7. The Correlates and Predictors of Material Well-being Amongst Older People

7.1 Introduction

The aim of this chapter is to provide an analysis of the correlates and predictors of material well-being scores amongst older people. Attention will focus on the contribution of a number of blocks of variables to variations in material well-being. These variables include:

a) current economic circumstances: Net annual income; savings and investments; accommodation costs;

b) household composition: Whether the household was a single or partnered CEU; whether other individuals lived in the household aside from the CEU;

c) exposure to current and past economic stresses; and

d) social and demographic background.

The justification for the inclusion of these variables as predictors of material well-being has been described in Chapter Two. A description of the measurement of these variables is given in Chapter Three. An account of the technical details of the modelling process is given below:

The Modelling Process

The general model fitted was:

$$Yi = B0 + \Sigma\ Bj\ Xij + \Sigma\ Bjk\ (Xij\ x\ Xik) + Ui \qquad EQ\ 1$$

where Yi was the material well-being score of the ith CEU (scaled to a mean of 100 and a standard deviation of 10), Xij were the predictor variables for the ith CEU, (Xij x Xik) a set of multiplicative interaction terms, and Ui was the disturbance of the model. (The pairwise interactions (Xij x Xik) were included into the model to detect possible non additive effects. However, these terms are only included and reported where significant interactions were found).

Although EQ1 gives a straightforward specification of a linear regression model containing multiplicative interactions, there were a number of technical issues that arose in fitting the model:

a) Sample design: The data were obtained from a sample design that was both stratified and clustered (See Chapter Three). To address these departures from simple random sampling assumptions, the STATA (StataCorp, 1999) programme **svyreg** was used.

This programme includes weighting options designed to address complex sample design.

b) Distributional assumptions: A second possible complication was that the material well-being score was not normally distributed and showed a marked skew to the left of the mean (See Figure 6.1). These departures from normality will not influence estimates of the parameters (Bj; Bjk) of the model but may lead to conservative estimates of model standard errors. In addition, bivariate regressions of material well-being on predictor variables suggested considerable heteroscedasticity in Yi. To address these issues, robust estimates of standard errors were obtained using Huber-White information sandwich estimates (Huber, 1967; White, 1980). This analysis suggested that any bias in standard errors resulting from departures from normality was negligible and, in all cases, the estimates of standard errors from normal theory estimates agreed well with the robust estimates. Since the robust estimates are more theoretically appropriate they have been reported.

Presentation of Results

To allow the reader to gain a sense of the data and the model fitting process, the analysis is presented in a series of stages with each stage of the analysis adding additional prediction information. Thus the analysis proceeds from an elementary model that is based on income and household composition to the final fitted model that includes information on a wide range of predictors and a number of interactive relationships. The model fitting process followed was:

a) First the association between mean scale scores and the X (predictor) variable of interest is tabulated. In cases where X is a continuous variable, it is categorised into a series of class intervals for the purpose of data display. The purpose of this tabulation is to give the reader a sense of the ways in which mean material well-being (Y) scores vary over the observed range of values of X. To describe the within groups variation in Y, standard deviations are provided.

b) Next a linear model is fitted including the relevant X variable(s) and theoretically relevant interaction terms. The parameter estimates (Bj; Bjk) and corresponding standard errors for the fitted model are reported and estimates of variance explained provided.

c) This process is repeated until all variables have been considered and a final model produced.

d) The model parameters of the final model are then interpreted by estimating adjusted distributions for each variable in the model. The adjusted distributions show the relationship between the predictor of interest (X) and the expected value of the response variable (Y) after the effects of the other predictors in the model have been taken into account. To permit the reader to inspect the adjusted data values, the X variables were classified into class intervals and the adjusted mean values of Y are reported for each class interval.

e) The analyses in this chapter are based on sample sizes that range from 3,013 to 2,882. This variation reflects the presence of small amounts of missing data on a number of variables. To show this sample size variation, sample Ns are quoted for all tables.

However, it is important to note that in all regression analyses, sample sizes are implicitly corrected by STATA to take account of clustering and stratification in the survey design.

7.2   Material Well-being and Net Annual Income

The first stage of the analysis of the determinants of material well-being involved consideration of the relationships between three key variables.[23]   These variables were:

1.   Material Well-being

This was measured on the material well-being scale described in the previous chapter. It will be recalled that this measure was scaled to a mean of 100 with a standard deviation of 10 and scored so that increasing scores indicated increasing material well-being.

2.   Annual Net Income [24]

This measure was based on income data (questions 72 to 112) gathered during the course of the SOP. However, the data collected in the survey did not accord with what is known from administrative information about the income of this population. Accordingly, estimates were made by Treasury representatives to take into account known information about benefit levels at the time that the SOP was undertaken and rates prevailing at this time (see Appendix 3). What this means is that although every attempt has been made to produce accurate income data, it should be kept in mind that at all times we are dealing with estimates of income. This will be taken into account when conclusions are drawn in about the relationship between income and material well-being.

3.   CEU Type

This was a two valued measure reflecting the marital/partnership status of each respondent: single (including never married; separated; widowed, divorced respondents); married/partnered (including both *de facto* and *de jure* unions).

Table 7.1 shows the sample of CEUs stratified by CEU type. For each strata and the total sample, the Table reports the association between estimated net annual income and mean material well-being. For purposes of tabulation, the data are presented in $2,000 income brackets up to $30,000 per annum with three further income brackets ($30,000-$40,000; $40,000-$50,000; $50,000+) to represent the top 16 percent of the income distribution.

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[23]   Another variable which, like income, has the potential to make a direct contribution to material well-being is home production. However, examination of the home production variable (see question 42, Appendix 1) shows that it has no significant explanatory power in relation to living standards for this population. It has, therefore, not been included in the determinants analysis described in this chapter.

[24]   Net or disposable income is used throughout the analysis

Table 7.1: Relationship between net annual income and mean material well-being for single, partnered and total population (N = 2951)

Net Annual Income ($000)	Single			Partnered			Total		
	% In Income Group	Mean Well-being	SD	% In Income Group	Mean Well-being	SD	% In Income Group	Mean Well-being	SD
<12	35.7	97.9	10.6	2.0	94.6	11.0	19.7	97.7	10.6
12-14	31.4	98.8	10.0	0.7	96.8	7.1	16.8	98.8	9.9
14-16	10.0	100.3	10.4	2.4	91.5	12.6	6.4	98.7	11.3
16-18	5.6	100.0	11.2	16.1	96.3	9.8	10.6	97.3	10.3
18-20	3.8	101.2	8.3	24.8	99.0	7.2	13.8	99.3	7.4
20-22	2.8	101.4	12.2	7.5	98.5	8.3	5.0	99.3	9.5
22-24	1.6	103.0	7.7	7.1	101.3	7.2	4.2	101.3	7.3
24-26	1.7	107.3	4.1	4.4	102.5	7.3	3.0	103.9	6.9
26-28	1.2	106.0	4.9	4.1	99.8	10.3	2.6	101.3	9.8
28-30	1.1	106.6	4.4	3.7	102.6	7.5	2.3	103.6	6.9
30-40	2.7	105.3	6.9	10.0	103.8	6.8	6.2	104.1	6.8
40-50	0.9	107.7	4.6	6.5	105.4	7.5	3.6	105.8	7.2
50+	1.4	109.4	6.0	10.8	108.5	4.9	5.9	108.6	5.0

The data in Table 7.1 show that for both single and partnered CEUs there were clear tendencies for mean scale scores to increase with increasing income. Amongst the single group those with a net annual income of over $50,000 had mean scale scores that were 11.5 points (1.15 standard deviations) higher than those with income less than $12,000 per annum. Similarly, among partnered CEUs those with a net annual income of over $50,000 had mean scores that were 13.9 points (1.39 standard deviations) higher than those with incomes less than $12,000. It is also evident that, at all income levels, the partnered group had lower mean scale scores than the corresponding single group. This difference reflects the effects of household size on the relationship between income and material well-being. Finally, the table shows that with increasing income the rate of change in mean material well-being tends to reduce. This property suggests that the relationship between income and scale score was not linear.

To represent the association between income and material well-being the sample was stratified by CEU type and two separate models fitted to each strata. The first model assumed that scale scores were linearly related to net annual income whereas the alternative model assumed that scale scores were linearly related to the (base 10) logarithm of income.

Table 7.2 reports on:

1.   The intercept (B0) and slope parameters (B1) for each model.

2.   The standard errors (SE) of the model parameters.

3.   The correlation between the income and scale score for each model.

Table 7.2:   Models of the relationship between net annual income and material well-being for single and partnered CEUs[1]

a) Single (N = 1545)

Income ($000 pa)	B0	SE	B1	SE	r
Untransformed	95.664	.637	.259	.034	.22
Log_{10} units	81.574	1.863	15.715	1.544	.24

b) Partnered (N = 1406)

Income ($000 pa)	B0	SE	B1	SE	r
Untransformed	95.770	.467	.165	.012	.39
Log_{10} units	77.260	1.522	16.697	1.010	.41

Note 1: All coefficients are significantly different (p<.001) from zero.

This analysis leads to the following conclusions:

1.   For both strata the correlation coefficients show that the model using the logarithm of income is a somewhat better predictor of material well-being than the linear model.

2.   However, there are marked differences between the two strata in the extent of prediction of material well-being. For single CEUs, the correlation between log income and material well-being was 0.24 (p <.001) whereas for partnered CEUs the correlation was 0.41 (p<.001). The estimate for single CEUs implies that variations in income explained 6 percent of the variation in living standards whereas the results for partnered CEUs imply that variations in income explained 17 percent of the variation in living standards. These

differences in predictive power appear to reflect differences in the variability of income in the single and partnered series. As described in Chapter Four, for the single series, the majority (75 percent) of income values lie within a very narrow range from <$10,000 to $15,300 pa. In contrast, the variation in income for partnered CEUs is far wider with 75 percent of values lying within the range from <$12,000 to $32,500.

