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April 21, 2017

Stock Selection: Research and Results April 2017

The Curse of Q1: Residual Seasonality

Pharmaceuticals and Technology: Role Reversal

A Turnabout in Seasonality

- It used to be that undervalued stocks performed well in the first quarter of the year as investors repurchased beaten-down issues they'd sold in the prior year in order to realize tax losses. In the past couple of business cycles and in the last five years in particular a very different dynamic has unfolded, and value stocks performed well in the final quarter of the year and poorly in the first one. Some of the shift is explained by the movement of mutual funds' fiscal years away from a calendar year end. More critical though is the seasonality that's crept into the economic data.
- It looks like there's a problem in the BEA's seasonal adjustment process that leads to a systemic understatement of growth in the first quarter, some of which is subsequently revised away. That seasonality has been imbued to the behavior of equity investors, causing value to lag early in the year and stable stocks to outperform. That pattern has been repeated this year making us think we shouldn't read much into the reversal in sentiment that unfolded in the first quarter.
- What's more important is that the inflation data has come in soft, as a price war in cell phone service and a glut of used cars impacted the core rate. Posing a further risk, rents, that comprise a third of the core CPI, look poised to flatten out as a new supply of apartments comes on line. At the same time, the labor market continues to tighten, as few retired people have been drawn back into it, and it looks like the rise of "gig economy" part-time jobs has led to an overestimation of slack.
- When the PMI is running hot, as it is has been in recent months, the yield curve subsequently flattens, by (20) or so basis points in the next quarter and by (100) basis points in the next year. We've seen (50) basis points thus far in 2017, causing the financials to underperform the market by a substantial amount. That sector represents a levered play on the seasonal effects and given the damage that's already been done, our judgment would be to hold on. Citibank, American Express and Morgan Stanley stand out, as they've reduced their share bases by material amounts.
- Without obvious anomalies to exploit we're looking to the GARP style for new ideas. Our large-cap growth stock universe offers an ROE that's more than +20 percentage points above the nominal growth rate of the economy, and a free cash flow yield that tops that of ten-year Treasury bonds by two points. Our Distrusted Fifty portfolio picks from that universe, looking for situations where exceptional returns on capital have been greeted with skepticism. It's generated almost +3½ points of alpha per annum over the last 12½ years, with annual turnover of about 30%, and is a little more than +2½ points ahead this year. Appendix 1 on page 13 presents its current constituents.

Pharmaceuticals and Technology: Role Reversal

- The fundamentals of pharmaceutical stocks have become more volatile in the last few years as drug pricing has come under scrutiny. As a result both their betas and arbitrage risk have been increasing, usually a stumbling block for growth stocks. We haven't seen that trend elsewhere in health care. Most technology stocks have the opposite characteristics as their fundamentals have become more stable. The mega-cap tech companies have generated nearly 30% free cash flow margins, an extraordinary level, and the behavior of those margins has been critical to stock performance. The stocks are bid up on evidence they're sustainable. The technology and pharma/biotech sectors are priced to comparable free cash flow yields, and we still prefer the former despite the decline in its risk premium in the last several years.

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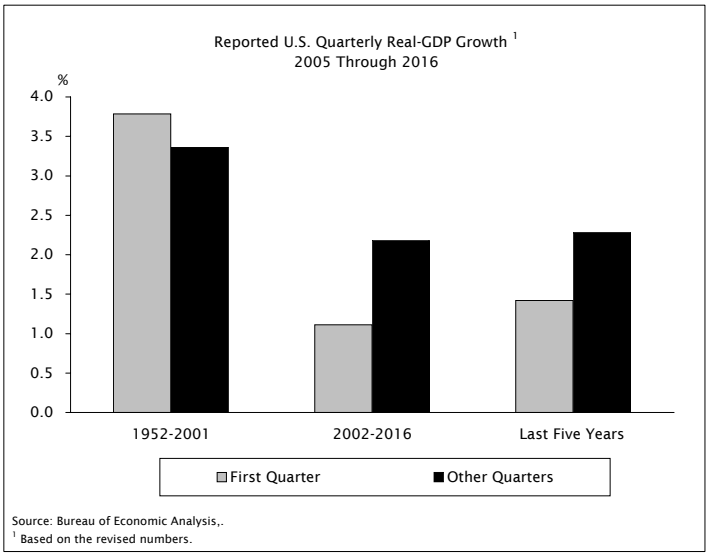
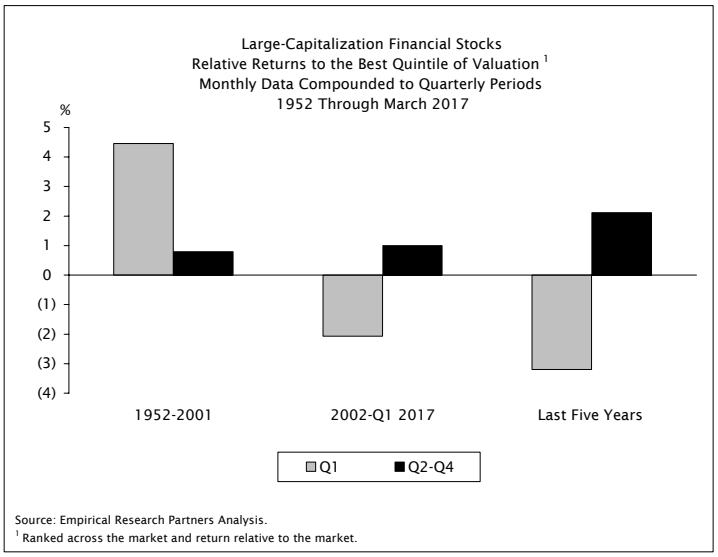
Conclusions in Brief

- The economic data exhibits seasonality…



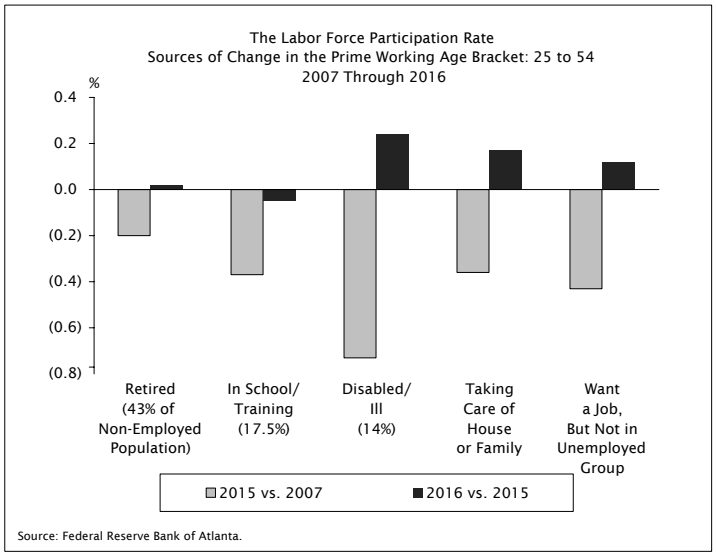
Source: Bureau of Economic Analysis,.
[1] Based on the revised numbers.

- ...That's carried over to stock performance:



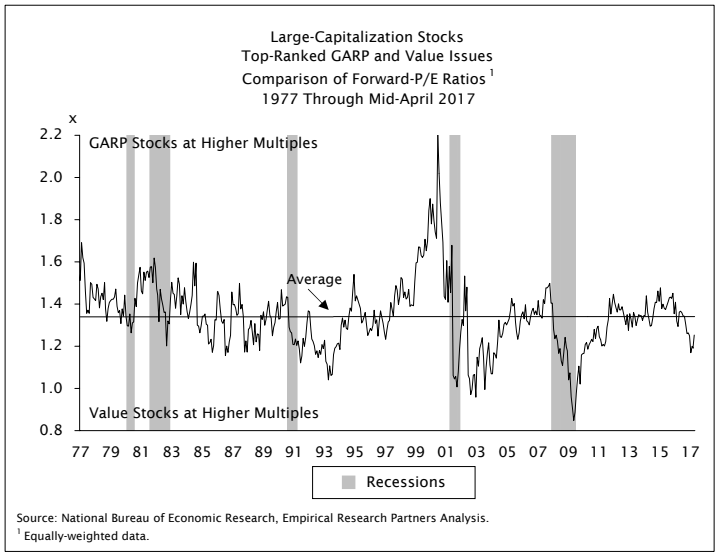
Source: Empirical Research Partners Analysis.
[1] Ranked across the market and return relative to the market.

- The labor market is legitimately tight:



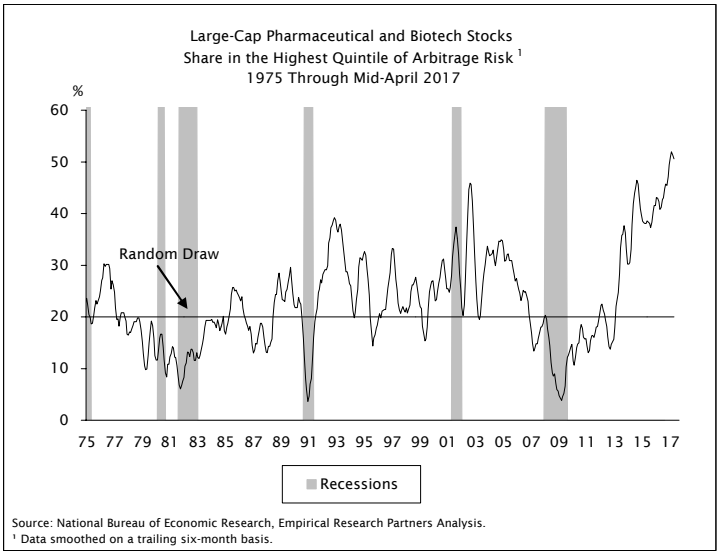
Source: Federal Reserve Bank of Atlanta.

