**Single-output firm**

1. P\*V at standard conditions

2. P\* V at actual volume conditions

3. P\*V at actual conditions (volume and price)

 1-2= activity variance

2-3= price variance

**Multi-product firm**

An example is useful to clarify the variances

 Products A and B

Standard total volume= 3000 units

Standard volume A= 2000 units

Standard volume B= 1000 units

q standard of A= units A/total units= 2000/3000= 66%

q standard of B= units B/total units= 1000/3000= 33%

p standard of A=100 $

p standard of B =200 $

actual volume= 3400 units

actual volume of A=2200 units

actual volume of B=1200 units

q actual of A =2200/3400=64%

q actual of B=1200/2400=35%

p actual of A= 150 $

p actual of B= 180 $

budget= sum for two products at standard conditions:

100\*(2000/3000)\*3000 + 200\*(1000/3000)\*3000= 200.000 + 200.000=400.000

budget flex with actual mix:

100\*(2200/3400)\*3400 +200\*(1200/3400)\*3400=220.000+ 240.000=460.000

Actual:

150 \*(2200/3400)\*3400 + 180\*(1200/3400)\*3400=330.000 + 216.000= 546.000

Activity variance= 460.000-400.000=60.000 fav in total and for both the products (20.000 and 40.000 respectively)

Price variance= 546000-460.000=86.000 fav (110.000 fav for A; -24.000 unfav for B)

Variance of volume can be better investigated by separating:

1. variance of volume stricto sensu: change the total volume in actual, but q is standard (i.e. mix standard). Firm is selling more by maintaining the same proportion in terms of products, A and B.

100\*(2000/3000)\*3400 + 200\*(1000/3000)\*3400=226.666 + 226.666=453.333

1. mix variance: change the mix, from standard to actual

Thus we can understand that total activity variance (60.000) is composed of:

1. Activity variance stricto sensu is 453.333-400.000=53.333 fav (for both A and B)
2. Mix variance 460.000 – 453.333=6.666 fav in total but unfav for A (220.000 – 226.666) and fav for B (240.000 – 226.666).

Company actually sells more, but in particular more product B (higher price even if actual price is lower than planned) . Mix variance is favorable because firm sells a higher proportion of the most expensive B.

Also A is sold in a higher absolute quantity (from 2000 to 2200 but in lower proportion): activity variance stricto sensu would be 26.000, “corrected “ by a negative mix variance of about 6.000 for a total equal to 20.000; if company should maintain the same proportion of sales (mix standard) it would sell (2000/3000)\*3400= 2266 units of A (and not 2200) and (1000/3000)\*3400=1133 of B (and not 1200). B is sold in a higher absolute quantity (from 1000 to 1200) and in a higher proportion: activity variance would be 26.000 + a positive mix variance of about 14.000 for a total equal to 40.000.

 Try to solve Merlino case….