

Moneyball in Retail: The New Competitive Advantage



What the Game of Baseball Can
Teach Us About Labour

Foreward

The Moneyball concept was pioneered by Bill James, the U.S. baseball writer, and further popularised by Michael Lewis' book Moneyball and the 2011 movie of the same name starring Brad Pitt. The concept looks at the game of baseball through the dispassionate eyes of statistical analysis. Similarly, Moneyball in Retail is about viewing the business of retail, particularly with regard to labour, through a statistical lens. The parallels between the two are more than superficial.

In baseball, Moneyball is about seeing players clearly. It's not about the 5 tools or the way a player carries himself or some scout's subjective view of a player's potential; it's about a player's ability to help a team score runs. In retail, the players are your workforce, and it's not just about the cost or compliance risk associated with the workforce — both of which are easy to see. It's also about their ability to generate revenue, repeat business, and, ultimately, margin, which are far more difficult to see.

In both baseball and retail, understanding a player's true value is hard, and this is primarily due to the role of variability. A quote from the book Moneyball brings this problem into focus:

"The naked eye was an inadequate tool for learning what you needed to know. Think about it. One absolutely cannot tell, by watching, the difference between a .300 hitter and a .275 hitter. In fact, if you see both for 15 games a year, there is a 40% chance that the .275 hitter will have more hits than the .300 hitter."¹

When player performances can change dramatically from game to game, the impact of small average differences is difficult to assess without the aid of statistics. In retail, people who have come up through the stores know that labour impacts conversion, average transaction value (ATV), and the likelihood and frequency of repeat business. In short, they know that labour affects revenue. But without statistics, it is very difficult to prove their case. Often, operations leaders may run labour experiments in stores, and they may even see a sales lift, but the experiments are confounded by

other factors such as weather, promotions, and the way that labour is used in a store. Due to uncontrolled sales and labour variability, it is extremely difficult to decisively claim that a specific percentage of increase/decrease in labour contributed to a specific increase/decrease percentage in sales. However, this uncontrolled sales and labour variability is also something that can be taken advantage of.

Retailers are essentially running thousands of inadvertent experiments, and the proper use of statistics can help to sort out the signal from the noise, so retailers see labour more clearly.

Once statistics helped pierce the veil of variability-induced obscurity, it became clear in baseball that traditionalists were focused on the wrong metrics or maybe more accurately, they did not have a perfect understanding of what the metrics meant. For instance, batting average was long thought to be the best measure of a player's offensive efficiency. Walks were undervalued. Seeing lots of pitches meant a player wasn't aggressive at the plate. The use of Moneyball statistics showed that on-base percentage was a much better predictor of ultimate baseball success than traditional metrics or rules of thumb. Internecine feuds erupted between baseball traditionalists

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¹ Michael Lewis, *Moneyball: The Art of Winning an Unfair Game*, W. W. Norton & Company, March 17, 2004, at 68.

and believers in sabermetrics (those who subscribe to Moneyball thinking). But over the past 20 years, the truth of Moneyball has begun to win out.

The retail analog concerns the role of Sales Per Labour Hour (SPLH) or its essential reciprocal Labour as a Percentage of Sales. SPLH and Labour as a Percentage of Sales have been long thought to be good measures of labour productivity. However, in both cases, a careful analysis shows these interpretations to be lacking and even misleading. If baseball's experience is any guide, it will take a lot of convincing for CFOs and financial managers to believe that it is not necessarily a good idea to mandate that a retail chain systemically ratchet up SPLH or ratchet down Labour as a Percentage of Sales year-over-year in an effort to drive labour productivity. In fact, increasing and decreasing SPLH can create a hard-to-see, vicious cycle that ultimately leads to depressed same-store sales and margins.

Another parallel lies with the math of Moneyball. The Bill James Pythagorean Theorem is a fundamental relationship that relates the number of runs a team scores with the number of runs a team allows to determine the team's eventual winning percentage.

