Javelin Diagrams

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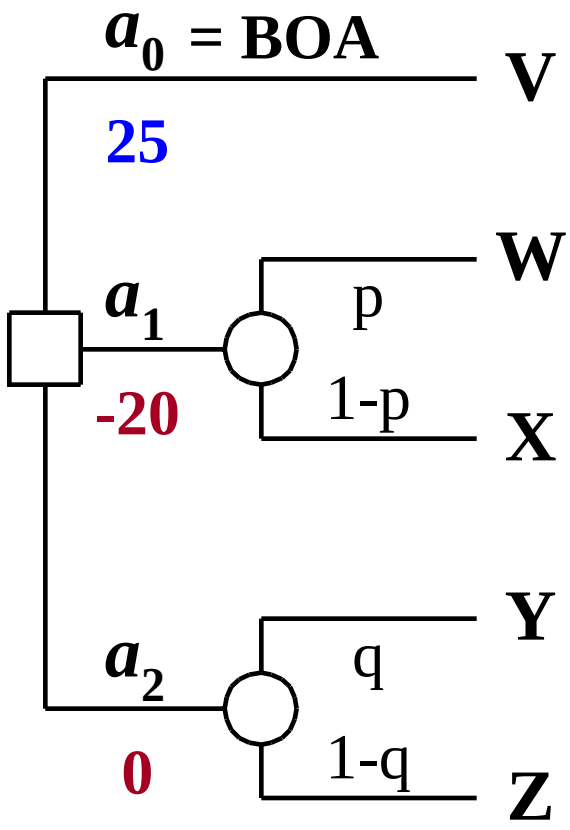
A sample problem

