Assignment -3

Australia's Borrowing and Savings Report

(Analysis based on Education Level)

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Introduction

The report is based on data from World Bank, which shows how adults in Australia manage their day-to-day finances in terms of spending, borrowing, savings, monthly income, government assistance. It also gives an idea about how education level of the adults and their monthly income affect the borrowing and savings by them.

Also, a comparison is made between Gender and Monthly income to determine if there is any difference between the average monthly income of male and female. This is done using hypothesis testing (ttest).

Methods

The data for this report is sourced from worldbank.org Global Findex. There are 1002 observations (adults surveyed) and nearly 48 variables from 6 different files covering information on demographics, government assistance, borrowing, savings, reasons for not having bank account and others. There are 17 missing observations for variable Education. Most of the variables are categorical except few such as wpid, weight, age and monthly income.

The software/tools used for data analysis is SAS Studio. The statistical analysis test such as 'Anova' and 'ttest' are carried out to find if monthly income is different based Education level and Gender, respectively. Most of the analysis is done using frequency table as the variables are categorical.

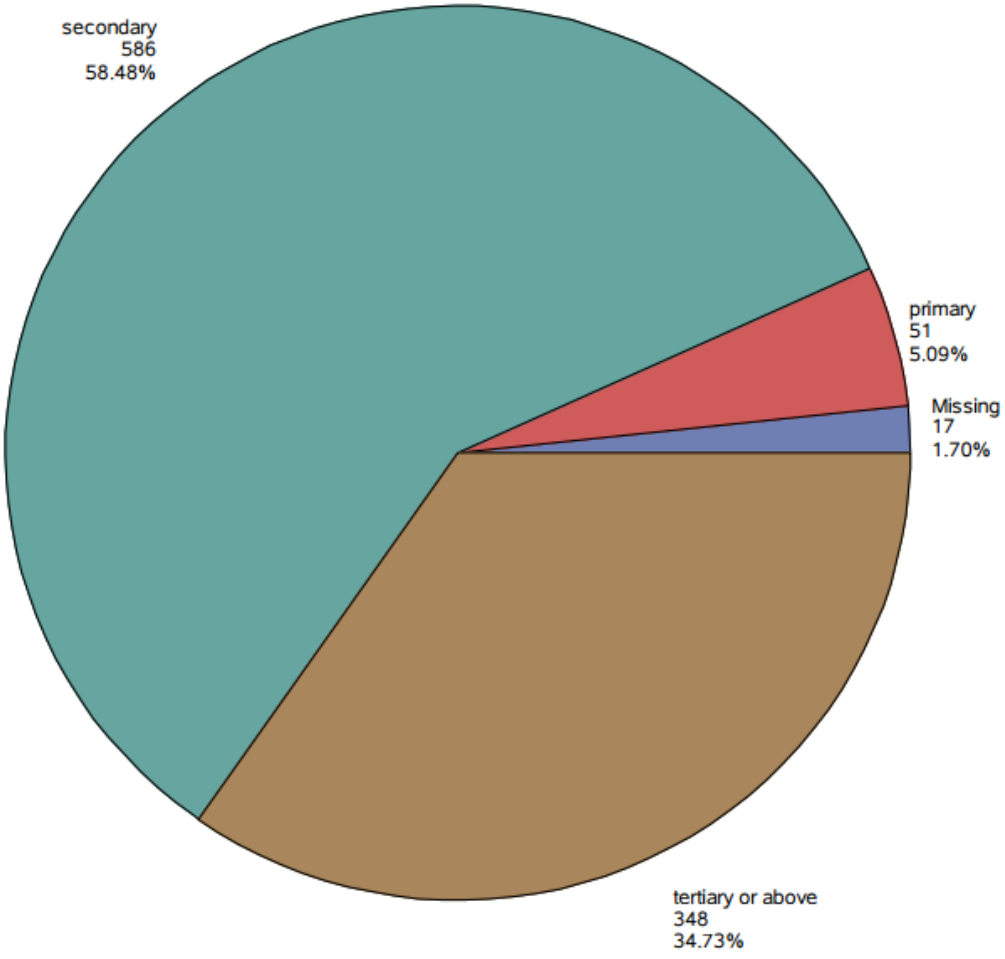
Results

A study of the frequency table for variable Education suggests that most of the adults in Australia (~58% of 1002) are secondary level educated.

