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Israel Solares-Moya
Israel.Solares-Moya@msci.com

Barra Insight

Examining US Economic Sector Behavior through the Lens of Barra US Sector Equity Models

Differences in US Economic Sectors

Introduction

Sector models are useful tools to evaluate the risk and performance of sector-specific portfolios, because they are aligned with the investment universe. This alignment leads to risk and performance attributions that more accurately reflect the portfolio manager's investment philosophy. In the latest Barra Insight, we examine the risk and return dynamics of each sector using the Barra US Sector Equity Models and compare the performance of sector-specific styles over time. The incorporation of sector-specific dynamics in the risk and performance attribution results in more relevant analysis for the portfolio manager by providing specific insights to the stocks in the investment universe.

Motivation for Sector Models

A risk model built from a broad estimation universe represents the risk and return dynamics from a large set of securities. As a result, portfolio managers gain comprehensive views on risk and return across markets, countries, regions, even the world. The broad estimation universe, however, may not be ideal in all cases. For example, sector-specific investment strategies with a sector benchmark or a constrained investment universe would be better represented with a model consistent with a sector-specific investment universe. To better understand why sector models produce factor returns and volatility estimates consistent with the investment universe, a broad US equity model, such as the Barra US Equity Model (USE4) should be considered. This model demonstrates the volatility of equities in the MSCI USA Investable Market Index (IMI), a broad index that includes a combination of small, mid, and large cap stocks. The use of a broad estimation universe means that the Barra US Equity Model is appropriate to analyze the risk and return profiles for portfolios representing the whole US equity market. However, if the portfolio manager is constrained to a sector-specific portfolio, using a sector risk model with an estimation universe that mimics this investment constraint will improve how the risk model represents the portfolio's risk and return profile.

The Barra US Sector Equity Models

Each model in the Barra US Sector Equity Model family is built with a sector-specific estimation universe, defined by the Global Industry Classification Standard (GICS®). As illustrated in **Table 1**, the 10 estimation universes differ greatly in terms of the number, size, and fundamental characteristics of the stocks. This heterogeneity across estimation universes supports the notion that risk models estimated from these sets of stocks

Table 1. MSCI USA IMI broken down by GICS® sector (as of September 30, 2013)

Sector	# of stocks	Weight in MSCI USA IMI	Average market cap.	Div. yield*	P/BV*	P/E*	P/S*	ROE*
Information Technology	407	18.07%	8,755	1.58%	3.39	17.78	2.26	23.56%
Financials	514	17.08%	6,494	2.25%	1.30	15.58	2.19	10.92%
Consumer Discretionary	368	13.03%	7,408	1.26%	4.10	20.00	1.28	25.68%
Health Care	284	12.61%	8,460	1.58%	3.55	22.32	1.67	19.18%
Industrials	340	10.96%	6,547	1.82%	3.13	19.84	1.31	28.72%
Energy	156	9.82%	12,022	2.06%	1.94	13.51	1.02	15.06%
Consumer Staples	111	9.06%	16,869	2.76%	4.19	18.47	1.02	35.93%
Materials	134	3.83%	5,629	2.03%	2.64	21.76	1.18	16.46%
Utilities	78	3.24%	7,681	3.88%	1.61	17.84	1.47	9.47%
Telecommunication Srvcs	32	2.29%	13,904	4.49%	2.56	45.12	1.28	4.42%

* Source: MSCI Fundamental Data

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will reflect unique risk and return dynamics within each sector. Once sector-specific factor returns are estimated, they are used to produce sector-specific covariance matrices that capture the unique interactions across styles within each sector. The use of sector models can produce better risk forecasts for portfolios that invest exclusively in a sector[1], with benefits that go beyond the risk and performance attribution of sector-specific portfolios. Comparing sector-specific factor returns during different market regimes, particularly periods of friction and crisis, can yield valuable insight. This information empowers investors with better insight into drivers of risk and return within and across sectors.

Comparison of Factor Returns for Sector Styles

We examine three styles that show significant divergence across sectors and explain these differences by understanding the unique drivers that can affect the styles within each sector:

- **Beta:** The Beta factor can be defined as the return of a dollar neutral, long-short portfolio with long positions in stocks with high historical betas, short positions in stocks with low historical betas, and neutral exposures to all other factors.
- **Leverage:** The Leverage factor can be defined as the return of a dollar neutral, long-short portfolio with long positions in highly levered stocks, short positions in stocks with low levels of leverage, and neutral exposures to all other factors.
- **Momentum:** The Momentum factor can be defined as the return of a dollar neutral, long-short portfolio with long positions in stocks that have recently outperformed short positions in stocks that have recently underperformed, and neutral exposures to all other factors.

Chart 1 presents the cumulative returns to the Beta factor for the IT and Energy sectors. The Beta factor in the IT sector outperformed the Beta factor in all other sectors during the dot-com bubble. This means that high-beta IT stocks paid a much larger premium than high-beta stocks in other sectors between 1998 and 2000. This reflects an increased appetite for IT stocks that had shown a high sensitivity to the returns of the market. In contrast, the performance of the Beta factor in the Energy sector was roughly flat from 1993 to 2007, but showed significant outperformance from the end of 2007. Differences in returns also produce differences in the estimated volatility. The forecast volatility for the Beta factor in the IT sector in December 2000 was 13.4%. In the same period, the Beta factor in the Energy sector had a forecast volatility of 7.2%.

