Talent is essential for team success in any setting – but is performance harmed if there is too wide a gap between the skills of an organisation's stars and the rest? **Alex Bryson** and colleagues analyse data on US major league baseball to investigate how the distribution of a team's talent affects its overall performance.

Team performance and the optimal spread of talent: evidence from US major league baseball

In a team-based enterprise, is output maximised by attracting individuals with the largest aggregate endowment of skills without regard to their effect on the distribution of skills within the team? Phil Jackson, former coach of US basketball team the Chicago Bulls and one of professional sport's most successful managers, illustrates the importance of this question:

'The real reason the Bulls won six NBA championships in nine years is that we plugged into the power of oneness instead of the power of one man. Sure, we had Michael Jordan, and you have to credit his talent. But at the other end of the spectrum, if players 9, 10, 11, and 12 are unhappy because Michael takes 25 shots a game, their negativity is going to undermine everything. It doesn't matter how good individual players are – they can't compete with a team that is awake and aware and trusts each other.'

Our research asks whether there is an optimal spread of talent that maximises performance. Specifically, we consider whether it is optimal for managers to assemble teams solely on the basis of average ability (irrespective of the effect this may have on the distribution of skills) or whether organisations should manage selection so as to prevent too wide a gap opening up between the best and poorest performers.

Our analysis is based on annual performance and biographical data from the history of US major league baseball, 1920-2009. As individual performance measures, we use earned run average (ERA) for pitchers and on-base plus slugging percentage (OPS) for hitters. A low ERA or a high OPS indicates a good player.

In baseball terms, the question we want to answer is if the manager is forced to choose two players whose average ability is the same (for example, a combined historical batting average of 0.275), is it better to approximate the average more closely (0.270 and 0.280 respectively) or should one star (0.325) and one less able player (0.225) be hired? And at what point would too large or too narrow a spread in ability be damaging to team chemistry and performance?

As might be expected, our research shows that teams with higher average talent are more successful: the higher/lower the average OPS/ERA of the players, the greater the winning percentage of the team. More surprisingly, we find that baseball teams assembled at

the start of a season with either too large or too small a degree of inequality in OPS or ERA underperform relative to teams with more intermediate skill distributions.

In other words, there is the inverse U-shaped pattern depicted in Figure 1, where skill dispersion and team output are positively related up to region A-B, after which, in the region of high skill dispersion, B-C, the relationship turns negative. The implication is that a team's winning percentage is not highest where skill dispersion is highest, but rather at point B, where heterogeneous ability is moderate.

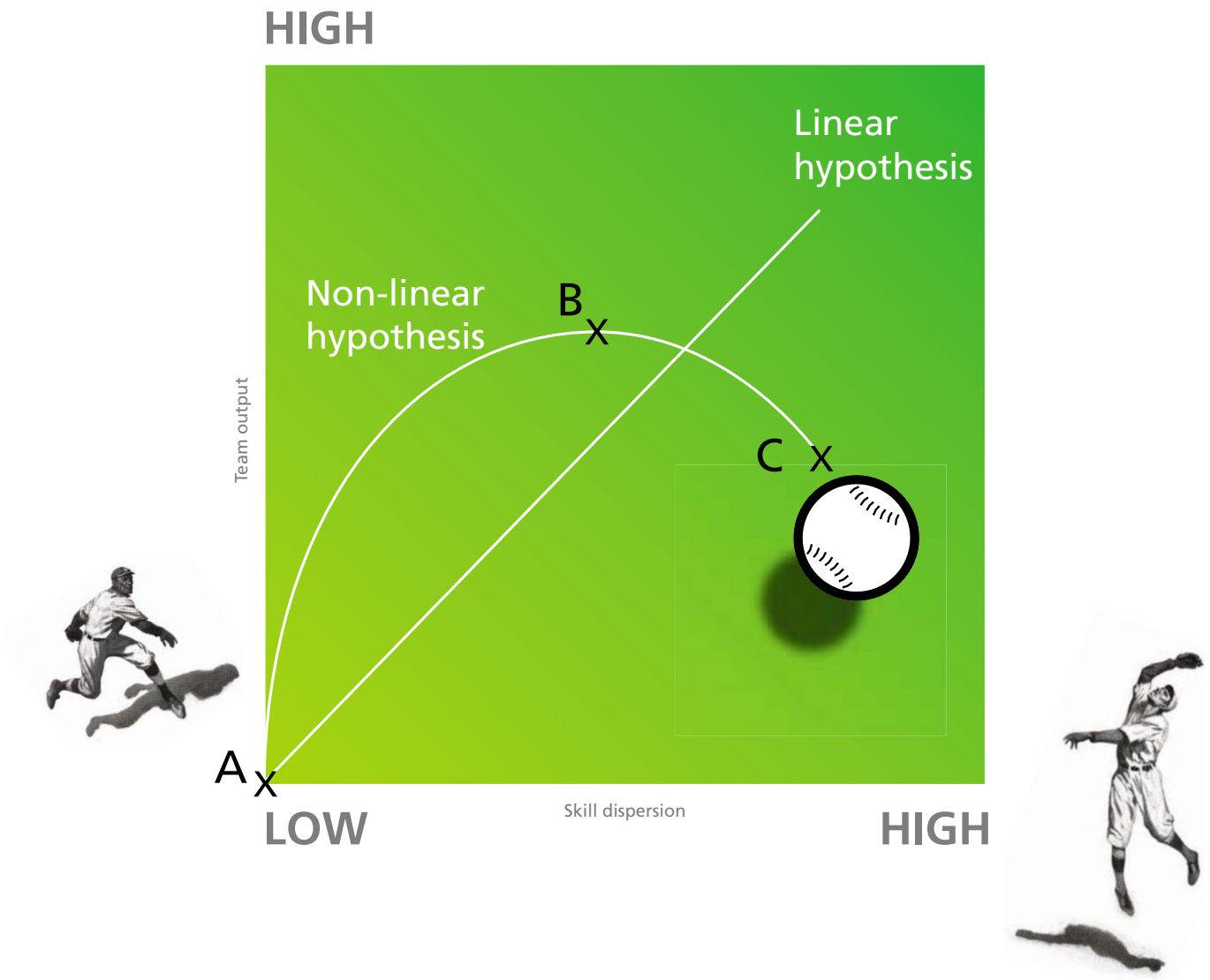
These findings suggest that teams with a healthy balance of stars and players on their way to becoming stars (and perhaps even older players with declining productivity but who provide experience) outperform teams with extremely equal or extremely unequal skill distributions. Yet most teams have levels of inequality greater than the estimated optimum, implying that they would benefit from a reduction in skill dispersion.