Overview of Education Level

The FREQ Procedure

Education	Frequency	Percent
Missing	17	1.70
primary	51	5.09
secondary	586	58.48
tertiary or above	348	34.73



Education Level vs Monthly Income

We do Anova test to determine if the education level of the adult makes any difference to their monthly income. From, the Anova Procedure we find that the p-value is 0.0001, which is less than the alpha of 0.02, we reject the null hypothesis. This means that the result is statistically significant and there is difference between the means of the monthly income of adults with "primary", "secondary" and "tertiary & above" education level. This is also evident from the box plot below.

The ANOVA Procedure

Class Level Information		
Class	**Levels**	**Values**
Education	3	primary secondary tertiary or above

Number of Observations Read	1002
Number of Observations Used	985

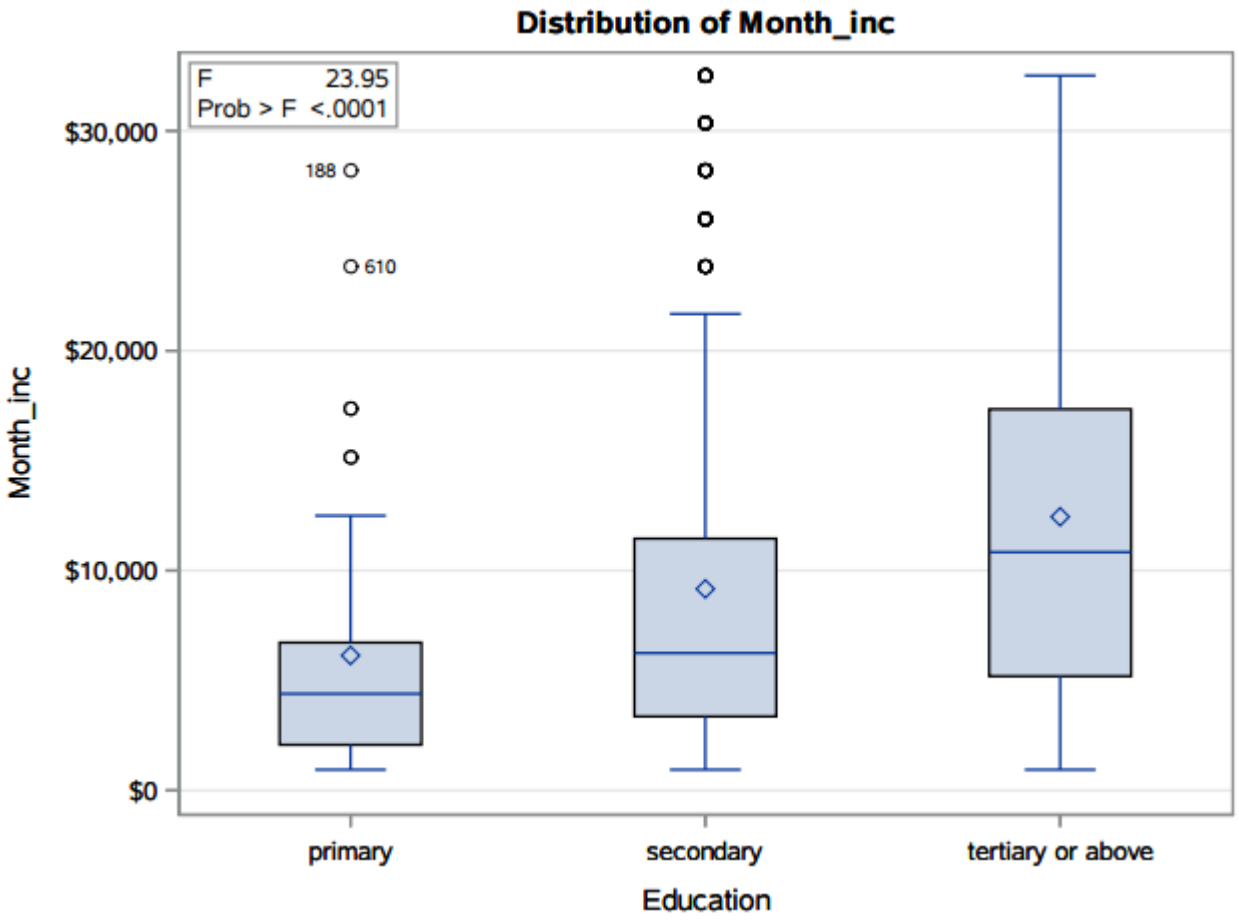
The ANOVA Procedure

Dependent Variable: Month_inc

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	3221431512	1610715756	23.95	<.0001
Error	982	66034974151	67245391		
Corrected Total	984	69256405663			