3.   Inspection of the model parameters for the $\log_{10}$ income model suggests clear differences between the intercept values (81.57 versus 77.26) but relatively similar slope values (15.72 versus 16.70). These observations raise the issue of the extent to which the relationship between income and material well-being differs for single and married people. One means of testing similarities in the relationship for single and partnered CEUs is to fit the model:

$$Y_i = B0 + B1\ (Log_{10}Inc_i) + B2\ (Status_i) + B3\ (Log_{10}Inc_i.Status_i) + U_i \qquad\qquad EQ2$$

where Y_i is the material well-being of the ith CEU; $Log_{10}Inc_i$ is the log value of annual income for the ith CEU and Status is a dummy variable that assumes the value 0 if the ith CEU is single and 1 if the CEU is partnered. It may be shown (Kleinbaum & Kupper, 1978) that the parameters of this model lead to a series of tests of the equality of regression parameters for the single and partnered groups:

1.   If $B2 = B3 = 0$ then the relationship between income and material well-being can be described by the same model for single and partnered CEUs.

2.   If $B2 \neq 0$; $B3 = 0$ then the relationship between income and material well-being can be described by a model in which the intercept varies with partnership status but there is a common slope.

3.   If $B2 \neq 0$; $B3 \neq 0$ then both slopes and intercept values vary with partnership status.

Table 7.3 reports on F tests of the null hypotheses: a) The relationship between ($\log_{10}$) income and material living standards fits a coincidence model in which both the intercepts and slopes are equal for single and partnered CEUs; and b) the relationship between ($\log_{10}$) income and material living standards is described by a model in which the intercept terms vary with CEU status but there is a common slope. The results in Table 7.3 lead to a clear rejection of the hypothesis that the regression line is coincident for single and partnered CEUs but the hypothesis that the slope of the regression line is the same for both groups cannot be rejected.

These results suggest that the most parsimonious model to describe the relationship between ($\log_{10}$) annual income and mean material well-being is one in which: a) the relationship between ($\log_{10}$) annual income and material well-being is linear; b) the intercepts of the linear model vary for single and partnered CEUs; and c) the slope of the linear function is the same for single and partnered CEUs.

Table 7.3: Tests of parallelism and coincidence of the ($\log_{10}$ income) regression lines for single and partnered CEUs (N = 2951)

Test	F	Df	p
Parallel slopes	.28	1, 2946	>.50
Coincident regression lines	29.76	2, 2946	<.0001

The final fitted model (with standard errors in parentheses) was:

$$Y_i = 80.831 + 16.361 \, (Log_{10}Inc_i) - 3.101 \, (Status_i)$$
$$(1.067) \quad (.852) \quad\quad\quad (.432)$$

This model implies that the regression lines for single and partnered CEUs had different intercepts but a common slope:

$$Y_i = 80.831 + 16.361 \, (Log_{10}Inc_i) \quad \text{(if single)}$$
$$Y_i = 77.730 + 16.361 \, (Log_{10}Inc_i) \quad \text{(if partnered)}$$

Figure 7.1 shows the fitted regression lines for single and partnered CEUs. The key features of the fitted curves are: a) the curve for single CEUs has a higher intercept value than the curve for married CEUs showing that, for any given value of income, single CEUs have greater material well-being than their partnered counterparts *(for the obvious reason that a given income is supporting one person rather than two)*; and b) the relationship is logarithmic so that for both single and partnered CEUs, increasing income is associated with diminishing gains on our scale of material well-being.

Figure 7.1:   Fitted models of net annual income and expected material well-being for single and partnered CEUs

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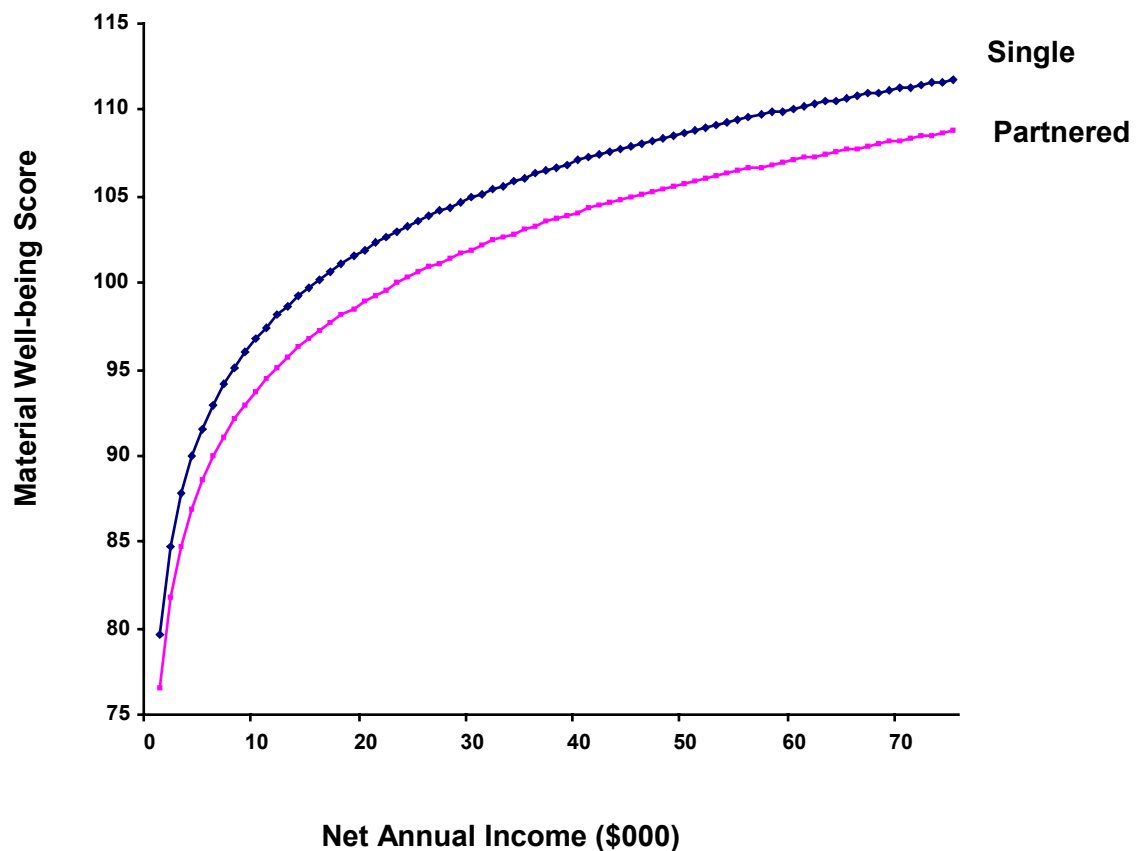
7.3   Deriving an Estimate of Income Equivalence

An important policy question in the area of income maintenance concerns the issue of income equivalence (Citro & Michael, 1995). One way of stating this issue is to ask the question:

Given that partnered individuals receive a benefit payment of $X at what level should the corresponding payment for single individuals be set to ensure that both partnered and single respondents experience, on average, the same level of material well-being?

Typically, this question has been addressed by estimating or proposing a coefficient that scales partnered income to an equivalent single value. For example, currently the New Zealand benefit system sets the benefit for a single person living alone at 65 percent of the married benefit. This method of assigning equivalence income assumes that the relationship between single income X^s and partnered income X^p is given by:

$$X^s = k \, X^p \hspace{4cm} EQ3$$

where k is some coefficient (k<1) that scales partnered income (X^p) to an equivalent single income value (X^s) .

An interesting feature of the model of income and material well-being developed above is that it leads readily to both an estimate of k and its confidence interval. The derivation of k and its confidence interval is given below.

First consider the model:

$$Y_i = B0 + B1 \, Log_{10}X_i + B2 \, S_i + U_i \hspace{2cm} EQ4$$

where Y_i is the material well-being score of the ith CEU, $Log_{10}X_i$ is the log to the base 10 of the ith CEU's net annual income, S_i is a dummy variable that is scored 0 if the CEU is single and 1 if the CEU is partnered and U_i is the disturbance of the model.

Subject to B1, B2 being non zero, the model in EQ4 implies that the regression lines for married and partnered CEUs have different intercepts but the same slope. This follows since EQ4 may be written as:

$$Y_i = B0 + B1 \, Log_{10}X_i + U_i \hspace{2cm} (if \; S_i = 0) \hspace{1cm} EQ5$$
$$Y_i = B0 + B2 + B1 \, Log_{10} \, X_i + U_i \hspace{1.3cm} (if \; S_i = 1) \hspace{1cm} EQ6$$

Given the above, the conditions under which single and married CEUs have the same expected level of material well-being is:

$$E (Y_i^s \mid Log_{10}X_i^s) = E (Y_i^p \mid Log_{10}X_i^p) \qquad\qquad EQ\ 7$$

where X_i^s is any value of net annual income for a single CEU and X_i^p is the corresponding value of income for a partnered CEU that leads to the same expected level of material well-being. Expressing EQ7 in terms of EQ5, EQ6 gives:

$$B0 + B1\ Log_{10}X_i^s = B0 + B2 + B1\ Log_{10}X_i^p \qquad\qquad EQ8$$

Re-arranging terms EQ8 may be written as:

$$Log_{10}X_i^s - Log_{10}X_i^p = (B2/B1) \qquad\qquad EQ9$$

EQ9 may also be written as:

$$(X_i^s/X_i^p) = k = 10^{(B2\ /\ B1)}$$

Since the estimate of k is a ratio of regression coefficients, it proves possible to obtain an estimate of the confidence interval of k using the so called delta method (Agresti, 1990). Applying these formulae to the known values of B1, B2 and the variances and covariances of these parameters gave a value of k = .65 with a 95 percent confidence interval of (.58-.71).

