

A deep dive into profitability

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We examine the characteristics and trend of a well-known measure of quality – Profitability. Firstly, we discuss some of the reasons why it is a useful measure and why it might be persistent through time. It is a strong contributor to alpha, both on the long and short sides.

We also see that it has broadly trended down over the last two decades. In particular, global small cap stocks and emerging market stocks have progressively become less profitable. In Australia, we have not seen this decline. It is difficult to construct an economic argument that explains this.

Large cap stocks – notably in North America and more recently in information technology (IT) – have become much more profitable, arresting this broad-based fall but flagging a rotation of profitability into large caps – so are small caps reducing in quality?

Variation by sector and region is also large, underlining the need to apply this measure carefully – neutralising for size, region and sector is critical. The very largest stocks have recently increased in profitability while anything smaller has reduced.

It seems that the broad-based reduction in profitability (NMP¹) over time (ex the largest stocks) is due more to a reduction in the proportion of very high profitability stocks than it is attributable to a downward shift in the distribution.

Finally, we note that the most profitable stocks are those with moderate growth expectations but are still on average expensive. The market is willing to pay up for quality over excessive growth so long as growth is maintained.

One of the most ubiquitous measurements for stock quality is Profitability. In use in different forms in the markets for many years, its formalisation in a well-known paper in 2013 by Novy-Marx² signalled its acceptance in academic circles and cemented its widespread use in alpha models. It has become known as Novy-Marx Profitability (or NMP) ever since.

But what is it? In simple terms, Profitability is measured as Gross Profit divided by Total Assets. Note that as the measure is scaled by total assets and not price, it is not a value metric. As it measures the gross profit as a proportion of total assets, it ranks firms by the ability to use their assets to generate raw gross profits (unfettered by leverage, depreciation and other costs that reduce Gross Profit to Net Income).

In more detail:

Gross Profit (the numerator in NMP) is comprised of reported Sales Revenue less Cost of Goods Sold (COGS). COGS is usually made up of three parts:

- Direct cost of raw materials used for production (includes storage costs and energy costs)
- Direct cost of labour for production
- Direct cost of equipment used for production
 - So indirect costs like rent, sales, marketing, and administration are explicitly excluded.

Total Assets (the denominator in NMP) is simply the reported level of total assets, including both tangible and intangible assets. As the size of intangible assets has grown over time, the NMP measure has encompassed gross profit earned off these as well.

It is important to stress that NMP measures company quality, not value. Correlation with Value factors is low and with other Quality factors is higher. The value of NMP is a percentage, and effectively measures the return (as gross profit) generated from the total asset base.

Why does NMP (that is, Quality) work as an alpha?

Measurements of quality metrics like ROE and NMP are simple and so we might expect them to be priced out quickly. However – as we see below for NMP – this is not the case. Alpha is strong and persists over time. Why is this?

There is clearly a premium attached to higher quality names in times of trouble – there is plentiful evidence of “flights to quality” when economic uncertainty increases. However, this explains the alpha we see in quality during these times, but not at other times. Why, for example, do better quality stocks continue to outperform lower quality stocks in good times?

1 NMP is Novy-Marx Profitability, see next page.

2 Novy-Marx, R. (2013) Journal of Financial Economics, “The other side of value: The gross profitability premium”. There are many academic papers exploring this – for example <https://www.sciencedirect.com/science/article/abs/pii/S0304405X15000203> and https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2526686

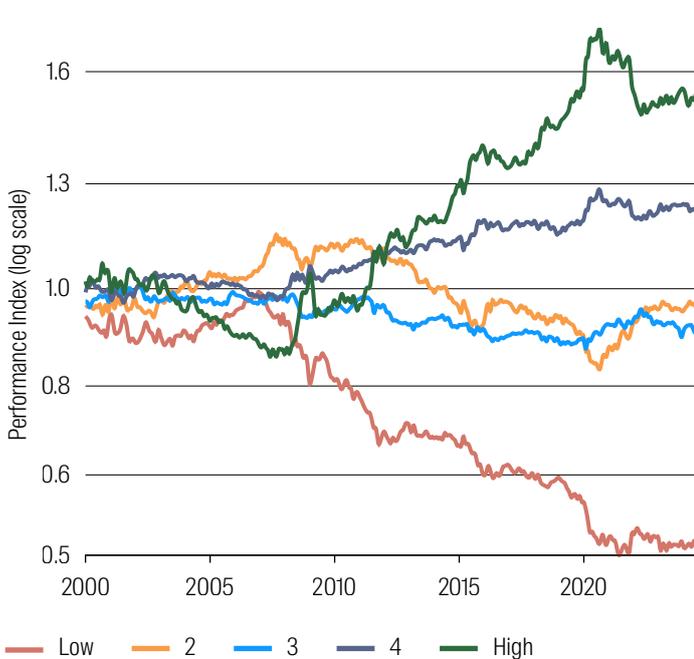
The best answer for this is partly behavioural – investors buy quality stocks (pushing up their prices) as insurance, and there is plentiful evidence that humans overpay for insurance. Further, investors tend to focus mainly on the short term, ignoring long term aspects – like stability and quality. This results in longer term payoffs for companies which are more stable – quality stocks.³ Finally, quality stocks tend to be more persistent in earnings and show lower earnings volatility, trailing and forecast. In short, investors shun uncertainty.

