

**RESEARCH**

# Expected Profitability: A New Dimension of Expected Returns

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For more than three decades, Dimensional has excelled at identifying academic findings that can be used to benefit our clients' portfolios. Financial economists uncover many variables that appear to drive differences in average returns. When determining which of those variables should be considered a dimension of expected returns, we require that they:

1. Be sensible
2. Be persistent, pervasive, and robust
3. Allow the cost-effective capture of higher expected returns

Financial economics suggests that expected profitability should be related to expected equity returns.<sup>1</sup> Controlling for other dimensions of expected returns, such as relative price and market capitalization, more profitable firms should have higher expected returns than less profitable firms.

This paper develops a reliable proxy for expected profitability. We show how this proxy has been persistently and pervasively related to average returns. We test whether that relation is empirically robust to the proxy's construction and whether profitability can be used in the design of investment solutions.

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1. See, for instance, Eugene F. Fama, and Kenneth R. French, "Average Returns, B/M, Profitability, and Growth," *Dimensional Fund Advisors' Quarterly Institutional Review* 8, no. 1 (2013): 2-3.

**TAKING ACADEMIC RESEARCH TO PRACTICE**

To capture the profitability dimension, one would need a reliable and robust proxy for expected profitability. Because a firm’s profitability tends to be persistent through time, measures of current profitability are likely to be good proxies for expected profitability. Table 1 shows regressions of future profitability on current profitability using different measures of profitability that range from the bottom of the income statement (net income scaled by book value) to the top of the income statement (sales scaled by book). These regressions include firm size and relative price (as measured by the book-to-market ratio) as explanatory variables, effectively controlling for existing dimensions of expected returns.

Using data on US stocks from 1975 to 2012, these regressions show that all the profitability coefficients are economically large and statistically reliable. In addition, this simple regression model that uses current profitability can explain from 22% to 84% of the variation in next year’s profitability, depending on the variable used to measure profitability.<sup>2</sup> Even more impressive, perhaps, is that current profitability can explain between 4% and 42% of the variability of profitability seven years into the future.

As Table 1 shows, various measures of profitability appear to do a good job of forecasting future profitability.

Table 1. REGRESSIONS OF FUTURE PROFITABILITY ON CURRENT PROFITABILITY, CONTROLLING FOR SIZE AND RELATIVE PRICE (1975–2012)

|  | YEAR 1            |                       |                | YEAR 2            |                       |                | YEAR 3            |                       |                | YEAR 7            |                       |                |
|--|-------------------|-----------------------|----------------|-------------------|-----------------------|----------------|-------------------|-----------------------|----------------|-------------------|-----------------------|----------------|
|  | beta <sub>3</sub> | t(beta <sub>3</sub> ) | R <sup>2</sup> | beta <sub>3</sub> | t(beta <sub>3</sub> ) | R <sup>2</sup> | beta <sub>3</sub> | t(beta <sub>3</sub> ) | R <sup>2</sup> | beta <sub>3</sub> | t(beta <sub>3</sub> ) | R <sup>2</sup> |
| <b>Panel A: Profitability Defined as Sales/Book</b>  |                   |                       |                |                   |                       |                |                   |                       |                |                   |                       |                |
| Large  | 0.88              | 55.37                 | 0.84           | 0.82              | 35.46                 | 0.73           | 0.81              | 31.00                 | 0.65           | 0.73              | 28.61                 | 0.42           |
| Small  | 0.83              | 45.67                 | 0.65           | 0.75              | 33.66                 | 0.50           | 0.69              | 32.87                 | 0.41           | 0.55              | 27.95                 | 0.26           |
| All  | 0.84              | 50.12                 | 0.68           | 0.76              | 37.29                 | 0.54           | 0.71              | 36.05                 | 0.45           | 0.58              | 28.03                 | 0.28           |
| <b>Panel B: Profitability Defined as (Net Operating Income Before Amortization and Depreciation)/Book</b>                        |                   |                       |                |                   |                       |                |                   |                       |                |                   |                       |                |
| Large  | 0.77              | 36.93                 | 0.70           | 0.66              | 23.40                 | 0.51           | 0.64              | 22.54                 | 0.39           | 0.55              | 18.91                 | 0.20           |
| Small  | 0.70              | 28.60                 | 0.47           | 0.57              | 20.10                 | 0.30           | 0.49              | 19.99                 | 0.23           | 0.32              | 22.38                 | 0.12           |
| All  | 0.71              | 32.98                 | 0.52           | 0.59              | 22.82                 | 0.35           | 0.51              | 22.85                 | 0.28           | 0.36              | 27.21                 | 0.16           |
| <b>Panel C: Profitability Defined as (Net Operating Income Before Amortization and Depreciation minus Interest Expense)/Book</b> |                   |                       |                |                   |                       |                |                   |                       |                |                   |                       |                |
| Large  | 0.72              | 37.08                 | 0.66           | 0.58              | 26.82                 | 0.46           | 0.53              | 30.19                 | 0.33           | 0.42              | 21.22                 | 0.14           |
| Small  | 0.68              | 24.16                 | 0.42           | 0.53              | 16.02                 | 0.26           | 0.45              | 15.89                 | 0.20           | 0.29              | 16.40                 | 0.11           |
| All  | 0.70              | 27.81                 | 0.48           | 0.55              | 18.56                 | 0.32           | 0.47              | 17.96                 | 0.25           | 0.31              | 18.91                 | 0.15           |
| <b>Panel D: Profitability Defined as Net Income/Book</b>   |                   |                       |                |                   |                       |                |                   |                       |                |                   |                       |                |
| Large  | 0.45              | 18.74                 | 0.41           | 0.32              | 11.05                 | 0.26           | 0.32              | 9.15                  | 0.17           | 0.25              | 7.31                  | 0.06           |
| Small  | 0.52              | 15.84                 | 0.22           | 0.37              | 10.02                 | 0.12           | 0.28              | 10.58                 | 0.08           | 0.14              | 10.45                 | 0.04           |
| All  | 0.53              | 17.95                 | 0.26           | 0.38              | 11.27                 | 0.15           | 0.30              | 11.51                 | 0.10           | 0.17              | 13.05                 | 0.06           |