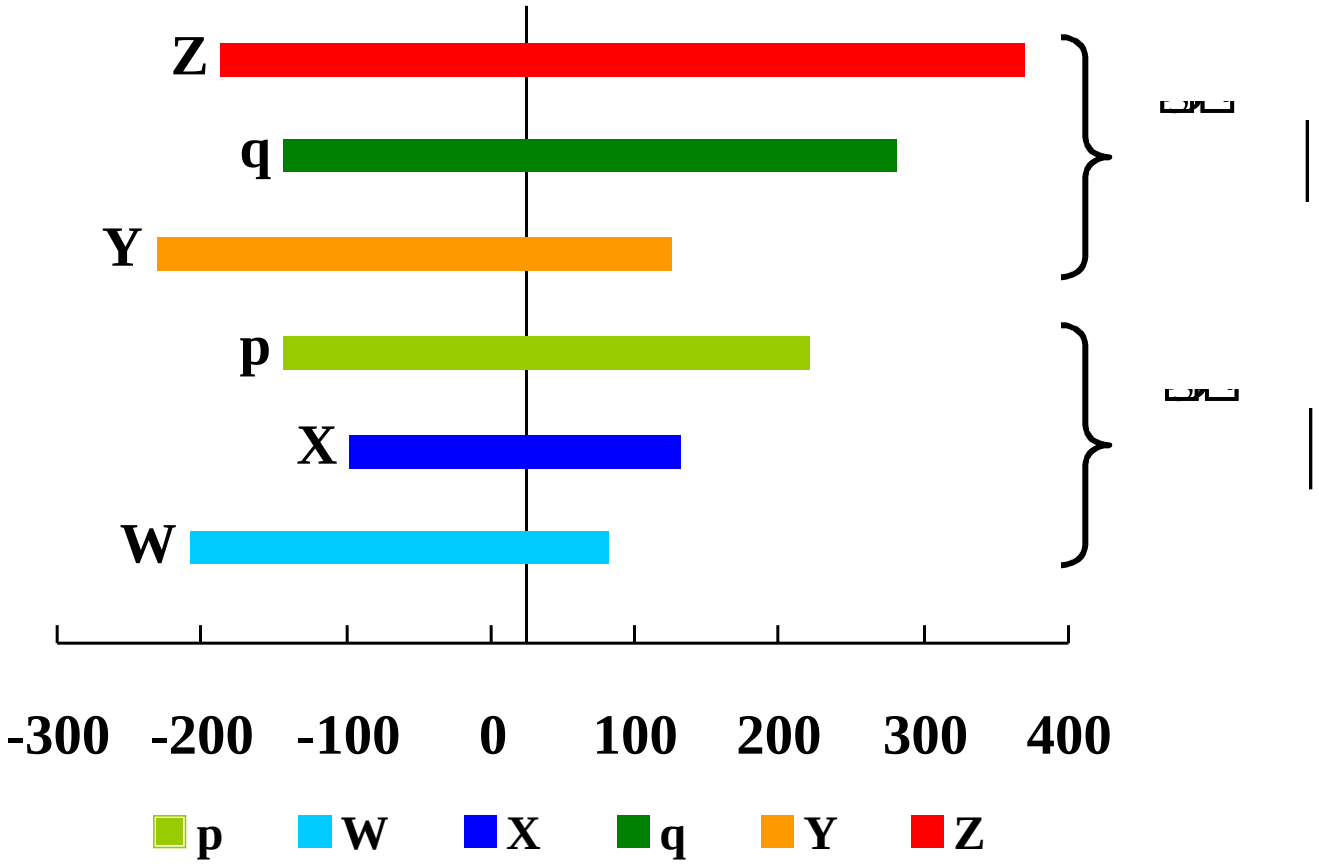
Consider the following problem



	Min	Max	Base
p	0	1	0.667
q	0	1	0.333
V	-350	400	25
W	-400	0	-133.3
X	0	620	206.67
Y	-400	600	266.67
Z	-400	400	-133.3