A problem with the estimate above is that it fails to take account of heterogeneity amongst single CEUs. In particular, single CEUs can be divided into those in which the older person lives alone and those in which the older person lives with others. This distinction has been recognised in current policy with single people living alone entitled to receive 65% of the married rate and those living with others receiving 60% of the married rate. This policy implies the existence of different income equivalence values for: a) single CEUs living alone; and b) single CEUs living with others.

It proves to be straightforward to generalise the estimate of equivalence income derived above to produce estimates of equivalence values for: a) single CEUs living alone relative to married CEUs; b) single CEUs living with other relative to married CEUs. These estimates may be obtained from the model:

$$Y_i = B0 + B1\ (Log_{10}\ income_i) + B2\ (Status_i) + B3\ (Household_i) + U_i$$

where Yi, income and status are defined as previously and household is a dichotomous variable that is scored 1 if the individual is in a single CEU living with others and 0 otherwise. From this model, estimates of the equivalence of single living alone relative to partnered CEUs is given by the ratio B2/B1 and the equivalence of single living with others relative to partnered CEUs is given by the ratio B3/B1. Table 7.4 shows estimates of these equivalence values and their 95% confidence intervals. The Table shows that for those single living alone, the value of the income equivalence coefficient is 0.65 (95% CI = .58 to .71) and for those living with others 0.63 (95% CI = 0.46 to 0.77).

These point estimates demonstrate one way in which the material well-being scale measure developed in Chapter Five can be used to investigate equivalence scales. The values derived above (65% and 63%) are very close to the equivalences for the current NZS rates (65% and 60%). However, caution is needed about interpreting these results as there is a relatively large margin of error around them and because there are a range of different views about the most appropriate way to set relativities for NZS. [25]

Table 7.4:   Estimated income equivalence coefficients for: a) single CEUs living alone; and b) single CEUs living with others relative to partnered CEUs

Income Equivalence	Coefficient	95% Confidence Interval
Single living alone/married	.65	.58 -.71
Single living with others/married	.63	.46 -.77

7.4   Material Well-being and Current Economic Circumstances

The results in the preceding section examined the way in which material well-being was related to the respondent's current income level. This section extends the analysis to examine the linkages between material well-being scores and two measures of current economic circumstances in addition to the measure of net annual income. These measures are savings and investments and accommodation costs.

In relation to accommodation, both accommodation costs and home ownership were considered in the analysis. Both were found to have significant associations by themselves, but the accommodation cost variable had the stronger association and ownership was found not to provide further useful predictive information about material well-being.

1.   Savings and Investments

As part of the SOP, respondents were asked to give an estimate of the total value of their savings and investments including: bank deposits; shares, bonds and debentures; endowment policies; family trusts; money owed to the respondent; residential property (other than family home); commercial property; business ownership or investment; and other assets (excluding household effects). (See questions 113 to 114 and Tables 4.10, 4.11). A limitation of the data collected on savings/investments was that in 420 cases (14 percent) the data on assets was missing. Further data was not missing completely at random since no data was missing for those subjects who did not have savings and investments. Since the loss of over 400 cases would have diminished the precision of the

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[25]   It has been suggested to us that the equivalence income estimates should have been calculated from the regression model in Table 7.11 which takes account of all variables rather than from the regression model that involved only income and partnership status. We note that the approach we have taken is appropriate given our aim is to estimate the income equivalence for the actual populations of single CEUs and partnered CEUs studied in this research. What the estimates based on Table 7.11 would produce is an estimate of income equivalence for hypothetical populations in which single CEUs and partnered CEUs had the same: savings and investments; accommodation costs; exposure to economic stress; and demographic background. This would result in an income equivalence estimate for these hypothetical populations that may not apply to the population of older people that was actually studied. On the other hand, the equivalence estimate based on income and partnership status provides a direct estimate of the amount of income that single CEUs need, on average, to achieve the same expected level of material well-being as partnered CEUs.

analysis, remedial action was taken to obtain estimates of the missing observations. These observations were estimated using the STATA programme **impute** (StataCorp, 1999). This programme uses the known values of other observations to obtain regression estimates of the missing observations. In this case, variables employed in the imputation process included: the number of types of savings and assets reported, income, partnership status, age, education, ethnicity, region, economic adversity, financial stress, health problems and disabilities (see Chapter Four for a description of these measures). The STATA manual notes *"estimates may be biased because any variable imputed by **impute** is only an estimate of the unknown true value ..... Usually the bias is toward zero meaning that the effect of the variable will be under-estimated"*.

To examine the extent to which the use of imputed values for savings/assets changed regression estimates, the results of analyses including the imputed values and excluding these values were compared. This comparison showed negligible changes in parameter estimates before and after the inclusion of imputed values suggesting that any bias caused by the use of imputed values for missing data was likely to be small.

2. Accommodation Costs

Respondents were asked to provide an estimate of the amount (if any) they paid per week in accommodation costs including: mortgage repayments; rental; board; and body corporate fees (see questions 49 to 67).[26]

Table 7.5 shows, for single and partnered CEUs and the total sample, the relationship between mean material well-being and estimates of savings/investments and accommodation costs. The table shows that:

1. With increasing savings and investments there were clear changes in levels of material well-being. Among single CEUs those with savings and investments of over $300,000 had mean material well-being scores that were 16.6 points (1.66 standard deviations) higher than those who had no savings or assets. Amongst partnered CEUs those having savings and assets in excess of $300,000 had mean material well-being scores that were 14.7 (1.47 standard deviations) higher than those who had no saving or assets.

2. With increasing accommodation costs there were clear reductions in material well-being scores. Amongst single CEUs those paying $150 or more per week in accommodation costs had mean material well-being scores that were 8.0 points (.80 standard deviations) lower than those not paying these costs. Amongst partnered CEUs those paying $150 or more per week in accommodation costs had mean material well-being scores that were 10.5 (1.05 standard deviations) lower than those not paying these costs.

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[26] Note that the estimate of accommodation costs used here does not include rates. The reason for this is that in preliminary analysis it was found that the amount spent on rates was associated with increasing material well-being, whereas other components of accommodation cost were negatively correlated with well-being.

Table 7.5: Mean material well-being by savings and accommodation costs for single and partnered CEUs (N = 2971)

Measure	Single			Partnered			Total		
	% of Sample in Group	Mean Well-being	SD	% of Sample in Group	Mean Well-being	SD	% of Sample in Group	Mean Well-being	SD
Savings and Investments ($000)									
None	18.3	92.0	14.5	12.3	92.8	11.6	15.5	92.3	13.4
≤10	30.9	98.1	10.2	18.6	96.8	8.6	25.0	97.7	9.7
10-25	18.6	101.0	7.4	13.6	100.2	7.7	16.2	100.7	7.5
25-50	9.7	103.3	6.1	13.6	100.6	7.4	11.6	101.8	6.9
50-100	10.6	103.0	6.2	14.9	102.7	6.5	12.6	102.8	6.3
100-200	5.9	104.7	6.1	11.9	104.5	6.7	8.8	104.6	6.5
200-300	2.7	105.5	4.1	5.2	104.8	6.9	3.9	105.0	6.1
300+	3.3	108.6	4.4	9.8	107.7	5.8	6.4	108.0	5.5
Accommodation costs ($ per week)									
None	78.2	101.3	8.2	87.0	101.5	8.1	82.4	101.4	8.1
<$50	5.3	98.0	9.1	3.1	101.2	9.6	4.2	99.1	9.4
$50-$99	7.4	93.8	15.7	2.8	92.5	10.1	5.2	93.5	14.4
$100-$149	5.4	89.2	15.7	3.3	94.1	9.9	4.4	90.9	14.1
$150+	3.7	93.3	17.1	3.8	91.0	15.8	3.8	92.2	16.4

To examine the relationships between accommodation costs, savings/investments and material well-being for single and partnered respondents, alternative regression models were fitted to the data. The first model assumed linear relationships between the variables and the alternative model assumed that material well-being varied with the (base 10) logarithm of savings/investments or accommodation costs. The results of these analyses, summarised in Table 7.6, suggest that scaling savings and investments, or accommodation costs in log units led to increased predictive precision in all analyses. In view of these findings, both savings/investments and accommodation costs were scored in Log_{10} units.

Table 7.6:   Models of material well-being, savings/investments, accommodation costs for single and partnered CEUs

<u>**Single**</u> **(N = 1557)**

i) Savings/Investments

Model	B0	SE	B1	SE	R
Linear	97.90	.36	.037	.003	.28
Log_{10}	98.46	.34	2.41	.21	.40

ii) Accommodation Costs

Model	B0	SE	B1	SE	R
Linear	100.95	.29	-.066	.01	-.30
Log_{10}	101.32	.29	-4.26	.52	-.32

<u>**Partnered**</u> **(N = 1422)**

i) Savings/Investments

Model	B0	SE	B1	SE	R
Linear	97.98	.34	.030	.002	.39
Log_{10}	98.14	.37	2.44	.19	.44

ii) Accommodation Costs

Model	B0	SE	B1	SE	R
Linear	101.27	.28	-.044	.01	-.24
Log_{10}	101.61	.27	-4.01	.54	-.29

Bringing together the findings on economic measures suggests that in the case of current income, savings/investments and accommodation costs, variations in levels of material well-being were related to each of these variables by a model in which levels of material well-being varied with the logarithms of these variables. However, it is clear that income, savings/investments and expenditure on accommodation costs are likely to be correlated variables.

