

Traffic Light Analysis

The traffic light analysis is a convenient presentational tool to summarise a large amount of data. If an organisation were measuring the recruitment and promotion of women and men within an organisation, each cell would represent the difference between the statistics relating to progression for men less the equivalent statistics for the women.

Example: Managers in financial year 2006 (leading to promotions as at 1st July 2006)

Let us assume that the promotion rate from manager to senior manager on 1 July 2006 was 29.5% for men and 15.8% for women. The cell in the traffic light analysis for manager to senior manager promotions shows the difference between these two promotion rates i.e.

$$29.5\% - 15.8\% = 13.7\% \text{ (or } 14\% \text{ rounded up)}$$

Since there is no data for leavers in the financial year 2007, the rates shown in the traffic light analysis have not been adjusted for the possibility of leaving (this adjustment has been applied to the rates for previous years). Such an adjustment does not impact on the results of the tests.

We can then also use this set of summary statistics to highlight the areas where the differences are of greatest statistical significance. We then use a traffic light colour coding system to show the results of the significance test.

The statistical test applies a traffic light colour in each cell.

- Red means that, if the underlying rates are equal, then the observed difference between male and female rates would occur simply by chance in less than one in 100 years
- Amber means that, if the underlying rates are equal, then the observed difference in rates would occur in less than one in 20 years
- Green means that the test is not statistically significant

The tests work in the following way:

- We start by assuming the probability of promotion is equal for men and women;
- We observe the actual numbers of promotions for men and women;
- We calculate how likely it is that we would observe this pattern if the underlying rates were actually equal
- If this probably is small, we conclude that it is unlikely that the difference between male and females arises by chance, and therefore the underlying promotion rates are not equal

This approach relies on (amongst other things):

- The same assumptions as above regarding independence of promotions from person to person;
- Obtaining a sufficient amount of data relating to both men and women.

The conclusion is influenced by the amount of data available. For example, an apparently small difference in promotion rates might be significant if it is based on a large amount of data. Conversely, an apparently large difference could be non-significant (i.e. could plausibly be caused by chance variations) if based on a small amount of data.

The purpose of the statistical test is to highlight areas where there appear to be genuine differences between males and females that are not plausibly explained by chance variations. These areas can then be subject to further (detailed) analysis. The test cannot, of itself, explain why differences arise or quantify the magnitude of those differences.

Method and assumptions

- The statistical test is used to compare the promotion (leaver) rate for each gender with a promotion (leaver) rate based on the combined male and female data. The higher the departure from the expected number of promotions (leavers) based on the combined male and female data, the higher the probability of showing a significant difference at the 1% (coloured red) or 5% (coloured amber).
- The significance of each cell in the traffic light depends on the amount of data on the respect of each grade and Line of Service
- Rates on the traffic light are 'dependent' rates – they are based on absolute differences in male and female promotion rates after leavers over each year have been taken into account
- Tests are based on the raw numbers of promotions (leavers) and the numbers eligible for promotion (leaving).
- The above assumptions mean that the rates in two separate cells could be the same, but the underlying data might give a test result that is significant for one cell and not significant for another (for example because there is a greater volume of data for one cell)

Key	Significant at 1% level	Significant at 5% level	Not statistically significant
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Difference between male and female promotion rates (positive rates indicate higher male promotion rates) - example

Grade	Associate to Consultant	3%	0%	3%	4%
	Consultant to Manager	8%	2%	5%	4%
	Manager to Senior Manager	14%	7%	7%	9%
	Senior Manager to Director	4%	5%	3%	5%
	Director to Partner	5%	-2%	5%	2%
		LOS 1	LOS 2	LOS 3	Overall