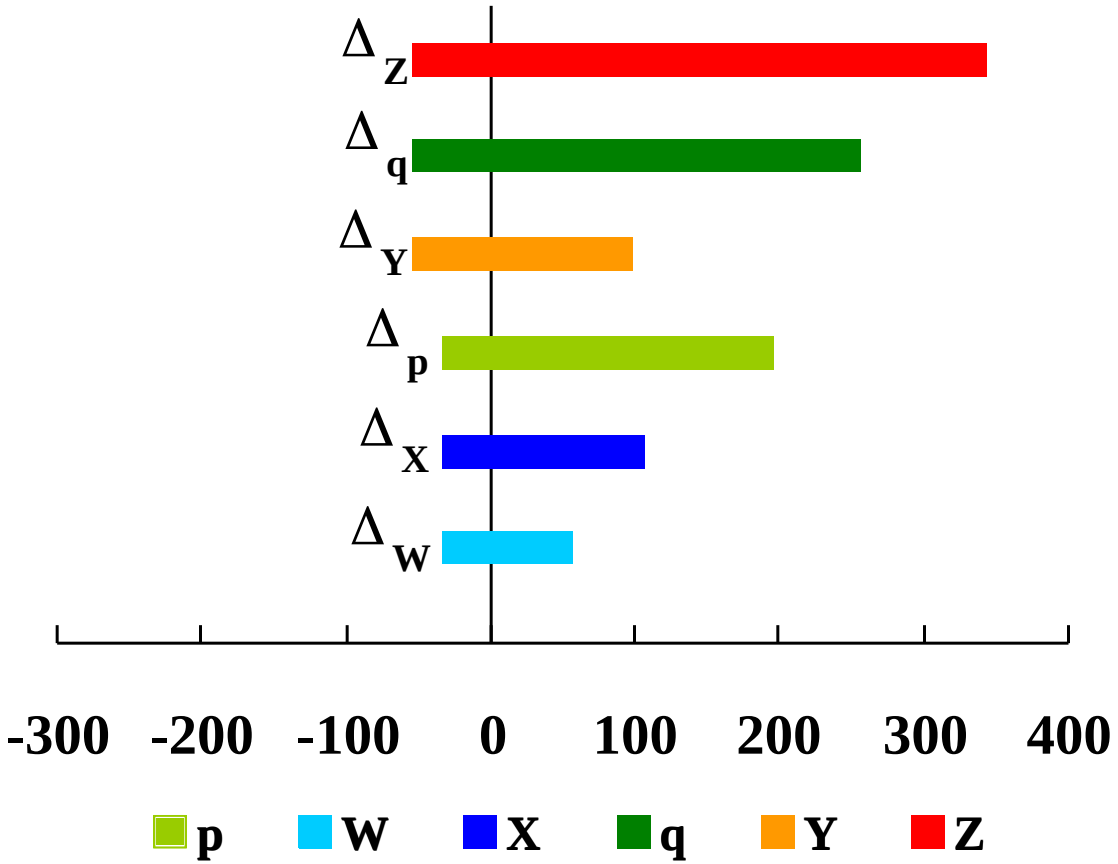
Tornado diagram

Two tornado diagrams on a single graph



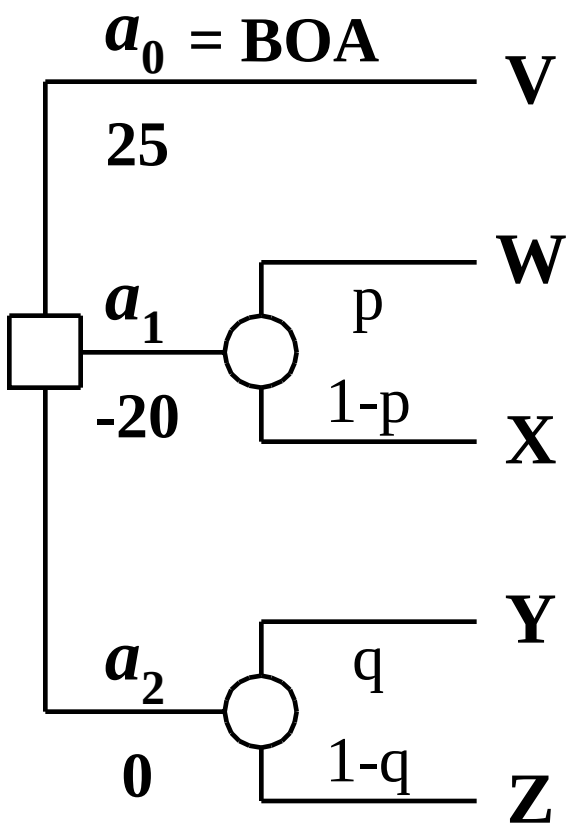
Modify the tornado

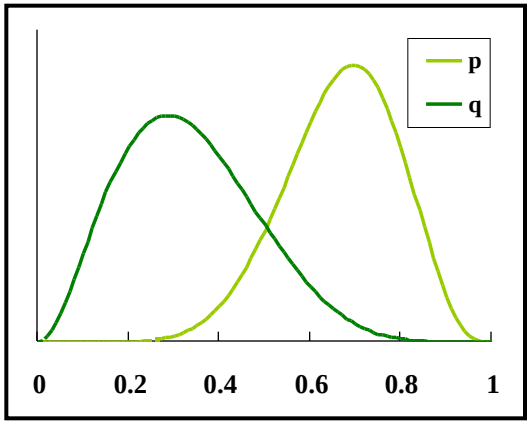
Redefine the bars:

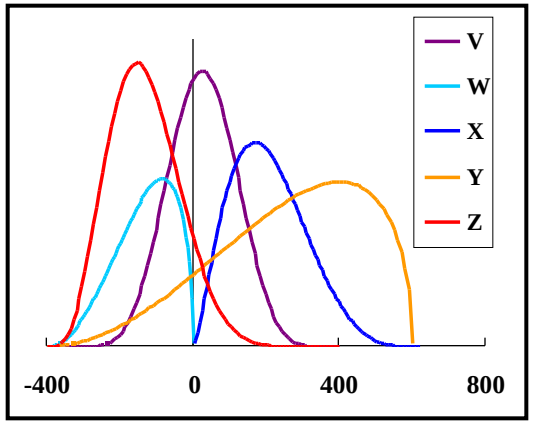


A sample problem

Now include parameter density information



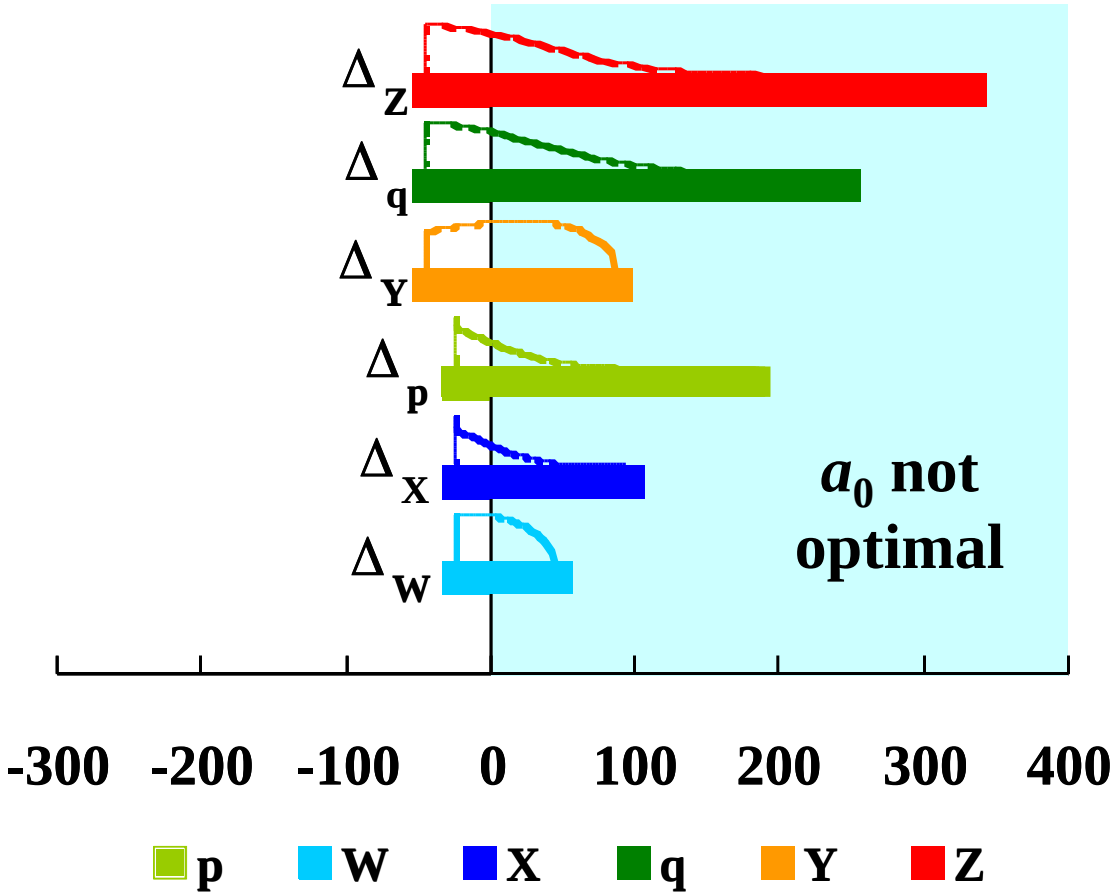




Parameter	Beta a	Beta b	lower	upper	mean
p	9	4.5	0	1	0.6667
q	3	6	0	1	0.3333
V	8	8	-350	400	25
W	3.15	1.575	-400	0	-133.3
X	2.475	4.95	0	620	206.67
Y	3	1.5	-400	600	266.67
Z	4.875	9.75	-400	400	-133.3