NMP performance

Note that it has been shown extensively that firms with better NMP outperform those with lower NMP, although the strength of this predictive power does vary with the reward to Quality as a style.

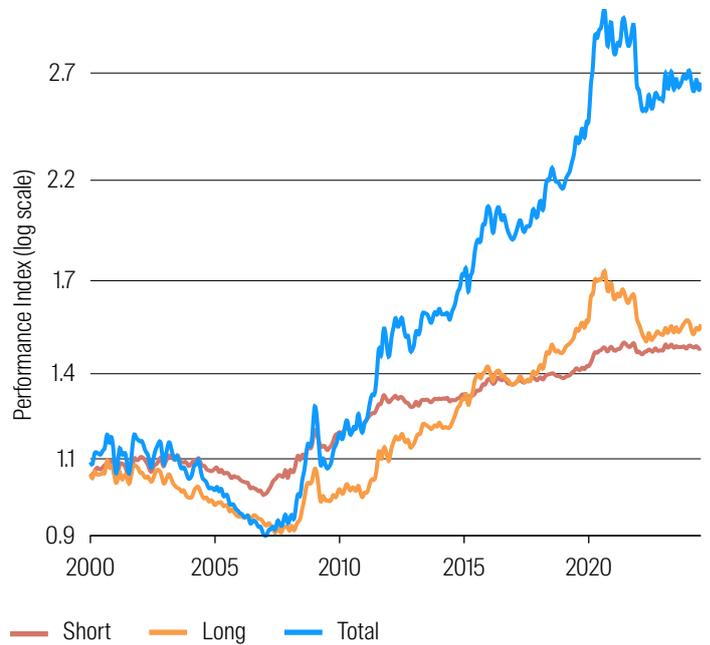
Using MSCI_ACWI_XAU as the universe, from Jan 2000 to Jun 2024, *Chart 1* Panels A and B⁴ below shows the performance of NMP quintiles over time. Performance is very strong post GFC, especially if we can short the underperformance of low NMP stocks. Both long side (good NMP) and short side (poor NMP) contribute equally. Panel C shows the correlation with the earnings yield (EY) is usually slightly negative and has trended down over time – in other words, NMP has become more expensive over time and is not a Value factor.

Chart 1: Panel A: NMP quintiles returns (rebalanced monthly) Jan 2000 to Jun 2024, indexed to 1 at start of sample.



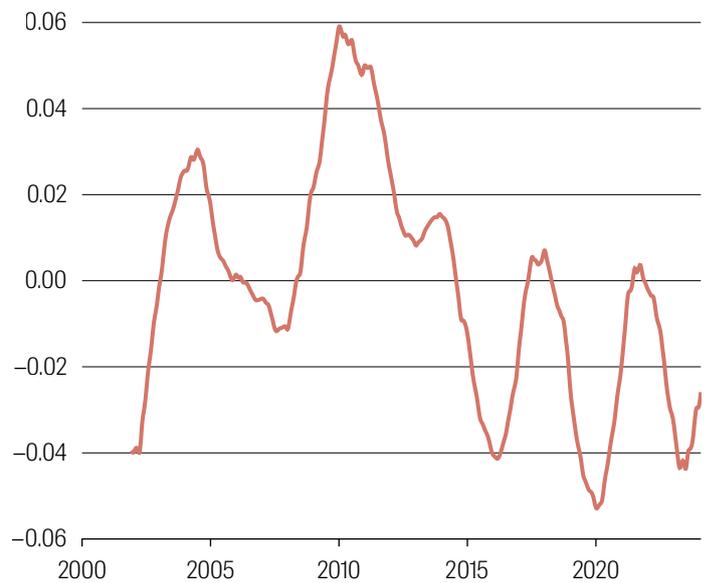
Source: RQI Investors, 2024.

Chart 1: Panel B: Aggregate performance plus long and short (indexed)



Source: RQI Investors, 2024.

Chart 1: Panel C: Correlation with EY (24 mth rolling window)



Source: RQI Investors, 2024.

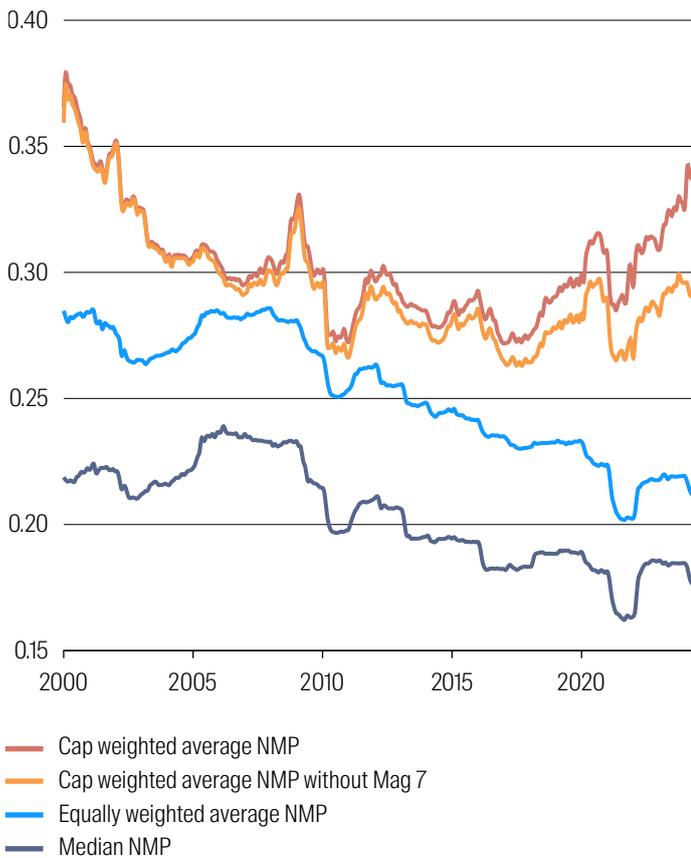
³ Although we know that over longer periods Value (especially higher quality Value) rebounds.

