

Success rate distributions

This analysis summarises key information on the distributions of success rates of various kinds for Research Organisations (ROs) applying for ESRC funding.

We are sharing it externally to invite comment, discussion and further analysis. Our aim is to use its conclusions to help us to work effectively with Research Organisations on future demand management and research strategy.

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If you have any questions or comments about this analysis please contact the head of ESRC's Insights team, alex.hulkes@esrc.ac.uk, or telephone 01793 413039.

Key findings

There are four success rates of interest, not just one: the overall success rate, the fundability rate, the conversion rate and the fundable rate. An understanding of all is necessary to provide a more complete picture of proposal quality and RO performance.

Insofar as no applicant institution has a notably low fundable rate, there are no consistently 'unlucky' ROs.

The ability to produce a fundable proposal, as described by the fundability rate, varies slightly across Research Organisations. Some are consistent higher-performers, others are less competitive. This ability is not often associated with a high overall success rate though.

Not one but four success rates

For any grant there are five possible outcomes: it may be funded, fundable but not funded, assessed by a panel as unfundable, rejected before panel or rejected before any form of peer review. Four 'success rates' of particular interest can be derived from the five possible outcomes:

1. The '**Overall success rate**' – the proportion of all proposals that is funded
2. The '**Fundability rate**' – the proportion of all proposals that is considered to be fundable, whether funded or not
3. The '**Conversion rate**' – the proportion of fundable proposals that is funded
4. The '**Fundable rate**' – the proportion of all proposals that is judged fundable but not funded

Figures 1 to 8 below show, for each of these four rates in turn and for a set of 71 ROs¹, the distributions of outcomes and plots of rate vs. number of proposals (usually in the form of funnel plots) for each distribution.

¹ These are 71 ROs which have had at least five decision made on proposals in the financial years 2013/2014 to 2015/2016. The picture of distributions across all ROs is slightly more complicated and will be looked at in a separate analysis.

Overall success rate

This is the headline rate of greatest practical consequence to applicants (Figure 1):

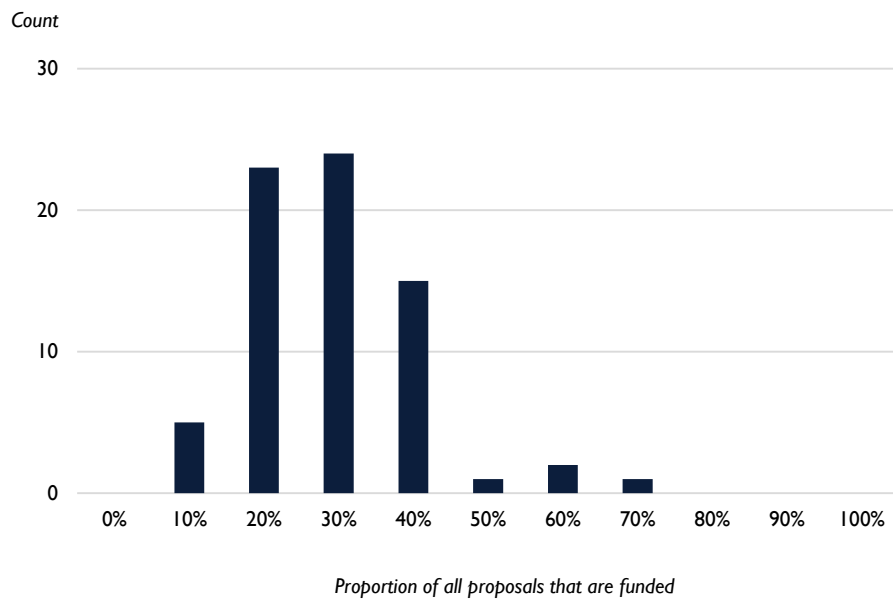


Figure 1: frequency of overall success rates for 71 ROs as measured over financial years 2013/2014 to 2015/2016. Bin size is 10%.

