

Industry-Specific Alpha Series

Banking on Alpha: Uncovering Investing Signals Using SNL Bank Data

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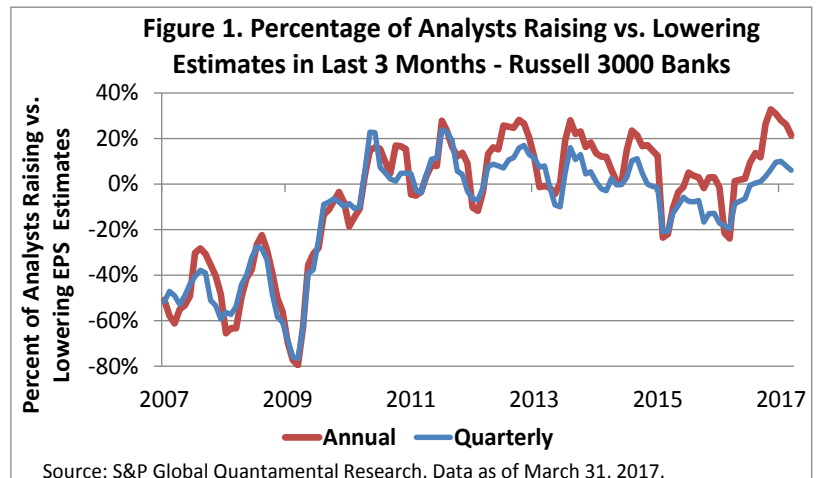
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On April 13th, JPMorgan Chase is scheduled to report first quarter earnings, kicking off a highly anticipated quarter for U.S. banks (Figure 1). This study leverages S&P Global Market Intelligence's SNL Financial data to answer three questions of importance to bank investors:

1. which widely-used investment strategies¹ have historically been profitable; 2. which lesser-known strategies deserve wider attention; 3. how do these strategies perform across varying macro environments: rising vs. falling interest rates and above- vs. below-average financial stress. SNL Bank fundamental data provides a comprehensive range of data items that form the

foundation for this research. Strategies are empirically examined and categorized according to industry standard – capital adequacy, asset quality, profitability, growth, and valuation:

- **Empirically, valuation is the strongest category of bank strategies in the U.S., followed by asset quality and profitability.** The three most effective factors in these categories are core EPS to price, the 1-year change in the Texas ratio, and the 3-year change in operating profit to Tier 1 capital. Investment strategies based on these ratios produced long-only excess annual returns of 7.4%, 5.7%, and 4.0%, all significant at the 1% level.
- **Banks that depend on wholesale markets for funding underperform, while banks with significant core deposits outperform.** Strategy results for savings & money market deposit accounts to total deposits had a 4.1% annual long-only excess return.
- **When short-term interest rates rise, valuation and asset quality-based investment strategies tend to perform best.** During periods of above-average financial stress, capital adequacy and asset quality strategies are most important.
- **Results of strategy backtests in Europe reflect an extended crisis in both credit quality and profitability,** as the study commences in 2007. The three strongest strategies in Europe are the risk-based capital ratio (11.7% annual long-only excess return), total pretax expense to assets (10.8%), and problem loans to equity plus reserves (10.1%). *Note: Problem loans, a data item unique to the SNL bank fundamental dataset, is a standardized measure of asset quality in Europe.*



¹ An investment strategy is a financial ratio that has been backtested historically to determine whether or not it has been predictive over the test period.

1 Back from the Brink: A Lost Decade for Banks

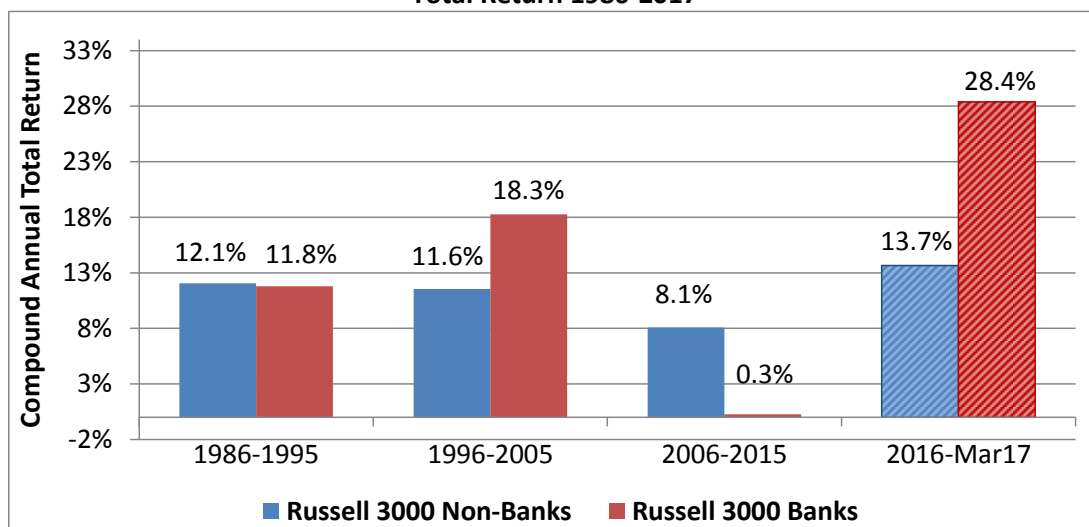
Over the last 30 years, bank stocks have taken a roller coaster ride relative to the broader market. From 1996 to 2005 (Figure 2), Russell 3000[®] banks strongly outperformed non-banks, as real-estate lending boomed, aided by falling interest rates and lax underwriting standards.