To take account of the intercorrelations of these variables, the analysis was extended to fit the model:

$$Yi = B0 + B1\ X1i + B2\ X2i + B3\ X3i + B4\ Si + B5\ (X1i.Si) + B6\ (X2i.Si) + B7\ (X3i.Si) + Ui$$

where X1i; X2i; X3i were the log (base 10) values of net annual income; savings and investments; weekly accommodation costs and Si was a dummy variable that assumed the value 0 if the respondent was single and the value 1 if the respondent was partnered. The terms (X1i.Si); (X2i.Si); (X3i.Si) denote interactions between the respondent status variable Si and the variables X1i, X2i, X3i. Initial model fitting showed all interaction terms to be non significant. For this reason, a main effects model was fitted to the data. The results of this analysis are shown in Table 7.7.

This Table shows that all variables entered into the model made statistically significant (p<.005) net contributions to variations in material well-being. The overall multiple correlation between the variables in the model and material well-being was .50 implying that the factors in the model explained 25% of the variance in the material well-being score.

Table 7.7: Model of material well-being using income, savings/investments, accommodation costs and partnership status as predictor (N = 2910)

Predictor	B	SE	P
Intercept	87.16	1.02	<.0001
CEU Type	-3.21	.42	<.0001
Log_{10} Income	11.25	.89	<.0001
Log_{10} Savings/investments	1.58	.15	<.0001
Log_{10} Accommodation costs	-2.99	.35	<.0001
Adjusted R^2 = .25; p<.0001			

7.5   Material Well-being and Economic Life Events

A set of factors that may influence material well-being, independently of the financial and health factors discussed previously, relates to the family's exposure to economic adversities both prior to and following retirement. It is easy to imagine the way in which unanticipated economic problems and losses may disrupt the family's level of material well-being during retirement. To examine the role of such stresses on levels of material well-being two measures describing exposure to economic stress were collected during the course of the SOP. These measures were:

1. **Exposure to adverse economic circumstances during the period from 50-59 years**

   The first measure was based on a series of questions about whether the respondent (or partner, if relevant) had been exposed to a series of life events that may have influenced their economic circumstances adversely. These events included: separation or divorce; mortgagee sale of the respondent's home; bankruptcy; a financial loss of $10,000 or more; being made redundant; becoming unemployed; losing a partner; major damage to the respondent's home and other related items (see question 124 and Table 4.15). To provide a measure of the

CEU's exposure to adverse events, the items were summed to give a count of the number of adversities reported.

2. Exposure to recent economic stresses

In addition, respondents were ask whether in the last year they had experienced a number of financial stresses (see question 125 and Table 4.16). A measure of the CEU's exposure to recent economic adversity was obtained by summing the number of adverse economic circumstances reported.

Table 7.8 shows the relationship between mean material well-being scores and measures of recent economic adversity and previous adverse circumstances. The table shows:

1. Reports of exposure to increasing recent economic stress were associated with declining living standards. Those reporting 3 or more recent stresses had mean material well-being scores that were 12.9 points (1.29 standard deviations) lower than those reporting no recent stresses.

2. Reports of financial adversity during the period from 50-59 years were also related to declining material well-being with those reporting 4 or more past difficulties having mean material well-being scores that were 12.4 points (1.24 standard deviations) lower than those not reporting exposure to adversity during the period from 50-59.

More generally, the results in Table 7.8 suggest that exposure to both past and current economic adversity was associated with reduced levels of material well-being. To incorporate these results into the analysis, the regression model was extended to include both the measures of past and current economic stress and partnership by economic stress interaction terms. The final fitted model is shown in Table 7.9. This Table shows that both current and past economic stresses were significant predictors of material well-being. There was also a significant interaction between partnership status and past economic stress. This interaction reflected the fact that past stresses had a greater effect on the material well-being of single respondents. The multiple correlation for the model was .61 implying that the variables in the model explained 37% of the variance in material well-being

Table 7.8: Mean material well-being score by measures of economic adversity (N = 3013)

Measure	Single			Partnered			Total		
	% of Sample in Group	Mean Well-being	SD	% of Sample in Group	Mean Well-being	SD	% of Sample in Group	Mean Well-being	SD
Number of financial stressors (past 12 months)									
None	73.3	101.1	8.9	76.7	102.3	7.5	74.9	101.7	8.3
1	18.3	96.9	10.8	17.3	96.1	10.9	17.8	96.5	10.8
2	5.5	92.0	17.3	4.2	91.3	12.2	5.0	91.7	15.3
3+	2.7	88.8	16.7	1.8	88.8	9.8	2.3	88.8	14.3
Adverse economic life events (age 50-59)									
None	57.6	100.8	9.3	62.0	101.5	8.3	59.7	101.2	8.8
1	26.0	100.1	10.0	25.6	100.1	10.0	25.8	100.1	10.0
2	9.6	98.2	9.1	7.6	97.5	9.4	8.7	97.9	9.2
3	4.4	87.2	16.1	3.6	97.7	11.3	4.1	91.7	14.9
4+	2.3	87.9	19.7	1.2	90.9	12.9	1.7	88.8	17.4

Table 7.9: Regression model for material well-being extended to include measures of adverse economic life events (N = 2910)

Predictor	B	SE	p
Intercept	90.56	.99	<.0001
CEU Type	-4.42	.45	<.0001
Current Economic Circumstances			
Log_{10} Net annual income ($000)	10.98	.84	<.0001
Log_{10} Savings/investments ($000)	1.44	.13	<.0001
Log_{10} Accommodation costs ($ per week)	-2.80	.31	<.0001
Adverse Economic Life Events			
Number of financial stressors (past 12 months)	-3.30	.34	<.0001
Number of adverse life events (age 50-59 years)	-2.51	.35	<.0001
CEU type x number of adverse life events	1.51	.44	<.001

Adjusted R^2 = .37; p<.0001

7.6   Demographic and Related Factors

The final block of variables considered in the analysis involved a series of social and demographic factors that may have influenced levels of material well-being. These factors included:

1. Respondent age[27]

2. Respondent ethnicity[27]

This was based on the self reported ethnic status of the respondent.

3. Family socio-economic status

This was coded using the New Zealand Socioeconomic Index of Occupational Status (NZSEI) (Davis, McLeod, Random, & Ongley, 1997) applied to the last full time occupation of the respondent and/or partner during the interval from age 50-59 years. The NZSEI gives a numerical score (ranging from 10-90) that ranks the population from low to high socio-economic status. In order to minimise the potential for missing data on this measure the NZSEI score assigned to the CEU was based on the maximum NZSEI score reported for the respondent or their partner. Even using this assignment rule 8.8 percent of CEUs could not be assigned an NZSEI score because neither the respondent nor their partner had been in a full time job in their 50's.

4. Respondent education[27]

This was based on reports of the highest educational qualification obtained by the respondent.

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[27] In all cases the age, ethnicity, and educational level of the CEU were assessed from the report describing the respondent.

5. Area of residence[28]

This was based on whether the CEU was resident in the Auckland region or some other part of New Zealand.

Table 7.10 shows the relationship between these factors and mean material well-being for both single and partnered respondents. The results in this table show:

1. Age

With increasing age, there were corresponding increases in mean material well-being scores. Amongst single CEUs, those aged over 80 had mean material well-being scores that were 6.9 points (.69 standard deviations) higher than those aged 60-65, whereas amongst partnered CEUs, those over 80 had mean material well-being scores that were 2.8 points (.28 standard deviations) higher than those aged 60-65. The finding that material well-being improves with increasing age appears somewhat counter intuitive since one might expect that material well-being would decline with increasing age. However, the findings here appear to be robust to the extent that the same result was reported in the 1974 survey of the aged (DSW, 1975).

2. Ethnicity

The results show that for, both single and partnered CEUs, there were marked differences between the mean material well-being of Māori or Pacific respondents and other New Zealanders. These differences clearly mirror the well documented differences in the levels of economic well-being of New Zealanders of differing ethnicity.

3. Socio-economic status

Lower socio-economic status was generally associated with lower material well-being for both single and partnered respondents.

4. Educational levels

In addition, there was clear evidence to suggest that increasing educational attainment was associated with increases in levels of material well-being for both single and partnered respondents. It is interesting that education has this effect even for these generations for whom education may not have been considered as necessary as it is today.

5. Residence in Auckland

There was some evidence to suggest that single CEUs resident in the Auckland region had lower material well-being than others.

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[28] In preliminary analyses of regional variations in material well-being the only consistent regional difference detected was for single CEUs resident in Auckland to have lower material well-being than other CEUs.