⁴ Returns calculated on equally weighted quintiles by NMP.

How much is Profitability changing over time?

Chart 2 below shows the average NMP for the MSCI_ACWI_XAU universe from Jan 2000 to Jun 2024. We have shown this average in four ways – median, equally weighted, market cap weighted and finally market cap weighted, but with the Magnificent 7 stocks⁵ excluded.

Chart 2. Average NMP from Jan 2000 to Jun 2024 in MSCI_ACWI_XAU universe, with averages measured as equally weighted, market cap-weighted and market cap-weighted excluding the Magnificent 7



Source: RQI Investors, 2024.

The decline in NMP, median and equally weighted, is marked. The equally weighted average falls steadily from approx. 28% in Jan 2000 to around 22% in Jan 2024. The market cap weighted average (ex the Magnificent 7) also falls sharply, from 2000 to 2010, but then flattens. Note the upward and downward spikes around the GFC and the Covid-19 pandemic. If we add back the Magnificent 7, we see a different story. These stocks are highly profitable and so, as they have grown, their market cap weight has increased. The result is to halt the fall in (cap weighted) average NMP around 2015 (at a level of about 28%), and then to return it to near 35% by June 2024.

Table 1 shows the NMP and market cap weights for these stocks at Jun 2024:

Table 1: NMP and benchmark weights for the Magnificent 7 at end of Jun 2024

Stock	NMP @ Jun 2024	Weight @ Jun 2024
Nvidia	85.6%	4.25%
Microsoft	41.4%	4.35%
Apple	51.2%	4.26%
Google	48.5%	2.77%
Meta	57.8%	1.52%
Amazon	64.3%	2.49%
Tesla	23.6%	0.78%

Source: RQI Investors, 2024

These stocks have a combined weight in the MSCI_ACWI_XAU of 20.4% and so a cap weighted NMP of 56.9% (more than twice the average of the rest of the universe).

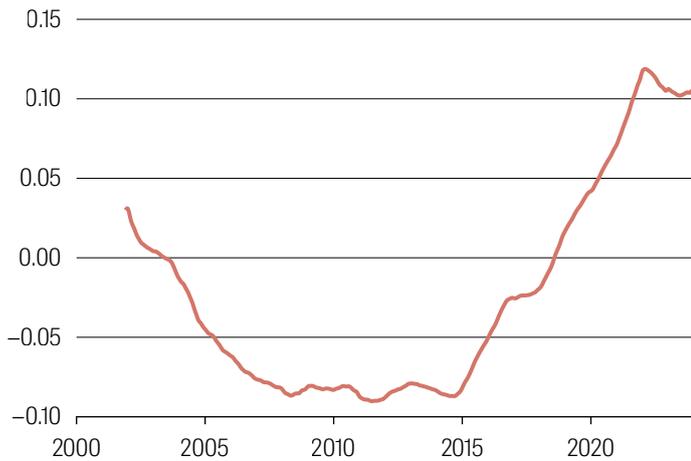
Even if we remove the Magnificent 7, we see that the cap weighted average NMP is above the equally weighted version, which tells us that NMP is becoming more correlated with company size: larger companies are on average becoming more profitable.

⁵ These are Nvidia, Microsoft, Apple, Google (Class A and Class C), Tesla, Meta and Amazon.

Does market cap matter?

Chart 3 below plots the correlation of NMP with size (as log of market cap). The negative correlation on the chart shows that, on average, higher NMP companies are smaller cap. However, the negative correlation is not especially strong, and the impact of the recent increased profitability among large caps has reduced the correlation to nearly zero.

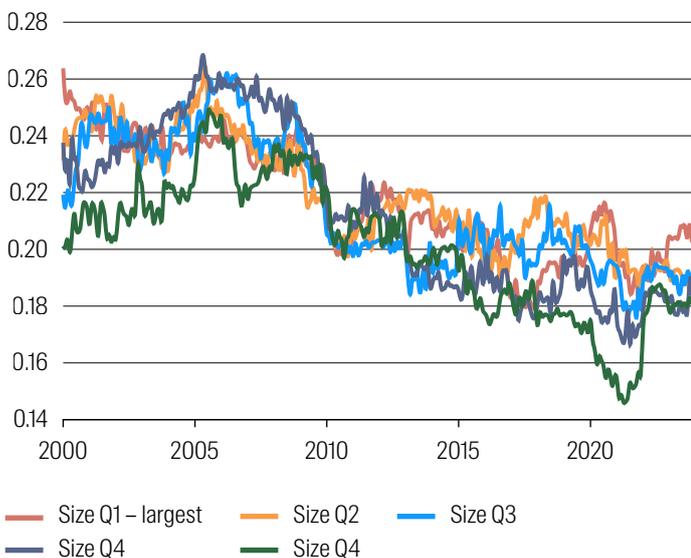
Chart 3: Rolling 12-month correlation of NMP with size



Source: RQI Investors, 2024.

