

Chapter 6 Career Advancement

6.1 Introduction

The previous chapter discussed the patterns of career advancement through mobility and the effect of various variables on mobility scores among the respondents. This chapter aims to examine the net effects of these variables on the career advancement an individual achieves through occupational mobility and income mobility. This is done using a multiple regression model. Occupational mobility score and income mobility score are the dependent variables. A comparison is made between variables affecting career advancement, measured using these two types of mobility.

Section 6.2 consists of discussion regarding the building of the regression models. Section 6.3 contains the assessment of the multicollinearity assumption. The checks on the normality and heteroscedasticity assumptions are shown in Section 6.4 and Section 6.5 respectively. Section 6.6 gives the diagnostic procedures to detect outlier and influential observations. The interpretation is in Section 6.7 while the comparison between occupational mobility score and income mobility score is found in Section 6.8. The discussion in this chapter is summarised in Section 6.9.

6.2 Model building

All the independent variables, including the interaction terms, which are included in the model are shown in Table 6.1. The discussion in this section is divided into two parts; one for occupational mobility score and one for income mobility score. For any model built, there are three stages. Firstly, demographic characteristics, human capital

investment, employment and family background are considered. Secondly, motivation and work value are considered. Thirdly, interaction terms are considered.

Table 6.1 Description of all the independent variables and their expected effect

Independent variables / group	Description	Expected effect	
Demographic characteristics			
Gender	- Dummy variable taking the value 1 if respondents are females	Negative (limited)	
Chinese	- Ethnic – Chinese - Dummy variable taking the value 1 if respondents are Chinese	Positive	
Indian	- Ethnic – Indian - Dummy variable taking the value 1 if respondents are Indian	Positive	
Age	- Age when survey was conducted - Continuous variable	Negative (limited)	
Marital	- Marital status - Dummy variable taking the value 1 if respondents are married	Negative	
Place grew	- Place in which an individual grew up - Dummy variable taking the value 1 if respondents grew up in large or small town	Positive	
Family background			
Parent's educational background	Paed*	- Parent's education level - Dummy variable taking the value 1 if respondents' parents have lower secondary education or above	Positive
	Paoc*	- Parent's occupational group - Dummy variable taking the value 1 if respondents' parents work as agriculture group	No prior expectation
	Pain*	- Parent's income level - Dummy variable taking the value 1 if respondents' parents earn RM1000 or more	Positive
	PaISEI*	- Parent's occupation ISEI score - Continuous variable	Positive

Family Size	Family size	<ul style="list-style-type: none"> - Total number of siblings in the family, including respondents themselves - Continuous variable 	Negative (limited)
	Eldest	<ul style="list-style-type: none"> - Being eldest in a family? - Dummy variable taking the value 1 if respondents are the eldest in a family 	Negative (limited)
Human capital investment			
Amount of human capital investment	Academic edu	<ul style="list-style-type: none"> - Years of academic education - Continuous variable 	Positive
	High qua	<ul style="list-style-type: none"> - Highest qualification acquired - Dummy variable taking the value 1 if respondents have degree or higher qualification 	Positive
Academic performance	SRP	<ul style="list-style-type: none"> - SRP aggregate - Continuous variable - Lower aggregate, better result 	No prior expectation
	SPM	<ul style="list-style-type: none"> - SPM aggregate - Continuous variable - Lower aggregate, better result 	No prior expectation
	PreU	<ul style="list-style-type: none"> - Pre-university result - Dummy variable taking the value 1 if respondents have excellent or above average result 	No prior expectation
Voca. train.		<ul style="list-style-type: none"> - Days of vocational training - Continuous variable 	Positive
Train. by emp		<ul style="list-style-type: none"> - Days of training by employer - Continuous variable 	Positive
Tenure 1		<ul style="list-style-type: none"> - First job tenure in days - Continuous variable 	Positive
Employment			
First job occupation	Occ 1	<ul style="list-style-type: none"> - First job occupational group - Dummy variable taking the value 1 if respondents have a first job as professional 	No prior expectation
	ISEI 1	<ul style="list-style-type: none"> - First job ISEI - Continuous variable 	Negative

	Income 1	- First job starting income - Continuous variable	No prior expectation
Working experience	Work exp	- Days of working experience - Continuous variable	No prior expectation
	No jobs	- Number of jobs held before, including current job - Continuous variable	No prior expectation
	Chg job	- Job changing pattern - Dummy variable taking the value 1 if respondents stay in the same occupation and same employer	No prior expectation
Principal component scores			
	Component 1	- First component in the principal component analysis for motivation an individual has - Continuous variable	No prior expectation
	Component 2	- First component in the principal component analysis for work value in school - Continuous variable	No prior expectation
	Component 3	- First component in the principal component analysis for work value in labour market - Continuous variable	No prior expectation
Interaction term			
	Gender/ Marital	- Interaction term between gender and marital status - Value 1 for female respondents who are married	Negative
	Gender/ High qua	- Interaction term between gender and highest qualification acquired - Value 1 for female respondents who have degree qualification	Negative
	Gender/ Train. by emp	- Interaction term between availability of training provided by employer and gender - Value 1 for female respondents who receive training provided by employer	Positive
Family background with human capital investment			
	Paed/ High qua*	- Interaction term between parent's education level and highest qualification acquired - Value 1 for respondents who have degree qualification and their parents have lower secondary education or above	Nil
	Paoc/ High qua*	- Interaction term between parent's occupational group and highest qualification acquired - Value 1 for respondents who have degree qualification and their parents work as agriculture workers	Nil

Pain/ High qua*	<ul style="list-style-type: none"> - Interaction term between parent's income level and highest qualification acquired - Value 1 for respondents who have degree qualification and their parents have income RM1000 or above 	Nil
Family size/ High qua	<ul style="list-style-type: none"> - Interaction term between family size and highest qualification acquired - Continuous variable 	Nil
Eldest/ High qua	<ul style="list-style-type: none"> - Interaction term between being the eldest in a family and highest qualification acquired - Value 1 for respondents who are eldest in a family and have degree qualification 	Nil

* For respondents whose guardian is both father and mother, father's information is used. For respondents with single parent, the single parent's information is used. If the respondents' present guardian is not their parent, then the guardian's information is taken.

Where more than one proxy measure is available to describe a particular factor, only one is included in the model. To select this variable, variables are entered into the model one at a time. Among all these variables, the variable selected is that which is statistically significant, has an interpretable sign, and constitute to the highest adjusted R square and lowest SER. Besides, the evaluation also takes into consideration that the selected variable does not lead to varying effects of certain important factors, such as ethnicity and education.