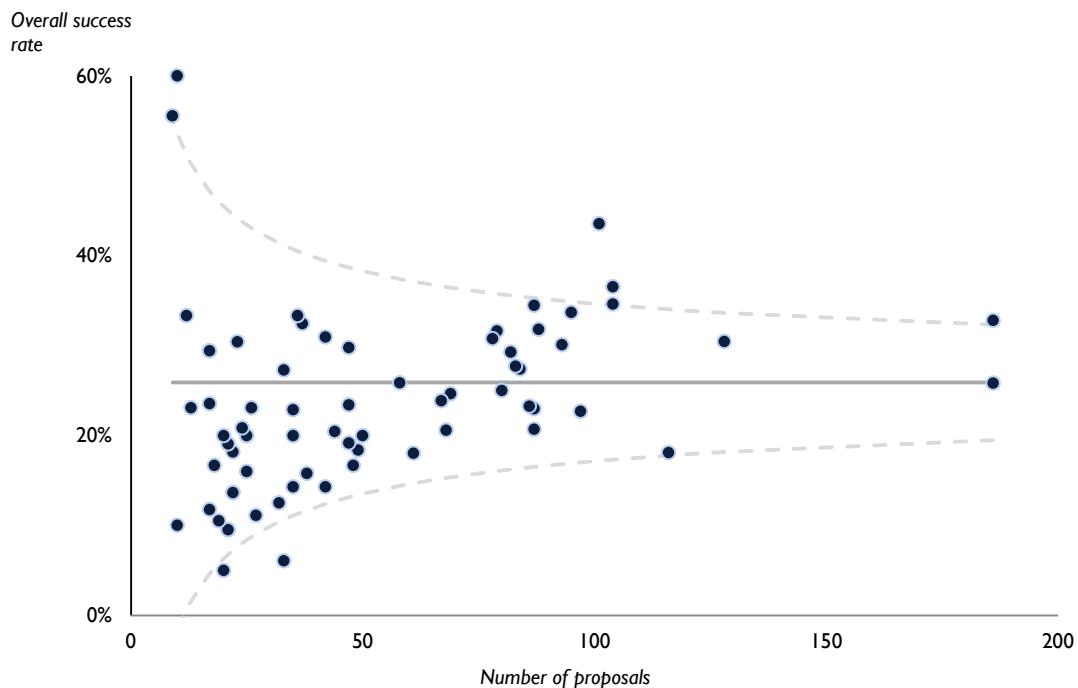


Figure 2: funnel plot of overall success rates for 71 ROs as measured over financial years 2013/2014 to 2015/2016. Dashed lines indicate 95% control limits, which is perhaps not quite conservative enough to control false positives across 71 data points.

While the range of rates is broad, particularly high or low success rates tend to be associated with infrequent applicants². At the level presented, and despite appearances, there is no appreciable simple correlation in these data between success rate and number of applications (R^2 for a linear regression is .05).

Fundability rate

This rate (Figures 3 and 4) is of greatest interest in relation to demand management as it shows the proportion of all proposals that is fundable:

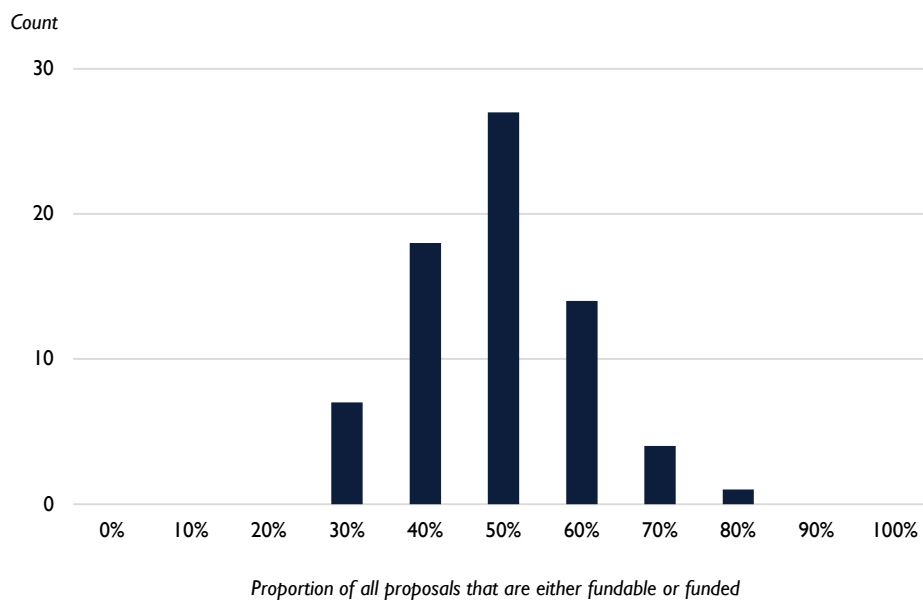


Figure 3: frequency of fundability rates for 71 ROs as measured over financial years 2013/2014 to 2015/2016. Bin size is 10%.