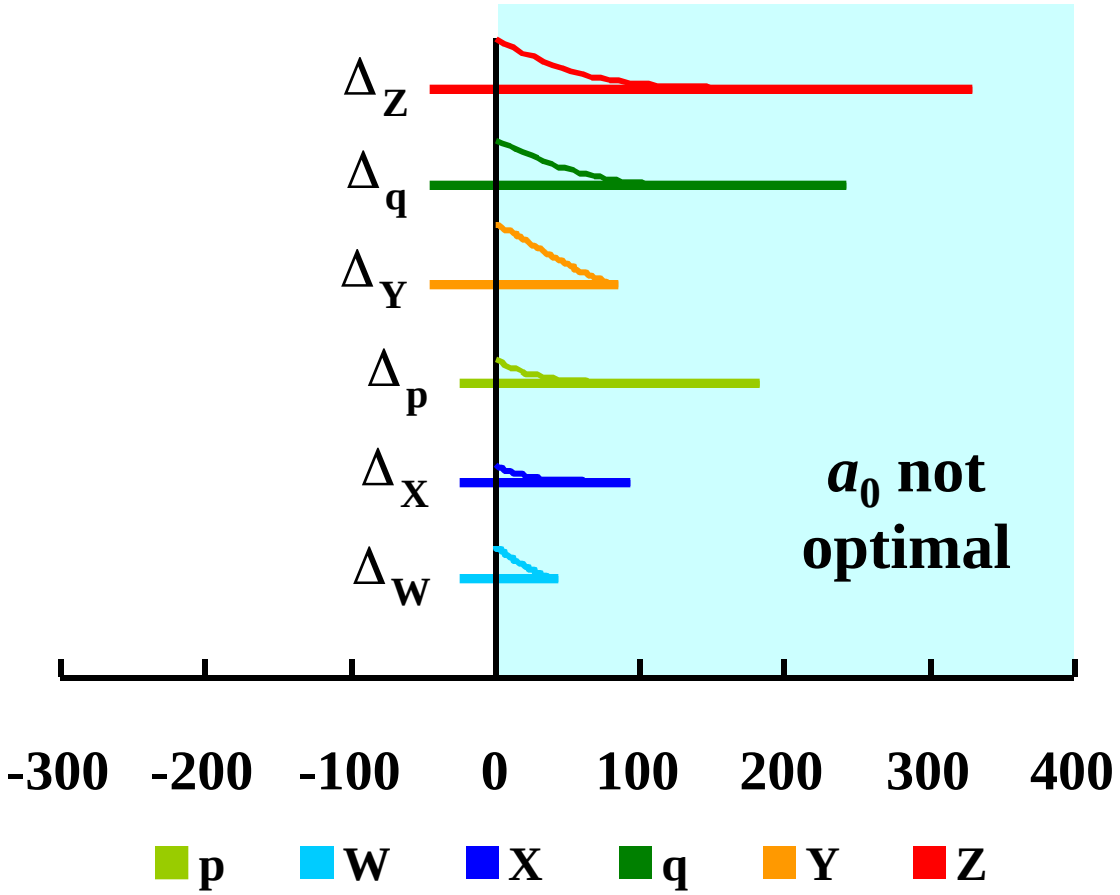
Building a javelin

Determine $\vec{x}$ over the range of improvement



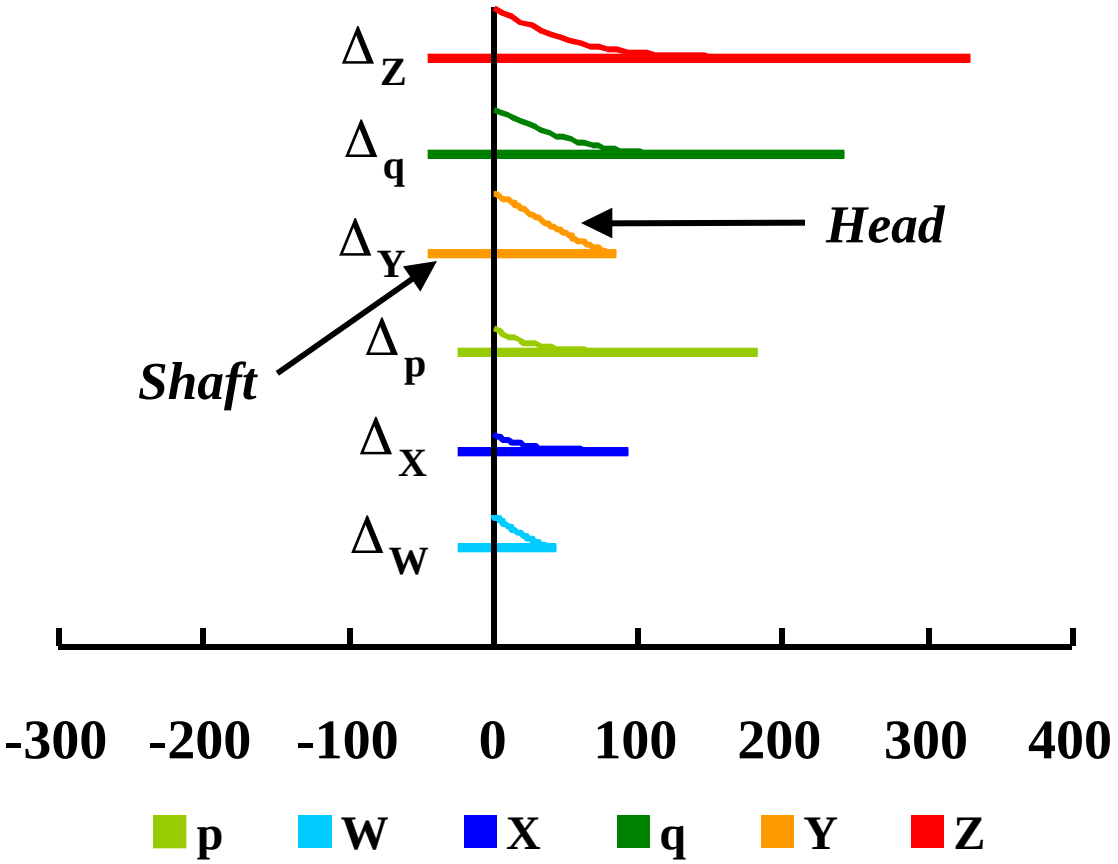
Building a javelin

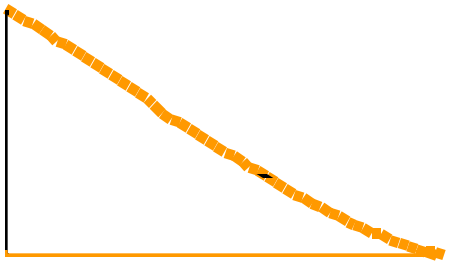
Determine $\vec{x}$ over the range of improvement