Further, if we sort our sample into sized quintiles (largest is quintile 1, smallest is quintile 5) and calculate the median NMP within each quintile, we see that the downwards trend in median NMP is strongly evident across all sizes. Taken with the results above, this means that the increase in NMP we see is concentrated in the very largest stocks.

Chart 4: Median NMP within size quintiles

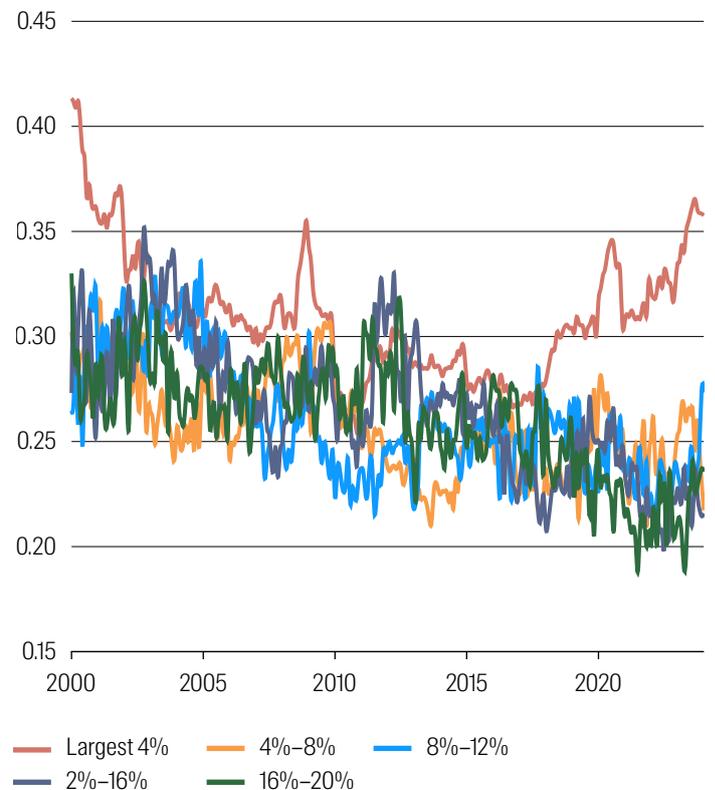


Source: RQI Investors, 2024.

We then go one step further and split this again. In Chart 5, we take the largest quintile by size and sort it into quintiles by size. So, the largest 4% of stocks will appear in the highest quintile, the next 4% by market cap in the next quintile, and so on. We also market cap weight NMP within each quintile.

This chart shows starkly that NMP has trended downwards for many years, and it is only the very largest firms that have shown a recent increase. These stocks would be – without taking too large a leap of faith – the Magnificent 7.

Chart 5: Largest 20% of stocks, split into quintiles. Market cap weighted NMP within each quintile



Source: RQI Investors, 2024.

Region and sector differences

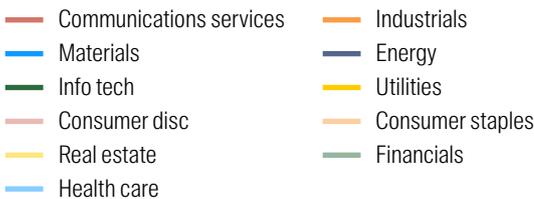
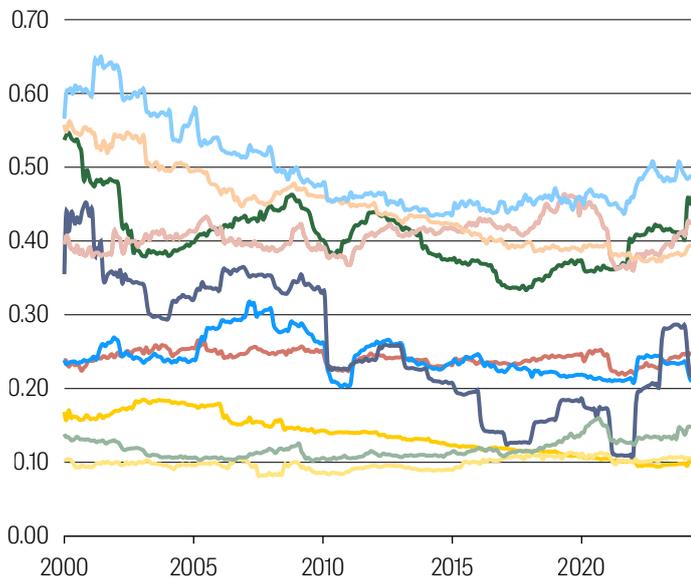
There are stark differences between sectors. Table 2 gives the whole sample market cap weighted average NMP, and *Chart 6* shows the time series for sectors in the MSCI_ACWI_XAU universe.