Then, in 2007-2008, the financial boom turned into a bust, as a subprime mortgage collapse spiraled into a global credit meltdown. **From 2006 through 2015 bank stocks posted a compound annual return of just 0.3%, including dividends.**

Recently, bank stocks have been re-energized. Russell 3000[®] banks rose at a compound annual rate of 28% over the 15 months ended in March. Much of this gain followed the U.S. presidential election in November 2016, as prospects for increased government spending, corporate tax cuts, and bank regulatory reform buoyed investor sentiment.

However, underlying bank fundamentals have also improved over the past three years, with credit quality and capital adequacy strong and revenues, profits, and loans all showing significant growth. The following sections examine a few areas of bank fundamental strength.

Figure 2. Compound Annual Return by Decade – Russell 3000[®] Banks Equal-Weighted Total Return 1986-2017

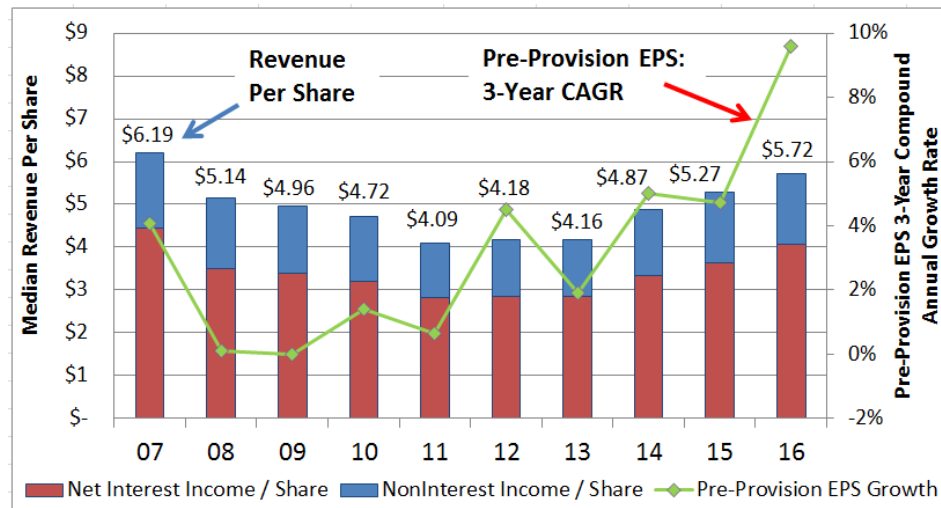


Source: S&P Global Market Intelligence Quantamental Research. All returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results. Data as of March 31, 2017.

1.1 U.S. Banks: Strong Profit Growth Returns

Bank revenues and earnings have both risen steadily over the past three years. In particular, the trend in pre-provision earnings per share (EPS) growth (green line, Figure 3) has accelerated. At the end of 2016 the annualized 3-year EPS growth rate improved to a healthy 9.6%. Median revenue per share (bars) put in a “double bottom” in 2011 and 2013 and has since moved steadily upward, nearing pre-crisis highs.

Figure 3. Median Revenue per Share and Pre-Provision EPS 3-Year Compound Annual Growth - Russell 3000® Banks 2007-2016



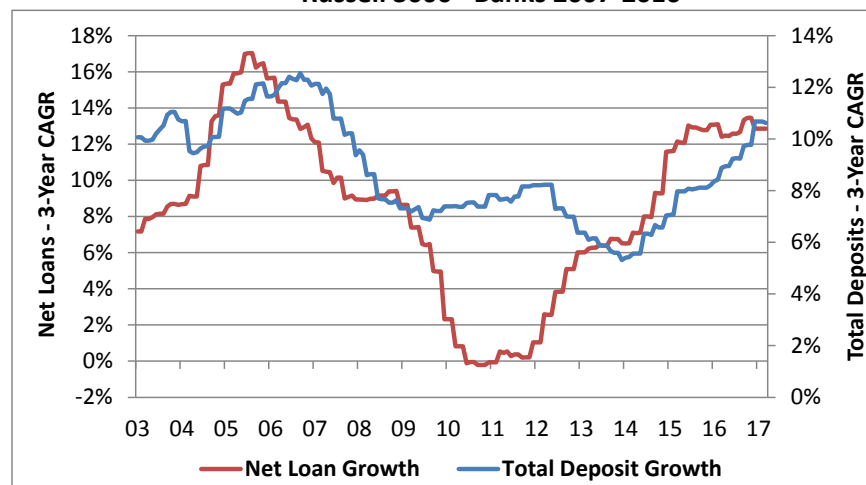
Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of March 31, 2017.