Javelin diagram

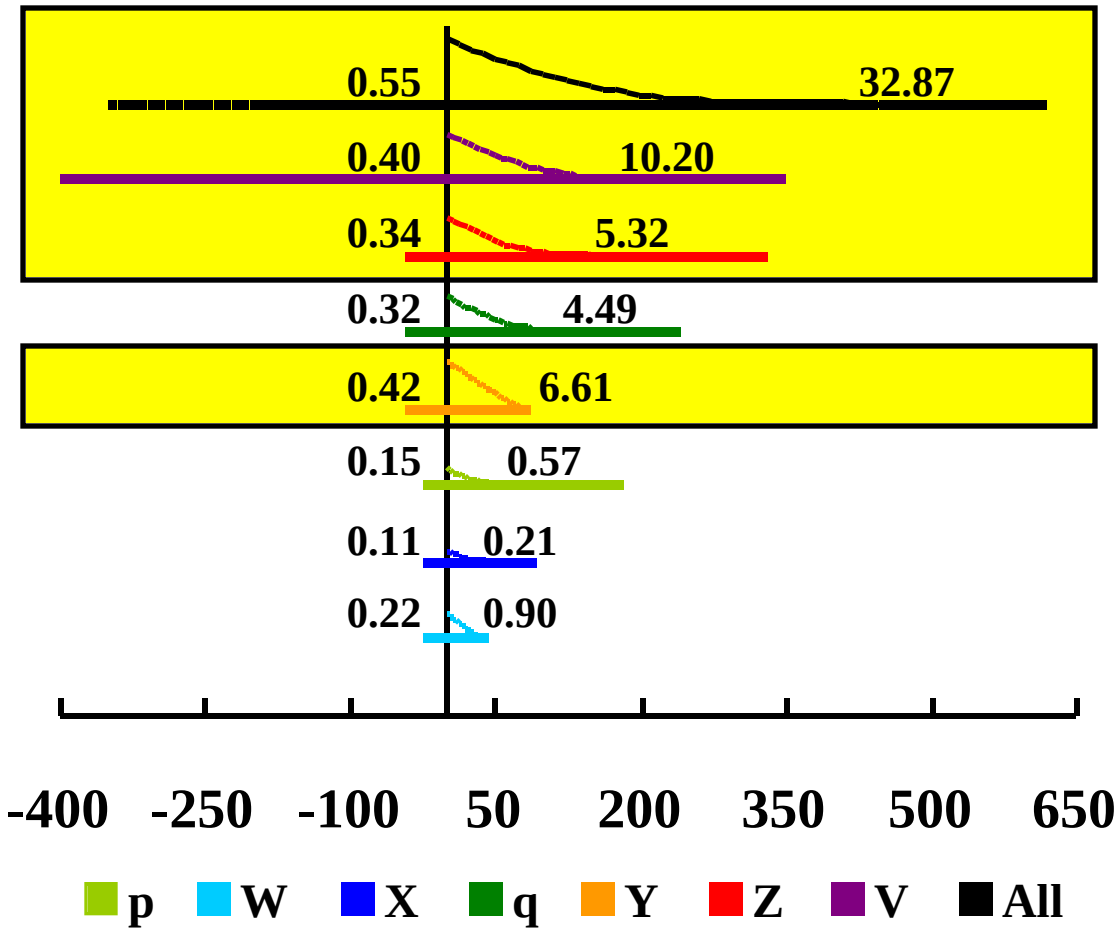
Now we have a javelin diagram!