² See also the analysis of all RO data on the ESRC website at <http://www.esrc.ac.uk/files/about-us/performance-information/application-and-success-rate-analysis/> (PDF)

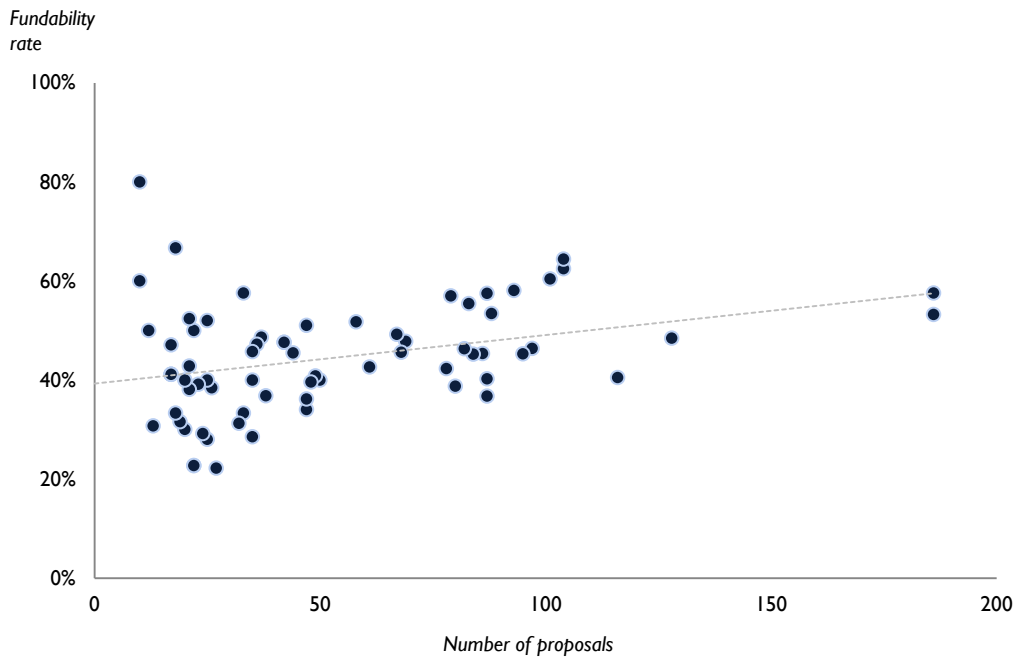


Figure 4: plot of fundability rates for 71 ROs as measured over financial years 2013/2014 to 2015/2016. The regression line is shown for illustrative purposes only.

The most common fundability rate is 50%. This is what we should expect, as fundability rates have been at around that level for the last three years, although the distribution in Figure 3 is rather skewed.

Figure 4 suggests an association between application volume and the fundability rate, with more frequent applicants having higher fundability rates³. While there is noise, there also appears to be some signal contained within this measure.

Conversion rate

This rate (Figures 5 and 6) indicates the proportion of fundable proposals that are actually funded.

³ This is why Figure 4 is not presented as a funnel plot. A funnel plot is a test for unusual variation from what is assumed to be an underlying average rate, shared by all ROs and apparent in the long run. The connection between the fundability rate and application volume will be covered in a separate analysis.