R-Square	Coeff Var	Root MSE	Month_inc Mean
0.046515	80.65363	8200.329	10167.34

Source	DF	Anova SS	Mean Square	F Value	Pr > F
Education	2	3221431512	1610715756	23.95	<.0001


Distribution of Month_inc
F 23.95
Prob > F <.0001
$30,000
$20,000
$10,000
$0
188
610
Month_inc
primary
secondary
tertiary or above
Education

Borrowing and Savings Analysis

A study of the borrowing behaviour based on education level suggests that of the total 1002 adults, nearly 36% borrowed money. Of this, adults with secondary level of education borrowed the highest (21%) followed by tertiary (~14%) and primary (1%). This could be possible due to the lower average level of monthly income of the primary level educated adults.

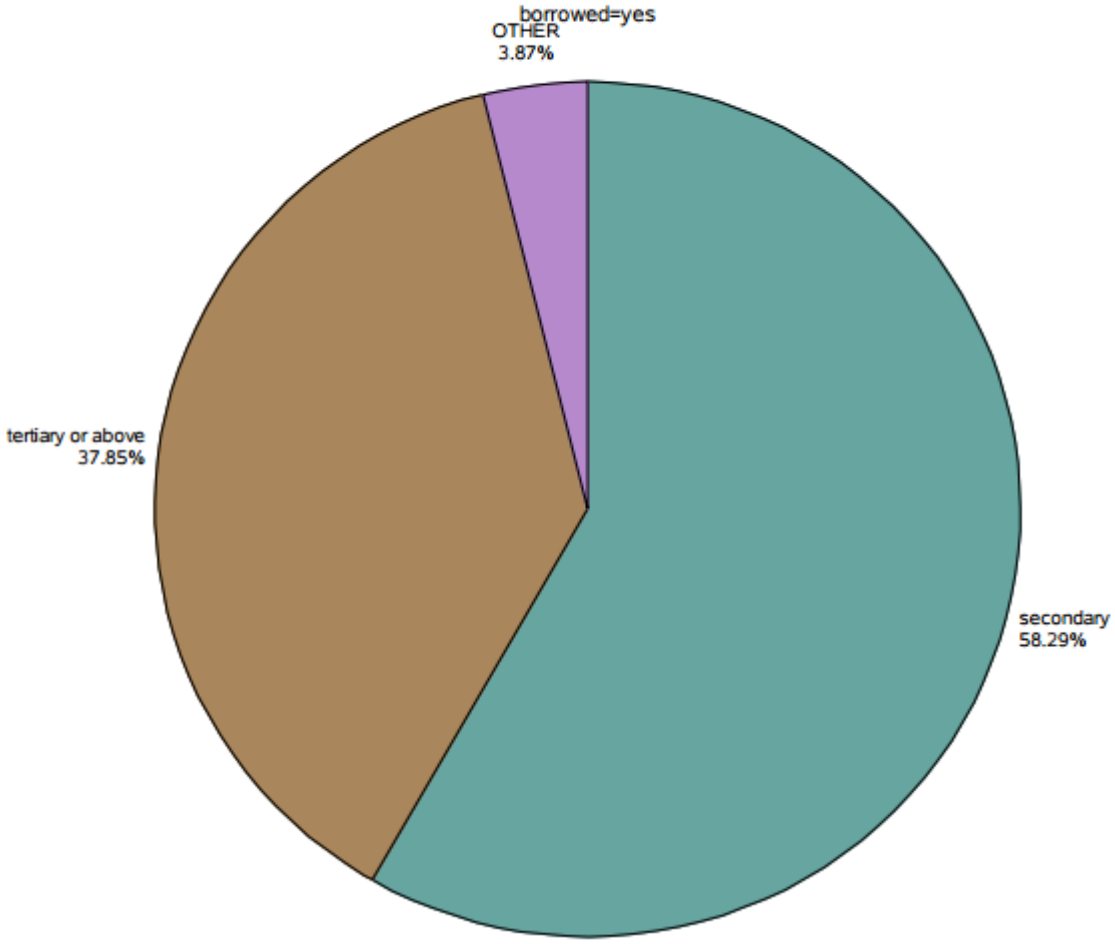
Number of Borrowings

The FREQ Procedure

Frequency Percent	Table of Education by borrowed		
	borrowed		
Education	no	yes	Total
Missing	14 1.40	3 0.30	17 1.70
primary	40 3.99	11 1.10	51 5.09
secondary	375 37.43	211 21.06	586 58.48
tertiary or above	211 21.06	137 13.67	348 34.73
Total	640 63.87	362 36.13	1002 100.00

The pie chart shows that of the total number of adults who borrowed money (362), the highest proportion is for secondary level of education (~58% of 362).

Pie Chart showing % of adults who borrowed (grouped by education level)



A study of savings behaviour based on education level suggests that of the total 1002 adults, nearly 82% saves money. Of this, adults with secondary level of education saves the highest (46%) followed by tertiary (~31%) and primary (~3%). A very low savings proportion could be possible due to the lower average level of monthly income of the primary level educated adults.