- We're looking to GARP for new ideas:



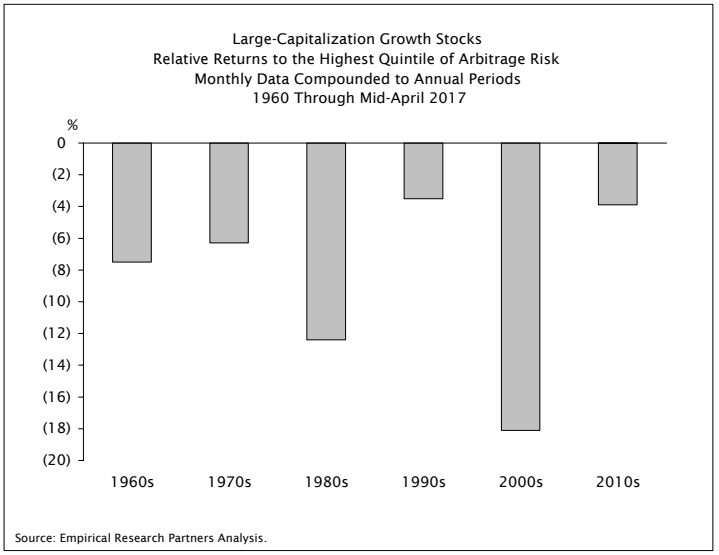
Source: National Bureau of Economic Research, Empirical Research Partners Analysis.
[1] Equally-weighted data.

- The pharma and biotech sectors have become riskier…



Source: National Bureau of Economic Research, Empirical Research Partners Analysis.
[1] Data smoothed on a trailing six-month basis.

- …Usually a problem for growth stocks:



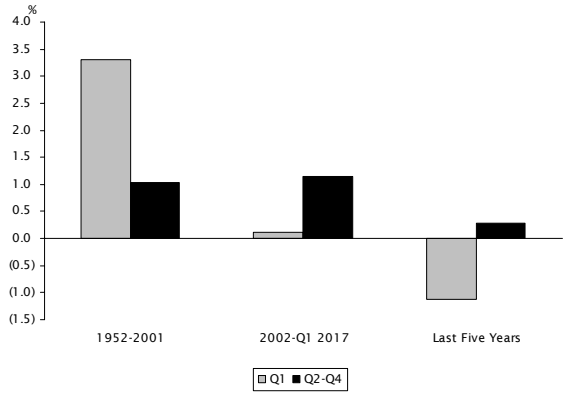
Source: Empirical Research Partners Analysis.

The Curse of Q1: Residual Seasonality

A Turnabout in Seasonality

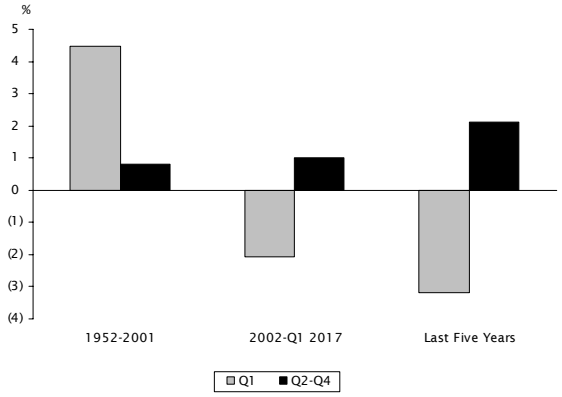
There used to be a rule of thumb that value stocks did well in the first-quarter of the year as investors bought back the issues they had sold in the prior year to realize tax losses. That was more than an old wives tale and from 1952 through 2001 the alpha generated by our best quintile of valuation was three times greater in the first quarter than in the remainder of the year (see Exhibit 1). Since then though the relationship has been turned on its head and the first quarter has been the weakest of the four, while little has changed in the other three. In the last five years the turnabout was more pronounced, with significant first-quarter underperformance by value in 2014, 2015, 2016 and again in 2017. The financial sector has demonstrated the same pattern, in fact in spades (see Exhibit 2). Issues offering the most-stable fundamentals have changed their stripes too, going from being first-quarter laggards to leaders (see Exhibit 3).

Exhibit 1: Large-Capitalization Stocks
Relative Returns to the Best Quintile of Valuation
Monthly Data Compounded to Quarterly Periods
1952 Through March 2017



Source: Empirical Research Partners Analysis.

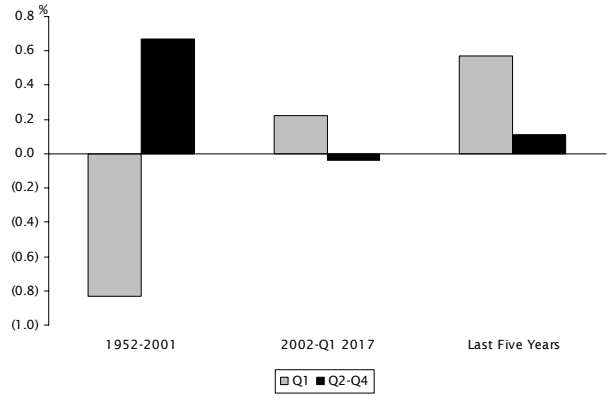
Exhibit 2: Large-Capitalization Financial Stocks
Relative Returns to the Best Quintile of Valuation[1]
Monthly Data Compounded to Quarterly Periods
1952 Through March 2017



Source: Empirical Research Partners Analysis.

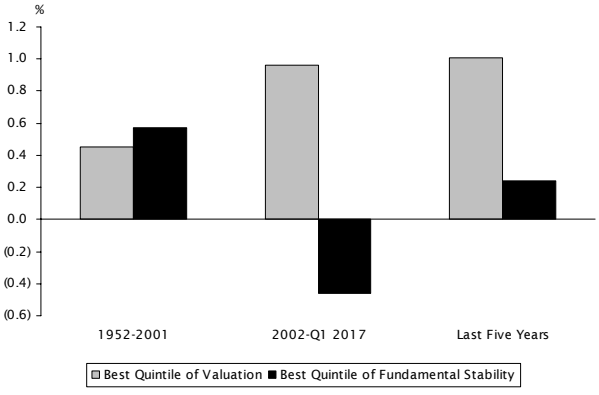
[1]Ranked across the market and return relative to the market.

Exhibit 3: Large-Capitalization Stocks
Relative Returns to the Best Quintile of Fundamental Stability
Monthly Data Compounded to Quarterly Periods
1952 Through March 2017



Source: Empirical Research Partners Analysis.

Exhibit 4: Large-Capitalization Stocks
Relative Returns to the Best Quintiles of Valuation and Fundamental Stability in the Fourth Quarter
Monthly Data Compounded to Quarterly Periods
1952 Through March 2017



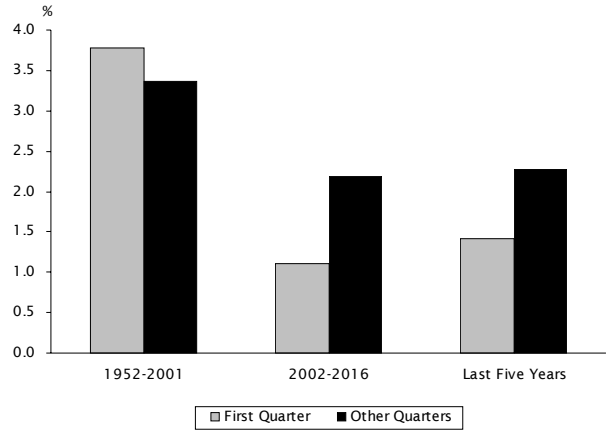
Source: Empirical Research Partners Analysis.

Much of what we've witnessed is a byproduct of a shift in the timing of tax selling, that's been pushed to earlier in the year as mutual funds have come to represent a larger share of the equity market. Only around a third of domestic-equity funds operate on a calendar year, and a little more than a quarter of the assets are in those with fiscal year ends in September, October and November. If we limit the universe to actively-managed funds, the share of assets in those with calendar-year ends falls to only a quarter. It's not surprising then to find that the fourth-quarter performance of value stocks has improved (see Exhibit 4). Tax selling is one explanation for the seasonal pattern and another is what's referred to as residual seasonality, an unintended regularity in the economic data itself.

Seasonality in the Economic Data Skews Perceptions

Economists have been aware of the residual seasonality problem for some time and the Bureau of Economic Analysis is in the midst of a multi-year project to address it.[1] As shown in Exhibit 5, economic growth in the first quarter of the year has lagged that in the other periods throughout the past two cycles, suggesting that the seasonal adjustment methodologies being used may be flawed. We see the same pattern in the forecasting errors made by economists, that've been concentrated in the same quarter (see Exhibit 6). The GDP growth estimates for that period have also been subject to larger revisions, both down and up, than those for the other quarters (see Exhibit 7).