Family background consists of two groups of variables. These are parent's educational background and family size. Parent's education level, occupational group, occupation ISEI score and income level are alternative proxies for parent's educational background. Parent's education level affects his own occupation. In turn, his occupation affects his income level. They are significantly correlated ($r = -0.796$, $p\text{-value} = 0.000$). On the other hand, family size and birth order are proxies for family size. All these reflect the financial resources and their distribution in a family. The financial resources in a

family affect an individual's education level, which is an important factor in affecting career advancement.

Under human capital investment, there are again two groups. These are amount of human capital investment and academic performance. Amount of human capital investment is measured using years of academic education and highest qualification acquired. These two aspects are highly correlated ($r = 0.783$, $p\text{-value} = 0.000$). Amount of human capital investment affects the career advancement positively. Academic performance is measured alternatively using SRP aggregate, SPM aggregate and pre-university result. These three variables are significantly correlated ($r = 0.686$, $p\text{-value} = 0.000$).

Under employment, first job occupational group and first job ISEI score are measures for first job occupation. These two variable are highly correlated ($r = -0.752$, $p\text{-value} = 0.000$). These two variables measure the effect of the first job towards career advancement in the future. On the other hand, days of working experience and number of jobs held before measure working experience. These two variables measure the working experience accumulated by an individual. This is an important factor in affecting career advancement. The variable days of working experience is significantly correlated with years of academic education, which is an important factor in affecting career advancement ($r = -0.533$, $p\text{-value} = 0.000$).

6.2.1 Occupational mobility score

6.2.1.1 First stage

The result for the estimated model built at this stage is shown in Table 6.2. The results are discussed below.

Table 6.2 Models built at first, second and third stage for occupational mobility score

Variable	First stage			Second Stage			Third Stage		
	Coefficient	p-value	VIF	Coefficient	p-value	VIF	Coefficient	p-value	VIF
Gender	2.188	0.000	1.12	2.128	0.001	1.12	2.978	0.000	1.79
Chinese	0.327	0.659	1.54						
Indian	-2.859	0.046	1.12	-3.975	0.009	1.06	-3.064	0.031	1.05
Age	1.089	0.000	1.29	1.174	0.000	1.21	1.088	0.000	1.23
Marital	0.779	0.269	1.13						
Place grew	0.294	0.660	1.44						
Paed*	-1.457	0.025	1.30	-1.148	0.084	1.15	-0.914	0.142	1.15
Eldest	0.677	0.289	1.07						
Academic edu	0.379	0.035	2.03	0.294	0.126	1.98	0.550	0.006	2.41
SPM	-0.179	0.000	1.78	-0.178	0.000	1.57	-0.190	0.000	1.62
Voca. train.	0.0034	0.049	1.08	0.0030	0.117	1.07	0.0043	0.013	1.08
Train. by emp	0.0017	0.428	1.04						
tenure1	-0.0037	0.000	1.23	-0.0035	0.000	1.25	-0.0034	0.000	1.25
ISEI 1	-0.444	0.000	1.61	-0.461	0.000	1.60	-0.450	0.000	1.63
Income1	-0.0009	0.085	1.63	-0.0005	0.328	1.57	-0.0007	0.220	1.64
No jobs	-0.482	0.014	1.22	-0.420	0.052	1.22	-0.313	0.119	1.21
Component 1				-0.215	0.540	1.25			
Component 2				0.0585	0.861	1.26			
Component 3				-0.510	0.123	1.17			
Gender/Marital							0.460	0.623	1.28
Gender/High qua							-2.317	0.049	1.63
Gender/Train. by emp							-1.786	0.058	1.24
Paoc/ High qua							1.17	0.396	1.28
Adjusted R square	32.8%			33.5%			32.1%		
SER	8.56			8.68			8.52		

* For respondents whose guardian is both father and mother, father's information is used. For respondents with single parent, the single parent's information is used. If the respondents' present guardian is not their parent, then the guardian's information is taken.

Demographic characteristics

As given in Table 6.2, gender and age are significant in the model. For ethnicity, only the variable Indian is significant as main differences of occupational mobility score exist between Indian and other groups and not between Bumiputera and Chinese. This is shown in Chapter 5. In addition, the net effect of the variable Chinese is statistically insignificant in the model. Although marital status is found to be significant in the univariate analysis, the multivariate analysis finds the net effect of marital status to be insignificant. As noted in the univariate analysis, the net effect of location in which an individual grew up is also insignificant in explaining occupational mobility score.

Family background

For parent's educational background, only the net effect of parent's education level is significant. Other variables do not improve the goodness of fit of the model as adjusted R square is lower and SER is higher. The adjusted R square for the models with parent's occupational group, occupation ISEI score and income level are 30.3%, 30.4% and 31.6% respectively. These adjusted R square is lower than the adjusted R square as shown in Table 6.2. For family size, both family size and birth order are insignificant in affecting occupational mobility score. So, none of them is selected.

Human capital investment

For amount of academic education, years of academic education is significant while highest qualification acquired is insignificant. The model with highest qualification acquired has a lower adjusted R square (31.2%) and a higher SER (8.69), indicating worse goodness of fit. So, years of academic education is included in the model.

For academic performance, all three variables are significant when it is included into the model one at a time. SPM is chosen to be included into the model as it gives the best goodness of fit. It gives the highest R square and lowest SER. The adjusted R square for the models with SRP aggregate and pre-university result are 31.7% and 30.1% respectively.

For other human capital investment, days of vocational training, days of training provided by employer and first job tenure are considered. The net effects of days of vocational training and first job are significant. Days of training provided by employer is insignificant in the model and the inclusion of this variable does not improve the fit of the model. This tallies with the univariate analysis results found in Chapter 5. So, it is not included.

Employment

Between the two variables in the first job occupation group, first job ISEI score is included. First job occupational group does not improve the fit of the model, as the adjusted R square is lower (14.8%) and the SER is higher (9.62). Besides, first job starting income is significant. Therefore, it is included into the model to evaluate the net effect of pecuniary return on career advancement along the ISEI scale.

For working experience group, years of working experience is an important variable. Nevertheless, years of working experience is closely related to years of academic education which is included in the model. Years of working experience is insignificant in explaining occupational mobility score. So, number of jobs held before is included as proxy to measure working experience.

6.2.1.2 Second stage

The principal component scores for motivation, work value in school and work value in labour market are insignificant when they are included. Furthermore, they do not improve the goodness of fit of the model. So, none of them is considered, as shown in Table 6.2.

6.2.1.3 Third stage

The interaction term between gender and marital status is not included as it is insignificant and does not improve the fit of the model. This is shown in Table 6.2.

The interaction term between gender and highest qualification acquired as well as the interaction term between gender and training provided by employer is selected. They are statistically significant and contribute to the fit of the model.