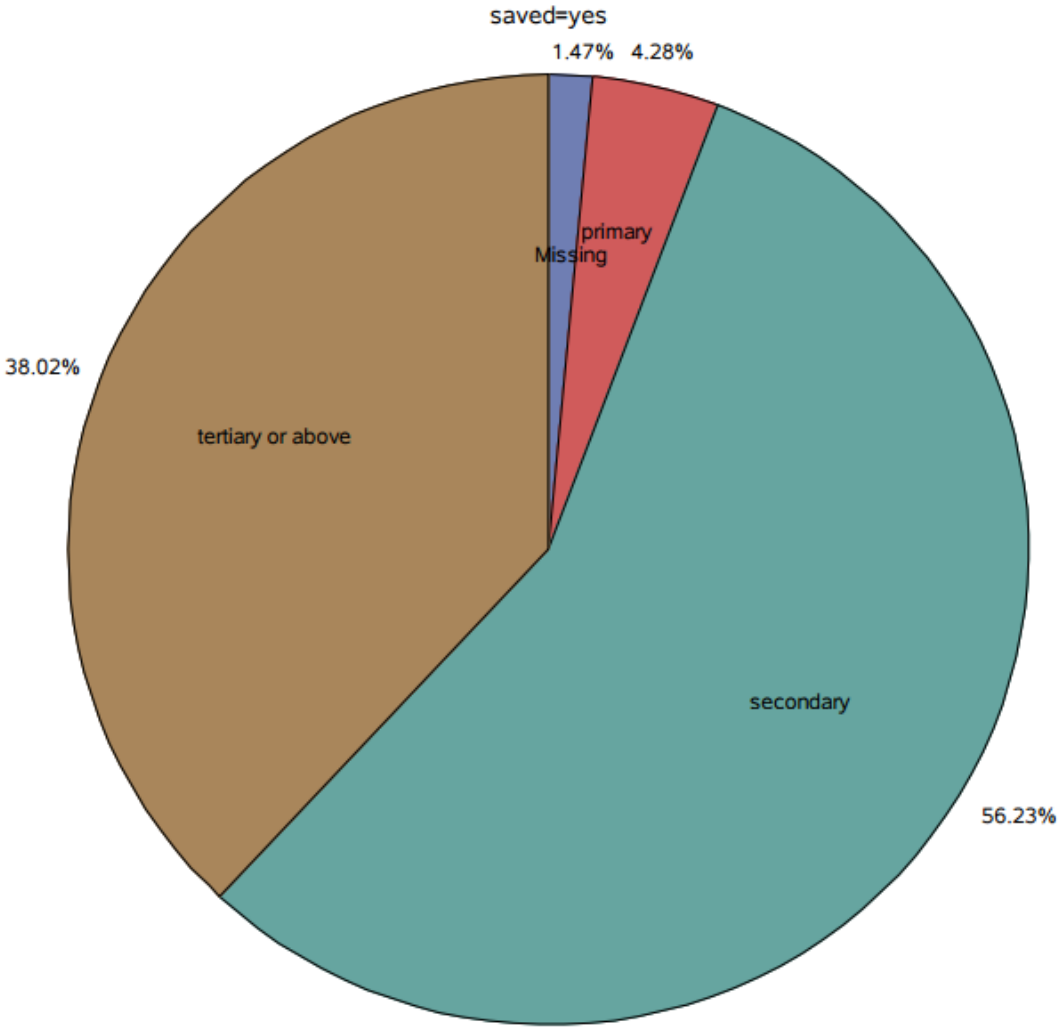
Number of Savings

The FREQ Procedure

Frequency Percent	Table of Education by saved		
	saved		
Education	no	yes	Total
Missing	5 0.50	12 1.20	17 1.70
primary	16 1.60	35 3.49	51 5.09
secondary	126 12.57	460 45.91	586 58.48
tertiary or above	37 3.69	311 31.04	348 34.73
Total	184 18.36	818 81.64	1002 100.00

The pie chart shows that of the total number of adults who saved money (818), the highest proportion is for secondary level of education (~56% of 818).

Pie Chart showing % of adults who saved (grouped by education level)



Reasons for Borrowings

The reasons for borrowings are:- for education and school fees, medical purpose and farm/business purposes. We find that the secondary level educated adults borrow the most in each category.

Frequency of Borrowing for reason q22a-Education or School Fees

The FREQ Procedure

Frequency Percent	Table of Education by q22a			
	q22a			
Education	(dk)	no	yes	Total
Missing	0 0.00	17 1.70	0 0.00	17 1.70
primary	0 0.00	51 5.09	0 0.00	51 5.09
secondary	1 0.10	559 55.79	26 2.59	586 58.48
tertiary or above	0 0.00	335 33.43	13 1.30	348 34.73
Total	1 0.10	962 96.01	39 3.89	1002 100.00

Frequency of Borrowing for reason q22b-Medical Purpose

The FREQ Procedure

Frequency Percent	Table of Education by q22b		
	q22b		
Education	no	yes	Total
Missing	17 1.70	0 0.00	17 1.70
primary	49 4.89	2 0.20	51 5.09
