.

These results reinforce the idea that the dimensions of inequality at work are complex. Both when and where work is carried out are important aspects of the quality of work, which vary to some degree across demographic groups and by socio-economic status. As Breedveld (1998) has pointed out, being a security guard in an empty mall near midnight is very different from catching up on some office work in the mid evening in the comfort of one's own home.

## 6.4 Factors influencing whether work is done at home

Even when agricultural workers, many of whom are self-employed, are excluded, home work is still quite strongly associated with self-employment. The reasons why self-employed workers tend to do more of their work from home could include:

- Some small businesses are physically located at their owner's home.
- Working at home some of the time may lead to savings in business overhead costs.
- Many self-employed workers have greater autonomy than employees – which may make it easier for them to work at home if they find this congenial or more convenient.

There are also a number of different reasons why employees might spend some or all of their time working from home. These include:

- Home may provide a quiet place to undertake work that requires more intense concentration than is possible in a workplace.
- Work may "spillover" from main workplace – additional hours are undertaken beyond the contracted ones, and workers choose to do these at home rather than stay on or return to the workplace.
- Working at home may represent an attempt by employees working long hours to better integrate their work and family life.

These situations may or may not be positive for the individual concerned.

The finding that many people do at least some of their paid work from home means that simple analyses of work-family 'conflict' using data on total hours worked may lead to some incorrect conclusions about the time workers spend away from their

families. Adding in information on work location can provide a better understanding of how people juggle work and family life in practice.

Technological, customer demand and other factors undoubtedly make different types of work more or less easy to perform at home – influencing occupational and industry patterns. In jobs that require the use of computers, having a home computer is essential to working at home. Variations in the degree of autonomy at work may also influence employees' patterns of home work and help to explain why home work is somewhat more common among managerial, professional and technical workers.

## 6.5 International comparisons of home work levels

The level of home working in New Zealand is compared with the levels recorded in other OECD countries in Table 6.21. The measure considered is the proportion of employed people who undertook some or all of their work at home on an average day of the week. The estimate for New Zealand (21.7 percent) was similar to that of Canada, higher than in some other European countries but lower than in Austria.

**Table 6.21: International comparison of the percentage of employed people who has undertaken some work at home on an average day of the week**

| Austria 1991 | Sweden 1991 | Netherlands 1995 | Norway 1990 | Canada 1992 | Italy 89 | NZ 1998/99 |
|---|---|---|---|---|---|---|
| 27.1 | 14.3 | 13.7 | 13.6 | 21.3 | 5.1 | 21.7 |

Source: Derived from Harvey *et al* (1997) and New Zealand Time Use data. The NZ estimate is for non-agricultural workers on weekdays.
Note: This comparison should be treated only as a guide due to differences in methodologies and definitions

# 7. Summary of findings

***Working time patterns: key features***

Both when and where work is carried out are important aspects of the quality of jobs. The results of this study indicate that while New Zealand is a 24-hour, 7-day society in a literal sense, the majority of paid work is still done at conventional times. In 1998/99, approximately three-quarters of paid working hours were carried out in traditional, daylight working hours, between 8am and 6pm from Monday to Friday.

Yet, the study shows that a great many people undertake *some* of their work outside of these traditional business hours. Rates of participation in evening and weekend work were relatively high. The key point to appreciate is that undertaking a few hours of work during the evening or on the weekend is a far more common than doing the majority of one's hours at unconventional times.

A substantial amount of the work that is undertaken outside the core hours of 8am to 6pm occurs on the boundaries of the core, that is early in the morning or in the early evening. On an average weekday, for example, 53 percent of the males who worked that day, and 29 percent of the females, were at work at some stage between 6am and 8am (perhaps only for a few minutes). Similarly, on an average weekday 29 percent of the males who were at work, and 22 percent of the females, did some paid work between 6pm and 8pm.

Weekend work is a significant feature of the labour market. About 13 percent of all paid working time recorded in the TUS was done on the weekend. About 45 percent of all employed people who completed time use diaries on Saturdays reported that they did some paid work that day. The proportion working on Sundays was only slightly lower. As might be expected, however, work spells recorded on weekends were substantially shorter on average than those recorded on weekdays.