The interaction effect between family background and human capital investment is not included as they are insignificant and do not contribute to the goodness of fit of the model. There is no interaction effect between family background and human capital investment, which agrees with the finding in Blau and Duncan (1967), as noted in Chapter 2. The aspect of human capital investment is the highest qualification acquired.

The aspects of family background which are considered are parent's education level, occupational group and income level; family size and birth order.

After considering all the relevant interaction terms, a final model for occupational mobility score is presented in Table 6.3. Since years of working experience is an important factor, the final model is rerun by replacing the variable number of jobs held before with years of working experience. The coefficient for other variables in the final model and their significance do not change greatly.

Table 6.3 Final model for occupational mobility score

Variable	Coefficient	p-value	VIF	Beta	Mean
Gender	3.243	0.000	1.50	0.156	0.053
Indian	-3.047	0.027	1.04	-0.060	0.044
Age	1.079	0.000	1.20	0.113	24.81
Paed*	-1.146	0.055	1.12	-0.054	0.39
Academic edu	0.523	0.006	2.32	0.111	13.83
SPM	-0.187	0.000	1.58	-0.163	24.76
Voca. Train.	0.00387	0.024	1.07	0.062	61.22
Tenure1	-0.00373	0.000	1.22	-0.199	571.51
ISEI 1	-0.458	0.000	1.61	-0.609	54.38
Income1	-0.0006	0.217	1.62	-0.042	938.11
No jobs	-0.432	0.023	1.16	-0.065	2.56
Gender/High qua	-2.200	0.053	1.56	-0.064	0.103
Gender/ Train. by emp	-1.920	0.036	1.21	-0.061	0.125

Adjusted R square = 33.3%

SER = 8.51

*For respondents whose guardian is both father and mother, father's information is used. For respondents with single parent, the single parent's information is used. If the respondents' present guardian is not their parent, then the guardian's information is taken.

6.2.2 Income mobility score

The result for the estimated models built at first, second and third stage are shown in Table 6.4. The results are discussed below.

Table 6.4 Models built at first, second and third stage for income mobility score

Variable	First stage			Second Stage			Third Stage		
	Coefficient	p-value	VIF	Coefficient	p-value	VIF	Coefficient	p-value	VIF
Gender	-120.69	0.007	1.65	-150.63	0.001	1.13	-187.74	0.001	1.83
Chinese	500.86	0.000	1.65	486.14	0.000	1.76	536.28	0.000	1.60
Indian	382.66	0.001	1.13	314.53	0.006	1.11	390.07	0.000	1.10
Age	-4.289	0.843	1.27						
Marital	56.64	0.297	1.11						
Place grew	94.258	0.072	1.55	114.63	0.037	1.58	68.77	0.169	1.54
Paoc*	-196.92	0.000	1.29	-199.00	0.000	1.30	-192.7	0.000	1.28
Family size	12.558	0.173	1.27						
Academic edu	-28.563	0.041	2.20	-17.985	0.180	1.86	-25.77	0.058	2.24
SRP	-12.728	0.000	2.10	-8.288	0.018	2.00	-10.16	0.002	2.04
Voca. Train.	-0.183	0.166	1.07						
Train. by emp	0.336	0.030	1.04	0.310	0.057	1.04	0.125	0.406	1.08
Tenure1	0.022	0.622	1.42						
ISEI 1	-4.12	0.036	1.68	-4.571	0.022	1.62	-3.743	0.044	1.64
Income1	-0.212	0.000	1.78	-0.227	0.000	1.74	-0.233	0.000	1.84
No jobs	15.881	0.298	1.36						
Chg job	-170.402	0.002	1.59	-204.21	0.000	1.26	-197.70	0.000	1.24
Component 1				6.148	0.817	1.35			
Component 2				-17.174	0.492	1.35			
Component 3				33.69	0.169	1.22			
Gender/ Marital							-2.010	0.977	1.23
Gender/High qua							73.455	0.404	1.75
Gender/ Train. by emp							224.10	0.001	1.31
Paed/ High qua							-84.816	0.269	1.53
Adjusted R square	24.0%			24.9%			25.1%		
SER	617.43			624.89			617.25		

* For respondents whose guardian is both father and mother, father's information is used. For respondents with single parent, the single parent's information is used. If the respondents' present guardian is not their parent, then the guardian's information is taken.

6.2.2.1 First stage

Demographic characteristics

As noted in the univariate analysis in Chapter 5, gender, age and marital status are insignificant in explaining income mobility. When age and marital status are included into the model, their net effects are insignificant. The removal of these variables improves the goodness of fit of the model. On the other hand, the net effect of gender, ethnic as Chinese and Indian and location in which an individual grew up are significant. This is shown in Table 6.4.

Family background

For parent's educational background, parent's occupational group is chosen. Parent's education level, occupation ISEI score and income level are excluded as they do not improve the fit of the model as much as parent's occupational group does and they are insignificant. The adjusted R square for the models with parent's education level, occupation ISEI score and income level are 23.4%, 23.8% and 23.5% respectively. For family size category, both family size and birth order are insignificant and do not improve the fit of the model.

Human capital investment

In the univariate analysis in Chapter 5, years of academic education is insignificant while highest qualification acquired is significant. However, the net effect of years of academic education is significant in explaining income mobility score. The adjusted R square with

the variable highest qualification acquired is lower (23.5%). So, years of academic education is included in the model.

For academic performance, the SRP aggregate is selected. It gives the model the best fit, which means higher adjusted R square and lower SER, compared to SPM aggregate and pre-university result. The adjusted R square for the models with SPM aggregate and pre-university result are 23.6% and 23.4% respectively.

Among other human capital investment, days of training provided by employer is selected as it is significant. The net effect of days of vocational training and first job tenure are not considered as they are insignificant in the model, as noted in the univariate analysis in Chapter 5. The removal of these variables does not affect the goodness of fit of the model adversely.

Employment

First job ISEI score is selected to reflect the status in the first job. The net effect of first job occupational group is insignificant in the model and the inclusion of the variable does not improve the goodness of fit of the model. The adjusted R square with first job occupational group is 23.4%. Besides, first job starting income is included in the model to evaluate the effect of starting income on subsequent income increment.

For working experience, days of working experience and number of jobs held are excluded as they are insignificant and do not affect the fit of the model. Besides, days of working experience is closely related to years of academic education. Since the latter is an important variable in human capital investment, which is included into the model, this

variable is not considered. For other employment attributes, only job changing pattern is included.

6.2.2.2 Second stage

The principal component scores for motivation, work value in school and work value in labour market are not chosen as the inclusion of these variables deteriorates the goodness of fit of the model and they are insignificant. This is shown in Table 6.4.

6.2.2.3 Third stage

The interaction term between gender and marital status as well as the interaction term between gender and the highest qualification acquired are excluded as they are statistically insignificant and they do not contribute to the goodness of fit of the model. This is shown in Table 6.4.