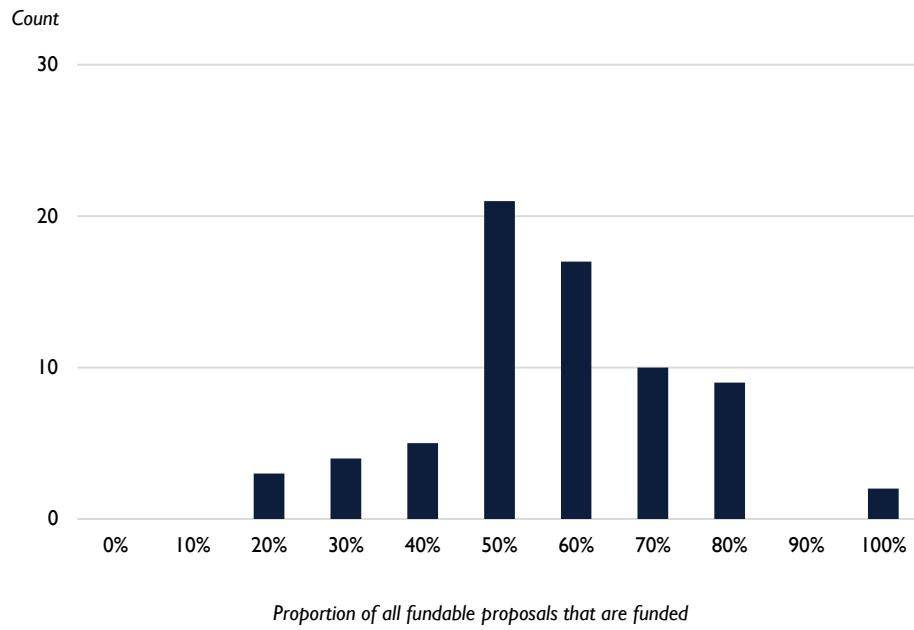


Figure 5: frequency of conversion rates for 71 ROs as measured over financial years 2013/2014 to 2015/2016. Bin size is 10%.

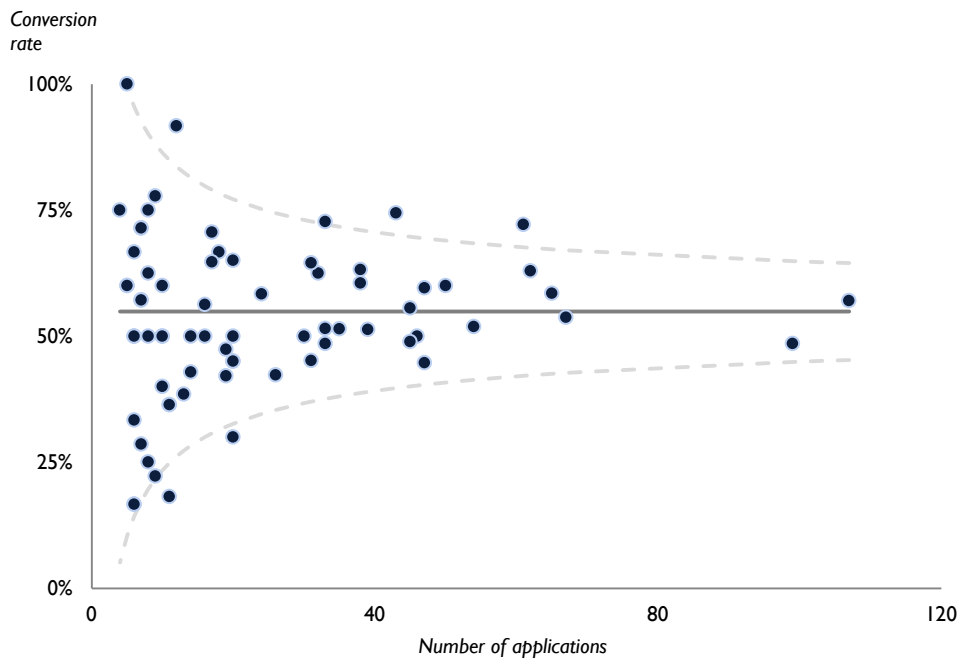


Figure 6: funnel plot of conversion rates for 71 ROs as measured over financial years 2013/2014 to 2015/2016. Dashed lines indicate 95% control limits.

The distribution is broader than the other rates and covers almost the full range of values. There is no association between conversion rates and application volumes and it does not appear that any ROs have conversion rates which are meaningfully higher or lower than the average.

Fundable rate

This is useful as an indicator of unmet demand (Figures 7 and 8):