This function has some useful properties and was the inspiration for the Moneyball in Retail equation that is used to relate a store's labour and sales potential to that store's expected sales. The Moneyball equation clearly shows how increases and decreases in labour drive increases and decreases in sales for a given store in a given week.

The most striking parallel is one of culture clash. Just as it was in baseball, it is highly likely that the Moneyball in Retail concept will be met with a great deal of skepticism by the traditional retail establishment, a situation that presents both a challenge and an opportunity.

The challenge will be to convince forward-thinking retail executives that investigating Moneyball in Retail is a reasonable, worthwhile thing to do. And if the findings suggest that labour increases may lead to same-store sales growth, enhanced margins, and increased brand loyalty, that experimentation should be performed to confirm without a doubt that the Moneyball equation holds true. It is likely that many in the retail establishment will dismiss these concepts as a fad, and herein lies the opportunity.

If a retailer decides to see labour differently and embrace the Moneyball in Retail concept, and it does drive margins and growth, they will do so with a difficult-to-overcome, competitive advantage. It will take years for traditional-type competitors to change their thinking and eventually follow in the innovator's footsteps. And by that time, it might be too late.

$$\text{Win\%} = \frac{\text{Runs Scored}^2}{\text{Runs Scored}^2 + \text{Runs Allowed}^2}$$

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The problem: The inability to see labour clearly

The crux of the problem is that retailers have come to have a one-sided view of labour. ERP systems and the like have made it easy for retailers to understand — down to the penny — how much labour is costing them. They have come to rely on two basic metrics to manage their workforce: SPLH, an ostensible labour productivity metric, and weekly labour cost. Somewhere along the way, retailers lost sight of the idea that their people are also the resource that can drive improvements in conversion, ATV, repeat business, and customer loyalty. Without a clear line of sight between labour and these top-line metrics, they often have set themselves up for a self-fulfilling, vicious cycle, with the ultimate result being systemically depressed sales and margins and a disaffected workforce.

The vicious cycle works something like this: Let's start the process in an optimal place.

- A store's year-over-year sales growth is 10%. A year ago, the store did £193,000 in sales.
- In the next week, the forecast, based largely on historical actual sales, says the store should do £213,000.
- The store is optimally staffed (though the store does not know this to be true) and payroll is expected to be £14,190. At a wage rate of £15 per hour, the store is given 946 hours.
- The SPLH is expected to be £225 per hour. Remember, this is considered to be a labour productivity metric.

- The store manager is bonused on SPLH (higher is better) and labour cost. While he is also responsible for same-store sales growth, he is not bonused on it, because sales are thought to be driven more by external factors out of his control such as location, competitive actions, promotions, pricing, consumer sentiment, merchandising, the brand, and even weather. In addition, these factors are highly variable from week to week.

As the week progresses, by Thursday, the store manager is feeling pretty good about the week. He is slightly ahead on sales but over on labour cost and under on SPLH, so the manager calls off a few employees for the remainder of the week to bring his cost and SPLH under control. At the end of the week, his numbers look like this:

- Sales of £211,000. Off from the target of £213,000 but still representing 9.3 percent year- over-year growth.
- Labour of £13,200. A 7 percent reduction in labour cost.
- SPLH of 240. A 6.3 percent improvement in labour productivity.

The manager soon learns that he can exceed his bonus every week by shaving labour. Because of large swings in sales variability, the inability to know which sales should have happened, and the idea that sales are driven largely by external factors, he is less concerned with a slightly smaller sales growth rate and elated by his excellent control over labour. By the end of the year, his averages look like this:

- Average weekly sales of £202,000, with some weeks as high as £240,000 and some weeks as low as £170,000. Still, overall, this represents a same-store sales growth of 4.7 percent.
- Average weekly labour of £11,000. A whopping 22 percent reduction in labour. Something that he directly controls.
- Average weekly SPLH of £276. A 22 percent improvement in labour productivity

At the end of the year, as corporate executives begin their planning and budgeting cycle, the store manager ends up winning store manager of the year for his tremendous improvement in productivity. Other store managers in the chain note this and begin to emulate his methods. Meanwhile, corporate leaders are concerned by the overall slowdown in growth from 10 percent. They put a number of programs in place to drive sales but also feel that they should leverage labour productivity best practices across the chain, so they mandate that the new corporate SPLH should be the £276 level achieved by our manager.