secondary	547 54.59	39 3.89	586 58.48
tertiary or above	334 33.33	14 1.40	348 34.73
Total	947 94.51	55 5.49	1002 100.00

Frequency of Borrowing for reason q22a-Farm/Business Purpose

The FREQ Procedure

Frequency Percent	Table of Education by q22c		
	q22c		
Education	no	yes	Total
Missing	17 1.70	0 0.00	17 1.70
primary	51 5.09	0 0.00	51 5.09
secondary	575 57.39	11 1.10	586 58.48
tertiary or above	328 32.73	20 2.00	348 34.73
Total	971 96.91	31 3.09	1002 100.00

Government Assistance

From the study of govt assistance taken by adults, we find that 44% of the total adults sought government support, of which highest was from secondary level educated adults.

Frequency of Govt Assistance for reason q39

The FREQ Procedure

Frequency Percent	Table of Education by q39		
	q39		
Education		yes	Total
Missing	7 0.70	10 1.00	17 1.70
primary	24 2.40	27 2.69	51 5.09
secondary	301 30.04	285 28.44	586 58.48
tertiary or above	226 22.55	122 12.18	348 34.73
Total	558 55.69	444 44.31	1002 100.00

Monthly income vs Gender

The study is done to determine if there is any difference between the average monthly income based on Gender. We did hypothesis testing using t-test and alpha of 0.05. A p value of 0.003 suggests the test is statistically significant and we reject our null hypothesis. So, there is a noticeable difference in the monthly income of male and female in Australia.