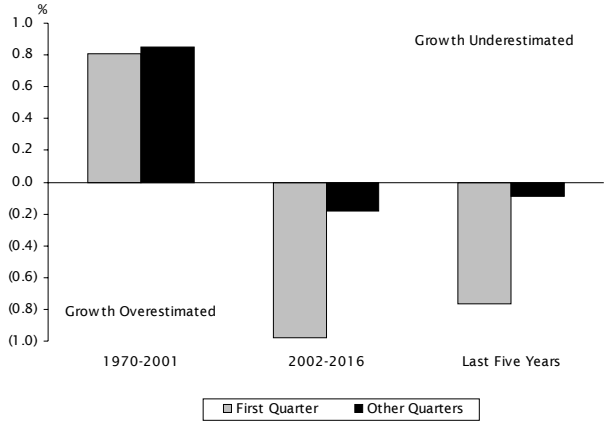
Exhibit 5: Reported U.S. Quarterly Real-GDP Growth[1]
1952 Through 2016



Source: Bureau of Economic Analysis.

[1]Based on the revised numbers.

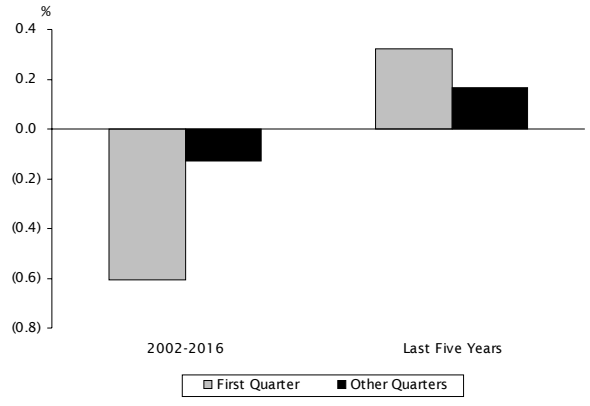
Exhibit 6: U.S. Quarterly Real-GDP Growth
Annualized Median Forecast Errors
1970 Through 2016



Source: Federal Reserve Bank of Philadelphia, Bureau of Economic Analysis, Empirical Research Partners Analysis.

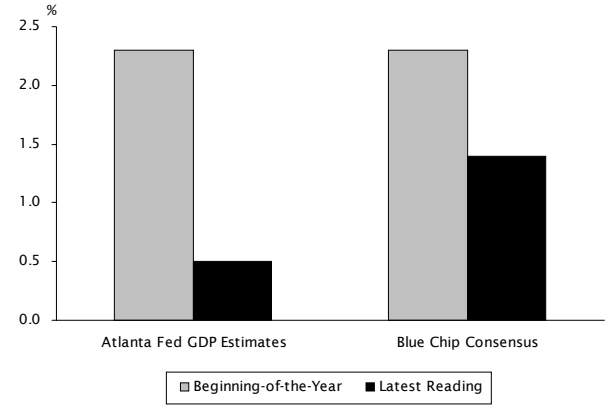
To get to the bottom of this thorny issue the BEA conducted a detailed component-by-component review of the data that goes into the calculation of economic output. They concluded that the biggest problem was that items that didn't demonstrate seasonality at monthly intervals sometimes did so when compiled at a quarterly frequency. Even when there was a seasonal adjustment of the monthly data it could prove inadequate when applied at the quarterly interval. The agency is in the process of addressing those problems, nevertheless, we suspect that once again this year they've had an impact on perceptions of the economy. The tracking number for first-quarter growth, an imprecise exercise to be sure, fell from +2.3% to +0.5% over the course of the first 3½ months of the year (see Exhibit 8). The bottom line is that given the seasonality issue we probably shouldn't read too much into what's gone on so far this year. Financial and labor market conditions both look constructive.

Exhibit 7: U.S. Real-GDP Growth
Final Reading Compared to the Advanced Estimates
2002 Through 2016



Source: Bureau of Economic Analysis, Empirical Research Partners Analysis.

Exhibit 8: Q1 2017 Real GDP Growth
Beginning-of-the-Year and the Latest Forecasts



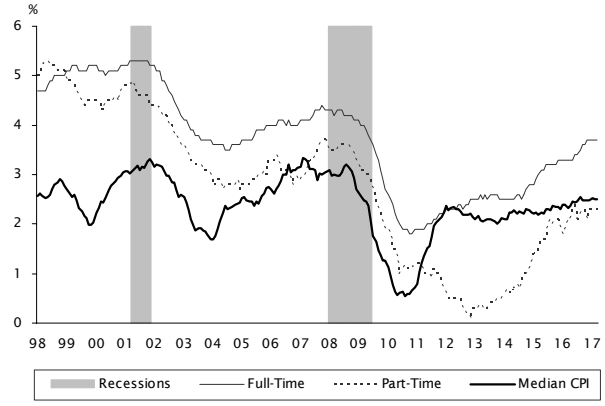
Source: Federal Reserve Bank of Atlanta and Blue Chip Economic Indicators.

[1]Moulton, B. R. and Benjamin D. Cowen, 2016. "Residual Seasonality in GDP and GDI. Findings and Next Steps," *Survey of Current Business,* Vol. 98, No. 7.

The Inflation Data: A Deeper-Seated Problem

The problem with the seasonal adjusters is one thing among many, and the inflation dynamic is the larger issue for equity investors. What's gone on is shown in Exhibit 9, that compares the *median* wage gains for full- and part-time employees to the trajectory of the *median* CPI. Even as the labor market has tightened and wage gains have picked up, inflation has barely budged. The latest CPI reading was especially weak as a price war among telecom giants and tighter auto credit impacted the statistics (see Exhibits 10 through 12). Those items constitute only 8% of the CPI so it takes large changes in them to affect the overall result. Rents on the other hand constitute a third of the index, and they've been a driver of inflation (see Exhibit 13). They could roll over as it appears that supply is finally catching up with demand in the apartment market (see Exhibit 14).

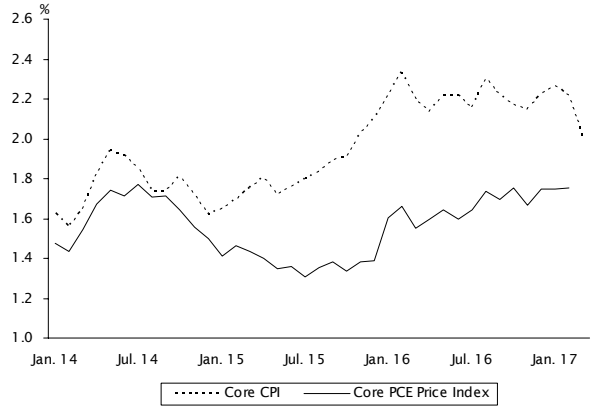
Exhibit 9: Wage Growth for Full- and Part-Time Employees and the CPI: Medians[1] 1998 Through March 2017



Source: Federal Reserve Bank of Atlanta, Federal Reserve Bank of Cleveland, National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Twelve-month moving averages.

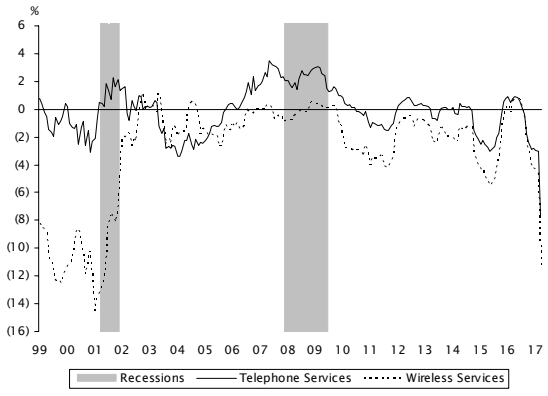
Exhibit 10: The Core CPI and PCE Indices[1] Year-over-Year Changes 2014 Through March 2017



Source: Bureau of Labor Statistics, Bureau of Economic Analysis, Empirical Research Partners Analysis.

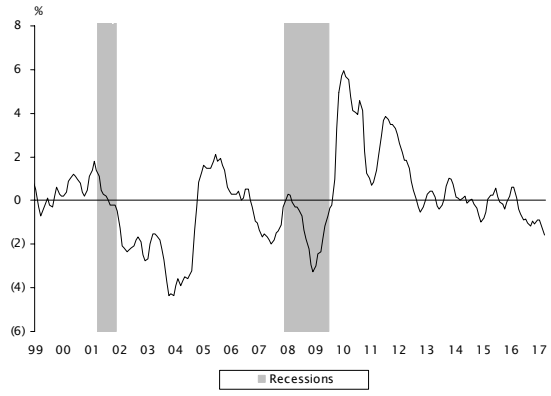
[1]Core PCE price index through February 2017.

Exhibit 11: Prices of Telecommunications Services Year-over-Year Changes 1999 Through March 2017



Source: Bureau of Labor Statistics, National Bureau of Economic Research, Empirical Research Partners Analysis.

Exhibit 12: Prices of New and Used Vehicles Year-over-Year Changes 1999 Through March 2017

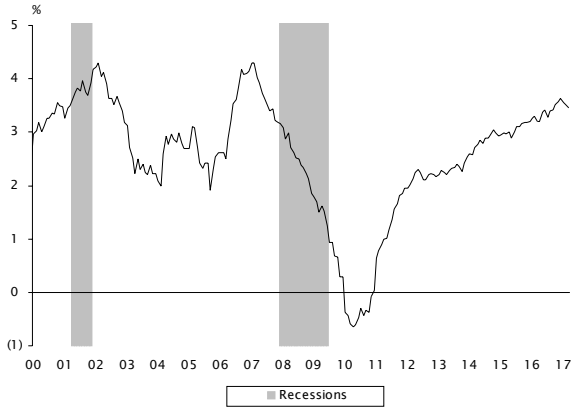


Source: Bureau of Labor Statistics, National Bureau of Economic Research, Empirical Research Partners Analysis.