What might explain the inverse U-shaped pattern? Below a certain level of heterogeneity, we contend that players do not benefit from the assistance and motivation resulting from playing alongside teammates with complementary skills and greater talent. Beyond a certain level of heterogeneity, however, further increases in the variance of talent can allow opposing teams to exploit the weaknesses of lower-performing players.

This could be the case if better players are either unwilling to help their teammates or if they are simply unable to

The idea of an optimal distribution of ability is relevant in any setting where output depends on teamwork

Figure 1:
Hypothetical relationship between skill dispersion and team performance



do so because the talent gap is too wide. And while baseball is more a game of individuals and requires less on-the-field interaction than sports like basketball and football, team performance still depends in large measure on who precedes or follows a player in the pitching rotation or batting order.

Baseball players are often called on to make 'sacrifices' by their managers so that other players will profit and the team will succeed. For example, a hitter might be told to tire an opposing pitcher out by 'fouling off' balls or a pitcher might be asked to 'walk' a hitter intentionally. We believe that such self-sacrificing behaviour is strengthened by having skill distributions that are neither too wide nor too narrow.

Can these results be generalised beyond baseball? We believe that wherever workers have to perform their tasks in a setting where there is a single product or ultimate output measure, the idea of an optimal distribution of worker ability is likely to be relevant even if, as in baseball, workers may be co-operating only indirectly. Such work environments are common and include areas as diverse as consultancy, academic departments, complex legal cases, film sets, space missions and most restaurants.

The task of a manager in these settings is not simply to hire individual workers with the best talent money can buy or to hire a star and allow the rest of a team to catch up. Rather, it is as important to look at the effect that hiring someone will have on the dispersion of ability. In cases where work is highly interdependent and resources for the firm are constrained, it may even be best to look at distributional concerns first and absolute ability second.

Our findings reinforce what good organisations seem to do every day: select the best group of workers possible and harness their collective potential by being as attentive to the distribution of skills as

In large organisations, a surfeit of star talent may prevent the formation of a well-functioning team

to the average ability. But an obvious question is why, just as in many of the baseball teams in our sample, so many organisations fail to attain the ideal distribution of talent?

In small organisations or teams, this may be because managers are simply unable to acquire the best talent: they may have a workforce with a very similar range of ability but not enough star talent to pull up overall production. Conversely, in large firms with few limitations on finding and developing the best staff, a surfeit of star talent may prevent the formation of a well-functioning team.

Baseball teams with too large or too small a spread of talent underperform relative to teams with intermediate skill distributions

This article summarises 'Heterogeneous Worker Ability and Team-based Production: Evidence from Major League Baseball, 1920-2009' by Alex Bryson, Kerry Papps and Rafael Gomez, CEP Discussion Paper No. 1015 (http://cep.lse.ac.uk/pubs/download/dp1015.pdf) and just published in *Labour Economics* 18: 310-19.

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