Table 2: Whole sample average NMP by sector

Sector	Average NMP
Communications Services	40.6%
Industrials	24.2%
Materials	24.4%
Energy	25.9%
Info Tech	40.6%
Utilities	13.7%
Consumer Discretionary	40.6%
Consumer Staples	44.4%
Real Estate	9.8%
Financials	11.9%
Health Care	49.7%

Source: RQI Investors, 2024

Chart 6: NMP time series by sector MSCI ACWI x AU



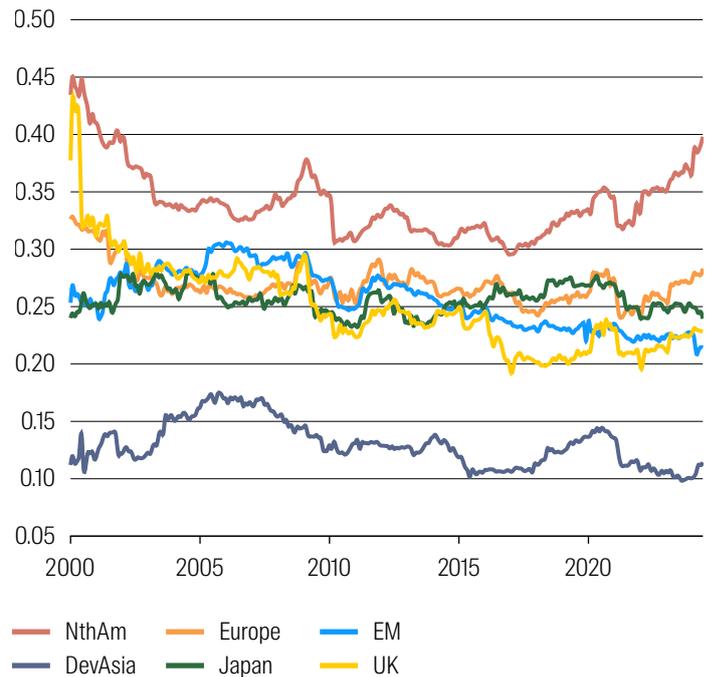
Source: RQI Investors, 2024.

Note that some sectors have very stable NMP through time (Materials, Financials), while others are much more volatile (Energy). Some trend downwards (Health Care, Energy, Utilities) while others are flatter. Utilities, Financials and Real Estate all have low average profitability, but these are very stable over time.

The reasons for these patterns will also be sector specific. In Utilities, we might expect a gradual growth in total asset value (through revaluations). In Energy, the invested asset total base will move slowly, but top line revenue will swing with economic cycles and energy prices.

Chart 7 shows that there are also large differences in NMP across regions, but on average North America has more profitable stocks and as we have noted, has strongly trended upwards in recent years. Other regions have been flat or trended downward more recently – for example, emerging markets and Europe. Developed Asia is a small sample of stocks, so we should not read too much into the lower profitability there.

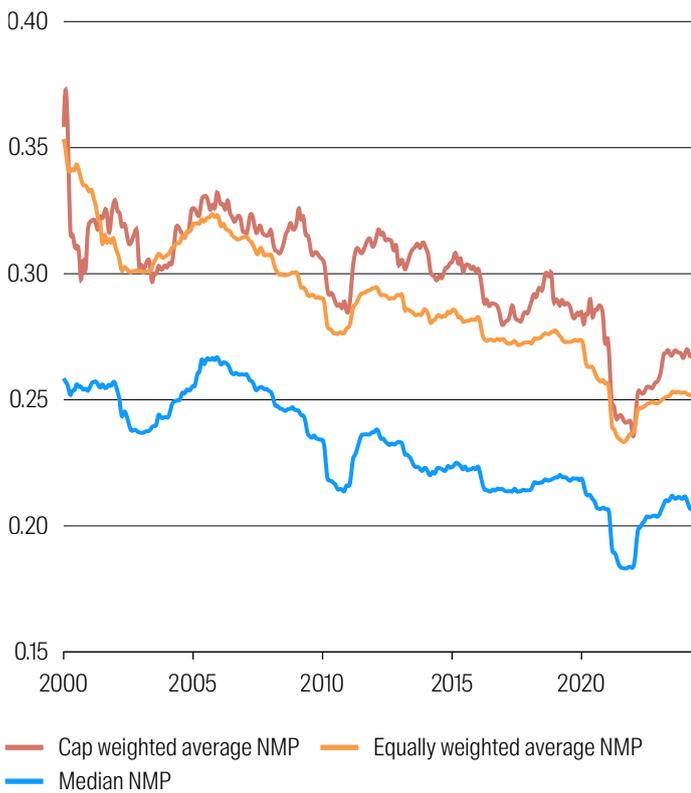
Chart 7: MSCI ACWI XAU regions cap weighted NMP



Source: RQI Investors, 2024.