Participation in evening work (defined here as work carried out between 7pm and midnight, on any day of the week) was also relatively common. Only 6 percent of all paid working hours were undertaken in this time period. However, on an average day of the week 17 percent of the employed, and nearly 25 percent of those who were at work that day, reported that they did some work between 7pm and midnight.

In contrast night work (defined here as work undertaken between midnight and 5am) was relatively uncommon. Night work accounted for only 1.8 percent of all paid working hours, and just under 5 percent of employed people did some work in this time slot on an average day of the week. The average duration of work for those who worked within this time slot was 1.9 hours, indicating that many of those who work at night were not doing lengthy shifts.

Overall, these patterns suggest that a high proportion of workers undertake small or moderate amounts of work at non-standard times of the day and week – typically early in the morning, in the evening or on weekends. Very few people work in the hours that are usually considered to be most problematic – between midnight and 5am. In

addition very few workers do *all* of their paid working hours at unconventional times of the day.

### *Group variations in working time patterns*

Because only two days of time use data were collected from each respondent in the TUS, the weekly work schedules of individuals cannot be analysed. People who worked at non-standard times on their diary days may have worked at standard times on other days of the week, and vice versa. In this study we analysed the *average* working time patterns of groups of workers, defined by their personal and job characteristics.

Employed men and women did very similar proportions of their paid working hours within traditional business hours (between 8am and 6pm, Monday to Friday). However, reflecting the fact that they work longer hours on average than women, men were more heavily involved in work at non-standard times of the day and week. For example, on an average weekday, 53 percent of the males who worked that day, but only 29 percent of the females, were at work at some stage between 6am and 8am. The average minutes of paid work undertaken by men were also higher than the female averages in almost all (standard and non-standard) time periods.

Workers in manual occupations and, connected to this, workers with lower levels of education, were more likely to be working in the early hours of the morning, before 8am. Workers in managerial, professional and technical occupations tended to start later in the day.

Self-employed workers were significantly more likely to undertake evening work than employees. Variations by other demographic and job attributes were less pronounced. For example, the differences by gender, educational level, and age group in average rates of participation in evening work and average minutes worked were relatively small. The data suggest that on an average day of the week, a sizeable minority of workers in all of the major demographic groups and most of the major occupational and industry groups, are likely to undertake some paid work during the evening.

Similarly, all of the main demographic groups were well represented among weekend workers. The variations in weekend work patterns by job type or type of employment relationship were larger. Self-employed people reported substantially higher levels of involvement in weekend work, in terms of both participation rates and hours worked, than did employees. People working in the agricultural, forestry and fishing industry sector and in agricultural, forestry and fishing occupations recorded much higher average levels of weekend work than did other occupations and industry groups. Levels of weekend work were also higher than average in the retail, restaurants and hotels industry sector and in the services and sales occupational group.

### *Factors influencing working time patterns*

One useful predictor of whether a particular labour force group does a lot of work at non-standard times is its average weekly working hours. As a general rule of thumb, groups with high average weekly hours (such as full-time males, employers, managers,

agricultural workers, and machinery and plant operators) were more likely to be at work outside the core period. Even if most of their work is carried out at standard time, these workers need to work outside the conventional periods if they are to clock up extended weekly hours.

Working time patterns are often shaped by the production and service delivery requirements (or conventions) of the firms and industries in which workers are employed. For instance, communication, transport and health services are industries that provide at least some level of service around the clock, and this is clearly evident in the working time patterns of the workers employed in these industries. Differences in working time patterns by industry and occupation were among the most pronounced variations found in this study.

The roles and responsibilities men and women take on in households, particularly households with dependent children, have the potential to influence working time patterns. We found that overall, the average working time patterns of women with children were only marginally different from those of women without dependent children. The idea that parents, and particularly mothers, might be scheduling much of their work around standard school or childcare hours was not strongly supported by the data. However, being a mother did seem to be associated with later starts in the working day and earlier finishing times. Regression estimates of the likelihood of participation in evening and night work also provided some weak evidence in support of the notion that mothers are more likely to do their paid work during the evenings and nights.