The interaction term between gender and training provided by employer is significant in the model. However, this variable is significantly correlated to the variable days of training provided by employer, which is included in the model (p -value = 0.000). The effect of training provided by employer is more important than the effect of the interaction term. So, the interaction term is excluded to avoid the existence of highly related variables in a model.

The interaction effect between family background and human capital investment are not chosen as they are insignificant and do not contribute to the goodness of fit of the model. So, final model for income mobility score is shown in Table 6.5.

Since working experience is an important factor, the final model is rerun by including this factor. The coefficient for other variables in the final model and their significance do not change greatly. In addition, this factor is insignificant in the model.

Table 6.5 Final model for income mobility score

Variable	Coefficient	p-value	VIF	Beta	Mean
Gender	-105.952	0.013	1.101	-0.074	0.51
Chinese	515.663	0.000	1.551	0.341	0.33
Indian	380.184	0.000	1.091	0.108	0.043
Place grew	79.196	0.111	1.511	0.056	0.50
Paoc*	-192.377	0.000	1.259	-0.125	0.31
Academic edu	-25.627	0.041	1.893	-0.080	13.888
SRP	-10.606	0.001	2.023	-0.134	17.68
Train. by emp	0.224	0.128	1.032	0.044	29.997
ISEI 1	-4.160	0.024	1.598	-0.081	54.42
Incomel	-0.228	0.000	1.745	-0.205	951.33
Chg job	-205.875	0.000	1.241	-0.138	0.36

Adjusted R square = 24.5%

SER = 619.67

* For respondents whose guardian is both father and mother, father's information is used. For respondents with single parent, the single parent's information is used. If the respondents' present guardian is not their parent, then the guardian's information is taken.

6.3 Multicollinearity

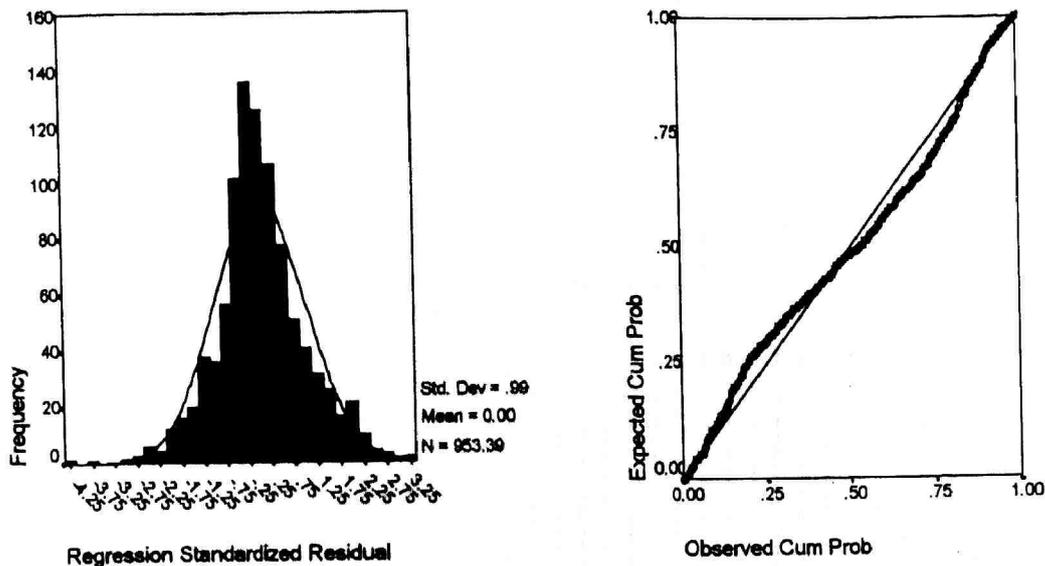
For both occupational mobility score and income mobility score final models, none of the VIF values exceed 2.5, which is much below the benchmark level of 10. This is shown in Table 6.3 and Table 6.5. So, the problem of multicollinearity is considered mild in these models and the variables in the models are not highly correlated.

6.4 Normality

For occupational mobility score final model, the distribution of the residual and the normal curve imposed in the histogram resemble one another, as shown in Figure 6.1. In

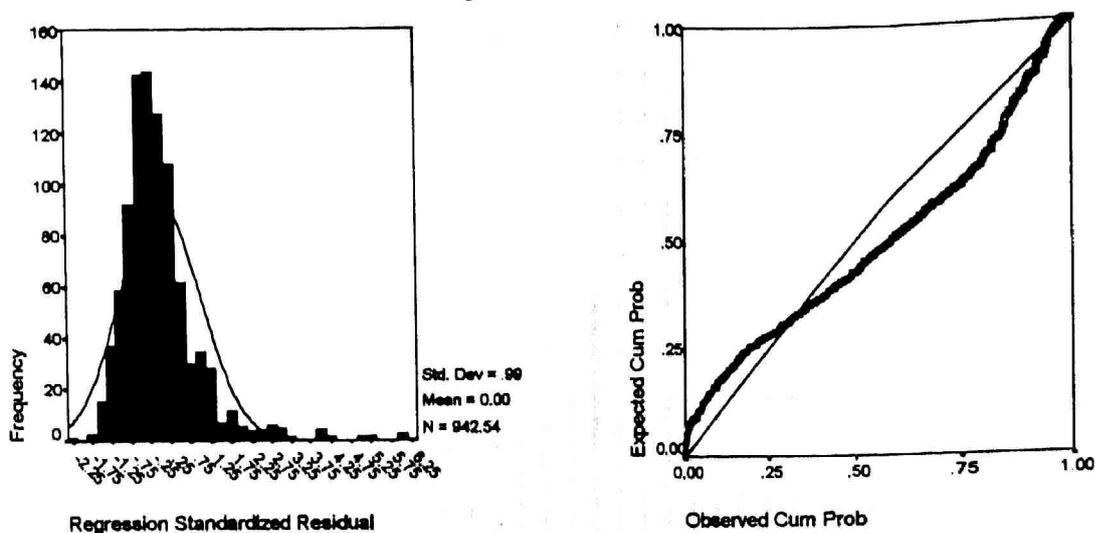
the normal probability plot, the residual can be considered scattering around the diagonal line closely. These all seem to support that the residual is normally distributed.

Figure 6.1 Histogram and normal probability plot of the residual for occupational mobility score final model



For the income mobility score final model, based on the histogram in Figure 6.2, the distribution of the residual and the normal curve imposed look similar. The normal probability plot may indicate slight departure from the normality assumption. Transformation is not chosen as regression is robust to moderate departures from normality and the departure is considered minor. Moreover, the original variable is preferred for the ease of comparability and interpretation.