What no one can see is what should have happened. If the store manager had kept labour at the original level of £14,190 per week and maintained an SPLH of £225, the store would have averaged £213,000 in sales per week.

Over the course of the year, the store sacrificed £572,000 in revenue and saved only £165,880 in labour cost. Considering a COGS of 37 percent of sales, the store achieved £194,480 less in profits than it would have had it maintained labour. This process continues in year two.

Even with the new SPLH target and reduced labour, our star store manager finds that he can continue to shave labour and drive up SPLH with only a small and difficult-to-see impact on sales — again due to the problems of excessive sales variability and the fact that sales are driven by many external factors. At the end of year two, the numbers look this way:

- Average weekly sales: £196,000. A 3 percent decline in same-store sales growth.
- Average weekly labour: £10,000. A 9 percent reduction in labour.
- Average SPLH: £293. A 6 percent improvement in labour productivity.

Our store manager wins manager of the year again for his productivity track record, but now the corporate executives are very troubled by the decline in sales (other store managers in the chain have by now caught on to shaving labour to drive SPLH). More sales programs are initiated, but the street is calling for labour cuts to protect the bottom line in the face of declining same-store sales. The corporate executives feel compelled to mandate labour productivity improvement, so they set the SPLH target to £320.

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Again, what no one can see is what should have happened. In the profit-optimising world, if the store had run labour at the original levels of £14,190 per week and SPLH of £225, it would have seen additional sales of £884,000 and additional profits of £339,040.

In year three, things stabilise with regard to labour. The store manager now finds that shaving labour to boost SPLH no longer seems to work. At this stage, shaving labour actually decreases SPLH. In addition, his employees are harried and stressed. For two years, they have felt that they were understaffed. Customers have a hard time finding an associate to ask a question, and when they do, they feel rushed. The store is in disarray much of the time, and product often sits in the backroom because the staff does not have time to replenish it. Customers defect from long lines at checkout. Still, the store does produce significant revenue. At the end of year three, the numbers look this way:

- Average weekly sales: £175,000. An 11 percent drop in sales.
- Average labour cost: £8,250. A 17.5 percent reduction.
- Average SPLH: £320. A 9 percent reduction.

Now the chain is in trouble, and no one seems to know why. Merchandising, advertising, the economy, and the competitive environment are all blamed for the huge reduction in same-store sales growth, but no one is blaming labour because productivity improved by 9 percent.

The table summarises what has happened in our store:

	Initially and Optimally	Year 1	Year 2	Year 3
Annual Sales	£11,076,000	£10,504,000	£10,192,000	£9,100,000
Annual Labour Cost	£737,880	£572,000	£520,000	£429,000
Average SPLH	£225	£276	£293	£320
Annual Profit	£6,240,000	£6,045,520	£5,900,960	£5,304,000

Over a three-year time frame, the executives and store managers purposefully understaffed their stores by a total of 42 percent, thinking that they were improving operations, when in fact, they were driving sales down by 17.8 percent and profits down by 14.5 percent.

Obviously, this is a contrived example, but not too far from reality to be a reasonable illustration of what has been going on in many retail operations for years. Some key points are:

- Retailers cannot clearly see how labour impacts revenue and margin.
- Current incentives drive the wrong behaviors.
- SPLH is not the labour productivity metric it is thought to be.
- Misunderstanding the role of labour can lead to systemically depressed sales and margins.