We're reasonably confident that wage growth is set to trend higher because unemployment looks to be legitimately low, and the labor market is probably tighter than it appears at first glance. As we described a few weeks ago, 20% to 30% of those being counted as either unemployed or not in the labor force are actually involved in the "gig economy," earning a competitive wage of around $16 an hour.[2] Given the mis-categorization of those people the true participation rate is likely at least a point higher than the official statistic (see Exhibit 15). Most of those not working are either retired or in school, and thus far they haven't been drawn back to the work force (see Exhibit 16). Rather it's been the disabled and those that had left the labor market that have reentered. While the participation rate may continue to stage a modest recovery, we think that the retirement of baby boomers is the heart of the story.

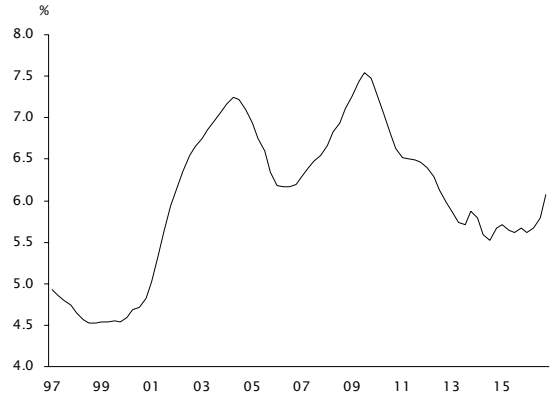
[2]*Portfolio Strategy* April 2017. "The Gig Economy: More Going On Than Meets the Eye."

Exhibit 13: The Price of Shelter
Year-over-Year Changes
2000 Through March 2017



Source: Bureau of Labor Statistics, National Bureau of Economic Research, Empirical Research Partners Analysis.

Exhibit 14: The Apartment Vacancy Rate
1997 Through 2016



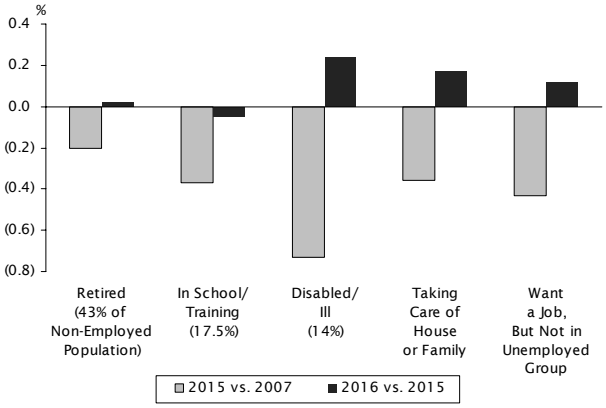
Source: CoStar.

Exhibit 15: The Labor Force Participation Rate[1]
For the Prime Working Age Bracket: 25 to 54
As Reported and Adjusted for the "Gig Economy"
1990 Through March 2017

Source: Bureau of Labor Statistics, Bracha, A. and Mary A. Burke, 2016. "Who Counts as Employed? Informal Work, Employment Status, and Labor Market Slack," Federal Reserve Bank of Boston Working Paper No. 16-29, Empirical Research Partners Analysis.

[1]Seasonally-adjusted data.

Exhibit 16: The Labor Force Participation Rate
Sources of Change in the
Prime Working Age Bracket: 25 to 54
2007 Through 2016



Source: Federal Reserve Bank of Atlanta.

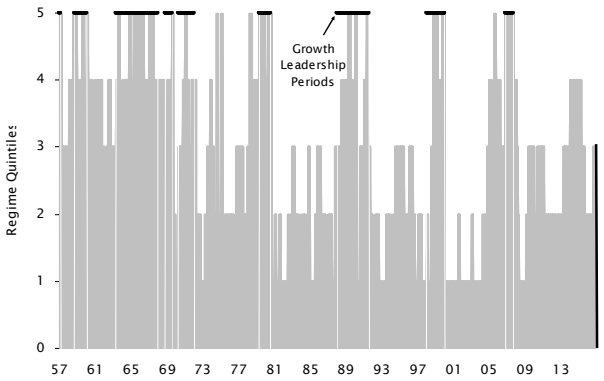
Conclusion: Going (Mostly) with GARP

Our U.S. regime indicator, that predicts the stylistic bias of the market, shifted to a neutral stance in late-January, after having a value tilt for nearly a year (see Exhibit 17).[3] At that point the fears that had created the value opportunities had subsided, and the low-lying fruit had been picked. Our valuation spreads fell to just shy of half a standard deviation below their mean, a level consistent with an ongoing expansion (see Exhibit 18). When measured on an intra-sectoral basis spreads sit below average in most sectors, with energy, where the supply looks endless, a notable exception (see Exhibit 19). Stocks that rank well in our growth model, that employs a GARP philosophy, now sell at about a 25% premium to their value counterparts, a modest differential given the state of the cycle (see Exhibit 20).

Generally when the PMI is running hot, as it has this year, monetary policy becomes more restrictive, causing the yield curve to flatten (see Exhibit 21). That shift has averaged around (20) basis points in the next quarter and almost (100) basis points in the subsequent year (see Exhibit 22). So far this year we've seen about (50) basis points of flattening, as the economic data came in weak and as President Trump's ability to enact his reflationary agenda was called into serious question.

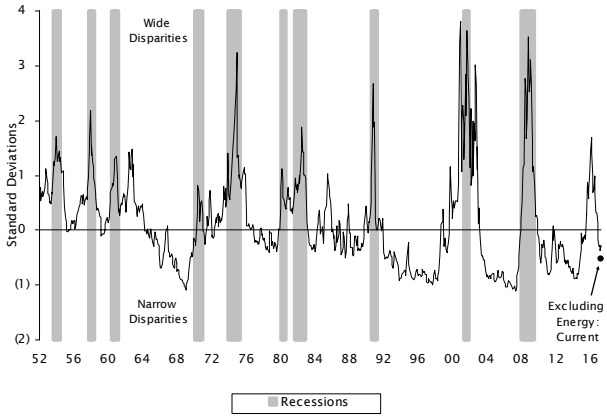
[3]*Stock Selection: Research and Results* January 2017. "Regime Change: From Value-Tilted to Neutral."

Exhibit 17: The U.S. Equity Market Regime Indicator Quintiles (5=Growth-Driven Dynamic; 1=Valuation-Driven Dynamic) 1957 Through March 2017



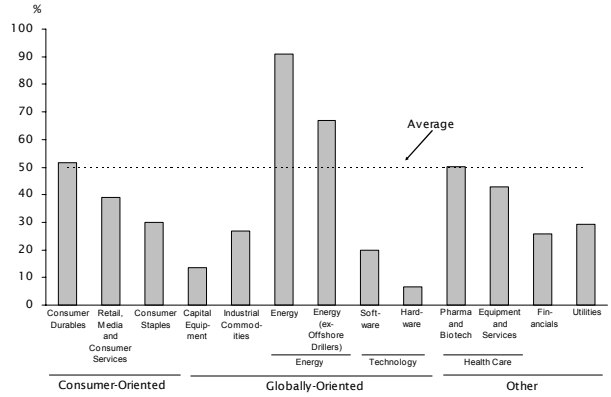
Source: Empirical Research Partners Analysis.

Exhibit 18: U.S. Valuation Spreads Expected Return of the Top Quintile Compared to the Average 1952 Through March 2017



Source: Empirical Research Partners Analysis, National Bureau of Economic Research.

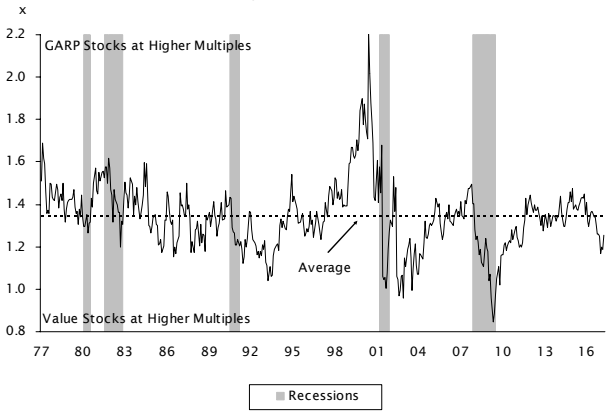
Exhibit 19: Intra-Sectoral Valuation Spreads[1] Current Readings Compared to the Long-Term Average Percentiles (1=Narrowest, 100=Widest) 1952 Through March 2017



Source: Empirical Research Partners Analysis.

[1]Based on an analysis of a 1,500 stock universe. Framework varies across sectors depending on what's efficacious.

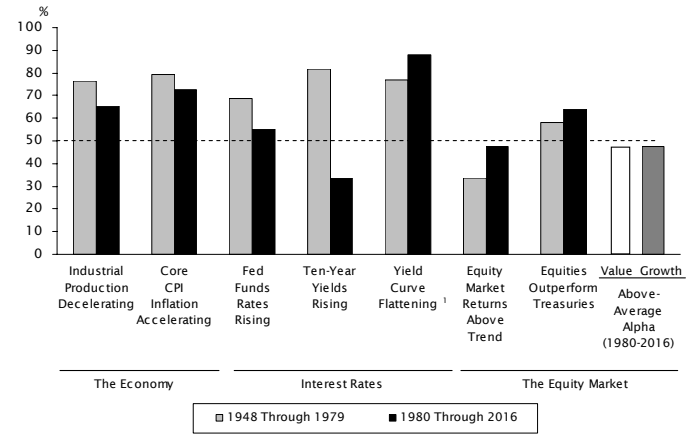
Exhibit 20: Large-Capitalization Stocks Top-Ranked GARP and Value Issues Comparison of Forward-P/E Ratios[1] 1977 Through Mid-April 2017



Source: Empirical Research Partners Analysis, National Bureau of Economic Research.