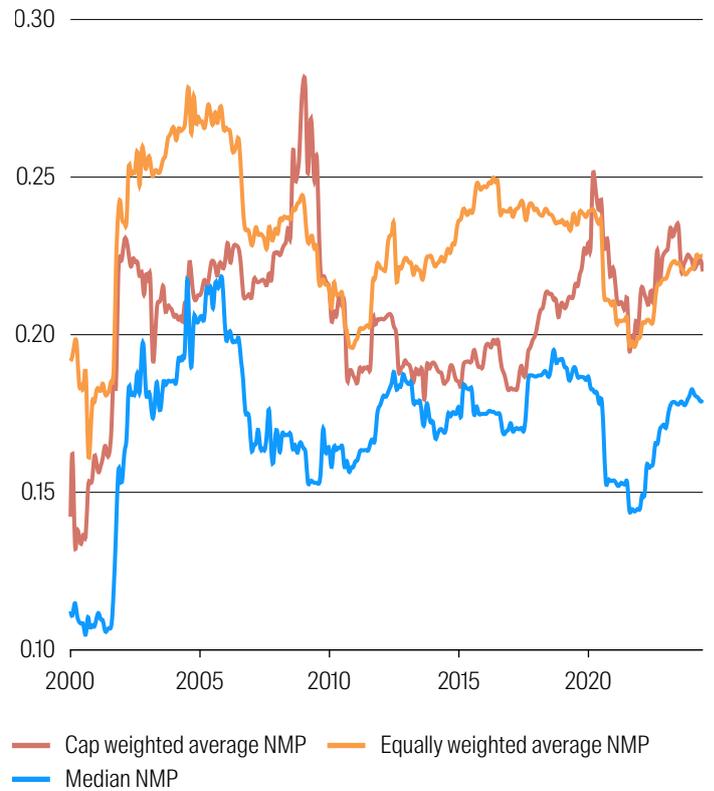
We do see a marked downward trend in profitability in global small caps. This is evident no matter how we calculate it. *Chart 8, Panel A*, shows this. However, we do not see it in Australia, as *Chart 8 Panel B* shows. In Australia, we can probably ascribe this to the dominance of Materials/Mining and Financials, which have lower NMP on average than other sectors, and have not seen a downward trend.

Chart 8: Panel A: Average NMP in MSCI_W_SML



Source: RQI Investors, 2024.

Chart 8: Panel B: Average NMP in ASX200



Source: RQI Investors, 2024.

All of this shows the importance of neutralising any comparison of stocks using NMP by region and sector. A simple (un-neutralised) application of NMP today will lead the investor to be overweight large cap, North American, IT and Health Care, and underweight small cap, all non-North American regions, financials, and materials. This portfolio would then hold proportionally more expensive growth names than the benchmark, which may not be what was intended with a tilt to NMP.

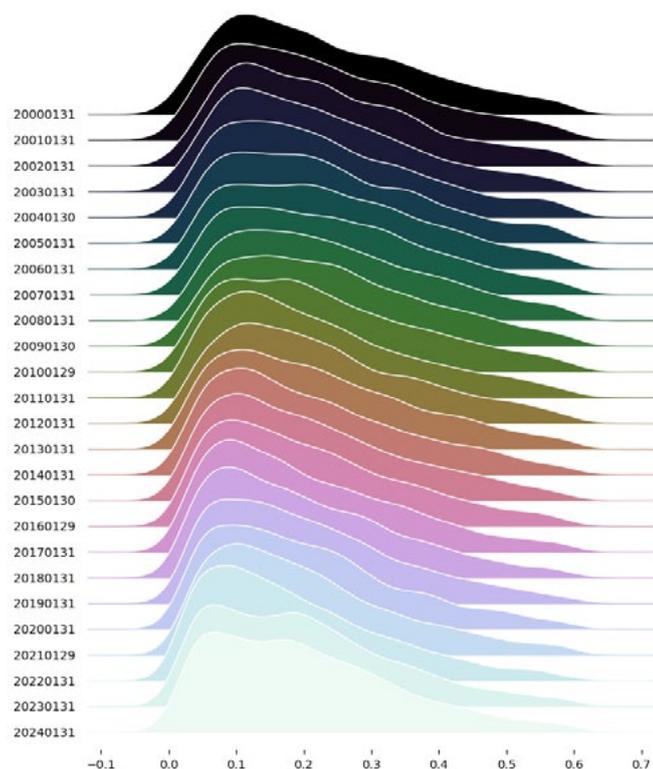
Distribution shape of NMP has changed

One more thing to note is that single metrics are not necessarily very good measures of trend in NMP. To get a wider perspective, we can look at the ridge plot⁶ in *Chart 9*. We can see that the distribution of NMP is both non-normal (in fact, skewed right) and changing over time. In all cases, the bulk of the distribution indeed moves to the left (i.e., towards reducing profitability), and the highest frequency point moves left as well. At the same time, the right side of the distribution (highest NMP values) has shrunk. This matches our observation above that mean and median NMP have fallen over time, but we can see that this is due to a reduction in the proportion of highly profitable firms over time. The highest point of the distribution does indeed reduce, but only very slowly.

Does this change our conclusions to date? Probably not, but it does throw light on a long-term compression of the highest profitability stocks, perhaps reflecting increased competition or cost inflation.

Chart 9: Ridge plot of NMP for MSCI_ACWI_XAU.

Frequency distribution, not cap weighted.



Source: RQI Investors, 2024

Can we explain why we see these changes over time?

