Cory Bruner, CFA®, CFP®
Associate Investment Advisor

Paul Bourbonniere and I were at the advanced Dimensional (DFA) conference recently in Chicago and since Dimensional constitutes the core holding in portfolios for the majority of our clients, I wanted to reiterate why we use them by taking a deep dive into the history and the strategy.

Dimensional was founded in 1981 by David Booth and Rex Sinquefield who met as students at the University of Chicago. They were looking for sources of expected return that could be identified and refer to these as dimensions. It was in 1981 that the size effect became a dimension. This was followed by the value dimension in 1992 and the profitability dimension in 2012.[1] These dimensions will be explored and examined thoroughly later on. The company has grown since its founding and now manages over $750 Billion CDN in assets worldwide. To put this into context, this is a little more than twice the size of the portfolio managed by the Canada Pension Plan.[2] They are a global company with 13 offices in 9 countries and over 1200 employees.

Dimensional always begins their story by examining the active and passive sides of the investment management spectrum.

The goal of every active manager is to earn alpha: that is to earn a return that is greater than their index/benchmark by trying to predict through analysis which securities, sectors, industries, countries and currencies will outperform and underperform. Of course the goal is also to outperform their benchmark on a consistent basis. This leads to two very important questions for all active managers regarding performance evaluation. Firstly, are fund managers able to outperform their benchmarks (performance measurement)? Second, are they able to do so consistently (performance appraisal)? The SPIVA® report is often used as a gauge to answer these questions.

SPIVA® stands for S&P Indices versus Active and collects data from active mutual funds from all over the world and compares them to an index. Table 1 shows a table from the Canada Scorecard compiled from data of Canadian fund managers who try to outperform various indices.[3] One important aspect of SPIVA® data collection is that they adjust it for survivorship bias and therefore ensure the integrity of the data isn't compromised or biased upward.

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[1] Dimensional Fund Advisors, 'Putting Science to Work', *Dimensional Fund Advisors*, 2017, https://my.dimensional.com/csmedia/cms/print/2006/08/cathesci/Putting_Financial_Science_to_Work.pdf. The value dimension was the result of research from Chicago professors Eugene Fama and Kenneth French and the three factor model. They are also Dimensional consultants.

[2] CPP fund at June 30, 2018 is $366.6 Billion as of June 30, 2018. www.cppib.com/en/, (accessed October 15, 2018).

[3] S&P Global, 'SPIVA® Canada Scorecard', *S&P Global*, 2018, spiva-canada-year-end-2017.pdf.

Table 1: Percentage of Funds Outperforming the Index at Dec 31, 2017					
FUND CATEGORY	COMPARISON INDEX	ONE-YEAR (%)	THREE-YEAR (%)	FIVE-YEAR (%)	TEN-YEAR (%)
Canadian Equity	S&P/TSX Composite	6.78	8.96	18.31	8.14
	S&P/TSX Capped Composite	6.78	8.96	18.31	8.14
U.S. Equity	S&P 500 (CAD)	30.59	1.11	2.20	1.67
International Equity	S&P EPAC LargeMidCap (CAD)	26.92	13.46	10.00	6.06
Global Equity	S&P Developed LargeMidCap (CAD)	20.97	10.69	5.63	2.45

S&P Global, 'SPIVA® Canada Scorecard', *S&P Global*, 2018, spiva-canada-year-end-2017.pdf

As the table shows, and as Dimensional would suggest, it is very difficult to predict the future. The probability of a Canadian fund manager who follows a particular strategy outperforming his or her index is low and becomes less likely as one looks out to the five and ten year periods. The percentage of managers managing Canadian equity funds outperforming their index over 10 year time periods is 8.14%; put another way, 91.86% of fund managers underperform the index. If we go down to Canadian managers executing a US equity strategy, only 1.67% of managers outperform their index or 98.33% of managers underperform.

Dimensional also challenges the passive side of the management spectrum, and specifically indexing, where the fund manager attempts to match the performance and tracking error or risk of the index.

The issues that come up with indexing are twofold but related: one is reconstitution and one is drift. Every managed fund has established reconstitution dates where they rebalance the portfolio to look like the index. During the period of time between these dates, the weights of the various securities held in the fund will drift from its index. This becomes a problem for a couple of reasons. Firstly, the portfolio could drift significantly from its intended mandate and the index it was designed to follow. Secondly, think about the market impact these rebalancing transactions will have on security prices. There could be billions of dollars of trades where the fund is paying higher than market prices for securities it's buying and receive lower than market prices for the securities it selling.