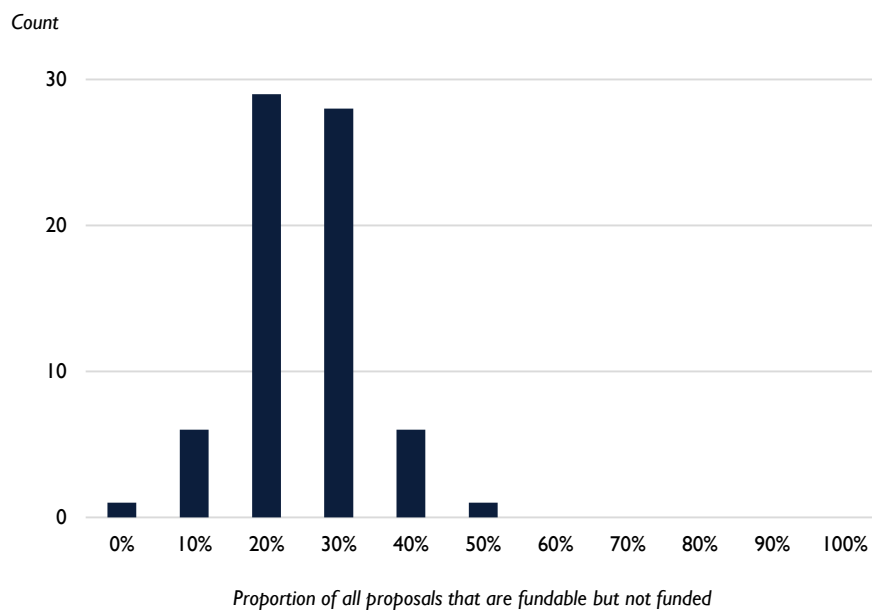


Figure 7: frequency of success rates for fundable proposals (the fundable rate) for 71 ROs as measured over financial years 2013/2014 to 2015/2016. Bin size is 10%.

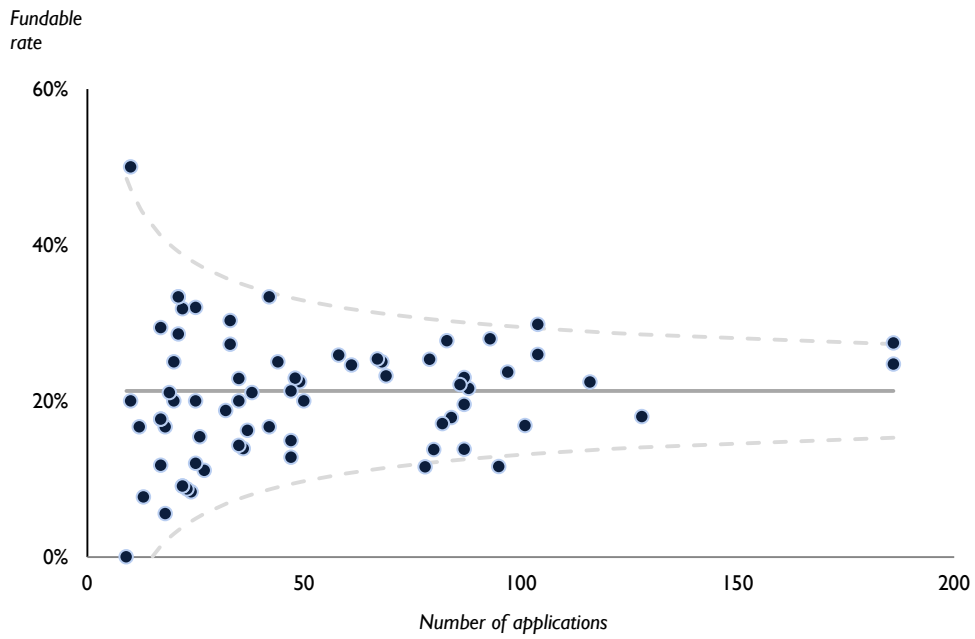


Figure 8: funnel plot of fundable rates for 71 ROs as measured over financial years 2013/2014 to 2015/2016. Dashed lines indicate 95% control limits.

The fundable rate has the narrowest range of outcomes of the four measures.

There do not appear to be any meaningful variations from the average. In the long run no RO should expect to find itself fundable but not funded more frequently than any other RO.

What determines success?