The only way through this problem is to clearly and convincingly show retailers how labour relates to sales and margins in their stores.

The solution: bringing moneyball to retail

Retailers are running thousands of inadvertent experiments every year. The sales actuals deviate from the forecast. People call out sick or are unexpectedly absent. Retailers make changes to their labour models. All of these factors drive sales and labour variability. Statistical analysis can be applied to this data to paint a clear picture of how labour impacts sales, margin, and SPLH.

Consider the following weekly sales and labour data in Figure 1.

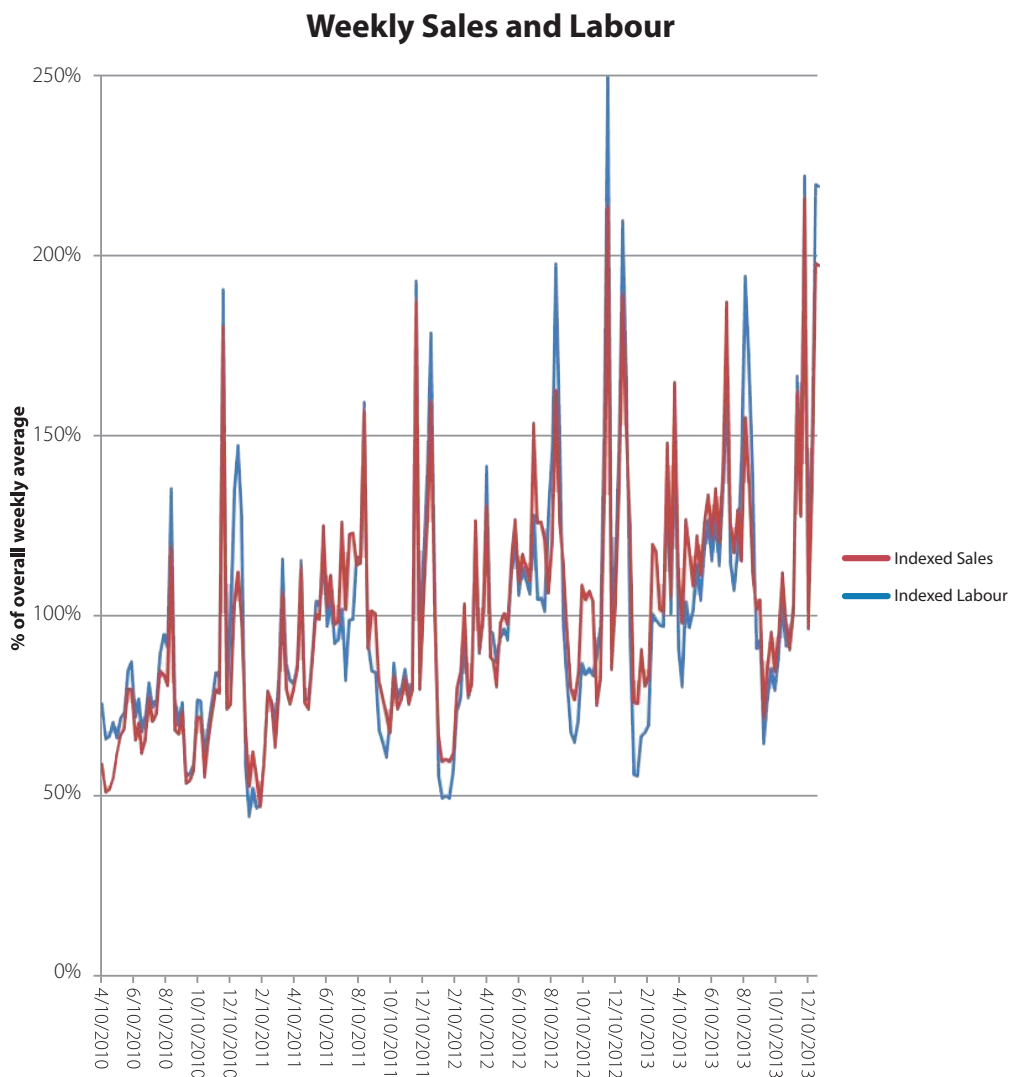
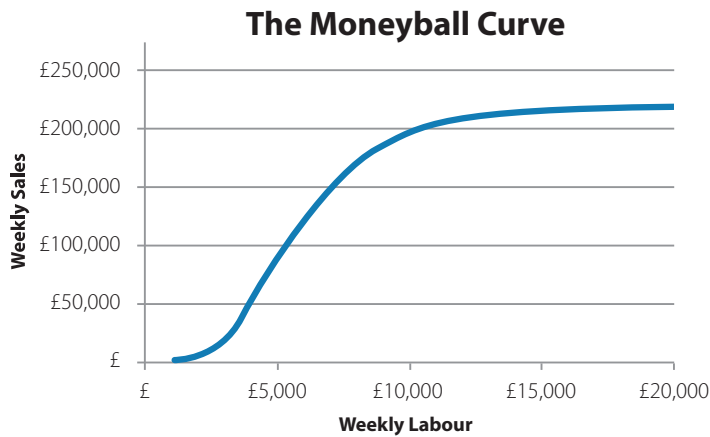