Let us step back and think about why we might see change in profitability. We can easily think of plausible reasons:

- Changing productivity in the economy. If productivity decreases, then less output will be generated from the same asset base, so we might see NMP falling. Productivity has indeed fallen in the decade and more since the GFC and even earlier, despite the improvements in technology.⁷ There is some evidence suggesting this decrease in productivity can lead to decreases in profitability⁸
- Increases in proportion of intangibles. If intangibles grow, total assets grow. However if the gross profit attributable to intangible assets is lower (greater) than for fixed assets, then we could expect NMP to be lower (higher). Intangible assets have indeed grown sharply in value⁹, but it is unclear to what extent this growth has also led to increases in profit. Change in intangibles can also be due to the building or reduction in goodwill, which could reflect the ebb and flow of M&A activity.
- Inflation of costs ahead of revenue. An inability to pass increased costs on to increase revenue would see gross profit reduced. This would particularly apply to increases in direct labour costs at above the underlying rate of inflation, but also in increased raw material costs.
- Lead-lag effects in economic cycles and changing economic and market leadership. The dramatic increase in technological development in the last 5 years or so is just the latest in a series of dominant market leadership by sectors: for example, materials and energy have had significant leading performances in the last two decades, and their profitability is quite different to other sectors.
- Changing competition in key sectors or regions. The best example here is probably the period when developed market production was (and probably still is) impacted by lower costs of production in other regions, most notably emerging markets. Further, if industries or sectors are concentrated, larger companies will tend to be dominant players and are so more profitable.

6 Ridge plots are smoothed histograms at snapshots over time, aiming to show the change in the distribution of a variable. Here the sample width is annual, taken at the end of January each year. The essence of the chart is not changed markedly by moving to a different month.

7 See for example <https://www.inet.ox.ac.uk/news/why-has-productivity-slowed-down>

8 <https://www.emerald.com/insight/content/doi/10.1108/IJPPM-10-2018-0366/full/html>

9 See for example <https://www.wipo.int/publications/en/details.jsp?id=4744>

While we can construct a list of this type, our best explanation of NMP changes is always going to be a mix of these and other ideas. That is, the changes we see in profitability are not consistently explained by any one of these concepts and there seems to be little published evidence linking them.¹⁰

Which companies are most profitable?

We have tried to answer this question at a sector or regional level above, but we can also ask in terms of other firm characteristics. In *Chart 10*, Panel A below, we examine the average (median) profitability across expected growth and value. We do this with what is known as a double sort:

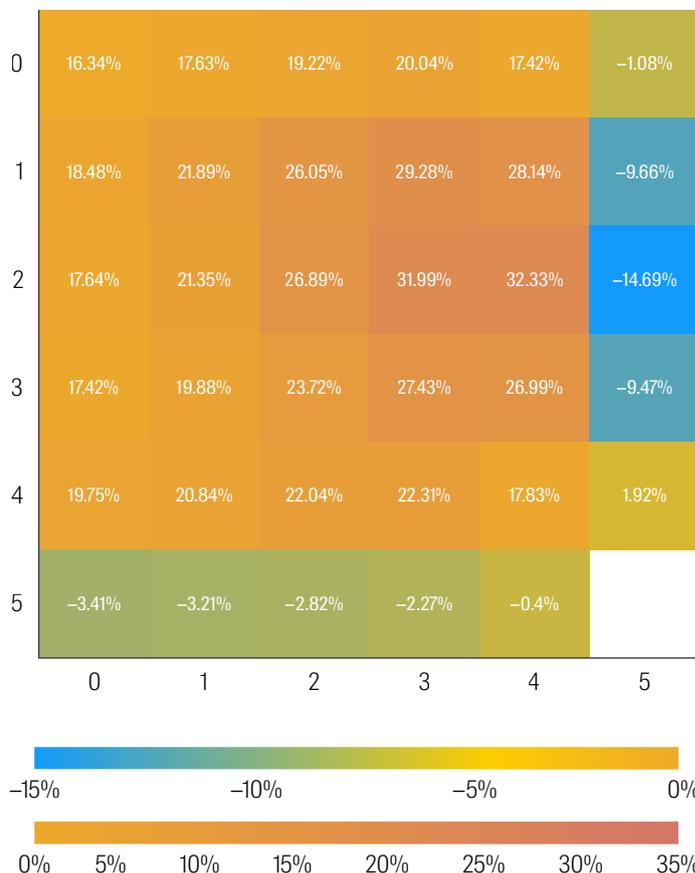
- First, sort all stocks into quintiles using 12mth forward forecast EPS growth (from consensus forecasts) (FWD_EPS_GWTH). Highest growth at the top.
- Then sort within each quintile using 12mth forward earnings yield (12mth forward forecast consensus earnings divided by current price) (EY_NTM). Most expensive at the right.
- Finally, within each cell, calculate the median 12mth forecast NMP (NMP_NTM¹¹)
- The differences between cell 1 and cell 5 in each column and row is also given at the end of the row or column.

The results are interesting. There is little variation among the cheapest stocks (left hand column) no matter the growth. As we move to the right, we see that NMP_NTM does not increase much for the highest and lowest growth firms.

Chart 10: Panel A: 5x5 double sort FWD_EPS_GWTH then EY_NTM

Top row is highest growth, right hand column is most expensive.

Median NMP_NTM in each cell



Source: RQI Investors, 2024.

However, it increases sharply for firms which are moderate growth (rows 2-4). For example, in row 3 (which is moderate growth) the NMP_NTM increases from 17.5% for the cheapest cell of stocks (column 1) to 32.2% for the most expensive (column 5). This means the most profitable (highest NMP_NTM) firms are both moderate growth and expensive. It would seem that the market pays up for profitability rather than just simple projected growth.¹²

¹⁰ Some early discussion appears here: <https://onlinelibrary.wiley.com/doi/abs/10.1002/mde.4090140104>

¹¹ We use forecast NMP here (NMP_NTM) so that we can compare with forecast EPS growth.

