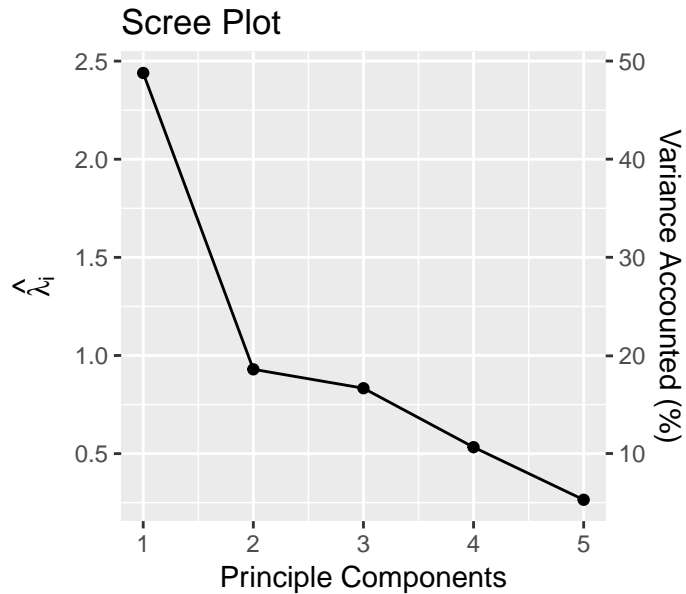# Q5: Food Price

(a) Scree Plot, PCs, Interpretation

Scree Plot

By either the "elbow" of the scree plot or the unity criterion, **one principle component** is sufficient, which explains **48.79%** of the total variance.

	PC1	PC2	PC3	PC4	PC5
food1	-0.510	0.056	-0.402	-0.532	-0.541
food2	-0.520	-0.278	-0.407	0.071	0.694
food3	-0.397	0.099	0.768	-0.430	0.238
food4	-0.291	0.877	-0.071	0.373	0.052
food5	-0.476	-0.376	0.277	0.623	-0.409

(b) The First Two principal component scores

city	PC1	PC2
Anchorage	-4.58	0.53
Atlanta	-0.32	-0.08
Baltimore	-0.36	-1.10
Boston	-0.57	-1.62
Buffalo	2.64	-1.17
Chicago	-0.51	1.29
Cincinnati	-0.27	-0.79
Cleveland	0.74	0.27
Dallas	-0.38	0.92
Detroit	0.20	-1.53
Honolulu	-2.80	0.91

city	PC1	PC2
Houston	0.46	1.34
Kansas_City	0.42	-0.39
Los_Angeles	1.55	1.17
Milwaukee	1.28	0.54
Minneapolis	0.73	-0.60
New_York	-1.29	-0.92
Philadelphia	-2.10	-0.80
Pittsburgh	0.32	-1.08
St_Louis	1.25	0.02
San_Diego	2.12	0.68
San_Francisco	0.71	1.32
Seattle	1.00	0.34
Washington	-0.25	0.74

(c) Scatter Plot: PC1 vs. PC2

Scatter Plot of PC1 & PC2
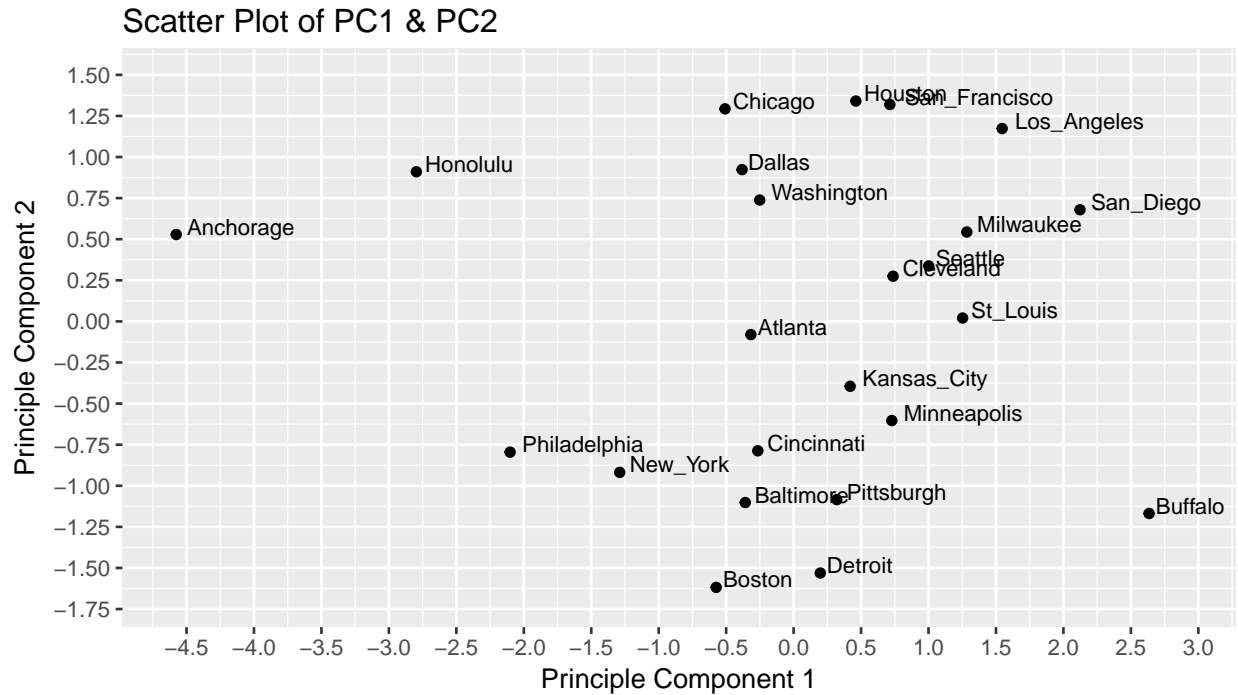
(d) Food Price in Different Cities

Using principle component 1 as indicator, since it has the same sign on all "weighted" food price, and it's the most important principle component in explaining the variability of the data, the x-axis of the scatter above showed that **Buffalo** has the cheapest food price, and **Anchorage** has the most expensive food price.