Figure 1: Sample Weekly Sales and Labour

While labour tracks sales reasonably well, it is not perfect, and these imperfections give us information that we can use to learn how changes in labour impact sales, independent of all other sales factors.

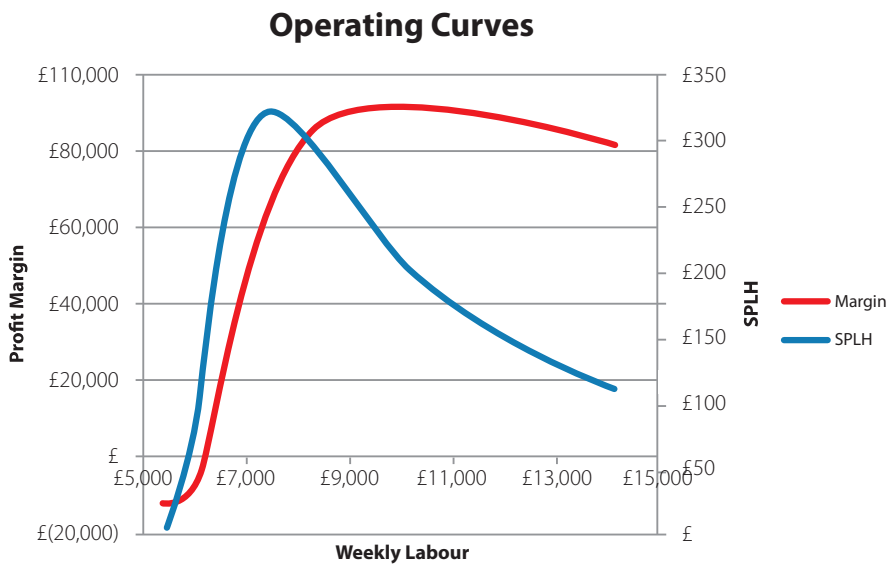
After much analysis, we can determine the “Moneyball curve” that relates labour to sales for the example described above.

Figure 2: The Moneyball Curve



With a little more manipulation, two other useful curves can be derived from the Moneyball curve that relate SPLH and margin to changes in labour.

Figure 3: Operating Curves



If the retailer described above had seen its stores through a Moneyball lens, it never would have cut labour in the first place. Figures 4 and 5 show the path that the retailer took,

from where it started in green to yellow (the end of the first year) to orange (the end of the second year) and finally to red (the end of the third year). In its quest for sales productivity (SPLH), it in reality depressed sales and margins.