Working time patterns are also likely to be influenced by the constraints that other non-work activities such as full-time education place on paid work. Our results show that young people and part-timers worked a larger proportion of their total hours on weekends and during evenings than did older workers and full-timers. This pattern could reflect in part the need to schedule paid work outside the hours at which schools and universities operate. However, it could also be influenced by the scheduling patterns of the types of part-time jobs that are available to young people.

***Is work at non-standard times of the day and week inequitably distributed?***

Working time patterns may be influenced by the degree of autonomy or control that workers are able to exercise over their working hours. Some researchers have suggested that more skilled and highly paid workers (such as professionals and the self-employed) use their greater bargaining power in the labour market, or their greater autonomy at work, to avoid evening and night work. Exploring this issue, we found evidence of higher rates of participation in night work on the part of both Mäori and Pacific men and women in the regressions we estimated on the probability of participation in work at these times. In addition, male employees in some of the lower skilled occupational groups had higher predicted rates of participation in night work. However, the evening work patterns of men and women did not show this pattern. Taking account of all the evidence, it does not appear that there are strong or simple relationships between either educational attainment or occupational skill level on the one hand, and the likelihood of working during evenings or nights on the other.

### *Home work: key features*

Just over 80 percent of the paid working hours that were recorded in the TUS were undertaken in workplaces. Homes were the second most important type of location. Just under 15 percent of paid working hours were done at the worker's own home. A further 3 percent were carried out while the worker was travelling. All other types of location were quantitatively unimportant.

The agricultural sector contributed a very high proportion of the work that was recorded 'at home', reflecting the fact that most farmers classified their farms as their homes. In fact, almost 60 percent of home-based working hours were recorded in the agricultural industry. If the agricultural industry is excluded from the statistics, measures of the prevalence of home work decline but remain significant. On an average day of the week, approximately 18 percent of non-agricultural workers undertook some paid work at their home. This accounted for nearly 10 percent of all paid working time in the non-agricultural sectors of the economy.

Although a minority of non-agricultural home worker did full-day shifts at home, the majority undertook relatively short shifts lasting for less than two hours. During weekdays, about two-thirds of the non-agricultural workers who recorded some work at home also worked in a workplace on the same day. A significant proportion of the non-agricultural home work was also carried out in the evenings and weekend. These patterns suggest that in New Zealand the pattern of combining small amounts of home work with generally longer spells in a conventionally-located job is far more common than the pattern of working predominantly from home.

Home-based work is much more common among the self-employed than among employees. Forty-four percent of non-agricultural employers and 52 percent of own-account workers recorded some paid work at home in their weekday diaries, compared with just 18 percent of employees. Workers in managerial, professional and technical occupations also carried out higher proportions of their paid work at home, on average, than other occupational groups. Paid work was also more likely to be undertaken at home on weekends than on weekdays.

### *Comparisons with working time and home work patterns in other countries*

International comparisons are inevitably constrained by differences in the data, concepts and measures reported by different authors. Nevertheless, the comparisons we have been able to make suggest that New Zealand is not a special case. For example, our estimates of the proportion of male and female workers who were at work at three specific times of the day – 3am, noon and 9pm – were quite similar to those reported by Hamermesh (1999a) for American workers in 1991. Similarly, our estimate of the proportion of employed people in New Zealand who undertook some or all of their work at home, on an average day of the week, was similar to the proportion reported for Canada by Harvey *et. al*. (2000).

Because only one time use survey has been carried out in New Zealand, we cannot assess how much patterns of work have changed in recent decades. Studies in a number of other countries have examined trends in the frequency of work undertaken

at non-standard times. Those considering changes during the 1990s (eg Beckers and Breedveld 2000, Harkness, 1999, Presser, 1999) have reported minor increases in workers' rates of involvement in evening and weekend work (but not in night work). Examining changes in working time patterns over several decades, however, some authors fail to find any evidence of growth in the proportion of work that is undertaken at non-standard times (Breedveld, 1999; Hamermesh, 1999a).