Figure 9 plots these 71 ROs' conversion rates against their fundability rates:

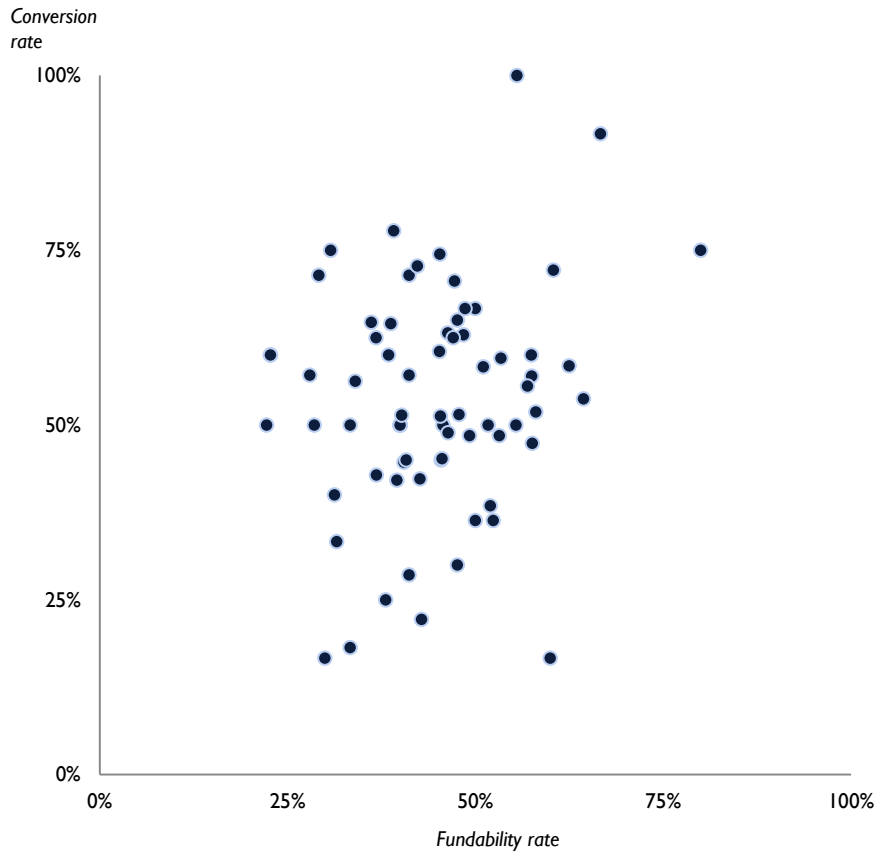


Figure 9: conversion rate vs fundability rate for 71 ROs as measured over financial years 2013/2014 to 2015/2016.

There is no real correlation between the fundability rate and the conversion rate ($R^2 = .04$, $p = .08$). An enhanced ability to produce fundable proposals is not associated with a greater chance of those proposals being funded.

Across all ROs, about 50% of fundable proposals are funded. The causes of variations from this average are likely to be numerous, complicated and subtle. For the most part they are likely to even out in the long run.

Figure 10 plots the 71 ROs' overall success rates against their fundability rates:

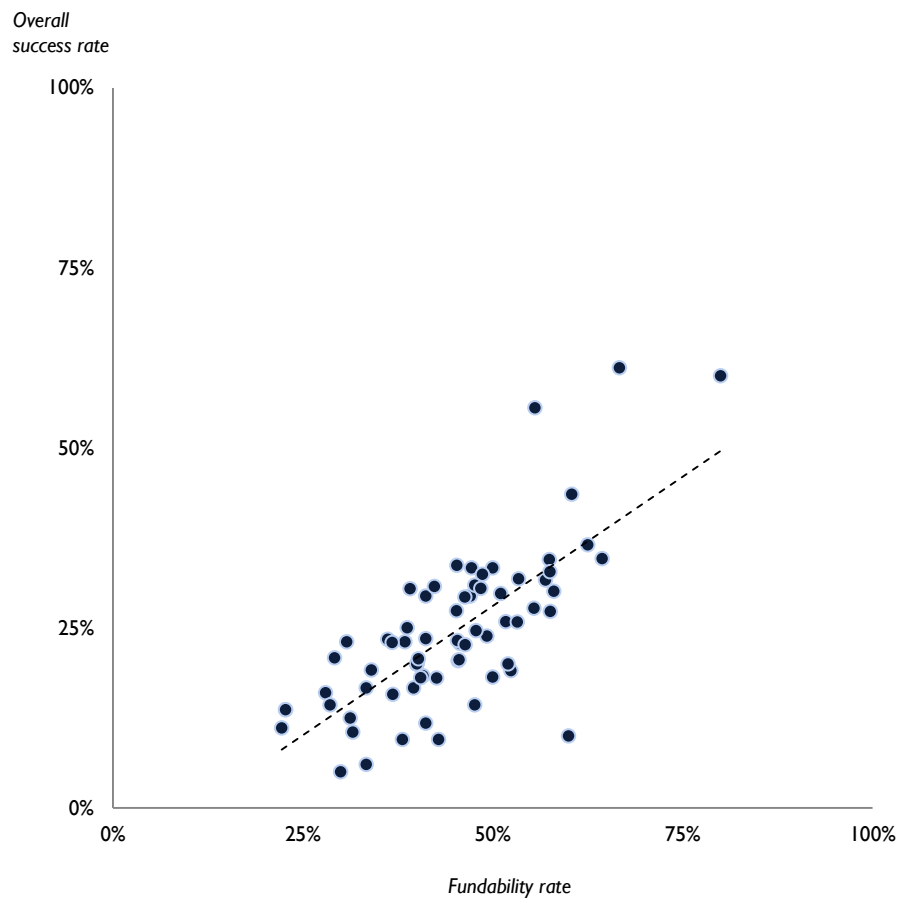


Figure 10: overall success rate vs fundability rate for 71 ROs as measured over financial years 2013/2014 to 2015/2016. Least-squares regression line shown.

The observed correlation is quite strong ($R^2 = .53$, $p < 10^{-3}$, $\beta = 0.71 \pm 0.16$)⁴. About half of the variability in overall success rates is associated with variability in the fundability rate. As questions of funding are settled after questions of fundability it's reasonable to say that half the variation in overall success rates can be explained by variation in fundability rates.

For every 1% increase in fundability rate we might expect to see an increase of 0.7% in the overall success rate. What signal there is in the overall success rate will be derived for the most part from the fundability rate.

⁴ In general it is not a good idea to analyse proportion data with a simple regression, so these results should be taken as illustrative/indicative only. The association is clear enough though.

The overall success rate for any RO is the product of that RO's fundability rates and conversion rates:

$$p(\text{funded}) = p(\text{fundable}) \times p(\text{converted})$$

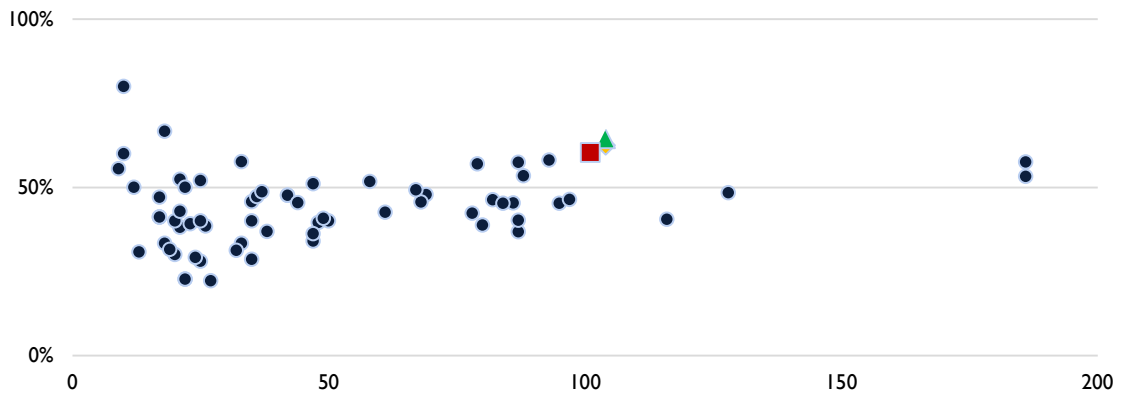
RO fundability rates and conversion rates will interact to produce different overall outcomes. Figure 11 shows the effect that these interactions will have on overall success rates.

		Fundability rate	
		High	Low
Conversion rate	High	Overall rate boosted and high	Overall rate improved but average
	Low	Overall rate reduced but average	Overall rate reduced and low