The TTEST Procedure

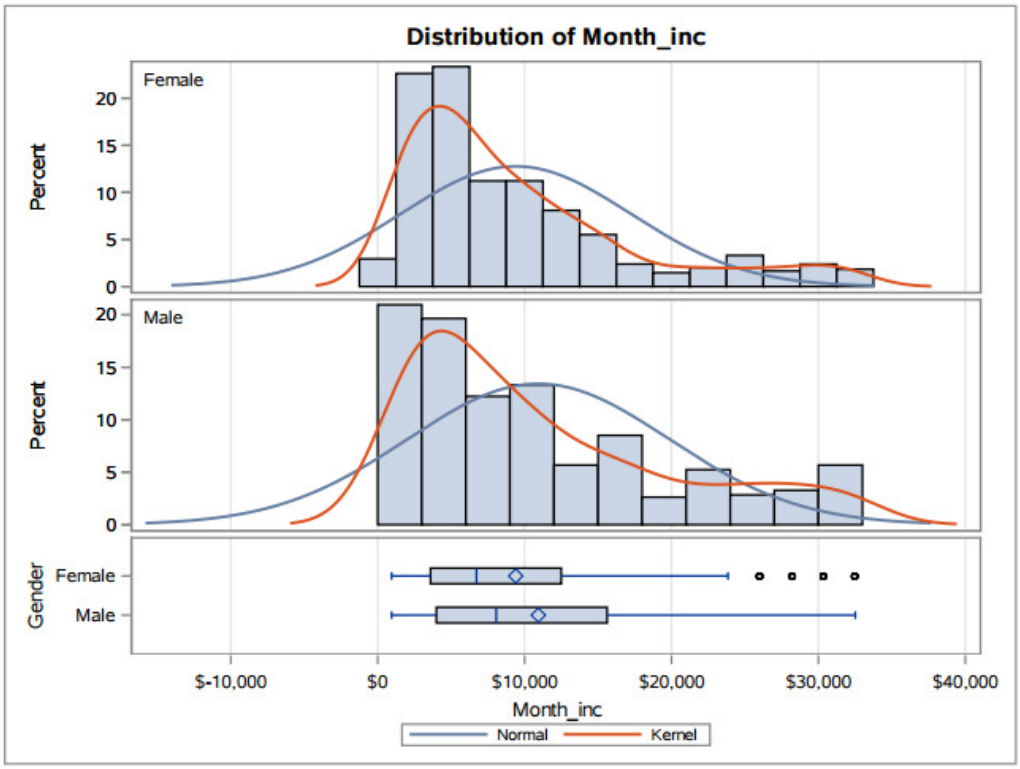
Variable: Month_inc

Gender	N	Mean	Std Dev	Std Err	Minimum	Maximum
Female	544	9393.7	7814.3	335.0	943.0	32513.0
Male	458	10933.7	8912.5	416.5	943.0	32513.0
Diff (1-2)		-1540.0	8334.1	528.5		

Gender	Method	Mean	95% CL Mean		Std Dev	95% CL Std Dev	
Female		9393.7	8735.5	10051.8	7814.3	7375.9	8308.5
Male		10933.7	10115.3	11752.1	8912.5	8370.3	9530.4
Diff (1-2)	Pooled	-1540.0	-2577.2	-502.9	8334.1	7984.4	8716.2
Diff (1-2)	Satterthwaite	-1540.0	-2589.0	-491.1			

Method	Variances	DF	t Value	Pr > |t|
Pooled	Equal	1000	-2.91	0.0036
Satterthwaite	Unequal	916.78	-2.88	0.0041

Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	457	543	1.30	0.0033



Also, percentage of male and female borrowings are almost same, however, percentage of savings is more for female.

Male/Female Borrowings & Savings

The FREQ Procedure

Frequency Percent	Table of Gender by borrowed		
	borrowed		
Gender	no	yes	Total
Female	356 35.53	188 18.76	544 54.29
Male	284 28.34	174 17.37	458 45.71
Total	640 63.87	362 36.13	1002 100.00

Frequency Percent	Table of Gender by saved		
	saved		
Gender	no	yes	Total
Female	106 10.58	438 43.71	544 54.29
Male	78 7.78	380 37.92	458 45.71
Total	184 18.36	818 81.64	1002 100.00

Conclusion

From the above findings, we conclude that most of the Australian adults are secondary level educated. Tertiary level educated adults have highest average monthly income followed by secondary and then primary level. The average monthly income of the male is higher than the average monthly income of female. Also, female saves more than male.

From the study of the borrowings and savings pattern, we conclude that secondary level educated adults comparatively borrow more and saves more. Also, almost 44% of Australians seek govt support.