These challenges prevent an index fund from outperforming its mandate. It will always earn the return minus any explicit fees but the returns quoted rarely take into account implicit fees that also reduce returns.
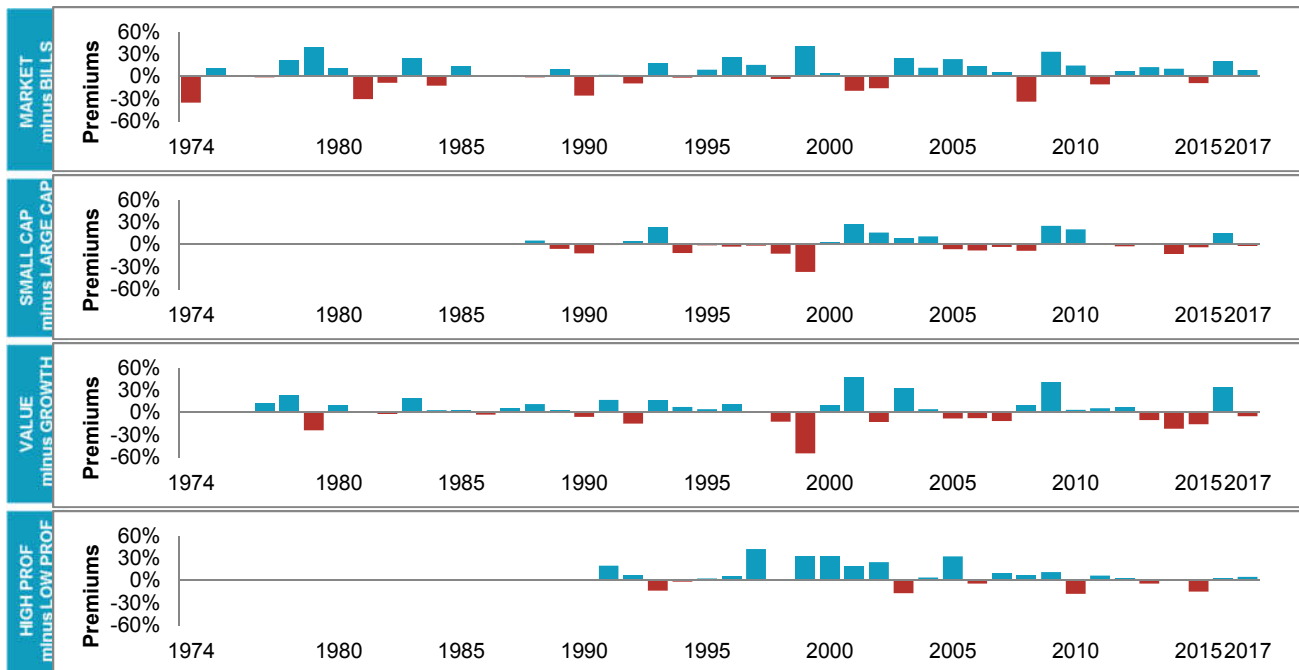
So how does Dimensional differentiate itself from these other approaches? Dimensional's approach is grounded in economic theory, robust models, and backed by decades of research going back to 1928 in the US and 1977 in Canada. The theory revolves around securities offering higher expected returns or premiums to certain characteristics/factors/dimensions as outlined in table 2.[4] Table 3 identifies years where the premiums from the dimensions were positive in Canada. We can see in table 3 that the premiums are more positive than negative and if we look at premium charts for the US, Europe, and Emerging markets, we see that the premiums are pervasive.[5]

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[4] Dimensional Fund Advisors, 'Putting Financial Science to Work', *Dimensional Fund Advisors*, 2017, https://my.dimensional.com/csmedia/cms/print/2006/08/cathesci/Putting_Financial_Science_to_Work.pdf.
[5] Dimensional Fund Advisors, 'Performance of premiums', *Dimensional Fund Advisors*, 2017.

Table 2	
Market	
Equity premium – stocks vs bonds – Stocks will outperform bonds over time.	
Company Size	
Small Cap premium – smaller companies outperform larger companies over time.	
Relative Price	
Value premium – value companies (those with lower prices measured by price to book) outperform growth (those with higher prices and more expensive measured by price to book).	
Profitability	
Profitability premium – those companies with higher profitability and cash flows outperform those with lower.	

Table 3
Equity, size, relative price, and profitability: Canadian Markets

These dimensions and their premiums seem pretty intuitive and sensible. For example, we would expect to get paid for taking on more market risk investing in equity over bonds and we would expect a company that is profitable and generates cash flow would perform better than one that does not.

However, Dimensional views the sensibility of these drivers of expected return as a starting point. They also have to be proven through models and research and they use market prices to do this. Dimensional is not attempting to forecast prices like an active manager but rather they examine spot market prices and subscribe to the efficient market hypothesis (EMH) developed by Eugene Fama. The EMH says that

prices reflect all available and relevant information which means it is extremely difficult to use fundamental or technical analysis to earn active return. Therefore, prices are the only way to get current information about securities and Dimensional uses this information to model the premiums from the various dimensions and determine how frequently they occur.

One of the most important criteria of the dimensions, in addition to their sensibility, is that they need to be captured and implemented at low cost. Dimensional would highlight that costs are an important headwind for any fund. Every buy and sell transaction in the portfolio has a cost (whether explicit or implicit) and every cost reduces portfolio return. It's much easier to identify explicit costs – trading costs, management costs, accounting and regulatory costs – and attempt to minimize these. However, implicit costs are less likely to be shown on a Fund Facts and normally aren't specifically identified or calculated. For example, market impact costs could scrub away some of the return of a fund if they were shown. If I trade a very small company in large quantities then each subsequent trade will cause the price to increase such that I start to buy at higher than fair market prices. What about liquidity costs? What about the cost of not making a trade at all or delaying trades?

Dimensional's approach to trading is more flexible than an active or passive fund and results in significantly lower trading costs. They can be more flexible in terms of the timing and frequency of trades and the names they trade. Ultimately, this trading discipline improves return as Dimensional is buying at lower prices and selling at higher ones.

It is important to note that Dimensional's research does not suggest that the premiums are probable or predictable. Table 3 above shows that premiums do appear more frequently than they don't but offer no insight into when or if they will occur. There is some comfort in knowing that if the premiums do not occur, we would know and understand why the premiums are negative. When one examines the performance of an active fund manager, there are often many factors that contribute to fund performance that are not easily identified, explained, or consistent from year to year.

The goal was to get into more detail than we can in face to face meetings about Dimensional and why we use them as our core strategy. Hopefully this will provide useful information to form the basis of further discussions and meetings going forward.

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