Table 7.10: Mean material well-being scores by demographic factors (N = 2984)

Measure	Single			Partnered			Total		
	% of Sample in Group	Mean Well-being	SD	% of Sample in Group	Mean Well-being	SD	% of Sample in Group	Mean Well-being	SD
Respondent's Age (years)									
65-69	19.8	95.2	13.8	42.6	99.5	10.1	30.6	98.1	11.7
70-74	23.3	98.5	12.1	29.6	100.7	8.3	26.4	99.6	10.3
75-79	25.0	100.4	8.4	17.4	101.8	8.3	21.4	100.9	8.4
80+	31.7	102.1	7.2	10.4	102.3	8.1	21.6	102.2	7.4
Respondent's Ethnicity									
Māori	2.8	87.1	15.5	2.6	91.7	12.3	2.7	89.2	14.1
Pacific peoples	1.6	81.5	21.8	1.2	83.5	15.0	1.5	82.4	19.0
Other	95.5	100.1	9.6	96.1	101.0	8.6	95.8	100.6	9.1
NZSEI (score)									
10-29	12.4	98.7	11.5	12.2	101.0	9.2	12.3	99.8	10.6
30-39	13.6	95.9	11.8	10.3	96.3	8.7	12.0	96.1	10.5
40-49	23.8	100.9	7.7	24.1	99.1	9.2	24.0	100.0	8.5
50-59	18.9	99.7	11.8	23.7	101.0	8.8	21.2	100.4	10.3
60-69	10.6	100.4	11.2	12.5	101.2	9.3	11.5	100.8	10.3
70+	6.9	103.0	9.7	14.0	103.9	7.8	10.3	103.6	8.6
No score assigned[1]	13.7	98.4	10.6	3.3	102.0	10.4	8.8	99.0	10.7

Table 7.10 continued

Measure	Single			Partnered			Total		
	% of Sample in Group	Mean Well-being	SD	% of Sample in Group	Mean Well-being	SD	% of Sample in Group	Mean Well-being	SD
Respondent's Highest Educational Qualification									
No formal qualifications	65.5	98.8	10.3	57.5	99.2	9.0	61.7	99.0	9.7
School/trade qualifications	25.0	99.6	12.4	31.1	101.4	9.2	27.9	100.6	10.9
Tertiary technical/ undergraduate qualification	6.5	103.6	6.7	5.5	104.0	7.4	6.0	103.8	7.0
University degree	3.0	104.7	6.8	5.9	105.8	9.6	4.4	105.4	8.7
Resident of Auckland									
No	75.5	100.1	9.4	75.7	100.8	8.3	75.6	100.3	8.9
Yes	24.5	97.4	16.2	24.3	100.5	13.4	24.4	99.0	15.1

Note 1: Not working full-time

Whilst the results in Table 7.10 show that a number of social background factors were associated with material well-being, these results do not take into account the fact that variables such as age, ethnicity, socio-economic status, educational level and related factors are likely to be correlated with other predictors of material well-being including current economic circumstances and previous economic history. To address this issue, the regression model was extended to include measures of the demographic factors reported in Table 7.11 as additional predictor variables. In addition, the analysis examined possible interactions between partnership status and these variables.

Table 7.11: Fitted regression model incorporating demographic factors (N = 2882)

Predictor	B	SE	P
Intercept	74.26	2.56	<.0001
CEU Type	-3.92	.44	<.0001
Current Economic Circumstances			
Log_{10} Net annual income ($000)	10.81	.85	<.0001
Log_{10} Savings/investments ($000)	1.31	.13	<.0001
Log_{10} Accommodation costs ($ per week)	-2.46	.28	<.0001
Adverse Economic Life Events			
Number of financial stressors (past 12 months)	-3.07	.32	<.0001
Number of adverse economic events (age 50-59 years)	-2.23	.35	<.0001
CEU type x number of adverse economic life events	1.46	.44	<.001
Demographic Factors			
Age	.19	.03	<.0001
Ethnicity - Māori	-5.60	1.52	<.001
- Pacific peoples	-6.12	2.19	<.005
Socio-economic status[1] - NZSEI score	.030	.011	<.01
- no score assigned	1.71	.68	<.05
Educational qualifications	.45	.19	<.05
Single CEU, resident of Auckland	-2.20	.68	<.005

Adjusted R^2 = .40; p<.0001

Note 1:   In the regression equation the NZSEI score was entered as a continuous variable with those who did not have an NZSEI score assigned because neither partner had a full time job arbitrarily coded to the lowest value of the NZSEI (10). The regression also included a binary (0/1) indicator variable for those who were not working full time to allow for departures from this arbitrary coding.

The final fitted model is shown in Table 7.11. This Table shows that of the additional factors considered, age, ethnicity, education and socio-economic status made significant (p<.05) contributions to the model. In addition, the analysis detected a small interactive effect that appeared to be relevant to single CEUs but not partnered CEUs. Specifically, when all other factors were taken into account, single CEUs had slightly lower material well-being than other CEUs if they were resident in Auckland.

The final fitted model suggests that variations in material well-being were predicted by a complex set of factors that included current economic circumstances (income, savings/investments, accommodation costs), exposure to past and present economic stress, age, ethnicity, socio-economic status, household composition and region. The squared multiple correlation between these risk factors and material well-being was .40 implying that, collectively, these factors explained 40 percent of the variability in material well-being.

The final prediction model for material well-being reported in Table 7.10 is the result of a detailed analysis of a wide range of potential risk factors, not all of which have been discussed in this chapter. Variables considered for inclusion that have not been discussed and which were found not to make significant contributions in the final model included: value of own home, number of children (ever) in family, currently having dependent children, gender (single CEUs only), frequency of family contact, family support, level of home production, and country of origin.

7.7 Interpreting the Results

7.7.1 Adjusted Scores

The parameters in Table 7.11 have the usual interpretation of regression parameters: the expected change in Y for a one unit shift in X. However, for a number of reasons the interpretation of these parameters may pose problems. These reasons include:

1. A number of variables (income; savings/assets; accommodation costs) have been transformed to log values and the interpretation of log values proves to be more complex than that of untransformed values.

2. In other cases (eg, partnership status; ethnicity) variables are categorical and the regression coefficients need to be interpreted according to the scoring used to represent these categorical variables.

3. Finally, although the model parameters define the slope of regression lines, they do not fully describe the distribution of the expected value of Y over the range of the observed value of X.

To address these problems of interpretation and to provide the reader with a handy method for interpreting the model results, adjusted score estimates were computed. The adjusted value of Y for the jth level of variable Xi given the other covariates Xk is given by:

$$E(Y|Xi = j;\ \overline{X}k) =\ B0 + j\,Bi + \Sigma\,(\overline{X}k)$$

where $\overline{X}k$ is the mean of the kth covariate. The adjusted score thus has the interpretation of being the expected value of Y when Xi = j and when all other variables Xk are held constant at their mean value.

Table 7.12 shows the adjusted score distributions for single, partnered and all respondents. In this Table, continuous variables have been grouped into a series of class intervals and the adjusted scores quoted are the mean of the adjusted scores for all those individuals who were members of the class interval. The advantage of this presentation is that the reader can readily see the ways in which changes in a given factor are associated with changes in X. For example, the Table shows that single respondents with an income of less than $12,000 have an adjusted mean score of 99.6 compared to an adjusted mean of 107.7 for those with incomes of greater than $50,000. Since the material well-being variable is scored to have a standard deviation of 10, this difference translates to a .8 standard deviation difference between those with incomes of less than $12,000 and those with incomes of greater than $50,000.

Table 7.12: **Comparison of unadjusted and adjusted mean material well-being scores for all significant factors in final regression model (N = 2882)**

Predictor	Single		Partnered		Total	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Net Annual Income ($000)						
<12	98.4	99.6	94.6	93.7	97.7	97.6
12-14	98.8	100.2	96.8	96.5	98.8	98.3
14-16	100.3	101.0	91.5	97.3	98.7	99.2
16-18	100.0	101.6	96.3	97.7	97.3	99.7
18-20	101.2	102.2	99.0	98.2	99.3	100.2
20-22	101.4	102.7	98.5	98.7	99.3	100.8
22-24	103.0	103.1	101.3	99.1	101.3	101.2
24-26	107.3	103.5	102.5	99.6	103.9	101.6
26-28	106.0	103.8	99.8	99.9	101.3	101.9
28-30	106.6	104.1	102.6	100.2	103.6	102.3
30-40	105.3	104.9	103.8	101.0	104.1	103.1
40-50	107.7	106.3	105.4	102.3	105.8	104.4
50+	109.4	107.7	108.5	104.8	108.6	106.7
Savings/Investments ($000)						
None	92.0	97.5	92.8	93.6	92.3	95.7
<10	98.1	101.7	96.8	97.7	97.7	99.8
10-25	101.0	102.8	100.2	98.8	100.7	100.9
25-50	103.3	103.2	100.6	99.2	101.8	101.3
50-100	103.0	103.6	102.7	99.7	102.8	101.7
100-200	104.7	103.9	104.5	100.0	104.6	102.1
200-300	105.5	104.2	104.8	100.3	105.0	102.3
300+	108.6	104.5	107.7	100.6	108.0	102.6

Predictor	Single		Partnered		Total	
	Unadjusted	**Adjusted**	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**
Accommodation costs ($ per week)						
None	101.3	102.9	101.5	98.9	101.4	101.0
<$50	98.0	99.5	101.2	95.9	99.1	97.7
$50-$99	93.8	98.3	92.5	94.4	93.5	96.4
$100-$149	89.2	97.7	94.1	93.8	90.9	95.9
$150+	93.3	97.2	91.0	93.3	92.2	95.3
Number of financial stressors (past 12 months)						
None	101.1	103.1	102.3	99.2	101.7	101.3
1	96.9	100.1	96.1	96.1	96.5	98.2
2	92.0	97.0	91.3	93.1	91.7	95.1
3+	88.8	92.9	88.8	89.0	88.8	91.0
Adverse economic life events (age 50-59)						
None	100.8	103.1	101.5	99.1	101.2	101.2
1	100.1	100.8	100.1	98.4	100.1	99.6
2	98.2	98.6	97.5	97.6	97.9	98.0
3	87.2	96.4	97.7	96.8	91.7	96.4
4+	87.9	93.2	90.9	95.7	88.8	93.3
Respondent's Age (years)						
65-69	95.2	100.7	99.5	96.7	98.1	98.8
70-74	98.5	101.7	100.7	97.7	99.6	99.8
75-79	100.4	102.6	101.8	98.6	100.9	100.7
80+	102.1	104.0	102.3	99.8	102.2	102.1
Respondent's Ethnicity						
Māori	87.1	96.7	91.7	92.8	89.2	94.8
Pacific peoples	81.5	96.2	83.5	92.2	82.4	94.3
Other	100.1	102.3	101.0	98.4	100.6	100.4
NZSEI (score)						
10-29	98.7	101.3	101.0	97.4	99.8	99.4
30-39	95.9	101.6	96.3	97.7	96.1	99.7
40-49	100.9	101.9	99.1	98.0	100.0	100.0
50-59	99.7	102.2	101.0	98.3	100.4	100.3
60-69	100.4	102.4	101.2	98.5	100.8	100.5
70+	103.0	102.9	103.9	99.0	103.6	101.0
No score assigned[1]	98.4	102.6	102.0	98.6	99.0	100.7

Predictor	Single		Partnered		Total	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Highest Educational Qualification						
No formal qualification	98.8	101.8	99.2	97.9	99.0	99.9
School/trade qualifications	99.6	102.3	101.4	98.4	100.6	100.4
Tertiary technical/ undergraduate qualification	103.6	102.7	104.0	98.8	103.8	100.9
University degree	104.7	103.2	105.8	99.3	105.4	101.3
Resident in Auckland						
No	100.1	102.3	100.8	98.4	100.3	100.4
Yes	97.4	100.2	100.5	98.4	99.0	99.3

Note 1: Not working full time.