[1]Equally-weighted data.

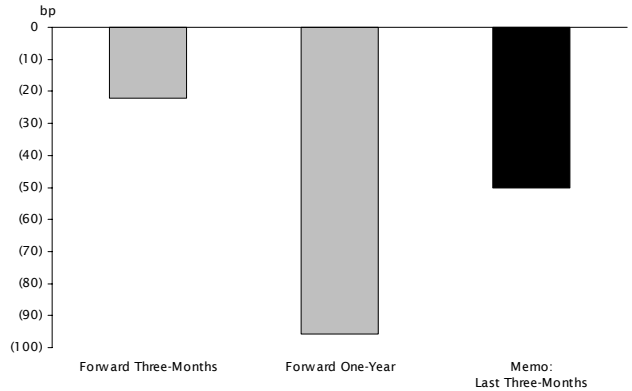
Exhibit 21: Performance of the Economy, Bond and Equity Markets After Top-Quintile Manufacturing PMI Readings Share of Observations: 1948 Through 2016



Source: Empirical Research Partners Analysis.

[1]Since 1950.

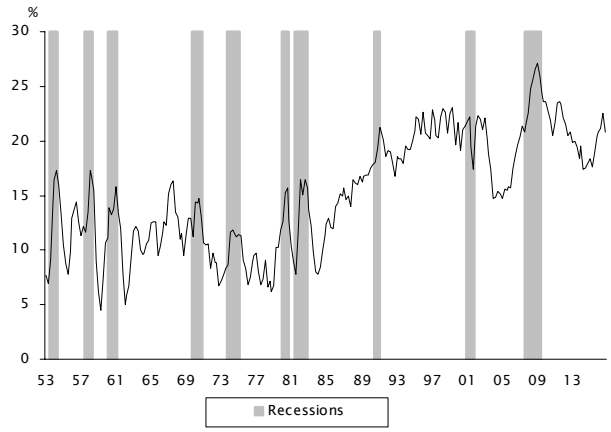
Exhibit 22: Top-Quintile Manufacturing PMI Readings Forward Three-Month and One-Year Changes in the Shape of the Yield Curve 1980 Through Mid-April 2017



Source: Federal Reserve Board, Empirical Research Partners Analysis.

When we're in doubt about what to do we're prone to go with GARP, because the numbers behind it are compelling. Exhibit 23 compares the ROE of the cap-weighted large-cap growth universe to the U.S. nominal growth rate. The differential, a whopping +21 percentage points, can be a continuing source of alpha as long as we don't overpay to tap the opportunity it conveys. We can avoid that fate because the growth universe still offers a free cash flow yield that tops that on the ten-year Treasury bond by more than +2 percentage points (see Exhibit 24).

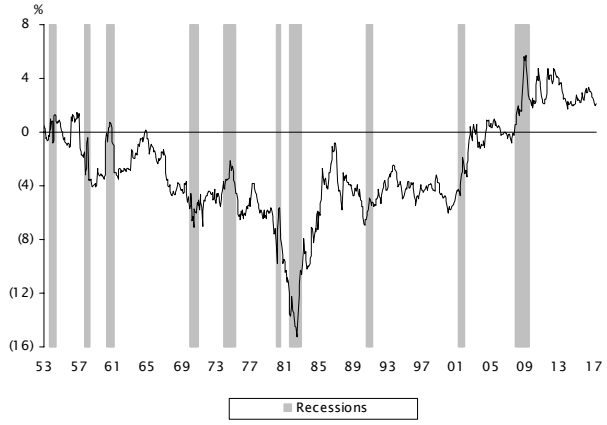
Exhibit 23: Large-Capitalization Growth Stocks
ROEs Less Nominal-U.S GDP Growth[1]
1953 Through 2016



Source: Federal Reserve Board, National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Capitalization-weighted data.

Exhibit 24: Large-Capitalization Growth Stocks
Free Cash Flow Yield Less That of the Ten-Year Treasury Bond[1]
1953 Through Mid-April 2017



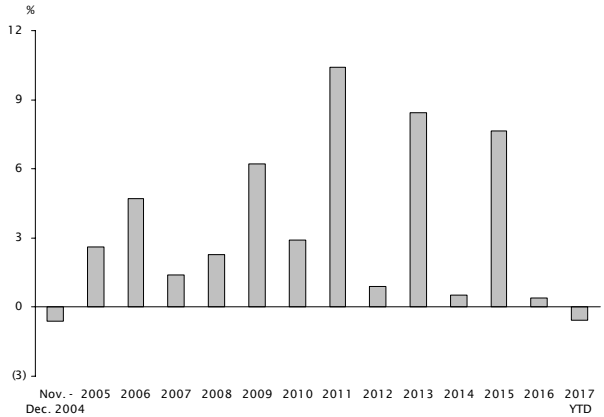
Source: Bureau of Economic Analysis, National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Capitalization-weighted data.

Our Distrusted Fifty portfolio, that's presented in Appendix 1 on page 13, employs a disciplined GARP philosophy, looking for stocks well ranked in our growth model, that offer above-average free cash flow yields and are surrounded by skepticism. The performance of the model has been critical to the approach (see Exhibit 25). To gauge skepticism we compare the company's earnings reinvestment rate to the earnings growth rate that's discounted in the stock's valuation. If the first is far above the second the market believes that much of the reinvestment will be for naught (see Exhibit 26). The Distrusted Fifty has led the S&P 500 by +340 basis points per annum over the past 12½ years and it has a +260 basis point lead so far this year.

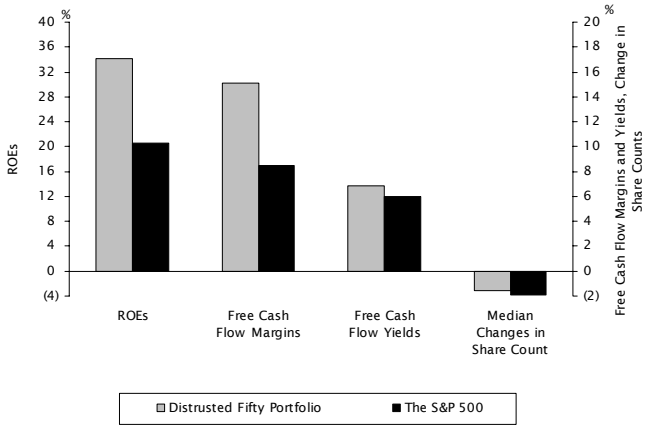
On the value side of the ledger we still have an interest in the financial stocks. Some of the pain from curve flattening has already been absorbed and most of the other parts of the story look to be intact. The first-quarter earnings were for the most part encouraging. They should be able to return more capital ahead and Morgan Stanley, American Express and Citigroup already stand out in that regard.

Exhibit 25: The Large-Capitalization Growth Model
Annual Relative Returns of the Top Quintile[1]
Monthly Data Compounded to Annual Periods
November 2004 Through Mid-April 2017



Source: Empirical Research Partners Analysis.

Exhibit 26: The Distrusted Fifty Portfolio and The S&P 500
Select Financial Metrics
As of Mid-April 2017



Source: Corporate Reports, Empirical Research Partners Analysis.

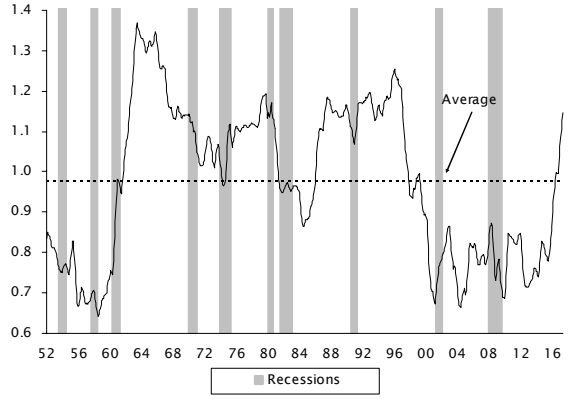
[1]Equally-weighted data. Relative to the large-capitalization growth universe.

Pharma/Biotech Versus Technology: Role Reversal

Pharma/Biotech Gets Riskier…

There's been a reversal in the risk profiles of the pharma/biotech and technology sectors, as the former has seen its beta spike after 15 years of calm (see Exhibit 27). There have been increases in the betas of both the pharmaceuticals and biotech industries (see Exhibits 28 and 29). The changing behavior of the stocks is linked to fundamentals as apparent in Exhibit 30, that presents a history of the stability scores for the sector. A number above zero indicates that the company's fundamentals are more stable than those of the average stock. We measure stability using a six-factor model that accounts for the level of ROEs, their variability as well as that of earnings, financial leverage, the dispersion of analysts' earnings estimates and beta (see Exhibit 31). Right now the composite's stability score is close to zero, with the pharmaceutical industry sourcing most of the decline (see Exhibit 32). There hasn't been a big change in the character of biotech fundamentals (see Exhibit 32). That's also true for the health care equipment and service stocks where little has gone on (see Exhibit 34).

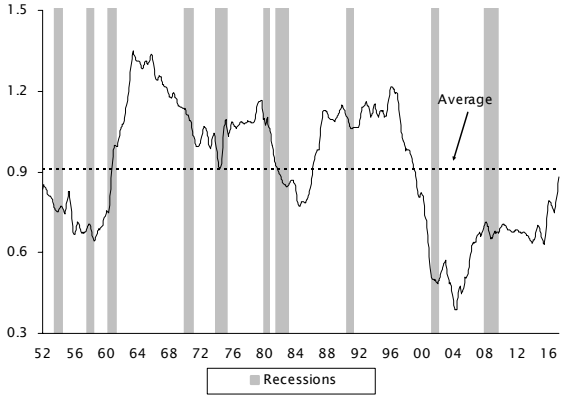
Exhibit 27: Large-Cap Pharmaceutical and Biotech Stocks
Average Beta[1]
1952 Through Mid-April 2017



Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Data smoothed on a trailing six-month basis.