Profitability(t+y) = a + beta<sub>1</sub> Ln ME(t) + beta<sub>2</sub> Ln BTM(t) + beta<sub>3</sub> Profitability(t).  
 Past performance is no guarantee of future results. Source: Dimensional using CRSP and Compustat data. CRSP data provided by the Center for Research in Security Prices.

2. For comparison, in cross-sectional regressions of firm returns on firm characteristics, the explained variation is usually 1%–2%.

Moreover, Table 2 shows that, after controlling for size and relative price, these measures of profitability yield large and reliable spreads in average returns.

Table 2. US PROFITABILITY PREMIUMS, 1975–2012

|  | High  | Low   | H-L  |
|--|-------|-------|------|
| <b>Panel A:</b><br>Profitability Defined as Sales/Book   |       |       |      |
| Annualized Average Return (%)  | 15.99 | 11.70 | 4.29 |
| Annualized Standard Dev. (%)   | 18.77 | 18.63 | 7.34 |
| t-statistic  |       |       | 3.61 |
| <b>Panel B: Profitability Defined as (Operating Income before Depreciation and Amortization)/Book</b>                        |       |       |      |
| Annualized Average Return (%)  | 16.43 | 11.54 | 4.89 |
| Annualized Standard Dev. (%)   | 18.01 | 20.73 | 8.66 |
| t-statistic  |       |       | 3.48 |
| <b>Panel C: Profitability Defined as (Operating Income before Depreciation and Amortization minus Interest Expense)/Book</b> |       |       |      |
| Annualized Average Return (%)  | 17.03 | 11.70 | 5.33 |
| Annualized Standard Dev. (%)   | 17.27 | 21.14 | 9.03 |
| t-statistic  |       |       | 3.64 |
| <b>Panel D:</b><br>Profitability Defined as Net Income/Book  |       |       |      |
| Annualized Average Return (%)  | 16.10 | 12.32 | 3.78 |
| Annualized Standard Dev. (%)   | 17.78 | 21.22 | 8.19 |
| t-statistic  |       |       | 2.84 |

*Past performance is no guarantee of future results. Source: Dimensional using CRSP and Compustat data. CRSP data provided by the Center for Research in Security Prices.*

We sort stocks into two size groups. Large is defined as the top 90% of the US total market capitalization. Small is the bottom 10%. Within each size group, we sort stocks into three relative price groups (each representing one-third of the market capitalization). Similarly, we sort stocks into three profitability groups. We compute the value-weighted returns of six high-profitability size/relative price indices (large/low relative price, large/medium relative price, large/high relative price, small/low relative price, small/medium relative price, and small/high relative price). The monthly return of the high-profitability index is the simple average of the monthly returns of the six high-profitability size/relative price indices. We use an analogous procedure to compute returns for the low-profitability index. We rebalance once per year.

To summarize, Tables 1 and 2 show that after controlling for size and relative price, different profitability measures perform well in forecasting future profitability and generating spreads in average returns.<sup>3</sup> Moreover, scaling profits by assets (rather than book) yields similar results.