Figure 6.2 Histogram and normal probability plot of the residual for income mobility score final model

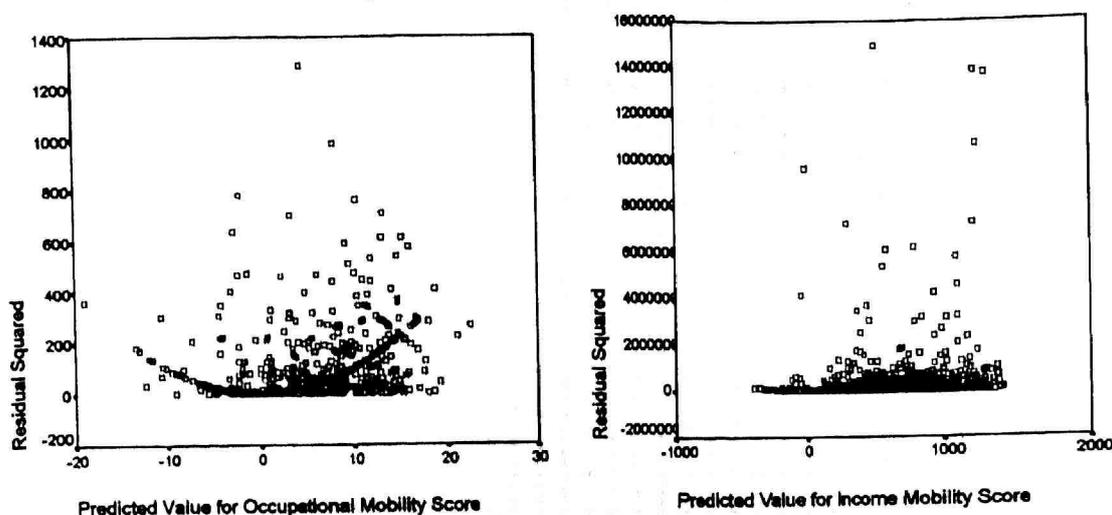


6.5 Heteroscedasticity

The scatter plot of the residual squared against the predicted value suggests there is a systematic pattern, as shown in Figure 6.3. This implies that the assumption of homoscedasticity may be violated. The White general heteroscedasticity test (without interaction terms) rejects the null hypothesis of homoscedasticity (p-value less than 0.001).

The scatter plot of residual squared against predicted income mobility scores shows systematic pattern, indicating the existence of heteroscedasticity. This is shown in Figure 6.3. White general heteroscedasticity test (without interaction term) is used to verify the above finding. Null hypothesis is rejected (p-value less than 0.001), indicating the existence of heteroscedasticity.

Figure 6.3 Scatter plots of the residual squared against the predicted occupational mobility score and income mobility score



The problem of heteroscedasticity is corrected using White's heteroscedasticity-consistent variances and standard errors. The heteroscedasticity-corrected standard errors differ from the uncorrected standard error while the coefficients for variable do not change. So, the p-value changes after the standard error is corrected. The final models for occupational mobility score and income mobility score after corrected for heteroscedasticity are shown in Table 6.6.

In the corrected occupational mobility score model, parent's education level is found to be insignificant. The first job starting income is still insignificant, as shown in the uncorrected final model. The interaction term gender and training provided by employer is marginally significant. The insignificance of the variable parent's education level may indicate that the variance is not the same for different levels of education.

In the corrected income mobility score model, location in which an individual grew up remain insignificant, as shown in the uncorrected final model. The years of academic education and SRP aggregate are insignificant after correcting for heteroscedasticity while days of training provided by employer is significant after

correction. The inconsistency of variance indicated in years of academic education may explain the negative sign of the coefficient, which is contrary to the expectation.

Table 6.6 Final models for occupational mobility score and income mobility score after correcting for heteroscedasticity

Occupational mobility score			Income mobility score		
Variable	Coefficient	p-value	Variable	Coefficient	p-value
Gender	3.243	0.000	Gender	-105.952	0.037
Indian	-3.047	0.048	Chinese	515.663	0.000
Age	1.079	0.002	Indian	380.184	0.002
Paed*	-1.146	0.123	Place grew	79.196	0.163
Academic edu	0.523	0.019	Paoc*	-192.377	0.000
SPM	-0.187	0.081	Academic edu	-25.627	0.133
Voca. train.	0.00387	0.000	SRP	-10.606	0.007
Tenure1	-0.00373	0.000	Train. by emp	0.224	0.088
ISEI 1	-0.458	0.000	ISEI 1	-4.160	0.070
Income1	-0.0006	0.222	Income1	-0.228	0.000
No jobs	-0.432	0.048	Chg job	-205.875	0.000
Gender/High qua	-2.200	0.048			
Gender/ Train. by emp	-1.920	0.102			
R square = 34.2%			R square = 25.4%		
SER = 8.509			SER = 619.84		

* For respondents whose guardian is both father and mother, father's information is used. For respondents with single parent, the single parent's information is used. If the respondents' present guardian is not their parent, then the guardian's information is taken.

6.6 Diagnostics

6.6.1 Occupational mobility score

Based on Mahalanobis distance (D^2), none of the observation has a D^2 that is much larger than other observations in the data set. No observation is identified as an outlier in this data set.

Using Cook's Distance, 50 observations are identified as having disproportionate influence on the occupational mobility score. The Cook's distance threshold level is 0.00426.

For the influential observations, 51% of them are males, which is higher than the proportion among other observations. This is shown in Table 6.7. Bumiputera, Chinese and Indian takes up 58.5%, 27.1% and 14.4% respectively. The percentage of Indian is higher than the proportion in other observations. More than 50% of the respondent's parents receive primary education or lower. Generally, the education level of the influential observation's parents is higher, compared to other observations. Slightly less than two third of them do not further their studies more than two years after SPM. This proportion is higher than the proportion among other observations, which is slightly more than half (53.2%). The average years of academic education received by this group of respondents is slightly less than the average among other observations. The average for the former is 13.5 years while the latter 13.9 years. The average SPM aggregate is 24.6, which is almost the same as in other observations. 29.5% of them suffer downward mobility while 15.7% of them experience horizontal mobility. The percentage who suffers downward mobility is much higher while the percentage who suffer horizontal mobility is much lower, compared to the percentage among other observations. Majority of the influential observations enjoys upward mobility while majority of other observations experience horizontal mobility. Their average first job ISEI score is 44.5, which is lower than the average in the final model. More than half of them has a first job with ISEI score of less than 40. Although there is a higher percentage suffering downward mobility, the average occupational mobility score is 10.5, which is much higher than the average among other observations (3.6). This may be due to the low first job ISEI score. Their average first job starting income is RM814.6, which is lower than the average among other observations.