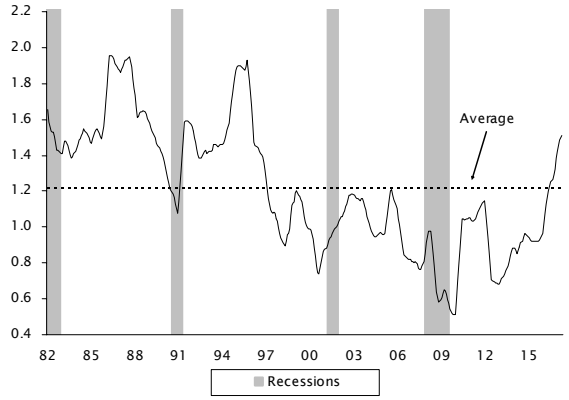
Exhibit 28: Large-Cap Pharmaceutical Stocks
Average Beta[1]
1952 Through Mid-April 2017



Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Data smoothed on a trailing six-month basis.

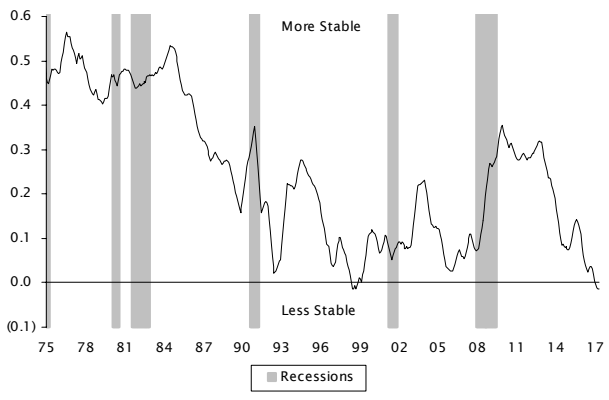
Exhibit 29: Large-Cap Biotech Stocks
Average Beta[1]
1982 Through Mid-April 2017



Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Data smoothed on a trailing six-month basis.

Exhibit 30: Large-Cap Pharmaceutical and Biotech Stocks
Average Fundamental Stability Score[1]
1975 Through Mid-April 2017

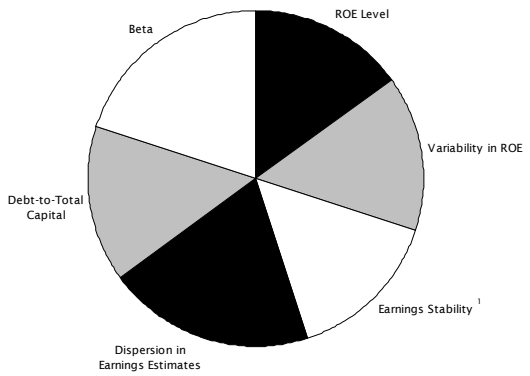


Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Data smoothed on a trailing six-month basis.

The day-to-day volatility of the pharmaceutical and biotech issues has been exceeding that predicted by their betas for more than three years now, leaving them with high unexplained idiosyncratic volatility (i.e., arbitrage risk). Exhibit 35 charts the history of that indicator while Exhibit 36 does so for the remainder of the health care sector, that consists of equipment manufacturers, HMOs and other service providers. It's the businesses that are most dependent on pricing power that've seen the biggest change. High arbitrage risk isn't a desirable attribute for growth stocks, where confidence is a building block for success (see Exhibit 37).

Exhibit 31: Fundamental Stability Score
Factor Composition
2017



Source: Empirical Research Partners Analysis.

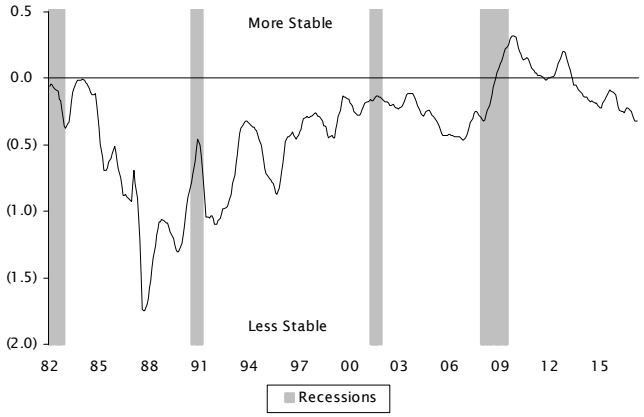
[1]Computed over the trailing twelve quarters.

Exhibit 32: Large-Cap Pharmaceutical Stocks
Average Fundamental Stability Score[1]
1975 Through Mid-April 2017

Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Data smoothed on a trailing six-month basis.

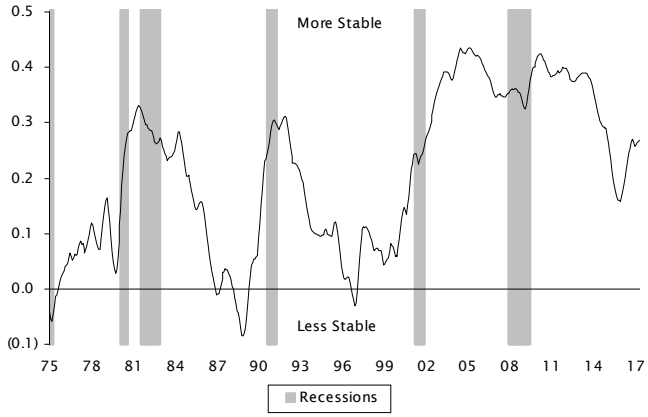
Exhibit 33: Large-Cap Biotech Stocks
Average Fundamental Stability Score[1]
1982 Through Mid-April 2017



Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Data smoothed on a trailing six-month basis.

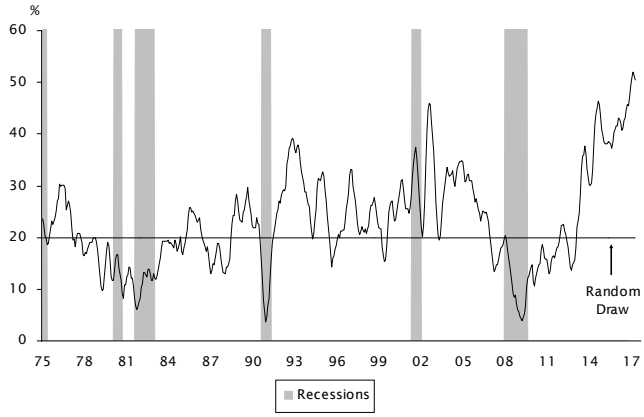
Exhibit 34: Large-Cap Health Care Equipment and Service Stocks
Average Fundamental Stability Score[1]
1975 Through Mid-April 2017



Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Data smoothed on a trailing six-month basis.

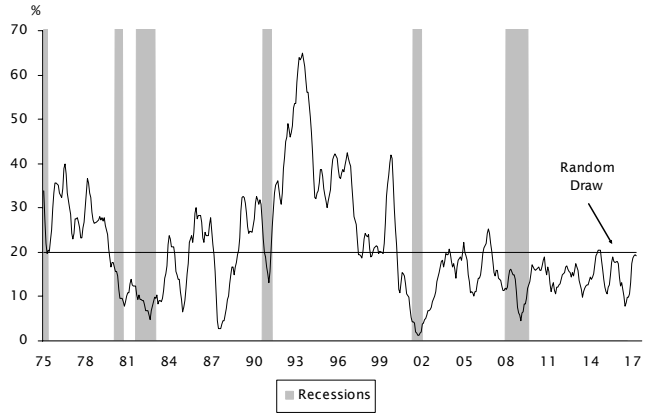
Exhibit 35: Large-Cap Pharmaceutical and Biotech Stocks
Share in the Highest Quintile of Arbitrage Risk[1]
1975 Through Mid-April 2017



Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Data smoothed on a trailing six-month basis.

Exhibit 36: Large-Cap Health Care Equipment and Service Stocks
Share in the Highest Quintile of Arbitrage Risk[1]
1975 Through Mid-April 2017



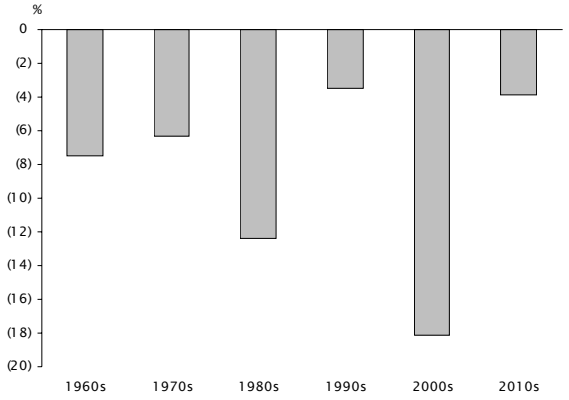
Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Data smoothed on a trailing six-month basis.