Chart 1. Beta Factor: Cumulative Performance in the IT and Energy Sectors

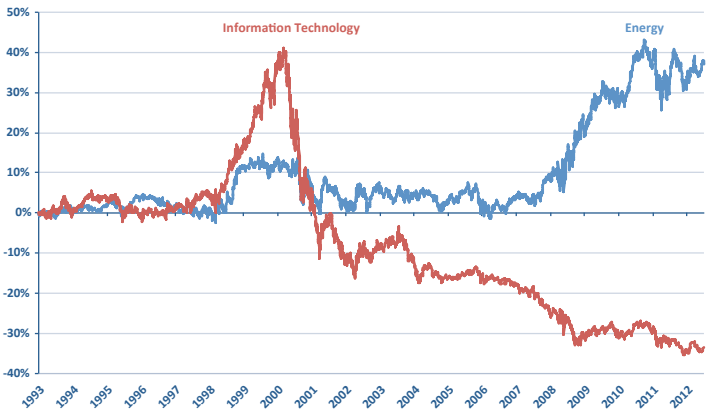
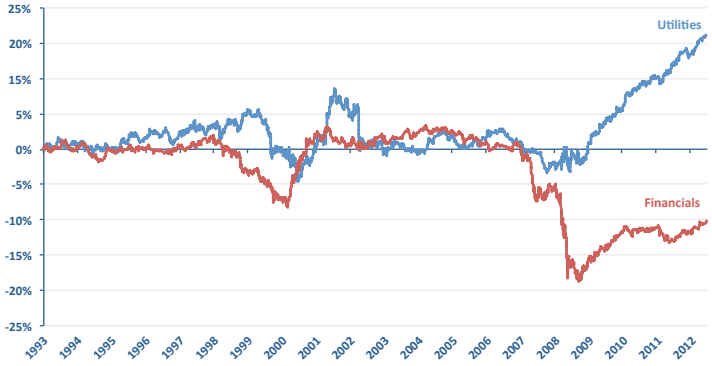


Chart 2, meanwhile, shows the cumulative returns to the Leverage factor for the Financials and Utilities sectors. As expected, the Financials Leverage factor showed large negative returns during the financial crisis in 2008 and 2009. Highly levered financial companies struggled to find the financing necessary to stay in business and in many cases were driven to insolvency by the lack of available financing. The negative performance of highly levered companies, however, was not widespread. For companies in the Utilities sector the Leverage Factor did not show the large negative returns that Financials showed in 2008 and 2009; it was mostly flat during this period and showed a marked outperformance since 2009. This positive performance can be attributed to the positive impact that low levels of interest rates had for highly levered utilities companies. Further, the forecast volatility for the Leverage factor in the Financials sector in January 2009 was 7.6%. In the same period, the Leverage factor in the Utilities sector had a forecast volatility of 4.9%.

Chart 2. Leverage Factor: Cumulative Performance in the Financials and Utilities Sectors



The Momentum factor shows similar divergence across sectors. Tables 2 and 3, on the next page, show the yearly returns to the Momentum factor for each of the GICS® sectors. In 1994 (Table 2), the best-performing sector for Momentum was IT with 7.2%; Utilities was at the bottom of the ranking with a negative return of -2.6%. In 2012 (Table 3), the best-performing sector was Energy with 11.9% and the worst-performing sector was Consumer Staples with a negative return of -2.8%. It is also useful to note the range of returns from year to year. For example, in 2000 the range of cumulative returns were around 42.8%, as defined by the spread between the largest (41.2%, IT) and smallest (-1.6%, Materials) cumulative returns. In contrast, the range in 2010 was only around 8.7%.

[1] For an in-depth discussion, please see Barra Insight - Sector Models: An Insightful View of Risk and Return.

Table 2. Sector-specific Momentum Factor: Yearly Cumulative Performance (1994 to 2002)