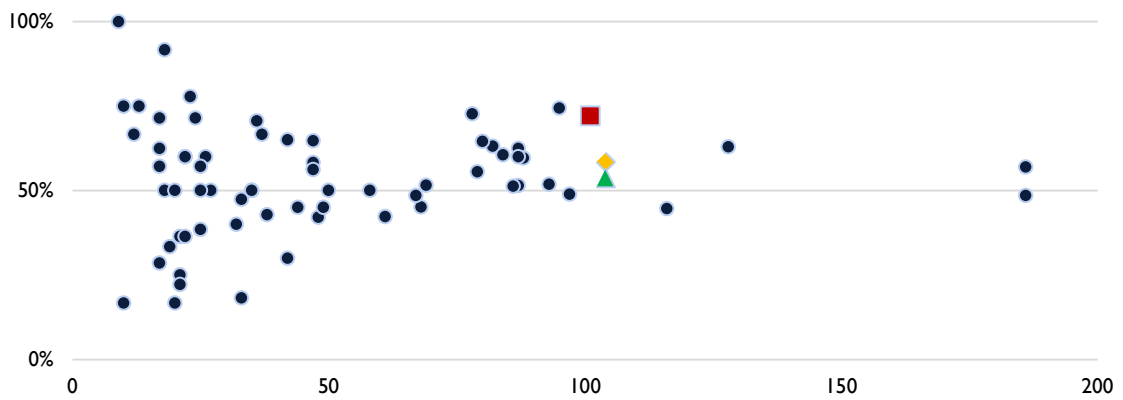
Figure 11: effect of interactions of fundability and conversion rates on overall RO success rates

Figure 12 shows, in sequence, the fundability, conversion and overall success rates for these 71 ROs, plotted against the number of applications submitted by each. Three ROs with similar application numbers are highlighted to illustrate the point made in Figure 11. While the three highlighted ROs have very similar fundability rates, only one has a high conversion rate. The net effect is that only that RO emerges at the end with a high overall success rate. The other two, while still above average, are in the noise.

Fundability rate...



...multiplied by conversion rate...



...equals overall success rate

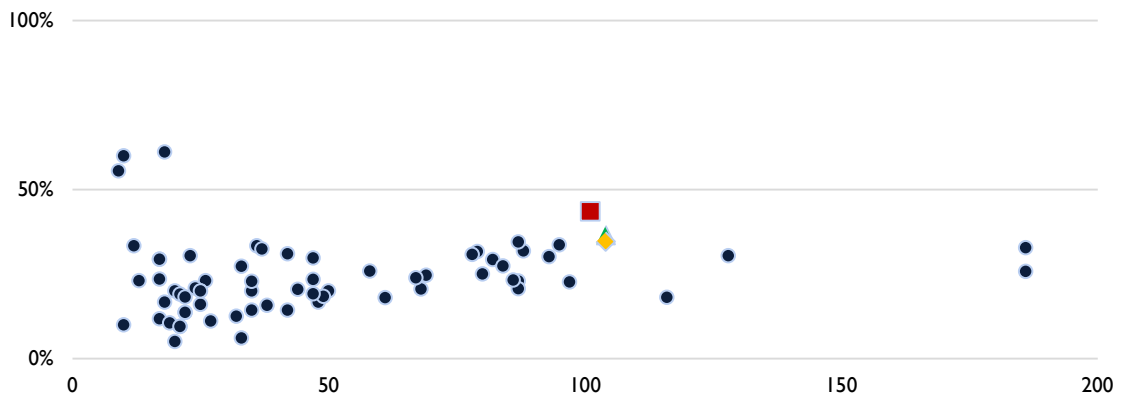


Figure 12: fundability, conversion and overall success rates for the 71 ROs in sequence. x axis is total number of decisions made for each RO across FYs 2013/2014 to 2015/2016.

Conclusions

While the overall success rate dominates discussions, other indicators of the processes that we use to allocate funding can give deeper insights into what is happening, and why it's happening.

We see a wide range of overall success, conversion and fundability rates, but fundable rates vary less. It might not feel like it, but in that limited sense there are no 'unlucky' ROs. No applicant institution has a proportion of fundable-but-not-funded proposals that is meaningfully higher than average.

Fundability rates may be quite noisy, but they can cast some light on proposal outcomes as it appears that there is a positive association between fundability and application success.

The suggestion from the data is that systematic differences between ROs' fundability rates are passed through a relatively noisy conversion process, in which no ROs are meaningfully more or less successful than others. Only those very few ROs that happen to have both high fundability rates and high conversion rates, and for which those rates are sustained, end up with consistently high overall success rates.

It's no surprise then that few ROs stand out when looking at the overall success rate. This is consistent with a peer review system which is able to differentiate good from bad, but which finds it harder to tell the difference between good and very good. This is a commonly-held view, but it's always better to support (or refute, if needed) even the most widespread belief with data.

All this suggests that if we want to understand success rates, fundability rates would be a good place to start.