Removing all the influential observations, the full model is re-estimated again, as shown in Table 6.8. The goodness of fit of the model improves after removing the influential observations. The sign and the significance of the independent variables' coefficients are not affected by the deletion of these observations. Starting income is still the only variables that is insignificant. However, there is a slight change in the magnitude of the coefficient. The magnitude of the coefficient for age, first job ISEI score and number of jobs held drops while the coefficient for gender, parent's education level and interaction term between gender and highest qualification acquired increases. Since the influential observations differ from other observations in the sample, these observations are removed from the sample. So, the model in Table 6.8 is our final model.

Table 6.7 Comparison of distribution of certain variables of influential observations in the occupational mobility score final model with other observations (in percentage)

Variables (N = 50)	Influential observations	Other observations	Variables (N = 50)	Influential observations	Other observations
Gender			Parent's education level*		
Female	49.0	54.2	Primary or below	53.4	61.7
Male	51.0	45.8	Lower secondary	30.9	20.6
Ethnicity			Upper secondary or above	15.7	17.7
Bumiputera	58.5	62.5	Mobility direction		
Chinese	27.1	33.8	Downward	29.5	10.1
Indian	14.4	3.7	Horizontal	15.7	57.9
			Upward	54.8	32.0

* For respondents whose guardian is both father and mother, father's information is used. For respondents with single parent, the single parent's information is used. If the respondents' present guardian is not their parent, then the guardian's information is taken.

Table 6.8 Final model for occupational mobility score after removing influential observations

Variable	Coefficient	p-value	VIF	Beta	Mean
Gender	4.406	0.000	1.531	0.253	0.54
Indian	-3.831	0.006	1.043	-0.083	0.036
Age	0.795	0.003	1.217	0.097	24.8
Paed*	-2.015	0.000	1.145	-0.113	0.38
Academic edu	0.465	0.009	2.399	0.120	13.89
SPM	-0.174	0.000	1.604	-0.179	24.79
Voca. train.	0.00363	0.028	1.093	0.068	60.93
Tenure1	-0.0040	0.000	1.241	-0.246	575.08
ISEI 1	-0.383	0.000	1.681	-0.603	55.12
Incomel	-0.00063	0.216	1.720	-0.048	960.61
No jobs	-0.315	0.068	1.161	-0.058	2.53
Gender/High qua	-3.421	0.001	1.629	-0.122	0.107
Gender/ Train. by emp	-2.167	0.012	1.192	-0.081	0.118

Adjusted R square = 36.5%

SER = 6.92

* For respondents whose guardian is both father and mother, father's information is used. For respondents with single parent, the single parent's information is used. If the respondents' present guardian is not their parent, then the guardian's information is taken.

6.6.2 Income mobility score

Based on Mahalanobis distance (D^2), no observation is identified as an outlier. The D^2 value does not increase greatly from one observation to the other.

Using Cook's distance, 37 observations are identified as influential. The Cook's benchmark is 0.00430.

Among influential observations, over 56% of them are males, which is more than the proportion of males among other observations. This is shown in Table 6.9. Over half of them are Chinese while more than one third of them are Bumiputera. The proportion of non-Bumiputera is much higher among the influential observations, especially the Chinese percentage, compared to other observations. Generally, parent's education level among influential observations is higher, compared to other observations. Slightly more

han half of them have 13 years or less of academic education. The average years of academic education received by the influential observations is almost the same as other observations. The average SRP aggregate is 15.0, which is lower than the average in the final model (17.7). This indicates they performed better in their academic education. Around 88.8% of them enjoy upward mobility. Only four of them suffer downward or horizontal mobility. The proportion who suffers horizontal mobility is lower than the proportion among other observations. The average starting income is RM1342.23, which is higher than the average in the final model (RM948.66). The percentage of influential observations who have starting income of more than RM1000 is 45%, which is higher than the percentage among other observations (38%). The average income mobility is RM2411.11, which is 4.9 times higher than other observations. This group of respondents enjoys more upward income mobility than other observations. This group of respondents generally has high starting income and enjoys high upward income mobility.

Table 6.9 Comparison of distribution of certain variables of influential observations in the income mobility score final model with other observations (in percentage)

Variables (N = 50)	Influential observations	Other observations	Variables (N = 50)	Influential observations	Other observations
Gender			Parent's education level*		
Female	43.7	51.9	Primary or below	34.1	61.4
Male	56.3	48.1	Lower secondary	27.3	21.2
Ethnicity			Upper secondary or above	38.6	17.4
Bumiputera	34.6	61.7	Mobility direction		
Chinese	58.2	34.1	Downward	4.5	6.0
Indian	7.2	4.2	Horizontal	6.7	16.1
			Upward	88.8	78.0

* For respondents whose guardian is both father and mother, father's information is used. For respondents with single parent, the single parent's information is used. If the respondents' present guardian is not their parent, then the guardian's information is taken.

The fit of the model improves after influential observations are removed, as shown in Table 6.10. The sign of the coefficient of the variables also do not vary, except

for years of academic education. Without the influential observations, the effect of years of academic education on income mobility score is positive. The magnitude of the coefficients changes. The coefficients for ethnicity, place in which an individual grew up, SRP aggregate and parent's occupation are smaller in this model. The coefficients for days of training provided by employer and job changing pattern are larger in this model. In short, the influential observations mostly consists of respondents who enjoy more upward income mobility even though they have a high starting income. This characteristic is different from other observations in the sample. So, the model without influential observations in Table 6.10 is our final model.

Table 6.10 Final model for income mobility score after removing influential observations

Variable	Coefficient	p-value	VIF	Beta	Mean
Gender	-112.397	0.001	1.138	-0.105	0.52
Chinese	452.730	0.000	1.561	0.401	0.34
Indian	284.116	0.001	1.114	0.106	0.0415
Place grew	50.617	0.201	1.602	0.047	0.49
Paoc*	-162.336	0.000	1.321	-0.143	0.33
Academic edu	17.680	0.071	1.960	0.074	13.933
SRP	-5.448	0.030	2.000	-0.090	17.69
Train. by emp	0.507	0.000	1.039	0.114	23.722
ISEI 1	-4.101	0.005	1.664	-0.107	54.64
Incomel	-0.278	0.000	1.937	-0.308	948.66
Chg job	-260.527	0.000	1.287	-0.233	0.35

Adjusted R square = 37.4%

SER = 423.37

* For respondents whose guardian is both father and mother, father's information is used. For respondents with single parent, the single parent's information is used. If the respondents' present guardian is not their parent, then the guardian's information is taken.