...While Technology Has Moved in the Opposite Direction

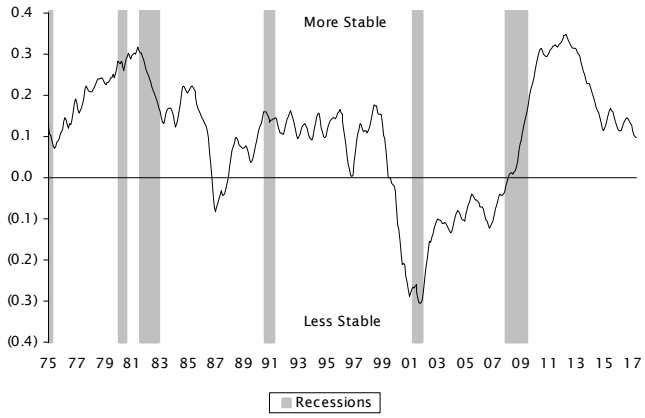
In the technology sector the fundamentals and the behavior of the stocks have moved in the opposite direction from those in pharma/biotech. Across the board, fundamentals have become less volatile, as software became a bigger part of the equation and as the capital intensity of manufacturing was laid off on emerging market-based partners (see Exhibits 38 through 40). The sector's arbitrage risk has been trading lower throughout the 15 years of the Bretton Woods II era (see Exhibit 41).

Exhibit 37: Large-Capitalization Growth Stocks
Relative Returns to the Highest Quintile of Arbitrage Risk
Monthly Data Compounded to Annual Periods
1960 Through Mid-April 2017



Source: Empirical Research Partners Analysis.

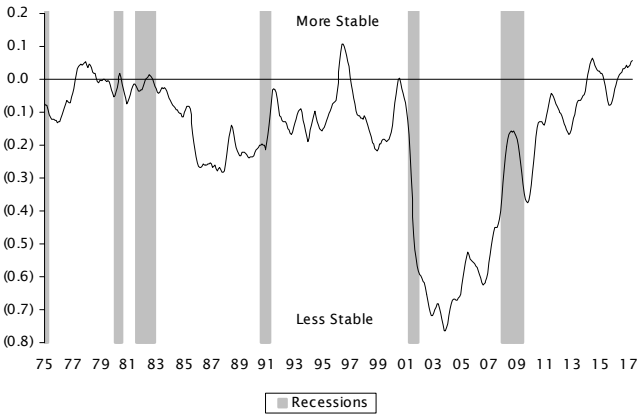
Exhibit 38: Large-Cap Software Stocks
Average Fundamental Stability Score[1]
1975 Through Mid-April 2017



Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Data smoothed on a trailing six-month basis.

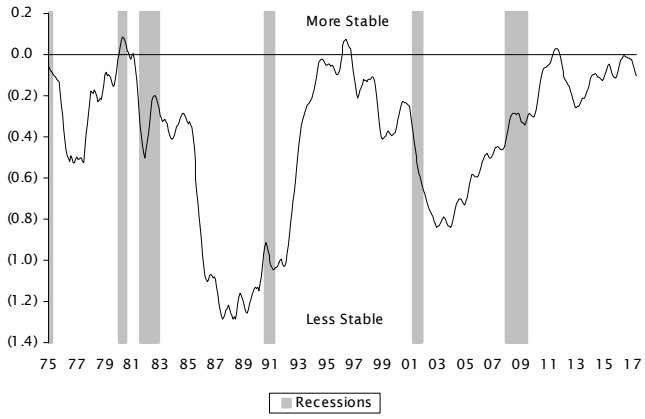
Exhibit 39: Large-Cap Hardware Stocks
Average Fundamental Stability Score[1]
1975 Through Mid-April 2017



Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Data smoothed on a trailing six-month basis.

Exhibit 40: Large-Cap Semiconductor Stocks
Average Fundamental Stability Score[1]
1975 Through Mid-April 2017



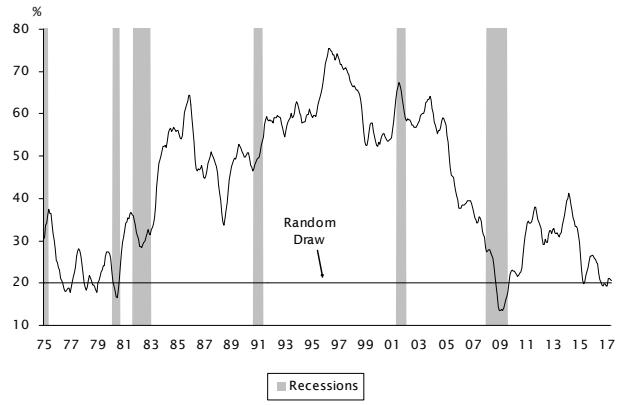
Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Data smoothed on a trailing six-month basis.

Conclusion: Convergence in Risk Premia

Stocks and entire industries can change their stripes over time, that's why time-series analyses can get us into trouble. Investors have come to believe that drug pricing will come under pressure as the population of retirees multiplies, and there's evidence that's already underway in non-specialty categories (see Exhibits 42 and 43). They also think that barring a successful anti-trust initiative or change in tax policy, the extraordinary free cash flow margins of the mega-cap technology companies will hold up (see Exhibit 44). Incremental free cash flow margins have been a key driver of performance in that sector (see Exhibit 45). Those views have become imbued to the market, and tech's free cash flow yield premium to pharma/biotech has dissipated over the course of the past five or six quarters (see Exhibit 46). We don't think the reversal in risk premia has yet run its course, and still prefer much of the technology sector to the pharmaceuticals. Biotech looks more interesting.

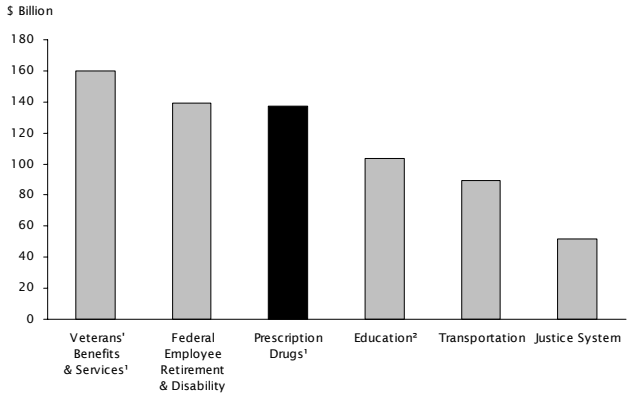
Exhibit 41: Large-Capitalization Technology Stocks
Share in the Highest Quintile of Arbitrage Risk[1]
1975 Through Mid-April 2017



Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Data smoothed on a trailing six-month basis.

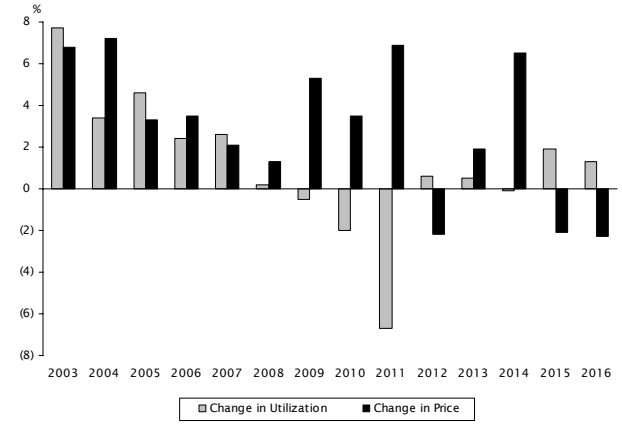
Exhibit 42: U.S. Federal Spending
Select Line Items
2015



Source: Centers for Medicare & Medicaid Services, Office of Management and Budget, Empirical Research Partners Analysis.

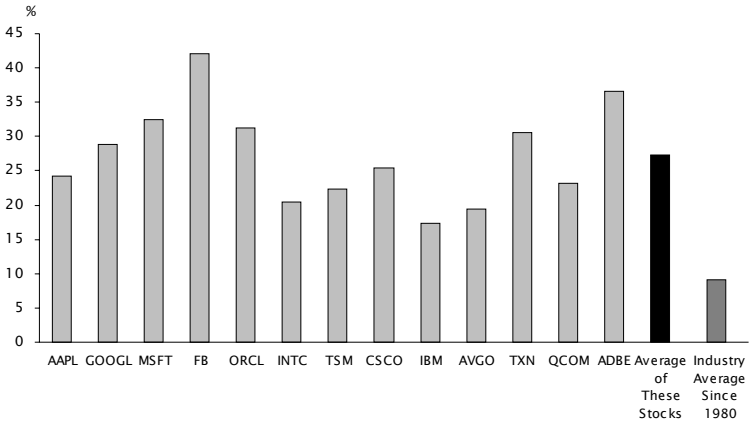
[1]Includes drug spending by Medicare, Medicaid, CHIP, Department of Defense and Department of Veteran Affairs.
[2]Includes primary, secondary and higher education but not social services.

Exhibit 43: Commercially Insured: Non-Specialty Drugs
Components of the Year-Over-Year Change
in Cost Per-Member-Per-Year
2003 Through 2016



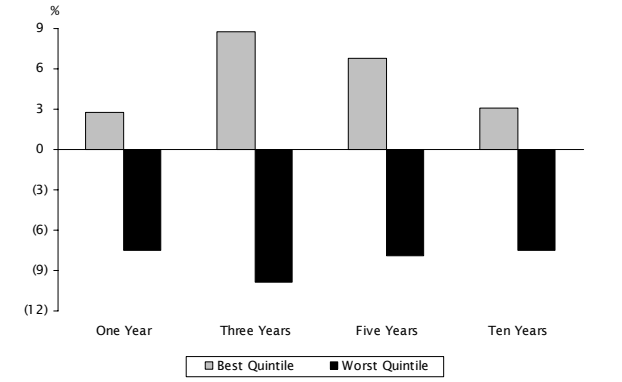
Source: Express Scripts Drug Trend Report, Empirical Research Partners Analysis.