7.7.2 Accumulative Effects of Predictors

The adjusted scores in Table 7. 12 provide an account of the net effects of specific factors. However, interest may focus on the ways in which accumulations of factors influence outcomes. This issue may be addressed by "solving through" the regression model to estimate the expected score associated with particular configurations of circumstances. However, below we develop a more approximate but nonetheless informative way of examining the accumulative effects of risk factors through the development of a simple risk factor scoring system.

To construct this scoring system, each of the major predictors in the model was dichotomised to produce a two valued risk factor.   The criteria for dichotomising the predictors are given in Table 7.13.   All risk factors were scored 1 if the CEU met the criterion and zero otherwise. For each CEU, a points score was then constructed representing the sum of the adverse conditions to which the CEU had been exposed. This score ranged from 0 (for CEUs exposed to no adverse factors) to a maximum of 9. Table 7.13 shows the distribution of the risk factor score: only a small minority (7%) met none of the risk criteria; 49% of CEUs met 1 or 2 risk criteria; a third met 3 or 4 risk criteria; and about 10% met 5 or more criteria.   A profile of these risk factors across all of the Material Well-being Scale Categories is provided in Appendix 6.

Table 7.13: Criteria used in constructing a risk factor score

Criterion	% of CEUs Meeting Criterion
Receiving an income equal to or less than that provided by New Zealand Superannuation ($212 per week for single respondents, $325 per week for partnered respondents)	17.9
Having no savings or assets	15.5
Paying rent or mortgage	17.6
Being exposed to economic stress in the last year	25.1
Being exposed to economic stress during the period from age 50-59 years	40.3
Being aged under 70	30.6
Being Māori or Pacific peoples	4.2
Having no formal educational qualifications	61.7
Having an NZSEI score under 40 or not having full time employment at age 50-59 years	33.1

Table 7.14:   Distribution of risk factor score

Number of Risk Factors Present	% of CEUs
0	7.5
1	21.3
2	27.9
3	21.5
4	12.6
5	6.1
6	2.7
7+	1.2

Figure 7.2 shows the relationship between the risk factor scores and mean levels of material well-being. The figure shows that those with no exposure to risk factors had mean material well-being scores that were 2.4 standard deviations higher than those who were exposed to seven or more risk factors.

Another way of looking at this association is to define a poverty threshold or hardship line on the material well-being scale and, using this line, create a dichotomous variable representing those above and below the hardship line. The choice of poverty threshold is clearly a matter of value judgement about the level of living at which (relative) poverty is assumed to exist.   However, to illustrate this approach we have assumed that the 10% of the sample with the lowest material living standard scores were in hardship and the remainder of the sample not in hardship. Figure 7.3 shows the relationships between risks of hardship (given the 10% definition) and the risk factor score. The figure shows very

low risks of hardship for CEUs having three or fewer risk factors, with risks rising rapidly thereafter. Overall, those with 7 or more risk factors had rates of hardship that were over 20 times higher than those with no risk factors.

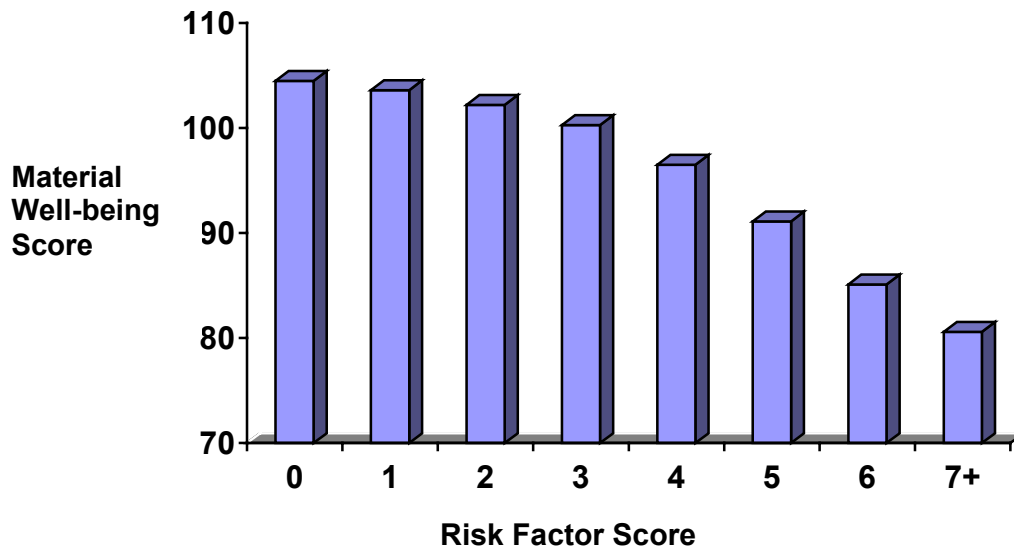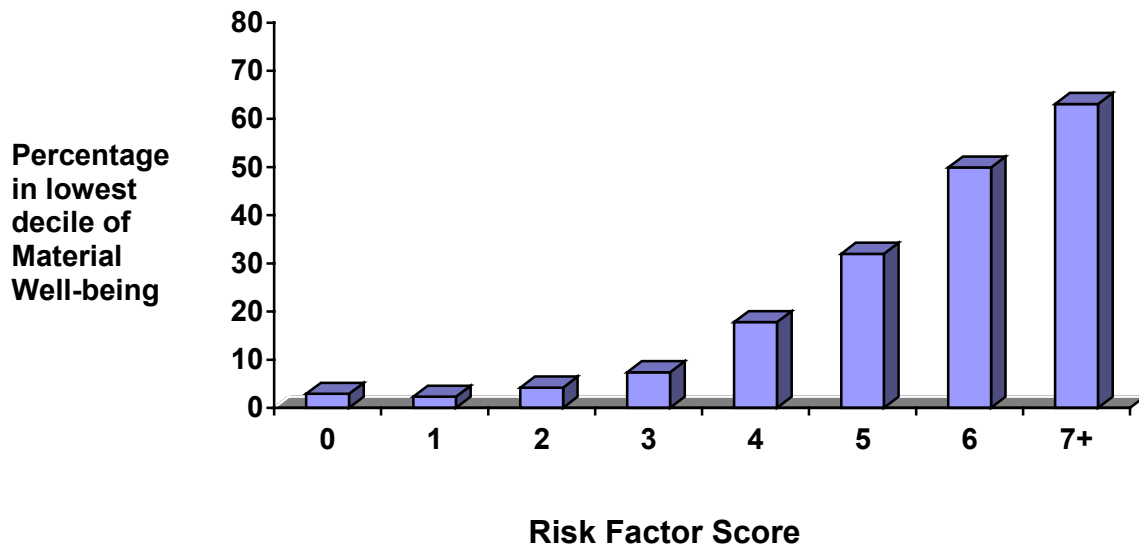**Figure 7.2:   Mean material well-being score by risk factor score**

Figure 7.3:   Risks (%) of 'poverty' by risk factor score

Both figures 7.2 and 7.3 illustrate the important point that what determines the CEU's level of living or risk of poverty is not the presence or absence of a single risk factor (eg, low income) but rather the CEU's accumulative exposure to a range of risk factors that span social background, life history, current income, savings and assets and accommodation costs.

7.8   Discussion

In this chapter, we have used methods of regression analysis to explore the linkages between a number of key correlates and predictors of the scale of material well-being. These variables included measures of: a) household composition; b) current financial circumstances; c) exposure to past and current economic stress; and d) socio-demographic background. These factors explained 40% of the variation in material well-being. A commentary on the specific findings of the analysis is given below.

7.8.1 The Accumulative Effects of Risk Factors

One of the more important findings to emerge from the analysis was that the level of material well-being achieved by older people was not the reflection of a single factor (such as the current level of family income) but rather reflected the effects of accumulations of factors that included: current financial circumstances (income, savings/investments, accommodation costs); exposure to past and current financial stress; and socio-demographic background. The accumulative effects of these factors are clearly illustrated in the simplified risk factor analysis depicted in figure 7.3. This figure shows that CEUs exposed to 7 or more adverse factors had rates of material hardship that were over 20 times higher than those not exposed to adversity. The major policy implication of this conclusion is that policies directed at improving or sustaining levels of material well-being amongst older people may need to reflect this complexity by considering not only current benefit payments and entitlements but also the ways in which various life course and contextual factors may influence the material well-being of older people.