6.7 Interpretation

6.7.1 Occupational mobility score

The final model explains more than one third of the variation in the occupational mobility score. Based on beta, first job ISEI score is deemed as the most important variable in affecting the occupational mobility score. Its beta absolute value is much higher than any other variables in the model. This is followed by the variable gender and the first job tenure. The least important variable is the first job starting income.

Demographic characteristics

Three demographic characteristics are significant in affecting occupational mobility score in the final model. They are gender, ethnicity and age. In addition, there is an interaction effect between gender and the highest qualification acquired and interaction effect between gender and training provided by employer.

Being a female, an individual enjoys more upward occupational mobility than her male counterparts, holding other things constant. Being an Indian, an individual enjoys less upward occupational mobility, holding other things constant. This may be due to the higher ISEI score of their first job. On average, Indian has a first job with higher ISEI score than other ethnic groups (t -value = -4.081, p -value = 0.000). The lowest first job ISEI score among Indian is 35, which is higher than the overall sample. The higher ISEI score first job appears to become an obstacle for the Indian to climb up further. Being older, an individual enjoys more upward occupational mobility, holding other things constant. This may appear to be contrary to the previous findings. However, a positive

sign is logical as the period studied is an individual's prime period. The older is an individual during his prime period, it is logical that he enjoys more upward occupational mobility.

There is an interaction effect between gender and the highest qualification acquired. Being a female with degree qualification, she enjoys less upward occupational mobility than her counterparts, holding other things constant. This may be due to the first job she gets. With a degree qualification, she starts off her career with a higher ISEI score first job. This impedes the upward movement she is able to climb. The average first job ISEI score for females with degree qualification is significantly higher than others (t -value = -11.061, p -value = 0.000). Moreover, the minimum first job ISEI score for this group is 30, which is much higher than the minimum ISEI score of the overall sample, i.e. 16.

There is an interaction effect between gender and training provided by employer. Having received training by employer renders a female individual less upward mobility, compared to her counterparts, holding other things constant. However, this variable is insignificant after correcting for heteroscedasticity.

Family background

Family background plays a role in affecting the occupational mobility of an individual. The aspect that is found to be significant is the parent's education level. Holding other things constant, an individual enjoys less upward occupational mobility if his parent has secondary school education or above. An individual, whose parent has secondary school education or more, held a first job with higher ISEI score, compared to his peers (t -

value = -4.295, p-value = 0.000). The higher starting ground may become an obstruction for the individual to climb up. This may explain why he enjoys less upward occupational mobility. Nevertheless, this variable is insignificant after correcting for heteroscedasticity, implying inconsistency of variance.

Human capital investment

Two aspects of human capital investment are significant. They are the amount of human capital investment and academic performance. The amount of human capital investment is measured using years of academic education, days of vocational training and first job tenure. The academic performance is graded using the SPM aggregate.

Holding other things constant, extra years of academic education enables an individual to enjoy more upward occupational mobility. Extra vocational training also helps an individual to climb up higher on the ISEI scale, holding other things constant. These two variables are measurements to evaluate the “trainability” of an individual. The human capital investment an individual accumulates assists him to excel in work as he may be more efficient in learning relevant techniques in his job. This excellent performance in job helps him to climb to higher positions with higher ISEI scores.

First job tenure has a negative effect on occupational mobility score. Holding other things constant, the longer an individual works in his first job, the less upward occupational mobility he is going to enjoy. The longer an individual stays in the first job, the more reluctant he is going to move as he enjoys more security in his current job. It may also show that he is lack of the desire to improve himself for career advancement or he is satisfied with his current condition. If an individual stays in the first job for too

long, he might be less inclined to change to new environment and this may make the employer more reluctant to promote him. Furthermore, there is limited opportunity to move up in a firm, compared to the opportunity in the whole labour market. So, he enjoys less upward mobility. Besides, this result for first job tenure may indicate that it is not a good measure of human capital investment, as noted in Chapter 2.

The better the SPM result of an individual, the more he is going to move upward on the ISEI scale. The coefficient of the SPM aggregate has a negative sign as lower SPM aggregate indicates better result. The more excellent the academic performance, the higher an individual is going to climb, holding other terms constant. This may be due to the attitude of the individual. If he is a high achiever in his studies, he tends to apply the same attitude in his career. This in turn helps him to excel in his work and promises career advancement.

Employment

Three employment aspects are deemed to be important in this model. They are the first job ISEI score, starting income and the number of jobs held before.

The first job ISEI score has a negative effect on the occupational mobility score. The higher the score of the first job, the less upward movement he is going to enjoy, holding other things constant. There may be a ceiling effect. Since the individual is already on the higher end of the ISEI scale, there is less space for him to move up further, compared to an individual who starts his career with a lower ISEI score job. Moreover, the competition is likely to be much stronger as excellent individuals are more tentative to start off their career at the higher end of the ISEI scale.

First job starting income has a negative effect on occupational mobility score. Holding other things constant, the higher is an individual's starting income, the less upward occupational mobility he is going to enjoy. This variable is significant in the beginning stage, however, it becomes insignificant in the later stage. This may indicate that the net effect of this variable operated through other variables and the inconsistency of variance. If an individual has high income, he may be reluctant to move and he is more likely to be satisfied with his current condition. So, this may be the reason why he does not move up the occupation ladder as much as others.

The number of jobs held has a negative effect on occupational mobility score. The more jobs an individual held, the less upward occupational mobility he is going to enjoy, holding other things constant. Employer may view the frequent job hopping negatively as this may indicate the individual's job commitment is limited. Hence, employer is reluctant to give him high post. So, he enjoys less upward occupational mobility.

6.7.2 Income mobility score

The final model explains more than one third of the variation in income mobility score. Ethnicity as Chinese has the largest beta value, indicating that it is the most important variable. This is followed by first job starting income and job changing pattern. The least important variable is the place in which an individual grew up (see Table 6.10).

Demographic characteristics

Gender, ethnicity and the place in which an individual grew up are the attributes that are significant in the income mobility score model. A female individual enjoys less upward income mobility than a male individual. Holding other things constant, on average, the income increment enjoyed by a female is RM112 less than a male.

Being a Chinese, holding other things constant, an individual enjoys an average of RM453 more increment in monthly income from his first job, compared to his Bumiputera counterparts. Being an Indian, holding other things constant, an individual enjoys an average of RM284 more income increment, compared to his Bumiputera counterparts.

Growing up in an urban area helps an individual to achieve more upward income mobility. He earns on average RM51 more income increment than an individual who grew up in a rural area. This may be due to the wide working exposure he gets when he grew up in urban area. This variable is significant in the beginning stages, but it becomes insignificant in the later stages, especially after correcting for heteroscedasticity. This may indicate inconsistency of variance.