1994	1995	1996	1997	1998	1999	2000	2001	2002
Info Tech 7.2%	Info Tech 13.2%	Info Tech 14.2%	Health Care 12.5%	Cons Discr 22.3%	Info Tech 23.7%	Info Tech 41.2%	Telecoms 5.4%	Utilities 6.4%
Health Care 6.4%	Cons Discr 12.5%	Industrials 11.0%	Telecoms 11.1%	Telecoms 15.5%	Cons Discr 17.1%	Telecoms 26.8%	Industrials 4.5%	Financials 3.0%
Telecoms 4.8%	Energy 6.5%	Health Care 10.8%	Cons Discr 9.1%	Energy 13.2%	Telecoms 13.7%	Health Care 20.8%	Utilities 4.2%	Cons Discr 2.9%
Cons Discr 3.9%	Health Care 6.5%	Cons Discr 9.0%	Cons Staples 7.4%	Health Care 12.6%	Utilities 9.3%	Industrials 12.0%	Cons Discr 3.6%	Cons Staples 2.6%
Industrials 2.0%	Industrials 6.3%	Telecoms 8.5%	Info Tech 7.3%	Info Tech 11.7%	Health Care 6.8%	Financials 11.1%	Materials -1.7%	Telecoms 2.2%
Cons Staples 0.5%	Telecoms 4.4%	Energy 7.2%	Industrials 5.8%	Industrials 7.5%	Financials 4.3%	Cons Staples 7.3%	Financials -5.8%	Energy -1.8%
Materials -0.8%	Materials 4.1%	Materials 5.5%	Financials 4.9%	Cons Staples 5.7%	Materials 1.4%	Utilities 5.7%	Energy -6.7%	Materials -1.9%
Energy -1.1%	Utilities 1.6%	Cons Staples 5.3%	Utilities 3.9%	Utilities 4.1%	Energy 1.0%	Energy 1.1%	Health Care -7.7%	Industrials -2.5%
Financials -2.1%	Cons Staples 0.6%	Utilities 2.0%	Energy 0.6%	Financials 2.9%	Industrials -2.1%	Cons Discr -0.2%	Cons Staples -8.6%	Info Tech -3.2%
Utilities -2.6%	Financials -1.2%	Financials 1.2%	Materials -1.1%	Materials -0.8%	Cons Staples -5.7%	Materials -1.6%	Info Tech -9.3%	Health Care -3.7%

Table 3. Sector-specific Momentum Factor: Yearly Cumulative Performance (2003 to 2012)

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Materials 1.2%	Info Tech 3.5%	Materials 11.2%	Energy 4.9%	Materials 17.1%	Energy 26.2%	Utilities -9.6%	Utilities 5.9%	Energy 13.7%	Energy 11.9%
Financials -0.2%	Cons Discr 3.5%	Telecoms 7.8%	Materials 3.4%	Telecoms 13.9%	Materials 17.1%	Info Tech -14.1%	Energy 5.6%	Health Care 7.9%	Materials 9.1%
Health Care -0.9%	Telecoms 1.3%	Info Tech 7.8%	Cons Discr 3.2%	Cons Discr 12.1%	Financials 14.0%	Health Care -14.1%	Info Tech 5.1%	Industrials 7.6%	Cons Discr 2.4%
Cons Discr -1.6%	Cons Staples 1.3%	Cons Staples 7.5%	Telecoms 2.8%	Industrials 10.9%	Telecoms 9.6%	Cons Staples -15.0%	Telecoms 3.9%	Financials 6.6%	Health Care 2.3%
Energy -2.3%	Materials 0.8%	Utilities 6.7%	Financials 2.1%	Financials 9.4%	Cons Discr 6.5%	Telecoms -16.1%	Industrials 3.1%	Cons Staples 6.0%	Info Tech 1.6%
Utilities -2.5%	Financials 0.5%	Cons Discr 5.7%	Industrials 2.1%	Health Care 9.2%	Health Care 5.7%	Energy -17.3%	Cons Discr 2.6%	Cons Discr 5.1%	Telecoms 1.6%
Industrials -3.6%	Energy -0.4%	Health Care 4.3%	Health Care 1.2%	Energy 7.6%	Cons Staples 1.7%	Financials -20.8%	Cons Staples 2.2%	Utilities 5.0%	Utilities 1.0%
Telecoms -4.4%	Health Care -0.8%	Industrials 3.0%	Utilities -0.3%	Info Tech 7.1%	Utilities 1.5%	Cons Discr -21.3%	Health Care 1.6%	Materials 2.3%	Industrials 0.5%
Cons Staples -7.1%	Utilities -1.0%	Financials 2.2%	Info Tech -1.2%	Cons Staples 4.1%	Industrials 0.7%	Industrials -22.3%	Materials -0.8%	Telecoms 2.2%	Financials -1.2%
Info Tech -9.4%	Industrials -1.1%	Energy -0.4%	Cons Staples -4.4%	Utilities 0.3%	Info Tech -0.6%	Materials -22.5%	Financials -2.8%	Info Tech 1.6%	Cons Staples -2.8

The best- and worst-performing sectors for the each factor change over time. As expected, IT was among the best-performing sectors for the Momentum factor during the dot-com bubble, but it repeatedly ranked in the bottom half in the last decade.

Conclusion

These examples demonstrate how sector-specific style returns can diverge significantly over time, responding to sector-specific shocks. The differences can be large, responding to market events that affect a specific sector, and highlight how diverse the risk and return profile of each sector can be. By estimating factor returns from sector-specific universes, the Barra US Sector Equity Models isolate each sector-specific style risk and return profile and show an aligned view of risk and return within each sector. This empowers portfolio managers with constrained investment universes with a more accurate view of the risk and return dynamics within their investment set. Accounting for the sector-specific risk and return profiles in the risk and performance attribution of a portfolio can help identify sources of risk and return, in a way that closely reflects the investment strategy.

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MSCI is headquartered in New York, with research and commercial offices around the world.

[1] *As of March 31, 2013, as reported on July 31, 2013 by eVestment, Lipper and Bloomberg.*

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