A limitation of the present design is that it is based on cross sectional data and thus provides only a limited perspective on the ways in which life course factors influence material circumstances during retirement. However, despite these limitations, the results hint at the potentially important role of pre-retirement events and circumstances in influencing living standards during retirement. The linkages between pre-retirement conditions and material standards are clearly suggested by the contributions to material well-being of: saving and investment levels; accommodation costs and economic stresses prior to retirement. In all cases, these factors are likely to reflect circumstance and events that occurred prior to retirement. These considerations suggest that an important step in more exactly understanding the origins of material well-being in retirement, requires a longitudinal study of the ways in which pre-retirement and post retirement factors combine to influence material well-being in retirement.

7.8.2 The Contribution of Specific Factors

Although the results of the analysis show the importance of accumulations of social, personal and financial factors as determinants of material well-being amongst older people, it is of both theoretical and applied interest to examine the role of specific predictors and the ways in which these were associated with variations in material well-being. A review of the key predictors of material well-being is given below.

1. Composition of the CEU

A variable that emerged as a predictor of material well-being was the composition of the CEU. Taken at face value, the results suggested that membership of a single

CEU was a factor that was associated with increased material well-being. However, these results do not show that members of single CEUs were better off than members of partnered CEUs. Rather, they have the more complex interpretation that for the same level of income, assets, etc, single CEUs fared better than their married counterparts.

Using the results from the fitted model for CEU composition and income, it was possible to secure estimates of income equivalence for: a) single CEUs living alone relative to married CEUs; and b) single CEUs living with others relative to married CEUs. The point estimates from the analysis suggested that the rate for single CEUs living alone should be set at 65% of the married rate and the rate of single CEUs living with others should be set at 63% of the married rate. These estimates are close to the values of 65% and 60% used to set current benefit relativities. However, the confidence intervals on these estimates were relatively wide suggesting there was quite considerable uncertainty about the true value of the equivalence coefficients. Thus, while the results of this analysis broadly support current policy, the present study does not have sufficient precision to produce precise estimates of income equivalence.

2. Income

As would be expected, the CEU's net income proved to be a predictor of well-being both before and after adjustment for other factors. Two features of the association between income and well-being are of particular interest. First, the relationship between income and levels of material well-being was found to be one in which mean living standards varied with the logarithm of income. This suggests a situation in which the impacts of changes in weekly income have greater effects on CEUs at lower income levels, with these benefits diminishing with increasing income. The applied implication of this result is clearly that changes in levels of NZS are likely to have their greatest effect on those who are in receipt of NZS alone and less effect on those receiving income additional to NZS.

A second feature of the relationship between income and material well-being was that the strength of this association proved to be modest. For example, the correlation between income and material well-being was .24 for single CEUs and .41 for partnered CEUs before adjustment for other factors. Variations in income explained only between 6% to 16% of the variations in levels of material well-being. This result is generally consistent with the findings of the 1974 survey (and other indicator studies) that found similar modest correlations between income levels and direct measures of material well-being.

Given the emphasis that has been placed on the role of current income levels as a determinant of living standards, the modest role of income as a predictor of material well-being requires comment. There are several explanations for these modest associations. These include:

i. Multi-causality:
   Although public policy debates often assume that current income levels are the primary determinant of material well-being amongst old people, these debates overlook the multi-causal factors that are likely to influence the actual material standards of older people. As the results of this study suggest, these outcomes are

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likely to be influenced by a wide range of individual, life course and social factors that include: levels of saving investments; home ownership; economic life history; exposure to current economic stress and social background. Given the complexity of the factors that influence levels of material well-being, it is perhaps not surprising to find that current income, by and of itself, is not a strong predictor of the material well-being of older people.

ii. Limited variation in income:
As noted in Chapter Four, income levels amongst older people were confined to a relatively narrow band of values, with this particularly being the case for single CEUs: 90% of those in single CEUs had (net) incomes below $23,000 pa. Furthermore, the income distribution was subject to a "floor effect" as a result of nearly all (98%) of respondents receiving NZS. The combination of a restricted range of income values and the floor imposed on income by NZS was likely to have attenuated the correlations and associations between income and living standards. More generally, it may be observed that one of the aims of a pension scheme is clearly to moderate the relationship between income levels and material hardship and it would appear that, to a quite considerable extent, levels of NZS may have risen to a point at which the relationship between income and material well-being is weak.

iii. Measurement errors:
Another possibility that should be considered is that the weak association between income and material well-being may reflect measurement errors. There are two possible sources of such errors. First, it is possible that the reporting of income is subject to errors of measurement. Since the income distribution is subject to a floor effect it is likely that these errors may be to some extent systematic, so that there is little error for those who report being on NZS alone but greater error for those who report higher income. Such systematic errors could conceivably alter the relationships between scale score values and income levels. Alternatively, the results could reflect errors of measurement or model misspecification in the construction of the living standard measures. It is possible that such errors could lead to a mis-estimation of the associations between material well-being and income levels. Unfortunately, in the absence of "gold standard" measures of income and material well-being, it is difficult to assess the extent to which results may have been adversely affected by measurement errors.

iv. The specification of the income variable:
Finally it has been suggested to us that the use of net income may have led to an underestimation of the effects of income. Alternatives suggested included the use of income estimates that incorporated imputed income from home ownership. Although it may be of interest to explore alternative income estimates in future analysis, there was a strong reason for focussing the analysis on net income since this was identified by the policy audience at whom this research is directed as being the most relevant income measure for their purposes.

These considerations notwithstanding, a potentially important result from this study is clearly that, by and of itself, current income has a surprisingly modest effect on the material well-being of older people and that, for this reason, it is important that social policies focus not only on the role of income maintenance for older people but on the

social, contextual, personal and other factors that influence the material well-being of older people independently of their current income.

3. Savings and Investments

A second economic factor that was related to material well-being scale, was the total value of the CEU's savings and investments. From the adjusted results in Table 7.11, it is apparent that those having no savings and investments had mean material well-being scores that were over .4 of a standard deviation below the population mean of 100. As was the case for income, there was a logarithmic relationship between levels of savings and material well-being suggesting that in terms of their impact on the material well-being of the CEU, investments and savings were subject to diminishing returns.

There are two ways in which savings and investments may influence material well-being. First, these factors may influence well-being indirectly by their effects on levels of income, as savings and investments can raise living standards by being progressively run down (spent) to permit a higher level of consumption than would otherwise have occurred.   Secondly, there is likely to be a direct effect in which savings and investments act as a buffer or cushion against unexpected economic shocks. Some indication of the extent to which this population was cushioned in this way is illustrated by responses to questions asking whether in an emergency the respondents could raise: a) $NZ1,500; and b) $NZ5,000. Over 85% of respondents reported the ability to raise $NZ1,500 and two thirds claimed that they could raise $NZ5,000. These results clearly suggest a population in which the great majority of respondents have the economic (or social) resources to raise money to meet unexpected economic shocks.

A clear implication of the significant role of savings and investments as a predictor of material well-being is that these results reinforce the commonly held view that saving for retirement makes a significant contribution to the material well-being of older people. However, a limitation of the present analysis is that because of the way in which the value of savings and investments was assessed it is not possible to disaggregate the measure to examine whether different types of savings and investments have differing effects on levels of material well-being. In particular, in order to reduce the burden placed on respondents the survey asked respondents to provide an estimate of total savings and investments, rather than for the value of each type of investment.

4. Accommodation Costs

A third economic factor that was a predictor of material well-being was the cost of the accommodation. Those spending $100 or more per week for their accommodation had mean material well-being scores that were nearly half a standard deviation lower than the population mean of 100. The role of these costs in determining living standards is likely to reflect the impact of accommodation on the CEU's disposable income with those CEUs having high accommodation costs being disadvantaged relative to those paying low costs. The primary source of housing costs came from rental costs from those who did not own their own home. The results thus reinforce the view that home ownership is one positive step that older respondents may take to preserve their levels of material well-being following retirement.

5. Economic Life Events and Stresses

A further class of variables that was found to influence the levels of material well-being of older people was their exposure to various adverse life events and circumstances in the decade prior to retirement. Those reporting four or more adverse economic events had mean material well-being scores that were over half a standard deviation lower than the population mean. These events included such things as marital breakdown, unemployment, bankruptcy, redundancy and similar events likely to disrupt the economic circumstances of the CEU. These findings highlight the role of long term life course factors relating to stability of employment and family circumstances in determining the living standards of older people.

In addition, there was also strong evidence to suggest that short term economic stresses such as unexpected bills or costs also had an impact on levels of material well-being with those CEUs reporting exposure to 3 of more financial stressors in the past 12 months having mean material well-being scores that were over one standard deviation lower than those reporting no exposure to economic stressors. These results clearly illustrate the ways in which unexpected economic shocks can influence the material well-being of older people and highlight the need for older people to have resources to cushion themselves from the effects of such economic shocks.

6. Age

In agreement with the findings of the 1974 survey, the results of the present study suggested the presence of a small but statistically significant tendency for the material well-being of older people to increase with age. Those aged 65-69 had mean material well-being scores that were a third of a standard deviation below the mean for those aged 80 or over.

This result, at first sight, appears to be counter intuitive since one might expect that with the passage of time (and the consequent reducing value of savings, assets and the need to replace possessions), the material well-being of CEUs should decline as respondents became older. There are at least three explanations of the linkages between age and material well-being. The first is that this association reflects a general process of disengagement so that as people grow older, their wants and needs tend to reduce, making older people less vulnerable to material hardship. This type of explanation is clearly applicable to the scale of material well-being that has been developed in this study since measures of deprivation have been assessed relative to the respondent's choices and preferences.

