

## STAT 826 Week2 Practical 42396603

### Question 4

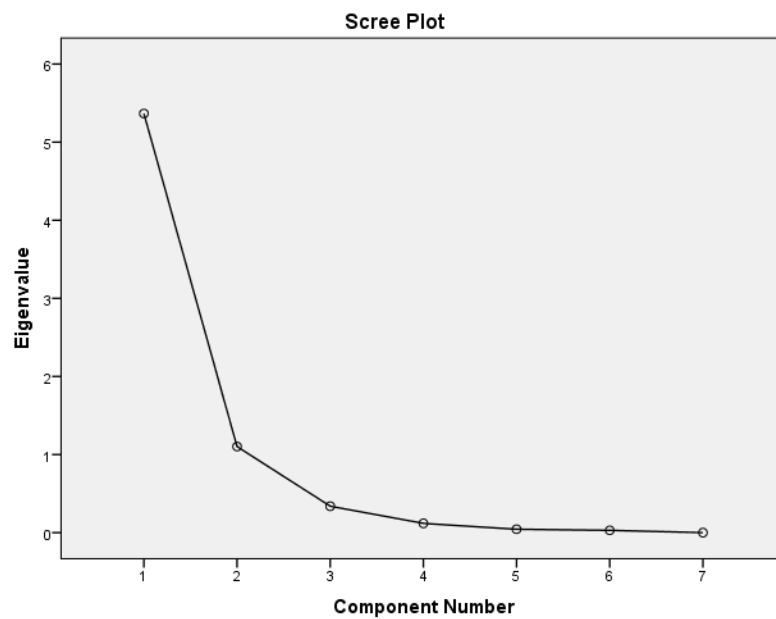
- a. As can be seen from the descriptive statistics below, the variances vary largely from 155,141,684.055 to 19,549.855, which shows the variables are not on “an equal footing”. This indicates that it is worth considering standardizing the data and conducting PCA on correlation instead of covariance.

Descriptive Statistics						
	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Walked only	11	68	1616	570.55	565.875	320214.073
Other mode	11	53	858	279.00	270.702	73279.800
Mode not stated	11	111	496	233.36	139.821	19549.855
Worked at Home or Did not go to Work	11	680	5273	1907.09	1481.701	2195436.491
Masss Public Transport	11	577	9225	3164.09	3176.534	10090365.291
By Car	11	5837	32772	12658.36	8221.177	67587758.855
Total Employment	11	8919	47494	18812.36	12455.588	155141684.055
Valid N (listwise)	11					

- b. i)  
2 principle components should be considered based on the output. It can be seen from the below table that 92% of the variation can be explained by the first two PCAs, which is acceptable. The scree plot further proves that 2 PCs are required as the points are in a straight line from the third eigenvalue onwards.

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.366	76.663	76.663	5.366	76.663	76.663
2	1.103	15.751	92.414	1.103	15.751	92.414
3	.339	4.836	97.251			
4	.119	1.700	98.951			
5	.044	.628	99.578			
6	.030	.422	100.000			
7	2.149E-10	3.070E-9	100.000			

Extraction Method: Principal Component Analysis.



ii)

PC scores for the first two PCs are as below. By checking the scores plot for 1<sup>st</sup> two PCs, it is obvious that Randwick Education and Health, St Lenards Office Cluster, Macquarie Business Park and Sydney Airport and Environs are potential outliers among all.

FAC1_1	FAC2_1
-.52890	-.87717
-.76105	.37865
1.96312	-.38656
-.40253	-.91937
-.64515	-.45930
-.22697	1.85386
-.57606	-.10565
.96007	1.80538
1.56677	-1.05447
-.81386	-.24921
-.53546	.01382