Exhibit 44: Mega-Capitalization Technology Stocks
Free Cash Flow Margins
2016



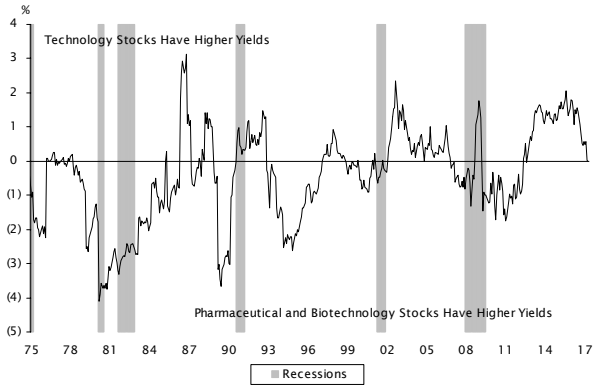
Source: Empirical Research Partners Analysis.

Exhibit 45: Large-Capitalization Technology Stocks
***Sector* Relative Returns to the Best and Worst**
Quintiles of Incremental Free Cash Flow Margins
Monthly Data Compounded to Annual Periods
Ten Years Ending Mid-April 2017



Source: Empirical Research Partners Analysis.

Exhibit 46: Large-Capitalization Stocks
Technology Compared to Pharmaceutical and Biotechnology[1]
Differentials in Free Cash Flow Yields
1975 Through Mid-April 2017



Source: Corporate Reports, National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Capitalization-weighted data.

Appendix 1: The Distrusted Fifty
Large-Capitalization Growth Stocks with High Reinvestment Rates Discounting Relatively Low Secular Earnings Growth
Sorted by Capitalization
As of Mid-April 2017

				Quintile Ranks (1=Best; 5=Worst)										
				Super Factors										
				Management Behavior										
Symbol	Company	Price at Inclusion	Recent Price	Capital Deployment	Earnings Quality and Trend	Market Reaction	Valuation	Growth Model Rank	Forward-P/E Ratio	Rate of Earnings Reinvestment	Implied Earnings Growth Rate	Implied Earnings Growth/ Reinvestment Rate	Free Cash Flow Yield	Market Capitalization ($ Billion)
AAPL	APPLE INC	$13.24	$140.68	3	3	1	1	1	15.4 x	25 %	+4.8 %	19 %	7.2 %	$739.3
GOOGL	ALPHABET INC	298.80	856.51	2	2	4	3	2	25.8	15	14.1	94	4.4	592.1
MSFT	MICROSOFT CORP	41.23	65.04	1	2	2	2	1	20.9	7	6.1	84	5.5	502.8
WFC	WELLS FARGO & CO	32.42	52.15	3	na	4	1	3	12.5	7	2.2	31	na	260.6
CMCSA	COMCAST CORP	27.33	37.53	2	2	3	2	1	19.9	11	7.6	66	5.4	178.3
PM	PHILIP MORRIS INTERNATIONAL	42.70	113.91	5	1	1	4	3	23.3	5	6.9	NM	3.9	176.7
TSM	TAIWAN SEMICONDUCTOR MFG CO	16.75	31.61	2	3	3	2	2	14.2	14	3.3	24	4.0	163.9
UNH	UNITEDHEALTH GROUP INC	74.70	169.25	1	4	2	2	2	17.3	13	6.4	48	6.6	163.3
PEP	PEPSICO INC	82.15	113.62	3	3	2	3	3	22.2	18	6.1	33	4.6	162.3
IBM	IBM CORP.	119.33	161.69	3	5	3	1	2	11.7	40	1.7	4	7.9	152.9
MMM	3M CO	77.21	189.83	3	2	4	3	3	22.0	22	5.9	27	4.6	113.4
BA	BOEING CO	74.78	178.40	1	2	1	2	1	19.2	60	5.0	8	7.2	110.1
ABBV	ABBVIE INC	55.65	63.45	1	2	3	1	1	11.6	52	(3.0)	NM	6.5	101.1
GILD	GILEAD SCIENCES INC	20.12	66.28	1	2	5	1	1	8.1	59	(0.4)	NM	18.3	86.8
AVGO	BROADCOM LTD	32.35	213.63	5	5	1	4	5	14.3	NM	4.0	NM	3.5	85.7
TXN	TEXAS INSTRUMENTS INC	59.28	79.37	2	1	4	4	2	21.6	19	6.2	32	5.1	79.3
AGN	ALLERGAN PLC	229.32	236.34	1	1	5	3	2	14.8	NM	4.4	NM	5.6	79.2
ACN	ACCENTURE PLC	31.89	116.95	3	4	4	3	3	19.5	33	5.9	18	5.8	77.3
AXP	AMERICAN EXPRESS CO	20.04	75.55	1	na	3	2	3	13.3	20	3.8	19	na	68.1
ADBE	ADOBE SYSTEMS INC	27.81	130.22	3	1	1	5	1	33.0	18	18.6	104	3.5	64.5
BIIB	BIOGEN INC	67.38	271.94	4	1	3	1	1	13.0	34	4.4	13	6.7	58.7
TJX	TJX COMPANIES INC	16.34	76.90	2	2	4	2	2	18.4	37	7.5	20	5.2	49.7
ITW	ILLINOIS TOOL WORKS	63.12	132.12	1	2	2	4	2	21.3	26	6.7	26	4.5	45.8
HAL	HALLIBURTON CO	55.14	47.43	1	5	5	5	5	47.6	NM	11.1	NM	(5.5)	41.1
ESRX	EXPRESS SCRIPTS HOLDING CO	74.58	66.36	1	3	5	1	2	9.6	20	(0.4)	NM	0.1	40.2
COF	CAPITAL ONE FINANCIAL CORP	42.77	81.91	1	na	3	1	1	10.4	6	(0.6)	NM	na	39.5
EBAY	EBAY INC	25.75	33.86	1	1	1	1	1	16.8	85	7.7	9	5.9	36.8
MAR	MARRIOTT INTERNATIONAL INC	69.75	91.49	5	5	1	4	4	23.2	46	5.8	13	3.9	35.3
HCA	HCA HOLDINGS INC	81.95	84.61	2	1	4	1	1	11.5	39	(0.4)	NM	9.2	31.4
STT	STATE STREET CORP	29.97	77.87	1	na	1	1	1	13.5	7	4.2	59	na	29.7
MCK	MCKESSON CORP	182.39	136.09	1	3	5	1	2	11.6	22	(0.4)	NM	20.7	28.9
TEL	TE CONNECTIVITY LTD	74.62	73.18	2	1	2	2	1	16.3	17	5.8	33	5.6	26.0
DFS	DISCOVER FINANCIAL SERVICES INC	43.74	64.97	1	na	3	2	2	10.7	17	(0.6)	NM	na	25.3
WDC	WESTERN DIGITAL CORP	18.87	82.80	5	5	1	1	3	9.4	NM	3.7	NM	7.2	23.9
LRCX	LAM RESEARCH CORP	82.66	136.17	1	2	1	1	1	13.2	14	4.4	32	6.9	22.3
MCO	MOODY'S CORP	28.63	114.38	2	2	2	3	2	21.7	NM	6.8	NM	5.1	21.8
DG	DOLLAR GENERAL CORP	73.39	69.31	3	3	5	1	4	14.2	18	4.4	24	5.5	19.1
CHKP	CHECK POINT SOFTWARE TECHNOLOGIES INC	34.41	102.82	4	3	2	3	3	19.8	21	9.1	44	5.0	18.0
TROW	PRICE (T. ROWE) GROUP	65.36	71.80	2	na	4	2	3	14.3	14	3.3	24	na	17.6
ADS	ALLIANCE DATA SYSTEMS CORP	152.77	240.64	1	3	2	1	1	13.0	22	4.4	20	13.6	13.8
CTXS	CITRIX SYSTEMS INC	55.49	83.23	2	2	2	1	1	18.0	23	7.7	34	7.5	13.0
WAT	WATERS CORP	47.00	159.21	1	2	2	4	2	22.7	24	12.3	51	4.2	12.7
TDG	TRANSDIGM GROUP INC	259.46	237.41	4	2	5	2	4	19.1	NM	5.8	NM	5.3	12.7
WYNN	WYNN RESORTS LTD	137.30	114.94	2	1	1	4	1	27.2	NM	7.3	NM	(2.2)	11.7
SNI	SCRIPPS NETWORKS INTERACTIVE	63.97	75.25	3	1	4	1	1	13.9	32	5.9	19	9.0	9.8
WYN	WYNDHAM WORLDWIDE CORP	61.65	88.99	1	1	2	1	1	14.3	47	3.9	8	8.3	9.4
VRSN	VERISIGN INC	56.47	88.82	1	1	3	2	1	22.8	39	12.3	32	7.0	9.2
JAZZ	JAZZ PHARMACEUTICALS PLC	143.63	151.51	1	3	3	2	2	13.6	23	5.9	26	6.4	9.1
FFIV	F5 NETWORKS INC	118.56	135.93	3	3	4	2	3	16.1	30	6.9	23	7.2	8.8
BBBY	BED BATH & BEYOND INC	67.34	39.11	1	5	5	1	3	9.0	26	(0.4)	NM	0.1	5.7
Average									17.3 x	26 %	5.3 %	20 %	6.0 %	
All Other Large-Cap Stocks									18.3 x	5 %	6.7 %	123 %	3.6 %	

Source: Empirical Research Partners Analysis.