¹² We have studied this before – see our Realinsights paper on Overpaying for Growth. <https://www.firstsentierinvestors.com.au/au/en/institutional/insights/latest-insights/overpaying-for-growth-quality-and-predictability.html>

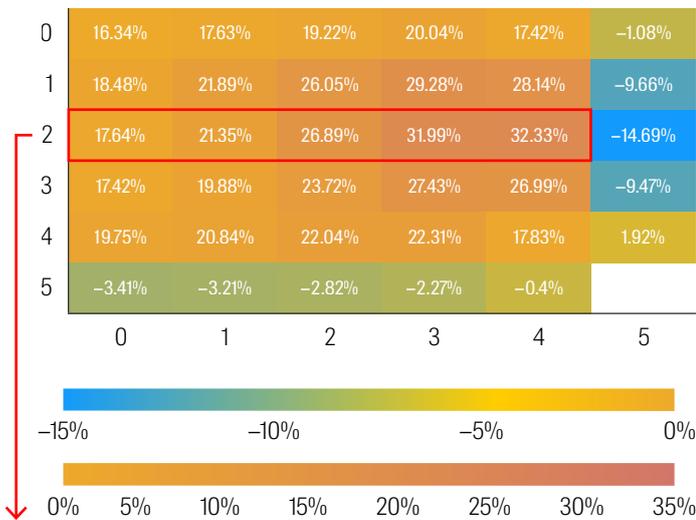
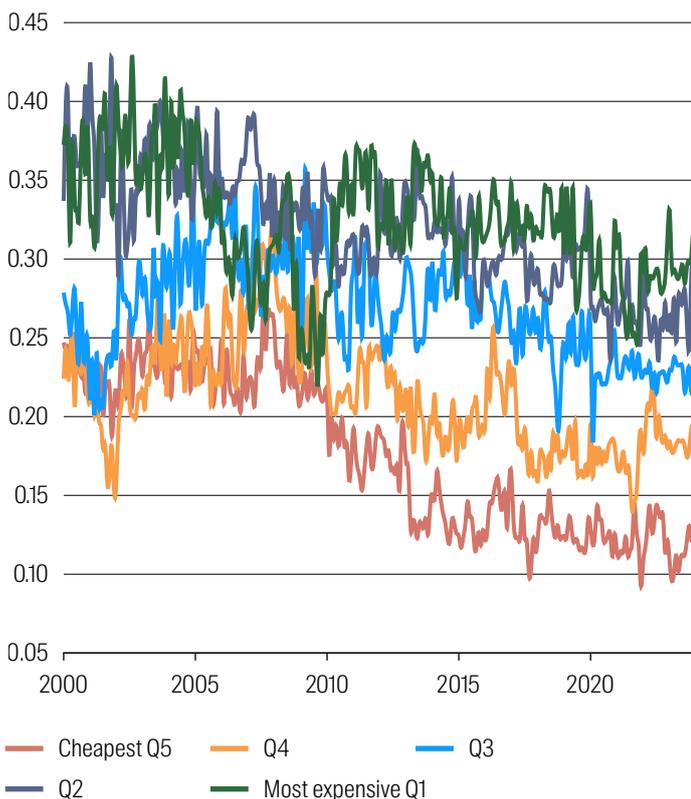


Chart 10: Panel B: Time series of NMP for moderate (Q3) expected EPS growth stocks (cheapest Q5 to most expensive Q1)



Source: RQI Investors, 2024.

One question that we might ask – is this pattern consistent over time? This is a perfectly reasonable question. *Chart 10*, Panel B, attempts to answer this by extracting the time series of each cell in row 3 in Panel A and plotting it.

We see that the NMP_NTM spread between the most expensive stocks and the cheapest stocks is consistent throughout the sample. The most expensive stocks have roughly double the expected profitability of the cheapest stocks at all times, even though both have fallen over time. The most profitable stocks have always been expensive stocks with moderate growth, not those with the highest anticipated growth.

Conclusion

The aim here was to take a deep dive into a well-known measure of quality – Gross Profitability. While pervasive in the industry, its characteristics are not well publicised and perhaps not well understood.

Firstly, we see that it generates strong and consistent alpha, both on the long and short sides, as the market rewards good quality and penalises junk.

Profitability has trended down over the last two decades, especially in global small cap stocks and emerging market stocks. In Australia, we have not seen this decline.

While we can construct economic arguments for variation in profitability over time, we cannot nail down a satisfactory explanation for this long-term trend. We do note that large cap stocks (mostly North American IT) have become much more profitable recently, so while the rest of the market sees profitability flat or falling, there has been a rotation of profitability into large caps. Variation by sector and region is also very large.

Across all stocks, we see a steady change in the distributional shape of profitability over time, with a large right skew reducing while the central weight of the distribution has only moved slightly. It may be that lower gross profitability (ex the largest stocks) is due more to a reduction in the proportion of very high profitability stocks than it is due to a downward shift in the distribution.

Finally, we note that the most profitable stocks are those with moderate growth expectations but are still, on average, expensive. The market is willing to pay up for quality over excessive growth so long as growth is maintained.

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