Javelin diagram

Javelins can include any parameter set

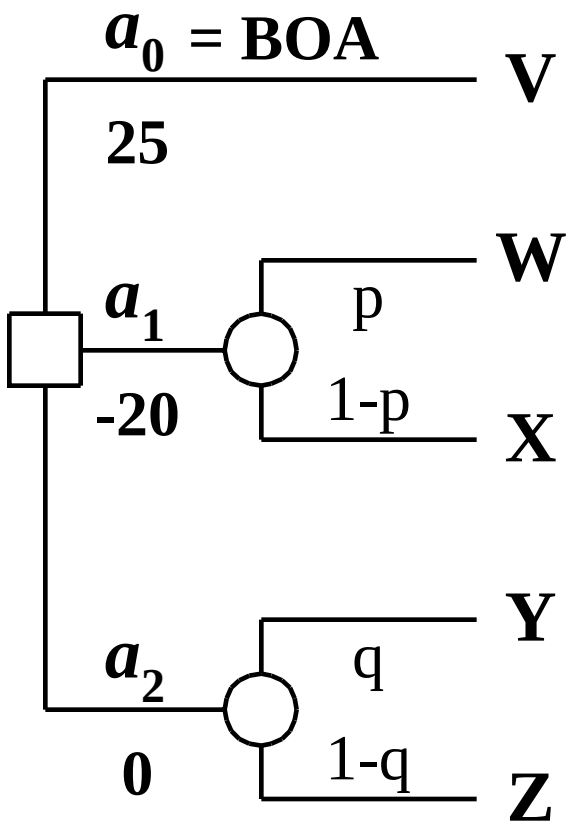


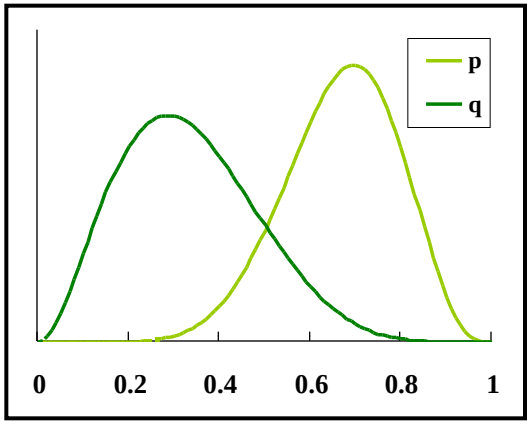
If MSI=5

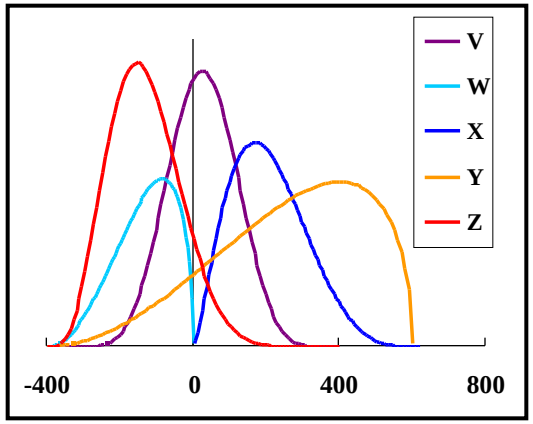
Parameter	Beta a	Beta b
p	9	4.5
q	3	6
V	8	8
W	3.15	1.575
X	2.475	4.95
Y	3	1.5
Z	4.875	9.75

A sample problem

Case 1 parameter densities:



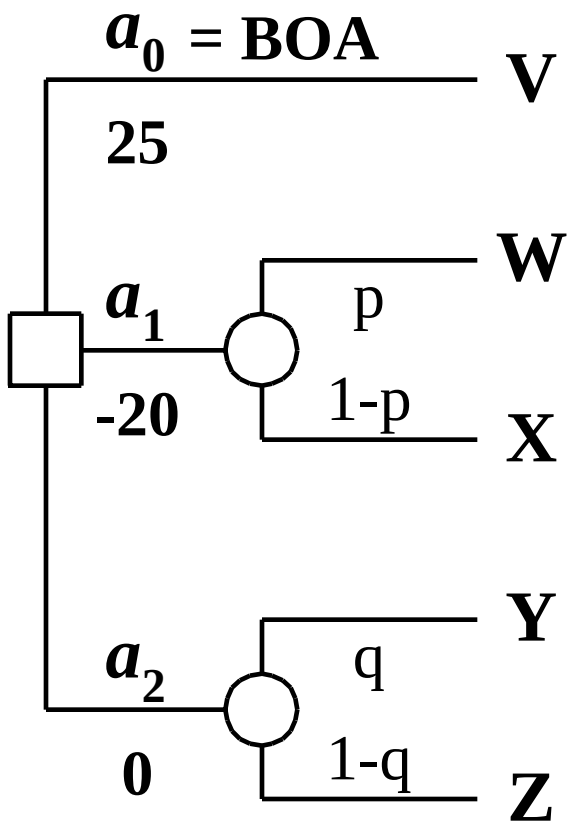


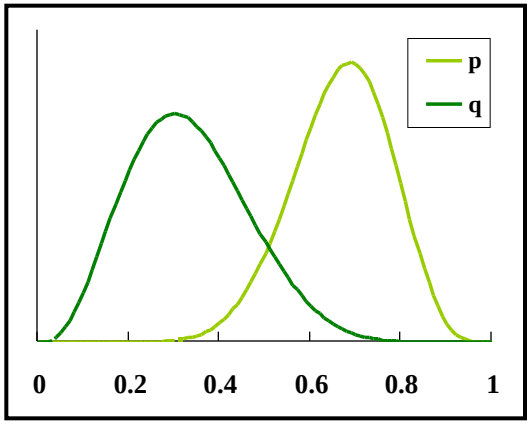


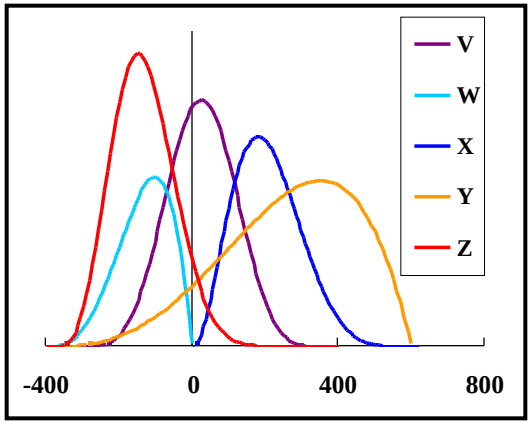
Parameter	Beta a	Beta b	lower	upper	mean
p	9	4.5	0	1	0.6667
q	3	6	0	1	0.3333
V	8	8	-350	400	25
W	3.15	1.575	-400	0	-133.3
X	2.475	4.95	0	620	206.67
Y	3	1.5	-400	600	266.67
Z	4.875	9.75	-400	400	-133.3