### *Limitations of this study*

One objective of this research was to explore the suitability of the New Zealand Time Use Survey data for examining work scheduling and work location issues. The TUS data do indeed provide many new insights into working time and home work patterns in New Zealand. Although the work patterns of individuals over a week or longer time periods cannot be examined, the data can be used to analyse the distribution of work in the labour market as a whole and in specific sectors, across time and locations. The data can be used to describe and compare the average working time and home work patterns of the main labour force groups.

What the group averages do not reveal is whether work at non-standard times is mainly undertaken by a minority of the individuals in each group, or is fairly evenly shared by different group members who work at different times. From a welfare perspective, the degree to which work at non-standard times is concentrated on particular individuals is an important part of the picture. If the jobs that require evening or night work are persistently undertaken by the same individuals, there may be smaller groups of workers for whom the adverse consequences of working at non-standard times (such as reduced family time, reduced ability to socialise, or reduced satisfaction with work) are particularly pronounced. Alternative types of data would be required to explore these issues – such as results from a survey in which respondents are asked about their typical working patterns over a longer period of time.

Another important limitation of the TUS data is that we cannot tell whether people chose to work when and where they did. In other countries, researchers are considering ways of gathering more information on workers' preferences and ability to choose their hours of work. In addition, the New Zealand TUS does not provide a complete set of time diaries from all household members. This limits the potential for using these data to study the interdependencies between the time use patterns of different household members. While it is recognised that response burden is a problem, this additional information would be valuable should another TUS be carried out in New Zealand.

# 8. Further research

There is considerable potential for further research using the currently available time use data. As one example, a further step in examining work scheduling patterns and the location of work could involve linking these variables to information on patterns of unpaid work. For example, when parents are working at home in the evenings what are they doing as a simultaneous activity? Are they looking after children? When parents reduce their activity rates around the time school ends, are they actually increasing their childcare time? Analysis of the unpaid work data in conjunction with the paid work data could lead to a better understanding of which factors are important in influencing work scheduling and location decisions.

The time use data might also allow the development of some life balance measures that could help in assessing whether people working at non-standard times have more or less stressful lives. It would be possible to examine whether people working non-standard schedules undertake different amounts of activities such as leisure, sleep, personal care, socialising, or voluntary work from people working at standard times - or, alternatively, these activities simply take place at different times.

Finally, undertaking a further time use survey in New Zealand would allow analysis of changes over time. Given both the high cost of time use surveys and the fact that changes in patterns of work are not likely to be rapid, the gap between time use surveys could be ten years or more.

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# APPENDIX 1

## Table A1: Average minutes worked by employed persons in each time slot, by day of week

| | 4-6 am | 6-8 am | 8-noon | 12-4 m | 4-6 pm | 6-8 pm | 8-12pm | 12-4 am |
|---|---|---|---|---|---|---|---|---|
| Sunday | 3 | 8 | 40 | 39 | 16 | 8 | 10 | 3 |
| Monday | 3 | 17 | 140 | 137 | 46 | 14 | 14 | 4 |
| Tuesday | 4 | 19 | 150 | 143 | 48 | 14 | 16 | 4 |
| Wednesday | 4 | 19 | 146 | 136 | 46 | 12 | 16 | 6 |
| Thursday | 4 | 17 | 146 | 136 | 45 | 14 | 17 | 5 |
| Friday | 4 | 17 | 143 | 131 | 41 | 14 | 14 | 4 |
| Saturday | 3 | 10 | 51 | 46 | 19 | 9 | 10 | 4 |