Family background

Having parent working as an agricultural worker has adverse effect on the income mobility enjoys by an individual. Holding other things constant, an individual with parents working in the agricultural field has on average RM162 less income increment, compared to others. Among those respondents whose parents work in the agricultural sector, 80% of them are Bumiputera.

Human capital investment

Amount of human capital investment, measured using years of academic education and days of training provided by employer, influences the income mobility score an individual achieves. Besides, academic performance is also another variable affecting income mobility score. It is measured using the SRP aggregate.

The more years of academic education an individual possesses, the more upward income mobility he enjoys. Holding other things constant, the income increment of an individual increases by RM18 on average for every one year increase in academic education. This is the general pattern noticed. However, if the influential observations are not removed, a negative effect is noted. This may be due to the effect imposed by the influential observations.

Training provided by employer assists an individual to achieve more upward income mobility. Holding other things constant, on average, an extra year of training provided by employer increases the income increment by RM 185. Employer may be more willing to pay higher income to keep employees with job-related training as this can help to save him time and resources to train up new employees who have limited job-related knowledge. This variable is significant in the first stage. However, it becomes insignificant in the third stage. After heteroscedasticity is corrected and the influential observations are removed, its net effect is significant.

SRP is statistically significant and has a negative coefficient. Holding other things constant, the lower the SRP aggregate (better result), the more income increment an individual is going to enjoy, compared to his first job starting income. This may be due to

the same rationale suggested in the previous part. However, it is insignificant after correcting for heteroscedasticity. This may indicate the variance is inconsistent.

Employment

First job ISEI score has a negative effect on income mobility score. Higher first job ISEI score reduces the upward income mobility an individual enjoys.

First job starting income is significant in affecting income mobility score. There is a significant inverse relationship. The higher an individual's starting income, the less income increment he is going to experience, holding other things constant. Every hundred Ringgit increase in first job income reduces the income increment by RM28 on average. There is less room for an individual to move up if he has a high starting income.

An individual enjoys less upward income mobility if he does not change occupation as well as employer in his current job, compared to his first job. Holding other things constant, he enjoys on average RM261 less increment, compared to others who either change occupation or employer or both. This type of job changing pattern may reflect his attitude. This may reflect that he is a risk averse. He is not adventurous to try out opportunities in other companies and other fields. This may also imply that he is less adaptable to environmental changes. This type of characteristic impedes his career advancement. Another possible reason is the individual does not change job because his first job is his dream job. Among respondents who do not change occupation or employer, over 50% of them agree that their first job is their dream job.

6.8 Comparison between occupational mobility and income mobility

This section aims to compare the model for occupational mobility score and income mobility score. The aspects looked into are: the independent variables that are significant and the relative importance of the independent variables.

For demographic characteristics, occupational mobility score and income mobility score are affected by gender and ethnicity. For occupational mobility, age is another important variable. For income mobility, the place in which an individual grew up is also considered influential.

Being a female, an individual enjoys more upward occupational mobility. But, she enjoys less upward income mobility.

The effect of ethnicity is different in both model. In the occupational mobility score model, the net effect of ethnicity as Indian is significant. Indian enjoys less upward occupational mobility, compared to others. In income mobility model, the net effect of ethnicity as Chinese and Indian is significant. Chinese and Indian earn more upward income mobility than Bumiputera.

For occupational mobility score model, age has positive net effect. For income mobility, place in which an individual grew up is a significant variable. Growing up in an urban area assists an individual to gain more upward income mobility.

In addition, there is an interaction effect between gender and human capital investment in the occupational mobility score model, which is not found in the income mobility score model. Being a female with degree qualification or training provided by employer restricts career advancement in term of upward occupational mobility, compared to others.

Different aspects of family background are significant in the occupational mobility model and income mobility model. In occupational mobility model, parent's educational level is important. Having parents with better education restricts an individual from moving upward. In income mobility model, parent's occupation group is influential. Having parents working in the agricultural sector reduces the income increment an individual enjoys.

In both models, human capital investment related variables are significant. Amount of different type of human capital investment and academic performance are important in affecting mobility score.

In occupational mobility score model, amount of human capital investment is measured using years of academic education, days of vocational training and first job tenure. Amount academic education and vocational training have a positive effect while first job tenure has an adverse effect. In income mobility score model, amount of human capital investment is measured using years of academic education and training provided by employer. Both measure have a positive effect.

For academic performance, SPM aggregate affects occupational mobility score while SRP aggregate affects income mobility score. Both have an adverse effect with the respective mobility score. This implies that better result helps an individual to gain more upward occupational and income mobility.

For occupational mobility, first job ISEI score, starting income and number of jobs have adverse effect. Higher first job ISEI score, starting income and more jobs held before reduce the upward occupational mobility an individual enjoys. For income mobility, first job ISEI score and starting income also has adverse effect. Starting off with

a first job, which offers high ISEI score or high income, does not encourage a great jump in career advancement. In addition, job changing pattern is significant in affecting income mobility score. Having stayed in the same occupation and employer reduces the income increment an individual can achieve.

The most important variable for occupational mobility score and income mobility score is first job ISEI score and ethnicity as Chinese respectively. The moderately important variables for occupational mobility are gender and first job tenure. The moderately important variables for income mobility score are first job starting income and job changing pattern. The least important variable for each of the score is first job starting income and the place in which an individual grew up.

6.9 Conclusion

The career advancement an individual achieves can be measured using occupational mobility and income mobility. Variables that affect career advancement measured using occupational mobility are slightly different from the variables that affect career advancement measured using income mobility.

Demographic characteristics, family background, human capital investment and employment are the variables affecting career advancement, measured using either occupational mobility or income mobility. The distinction between these two measurements lies in the different perspective that is deemed important in each model. This may be due to the difference in the aspects that are studied in these two measurements. Occupation ISEI score reflects more on the intrinsic values and it evaluates more of the non-pecuniary return a job can offer. On the other hand, income is

one of the main forms of pecuniary return and it represents more of the extrinsic values that a job offers.

The models shows the general pattern observed among the young school leavers. Nevertheless, there is a group of outliers who shows a different pattern from the general pattern. This group of outliers enjoys more upward mobility, compared to the general pattern. This group of outliers has a higher proportion of Indian. Nevertheless, the sample size of Indian is relatively small to draw any conclusion.

For occupational mobility, there is a higher proportion of respondents who experience upward or downward mobility among the outliers group. In the general pattern, horizontal mobility is more common. Generally, among the Indian, there is a higher percentage of respondents who suffer downward mobility. However, this group of outliers has a lower proportion of Indian who suffers downward mobility and a much higher proportion of Indian who enjoys upward mobility.

For income mobility, among this group of outliers, the proportion that enjoy upward mobility is higher, compared to the general trend. However, Bumiputera is more likely to suffer downward mobility among this group of outliers, compared to the general trend.