A sample problem

Case 2 parameter densities



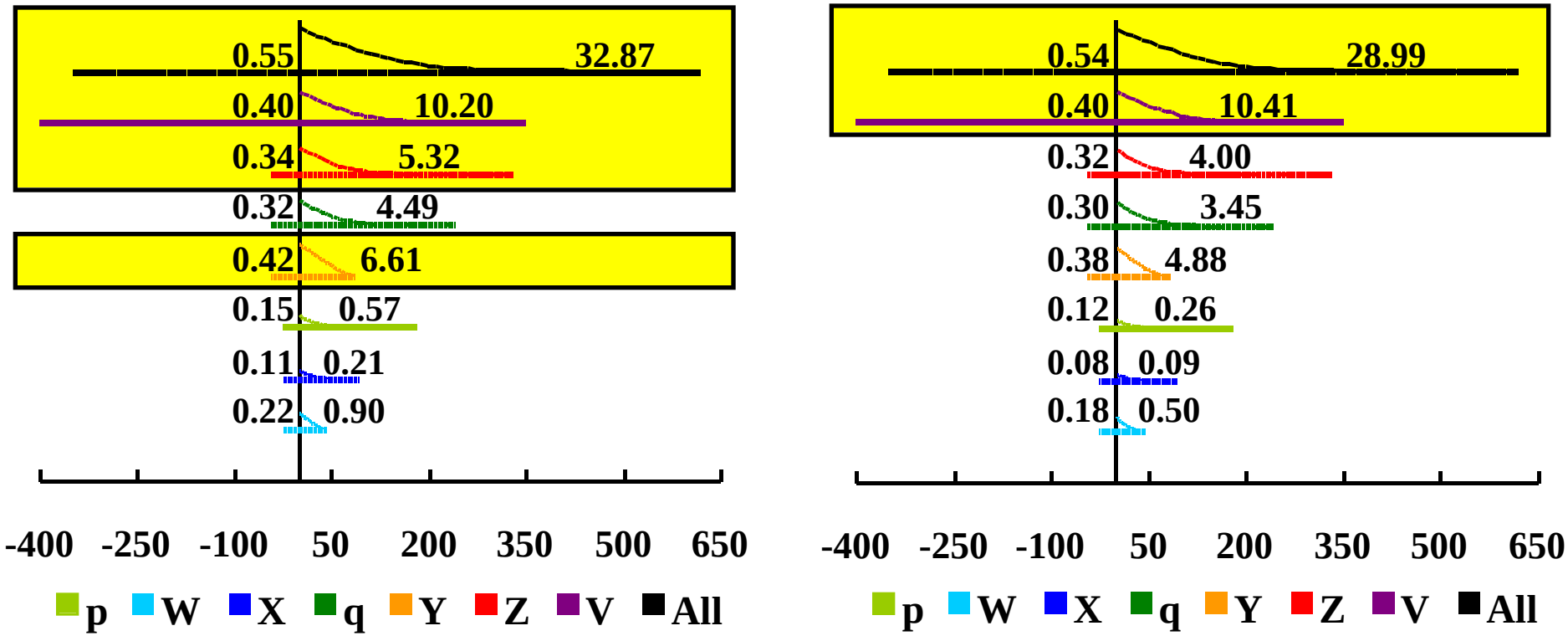




Parameter	Beta a	Beta b	lower	upper	mean
p	12	6	0	1	0.6667
q	4	8	0	1	0.3333
V	8	8	-350	400	25
W	4.2	2.1	-400	0	-133.3
X	3.3	6.6	0	620	206.67
Y	4	2	-400	600	266.67
Z	6.5	13	-400	400	-133.3

Javelin diagrams

Comparison of the two javelin diagrams



MSI=5

Javelin advantages

- Includes all alternatives in single diagram
- Reference point of zero highlights benefits
- Shows **range** of potentially foregone benefits
- Shows **probability** of the BOA losing optimality
- Provides **EVPI** as additional sensitivity measure

That’s all, folks!