Appendix

APPENDIX OF SAS CODES	

Question.1	libname GFI "/home/s33989790/Assgmnt/Assg_3";
	
	/*Read Demographics data in SAS*/
	data demographics;
	Informat wpid 12. wgt 2. female 1. age 2. educ 1. Month_inc dollar10.0;
	infile "/home/s33989790/Assgmnt/Assg_3/Demographics.csv" delimiter="," firstobs=2 dsd missover;
	input wpid wgt female age educ Month_inc;
	format Month_inc dollar10.0;
	run;
	
	/*Read Borrowed data in SAS*/
	data borrowed;
	infile "/home/s33989790/Assgmnt/Assg_3/Borrowed.csv" delimiter="," firstobs=2 dsd missover;
	input wpid q21a:$4. q21b:$4. q21c:$4. q21d:$4. q22a:$4. q22b:$4. q22c:$4.;
	run;
	
	data Q17;
	infile "/home/s33989790/Assgmnt/Assg_3/Q17.csv" delimiter="," firstobs=2 dsd missover;
	input wpid q17a:$4. q17b:$4. q17c:$4. q18a:$4.;
	run;
	
	data Q8;
	infile "/home/s33989790/Assgmnt/Assg_3/Q8.csv" delimiter="," firstobs=2 dsd missover;
	input wpid q8a:$4. q8b:$4. q8c:$4. q8d:$4. q8e:$4. q8f:$4. q8g:$4. q8h:$4. q8i:$4.;
	run;

overview	proc freq data = GFI.new_demographics;
	Title "Overview of Education Level";
	table education / norow nocol nocum Missing;
	run;
	
	proc gchart data=Q1;
	title "% of Diff Education Level";
	pie Education / slice=outside percent=outside;
	run;
	quit;

Question.2	PROC SQL; CREATE Table GFI.new_Demographics as select *, (case when educ = 1 then "primary" when educ = 2 then "secondary" when educ = 3 then "tertiary or above" else "Missing" END) as Education, (Case when female = 1 then "Female" when female = 0 then "Male"

	else "Missing" end) as Gender from demographics; QUIT;

Question.3	ods graphics on;
	PROC ANOVA data=GFI.new_Demographics;
	class Education;
	model Month_inc = Education;
	means Education / alpha = 0.02;
	RUN;

Question.4	Proc SQL; Create Table Q1 as Select d.*, b.* from GFI.new_demographics as d Left Join Borrowed as b ON d.wpid = b.wpid; Quit; Proc freq data = Q1; title "Frequency of Borrowing for reason q22a-Education or School Fees"; tables Education * q22a / norow nocol nocum; run; Proc freq data = Q1; title "Frequency of Borrowing for reason q22b-Medical Purpose"; tables Education * q22b / norow nocol nocum; run; Proc freq data = Q1; title "Frequency of Borrowing for reason q22a-Farm/Business Purpose"; tables Education * q22c / norow nocol nocum; run;
Borrowed	Proc SQL; Create Table Q4 as Select d.*, t.* from GFI.new_demographics as d Left Join GFI.table_1 as t ON d.wpid = t.wpid_random; Quit; Proc freq data = Q4; title "Number of Borrowings"; tables Education * borrowed / norow nocol nocum; run; proc gchart data=Q4 (where=(borrowed ="yes")); title "Borrowed % for Diff Education Level"; pie Education / group=saved across=1 clockwise value=none

	slice=inside percent=outside; run; quit;

Saved	Proc freq data = Q4;
	title "Number of Savings";
	tables Education * saved / norow nocol nocum;
	run;
	
	proc gchart data=Q4 (where=(saved ="yes"));
	title "Savings % for Diff Education Level";
	pie Education / group=saved
	across=1
	clockwise value=none
	slice=inside percent=outside;
	run;
	quit;

Question.5	Proc SQL; Create Table Q2 as Select d.*, g.* from GFI.new_demographics as d Left Join GFI.government as g ON d.wpid = g.wpid_random; Quit; Proc freq data = Q2; title "Frequency of Govt Assistance for reason q39"; tables Education * q39 / norow nocol nocum Missing; run;
Question.6	PROC ttest data=GFI.new_demographics alpha=0.05; class Gender; var Month_inc; RUN;