It is sensible to expect that, if current profitability is related to expected profitability, current profitability should be related to average returns. This is exactly what we observe in the data: a strong empirical relation between current profitability and future profitability and average returns. Further, our empirical observations are robust to many different measures of current profitability. This finding is important when informing expectations of what will drive expected returns and how we can use the information in current profitability to build robust portfolios—that is, portfolios that deliver consistent results under a wide variety of market conditions. Finally, the high- and low-profitability portfolios presented in Table 2 are rebalanced annually. The differences in average returns based on annual rebalancing, along with the persistence of firm-level profitability, suggest a level of turnover that allows for the cost-effective capture of this dimension of expected returns.

### CHOOSING A PROXY—DIRECT PROFITABILITY

To incorporate profitability in investment solutions, we need to consider a number of selection criteria. The profitability measure should (1) exclude nonrecurring items of profitability, (2) be comprehensive, and (3) be comparable across sectors. The first requirement suggests that measures at the bottom of the income statement, such as net income to book, are inappropriate because they are often affected by extraordinary items, discontinued operations, unusual charges to depreciation and amortization, and other items that are unlikely to persist in the future. Going to the top of the income statement (sales – cost of goods sold scaled by book or assets) also seems inappropriate because it does not satisfy the second requirement. (The profitability measure needs to be comprehensive.) Major operating expenses, such as staff compensation, are classified as cost of goods sold (COGS) in some industries and as selling, general, and administrative (SGA) expenses in others. Moreover, the breakdown between COGS and SGA expenses is often vague and arbitrary.

3. Tables 1 and 2 focus on the US market because it has the longest available history. Results for non-US markets are qualitatively similar. Past performance is no guarantee of future results.

Therefore, a comprehensive profitability measure needs to take into account both COGS and SGA expenses. However, the current profits measure should be comparable across sectors. For financials, the main cost of doing business is the cost of borrowing, which implies that interest expense needs to be incorporated into the profitability measure. If the numerator of the profitability measure reflects leverage, however, the denominator should also reflect it. Therefore, the natural choice for the denominator should be book value. Moreover, valuation theory also suggests scaling profits by book equity. Hence, the most appropriate proxy for expected profitability is sales minus COGS minus SGA minus interest expense, scaled by book equity. This proxy has strong support, both empirical and theoretical. In accounting terms, it is operating income before depreciation and amortization minus interest expense, scaled by book equity. We refer to this variable as direct profitability.

**DIRECT PROFITABILITY PREMIUM—  
PERSISTENT AND PERVASIVE**

Empowered with a robust proxy for expected profitability, we can explore the pervasiveness and persistence of the expected profitability dimension across countries and regions. Table 3 presents the historical performance of high and low direct profitability stocks in the US, non-US developed markets, and emerging markets. In the US and non-US developed markets, the monthly return on the high or low direct profitability indices is computed in the manner described above for Table 2. In emerging markets, the monthly return on the high direct profitability

index is the simple average of the monthly returns of three value-weighted high direct profitability indices (high profitability and low, medium, and high relative price). We use an analogous procedure to compute the returns of the emerging markets low direct profitability index. Thus, the returns on the high and low direct profitability indices are constructed to control for size and relative price effects.

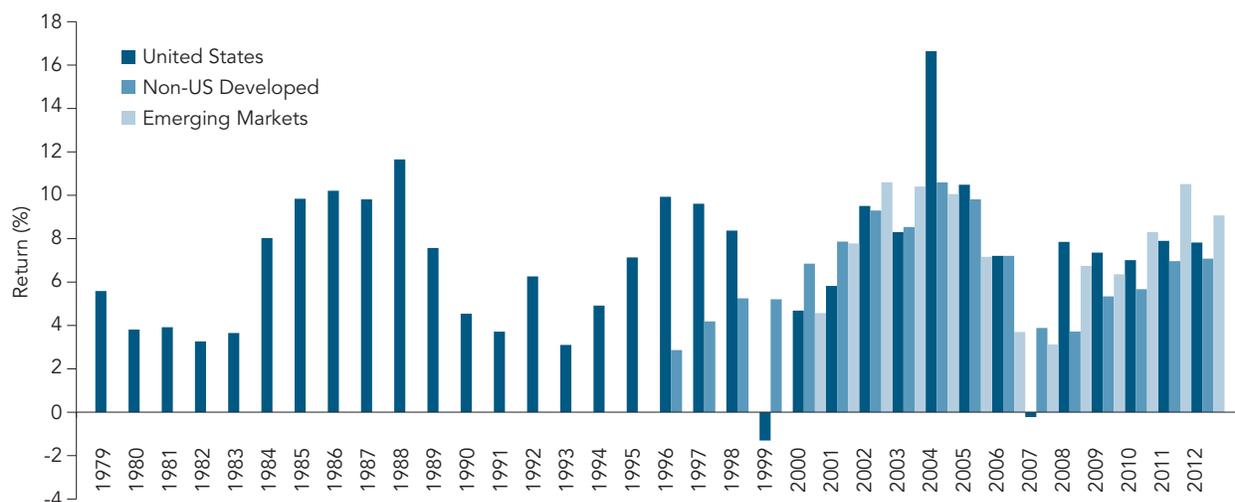
Table 3 shows high direct profitability stocks outperform low direct profitability stocks in all three regions (US, non-US developed, and emerging markets). In the US, the annualized average return on high direct profitability stocks is 17.03% vs. 11.70% for low direct profitability stocks from 1975 to 2012. The direct profitability premium is 5.33% per year and is statistically reliable (t-statistic of 3.64). In non-US developed markets, the average annualized return on high direct profitability stocks is 10.15% vs. 4.69% for low direct profitability stocks from July 1991 to December 2012. The direct profitability premium in non-US developed markets is 5.46% per year and is also statistically different from zero (with a t-statistic of 5.30). Finally, in emerging markets, high direct profitability stocks earned an annualized average return of 13.50%, while low direct profitability stocks earned an annualized return of 7.38% from July 1995 to December 2012. Hence, the direct profitability premium in emerging markets is 6.12% per year with a t-statistic of 4.79. Overall, Table 3 reveals that the premium associated with direct profitability is pervasive across stock markets.