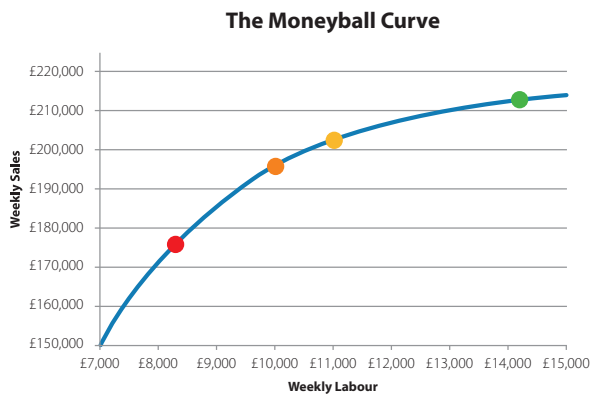


Figure 4

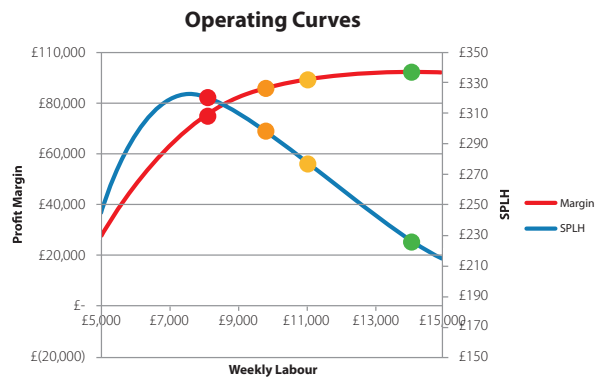


Figure 5

Legend

- End of year 3 ● End of year 1
- End of year 2 ● Initial and optimal start

The statistical analysis isolates the impact that labour has on sales, controlling other factors. The insight is that in any given situation, a store has a certain sales potential. If there is too little labour in the store, sales associates cannot capture all of the opportunity and convert the maximum amount of traffic. If shelves aren't fully stocked and sales associates don't have enough time, they cannot upsell or cross-sell. If register lines are too long, customers will defect from queues. And if the customer has a poor experience, the likelihood and frequency of repeat business will suffer.

The shape of the Moneyball curve relating sales to labour makes sense. When labour is insufficient, conversion and ATV will suffer. As labour is added, conversion and ATV will improve. But the impact of each increment of labour on sales experiences diminishing returns, as the store gets closer and closer to its sales potential, which is why the curve starts to bend down toward the x-axis as labour increases.

This nonlinear behavior in the Sales vs. Labour curve is what drives the unique shapes of the SPLH vs. Labour curve and Margin vs. Labour curve. It again makes sense that when a store is staffed to achieve optimal SPLH, that adding an increment of labour will actually decrease SPLH but improve sales and margin. As labour is added past the peak of the SPLH curve, it gets a little harder for the next increment of labour to drive sales. That next increment of labour drives sales to more than cover the cost of the labour and the cost of goods sold, but not quite as much as the last increment of labour

The Margin vs. Labour curve tells retailers what they really want to know. At which point does the marginal cost of labour (plus the COGS associated with the incremental sales) equal the marginal revenue that the labour drives?

The Moneyball analysis separates the signal from the noise and shows how labour affects sales. With information, retailers can finally see labour clearly.

For more tips and strategies to help better understand labour issues, download the UKG Workforce Analytics for Retail Feature Guide.

About the author

Charlie DeWitt leads innovation efforts at UKG that align with the belief that the workforce is an employer's biggest competitive differentiator, and he has been quoted in leading publications including The New York Times. He has also spoken about increased employee engagement leading to better business results at national forums addressing policymakers, employers, and academics who are working on improving opportunities for today's workforce.



Building on 70 years of experience from two leaders in HR solutions, UKG™ combines the strength and innovation of Ultimate Software and UKG®. Individually, we've always put people at the center of everything we do. Together, we're committed to inspiring workforces and businesses around the world, helping to pave the way forward for our people, customers, and industry.

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