The second explanation is that the association may reflect a cohort effect in which, for a variety of reasons, older cohorts experienced a more favourable economic life history than younger cohorts. Such an association could have resulted in members of older cohorts being more materially advantaged when compared with younger cohorts.

The third explanation is that the linkage reflects the effect of some unmeasured factor (relating to lifestyle or capability) that influences both material well-being and the likelihood of surviving into advanced age, with the consequence that the "survivor" group tends to be better endowed in respect of that factor than is the younger group.

Which of these explanations (if any) provides the better account of age effects is unknown but in the future it is planned to examine this issue in greater detail. These

uncertainties notwithstanding, the present findings suggest that amongst older people, increasing age is associated with increasing levels of material well-being.

7. Ethnicity

In addition to the present study, a detailed analysis of the supplementary survey of Māori respondents aged 65-69 (see Chapter Three) is being undertaken as a separate exercise. To avoid intruding on the separate detailed study of Māori living standards, the present analysis has conducted only a preliminary investigation of the linkages between Māori ethnicity and material well-being. Nonetheless, even this preliminary analysis produces potentially interesting conclusions about the linkages between ethnicity and material well-being.

Although only a few older Pacific peoples (1.6%) were in the sample, an analysis of their material well-being was undertaken at a general level. However, note that Pacific peoples who have recently migrated to New Zealand may be under-represented in the survey, and the findings are likely to be more indicative of Pacific peoples who have lived in New Zealand for some time.

In agreement with a large body of New Zealand evidence that has linked Māori ethnicity with material and social disadvantage there were large differences in the mean material well-being scores of Māori CEUs when compared to other (predominantly European-Pakeha) CEUs. Māori CEUs had mean material well being scores that were 1.1 standard deviations lower than European-Pakeha/Other CEUs.

The results also support findings of material and social disadvantage for Pacific peoples. CEUs of Pacific ethnicity had lower mean material well-being scores than CEUs of Māori or other ethnicity.   Pacific CEU mean scores were 1.8 standard deviations lower than European-Pakeha/Other CEUs.

Most of these differences for both Māori and Pacific peoples were explained by other variables in the model (income, savings, accommodation costs) that were correlated with both ethnicity and material well-being. These results suggest that, to a large extent, the material disadvantages experienced by Māori and Pacific respondents were a consequence of their economically disadvantaged position. However, even after other factors had been taken into account Māori and Pacific CEUs still remained at a disadvantage when compared to other CEUs: Māori CEUs had adjusted mean scores that were over a half of a standard deviation lower than Other CEUs, and Pacific CEUs had mean adjusted scores that were over 0.6 standard deviations lower than Other CEUs. These unexplained differences suggested the presence of non-observed sources of variation that lead Māori and Pacific CEUs to obtain lower mean material well-being scores. There are two possible sources of such unexplained variation:

a) Biases in Scale: It could be suggested that the differences arise because Māori, Pacific peoples and other respondents have been measured on a common scale of material well-being that is not appropriate for Māori and Pacific respondents. It might be then argued that the use of an inappropriate scale measure gives a misleading impression of the material disadvantage of Māori and Pacific respondents. This line of reasoning raises complex issues about the effects of population heterogeneity on scale estimates. Some exploratory analysis has been conducted on this issue and, in general, these explorations do not support the view

that the differences arise from the use of scale measures that are inappropriate for Māori and Pacific respondents. However, this is clearly a matter which deserves further consideration in the proposed analysis of the Māori sample.

b) Omitted Variables: The alternative explanation is that the differences arise because the regression model omits a number of variables that, if included, would explain the remaining ethnic differences. One important source of omitted variables reflects the cross-sectional nature of the study and the consequent limited data available on pre-retirement variables. One explanation for the unexplained disadvantage of Māori and Pacific respondents is that this disadvantage reflects disadvantages that Māori and Pacific respondents experienced prior to retirement and which were carried over into retirement.

8. Education and Socio-economic Status

Parallel to findings on ethnic differences in material well-being, there was also evidence of socio-economic differences. These differences were reflected in findings showing that CEUs in which the respondent had worked in a low SES occupation or had lacked formal educational qualifications had lower mean material well-being scores. Most of these differences were explained by other variables in the model (income, savings, accommodation cost, etc). However, even after other factors were taken into account there were detectable tendencies for CEUs in which the respondent was of low SES or lacked formal educational qualifications to have poorer material well-being. These findings suggest the presence of omitted variables that were associated with socio-economic status and which also contribute to levels of material well-being. Important factors that are not fully taken into account in the analysis are measures of pre-retirement history.

9. Interactions

A number of interactive (non additive) relationships were uncovered. These interactions involved the partnership status measure and economic life events and region. These results showed that the material well-being of single CEUs was more affected by economic adversity and living in Auckland than was the material well-being of partnered CEUs. These results suggest that single CEUs showed a tendency to be more vulnerable to economic or related stressors. This may reflect the fact that partner relationships may act to buffer the effects of these other stressors.

Collectively, the factors above accounted for 40% of the total variation in the measures of material well-being. This result suggests that whilst quite considerable prediction of the variation in material well-being was possible, there was also a substantial amount of unexplained variation showing that the material circumstances of CEUs were not entirely predictable from the measures of social, economic and related factors collected in this study.

7.8.3 Threats to Validity

As is the case with all social research investigations, research findings are subject to a number of caveats relating to various sources of methodological doubt and uncertainty that pose threats to the validity of conclusions draw. The key threats to validity in this investigation arise from three major sources:

1. Sample Selection Bias

Implicit in the regression and related analyses is the assumption that the results reflect the circumstances that prevail within a random sample of CEUs. As explained in Chapter Three, the sample is not a simple random sample of CEUs but rather the sample is stratified and clustered. To address this, corrections for stratification and clustering have been incorporated into the regression model. However, a potential threat to validity comes from the response rate achieved in the study. As shown in Chapter Three, nearly one in 3 eligible respondents declined to participate in the study. This raises the important issue of the extent to which the study conclusions may have been biased by selective sample loss. Comparison of the characteristics of respondents and non respondents on SOP with respect to 1996 Population Census data produced no clear evidence to suggest detectable sample biases. Although this result tends to suggest that sample selection bias is probably not a major threat to validity, it should be borne in mind that the comparisons made were limited to a small number of variables for which official information was available.

2. Measurement Errors

The data analysed are essentially older people's reports of their life history, economic circumstances and material well-being. It is almost inevitable that these accounts will be subject to reporting errors. The effects of these errors will depend on the nature of the measurement error. If errors occur at random, then errors in reports will influence the precision but not validity of results. If, however, errors are systematic both precision and validity may be compromised. In terms of the study results, it is clear that a major limitation on the measurement process has come from the cross sectional nature of the research design. It is apparent from the results that much of what determines the living standards of older people concerns events and circumstances that were present prior to retirement. However, this information has been collected largely on the basis of the recall and reports of older people about circumstances that may have occurred decades in the past. It is clear that a more powerful research methodology would have been to conduct a longitudinal study of the transition to retirement, beginning with cohorts of individuals about to retire.

3. Omitted Variables

The final threat to validity for the regression model concerns the effects of variables that have been omitted from the regression model as a result of these variables not being measured. The extent to which results are influenced by omitted variables is unknown. However, following on from the comments above, an important class of variables that may have been omitted from the analysis may have been measures of the CEU's social, educational, economic and related circumstances prior to its members reaching retiring age. From the limited data available, it is clear that pre-retirement factors play an important role in shaping the material well-being of the CEU in retirement. The cross sectional nature of the design limited the extent to which data could be gathered on these pre-retirement events and circumstances and as noted above, those measures that were collected may be subject to substantial errors of measurement.

However, notwithstanding these caveats the weight of the evidence from this study suggests that the living standards of older people are quite substantially determined by a model in which the CEU's level of material well-being is influenced by a relatively large

number of factors that span current economic resources, accommodation costs, current exposure to economic stress, past economic history, and socio-demographic characteristics.

7.8.4 Origins of Unexplained Variation

The fitted model accounted for 40% of the variation in the material well-being scale leaving 60% of the variation unexplained. This observation naturally raises the issue of the factors or processes that account for the unexplained 60% of variation. There are at least three explanations for the 60% of unexplained variance.

1. Measurement Errors

As noted in the previous section the measures used in this study are based on responses by a sample of older respondents about their social, financial and material circumstances. There is considerable potential for such responses to be subject to errors of measurement. Errors may arise because respondents may not be able to provide a precise response to questions on such matters as income, savings and so forth. Errors may arise because respondents have difficulty addressing complex survey items which asked about their material circumstances and decision about consumption and economising. Errors may arise because some respondents may be resistant to discussing their personal finances and circumstances with a third party. All of these sources of error are likely to combine to produce a situation in which the measured variables give only an approximation to the complex interplay between social, financial and material circumstances.

2. Omitted Variables

A second source of unexplained variation may come from explanatory variables that have been omitted from the model. Although the predictor variables used in this analysis spanned most of the variables used in previous studies of this type, there are obviously a large number of theoretically relevant variables that were not measured. These variables include measures of pre-retirement circumstances that were hard to assess on the basis of retrospective report and other variables that were omitted from the survey because they were difficult to ask or to reduce the duration of the interview to an acceptable length.

3. Behavioural Indeterminacy

A third source of unexplained variation may arise from the fact that the outcome measured in this study (material well-being) represents a highly complex set of behaviours, choices and decisions that determine the overall level of material well-being attained by the CEU. It is likely that these behaviours, choices and decisions will be to some extent idiosyncratic and specific to a given CEU. The effects of this will be to introduce into the measurement of material well-being sources of variation that cannot be predicted from the predictor variables used in this research.