Table 3. SUMMARY STATISTICS FOR THE DIRECT PROFITABILITY PREMIUM

|                                   | US Market<br>1/1975–12/2012 |         |      | Non-US Developed Markets<br>7/1991–12/2012 |         |      | Emerging Markets<br>7/1995–12/2012 |         |      |
|-----------------------------------|-----------------------------|---------|------|--|---------|------|------------------------------------|---------|------|
|                                   | High DPB                    | Low DPB | H–L  | High DPB                                   | Low DPB | H–L  | High DPB                           | Low DPB | H–L  |
| Annualized Average Return (%)     | 17.03                       | 11.70   | 5.33 | 10.15                                      | 4.69    | 5.46 | 13.50                              | 7.38    | 6.12 |
| Annualized Standard Deviation (%) | 17.27                       | 21.14   | 9.03 | 17.36                                      | 18.57   | 4.77 | 23.88                              | 25.65   | 5.35 |
| t-statistic                       | —                           | —       | 3.64 | —  | —       | 5.30 | —                                  | —       | 4.79 |

Past performance is no guarantee of future results. Asset class and profitability filters were applied to data retroactively and with the benefit of hindsight. Returns are not representative of indices or actual portfolios and do not reflect costs and fees associated with an actual investment. Source: Dimensional using CRSP, Compustat, and Bloomberg data. CRSP data provided by the Center for Research in Security Prices.

Figure 1. ROLLING FIVE-YEAR RETURNS FOR DIRECT PROFITABILITY PREMIUM



Past performance is no guarantee of future results. Asset class and profitability filters were applied to data retroactively and with the benefit of hindsight. Returns are not representative of indices or actual portfolios, and do not reflect costs and fees associated with an actual investment. Source: Dimensional using CRSP, Compustat, and Bloomberg data. CRSP data provided by the Center for Research in Security Prices.

Is the direct profitability premium also persistent through time? Figure 1 provides a positive answer. This figure plots the difference in annualized five-year rolling returns between high and low direct profitability stocks for the US, non-US developed markets, and emerging markets. In all three regions, we see that high direct profitability stocks outperformed low direct profitability stocks throughout most of the period. In short, the direct profitability premium is both pervasive across markets and persistent through time.

## CONCLUSION

Financial economics shows that higher expected profitability is related to higher expected returns, holding all else fixed. Thanks to recent research advances, we now have a robust proxy for expected profitability—direct profitability. Using this proxy, we find that high direct profitability stocks tend to outperform low direct profitability stocks across stock markets and over time, which is consistent with financial economics. The direct profitability premium is pervasive and persistent. Moreover, our analysis indicates that profitability can be used in investment strategies to improve their expected returns while maintaining their broad diversification. Therefore, expected profitability is a new dimension of expected equity returns that we can use to build better investment solutions. In a separate paper, we show how, by incorporating all

three dimensions of expected equity returns (company size, relative price, and expected profitability) in the structure of a portfolio, we can use the information in all three dimensions to improve the reliability of the outcome. Put another way, we can increase the probability of achieving higher expected returns vs. the market or an asset class.

Dimensional has managed strategies that consistently focus on the dimensions of expected returns for more than three decades. We began in 1981 with small cap strategies. We have launched large, small, and core strategies investing in the US, developed, and emerging markets—fully integrated strategies that target more than one dimension of expected returns. Our strategies have targeted the dimensions of expected returns for our clients in a cost-effective way over many market cycles. By efficiently balancing competing premiums, keeping turnover low, and trading with patience and flexibility, we have consistently added value relative to our peers.

Incorporating direct profitability into our strategies is the natural next step toward building better investment solutions for our clients.

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