## Table A2: Average minutes worked by employed persons in each time slot, Monday to Friday only

| | 4-6 am | 6-8 am | 8-noon | 12-4 m | 4-6 pm | 6-8 pm | 8-12pm | 12-4 am |
|---|---|---|---|---|---|---|---|---|
| Males | 5 | 24 | 165 | 155 | 54 | 15 | 16 | 5 |
| Females | 2 | 10 | 120 | 113 | 34 | 11 | 14 | 4 |
| | | | | | | | | |
| Males, part-time | 1 | 9 | 49 | 44 | 23 | 11 | 12 | 4 |
| Males, full-time | 5 | 27 | 185 | 174 | 60 | 16 | 16 | 5 |
| Females, part-time | 2 | 5 | 60 | 51 | 13 | 8 | 9 | 3 |
| Females, full-time | 2 | 13 | 163 | 156 | 47 | 13 | 17 | 5 |
| | | | | | | | | |
| 15-24 years | 3 | 13 | 102 | 104 | 39 | 14 | 11 | 3 |
| 25-34 years | 5 | 20 | 156 | 147 | 49 | 13 | 14 | 5 |
| 35-44 years | 3 | 17 | 153 | 144 | 46 | 14 | 18 | 6 |
| 45-54 years | 4 | 20 | 154 | 144 | 47 | 14 | 16 | 4 |
| 55-64 years | 4 | 21 | 148 | 129 | 40 | 14 | 16 | 5 |
| | | | | | | | | |
| No qualifications | 6 | 25 | 137 | 123 | 39 | 14 | 17 | 8 |
| School qualifications | 3 | 17 | 133 | 127 | 42 | 13 | 13 | 3 |
| Post-school qualifications | 3 | 16 | 155 | 147 | 50 | 14 | 16 | 5 |
| | | | | | | | | |
| Pakeha | 3 | 18 | 148 | 139 | 46 | 13 | 14 | 4 |
| Mäori | 6 | 21 | 126 | 118 | 35 | 14 | 20 | 10 |
| Pacific Islander | 9 | 28 | 149 | 137 | 55 | 25 | 35 | 21 |
| Other | 3 | 10 | 132 | 133 | 51 | 17 | 21 | 1 |
| | | | | | | | | |
| Employee | 4 | 17 | 145 | 136 | 42 | 12 | 15 | 5 |
| Employer | 4 | 27 | 176 | 171 | 69 | 24 | 24 | 2 |
| Self employed (w'out employe | 5 | 22 | 141 | 134 | 53 | 15 | 14 | 2 |
| Unpaid worker in family busin | 0 | 6 | 54 | 56 | 22 | 7 | 5 | 1 |
| | | | | | | | | |
| Annual income $1-25,000 | 3 | 13 | 106 | 97 | 33 | 13 | 14 | 4 |
| Ann income $25-40,000 | 5 | 23 | 176 | 166 | 50 | 13 | 13 | 5 |
| Ann income $40,000+ | 4 | 20 | 177 | 170 | 61 | 16 | 20 | 4 |
| | | | | | | | | |
| Male, joint parent | 7 | 27 | 177 | 168 | 59 | 16 | 20 | 7 |
| Male, sole parent | 4 | 18 | 153 | 139 | 39 | 8 | 14 | 2 |
| Male, no dependent children | 4 | 23 | 157 | 146 | 51 | 15 | 14 | 4 |
| Female, joint parent | 3 | 10 | 113 | 101 | 27 | 11 | 16 | 6 |
| Female, sole parent | 1 | 6 | 96 | 93 | 23 | 6 | 7 | 3 |
| Female, no dependent childre | 2 | 11 | 127 | 123 | 40 | 12 | 13 | 3 |

## Table A3: Average minutes worked by employed persons in each time slot, Monday to Friday only

| | 4-6 am | 6-8 am | 8-noon | 12-4 m | 4-6 pm | 6-8 pm | 8-12pm | 12-4 am |
|---|---|---|---|---|---|---|---|---|
| Managerial | 0.02 | 0.22 | 2.87 | 2.81 | 1.01 | 0.27 | 0.28 | 0.02 |
| Professional | 0.05 | 0.15 | 2.67 | 2.60 | 0.84 | 0.20 | 0.33 | 0.09 |
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