1.2 Drivers of Bank Profitability

Three factors have played a large part in driving recent profit increases: strong growth in net loans and deposits and declining efficiency ratios. Net interest margins have also shown modest improvement. Figure 4 shows remarkable growth in two components at the heart of every bank’s business – loans and deposits.

Both loan and deposit growth have improved significantly since 2014, with loans now growing at a 13% compound annual rate and deposits at an 11% rate, providing a strong underpinning for core profitability growth.

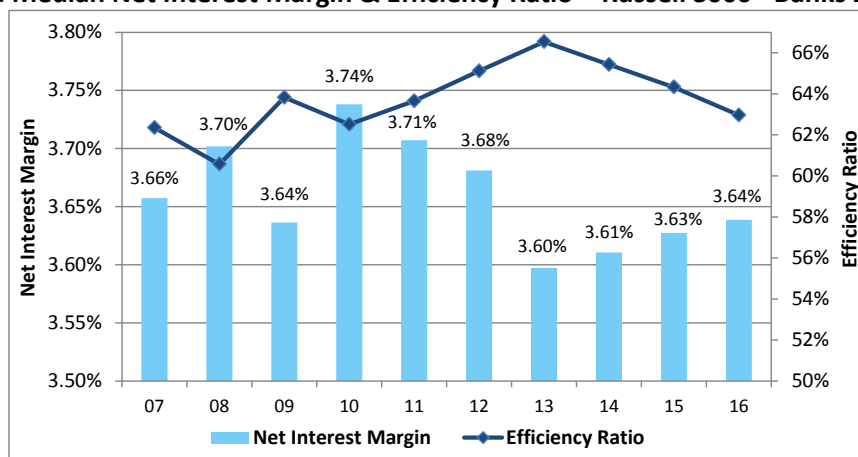
Figure 4. Median Net Loan and Total Deposit 3-Year Compound Annual Growth Rates – Russell 3000® Banks 2007-2016



Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of March 31, 2017.

The bank efficiency ratio² (Figure 5, dark blue line) has also improved significantly over the past three years. However, it remains well above historic lows,³ as banks continue to confront high compliance costs related to Dodd-Frank and other post-crisis regulation. Banking net interest margins (light blue bars) have also begun to slowly widen.

Figure 5. Median Net Interest Margin & Efficiency Ratio – Russell 3000® Banks 2007-2017



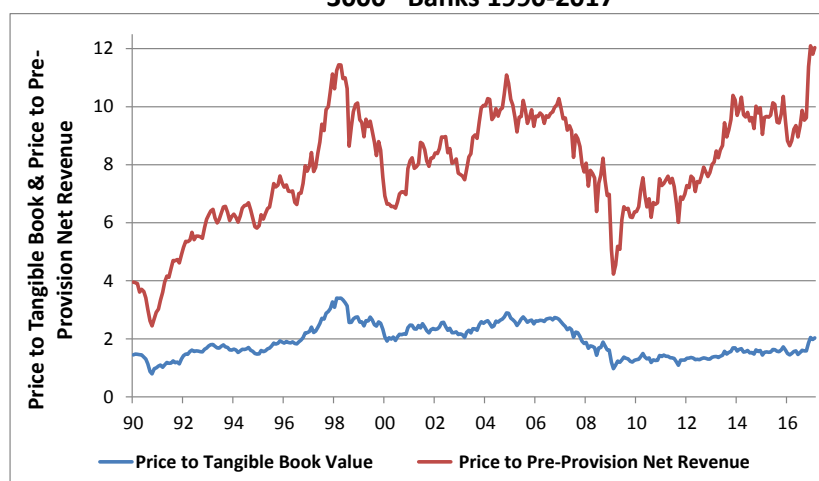
Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of March 31, 2017.

1.3 Valuation: The Missing Link?

Despite robust financial improvement at many U.S. banks, valuations may be cause for concern. Figure 6 shows two of the strongest valuation metrics tested: price to pre-provision net revenue (PPNR) and price to tangible book value. Price to PPNR is the banking version of price to sales, widely used for non-banks. This ratio is now above 1998 highs.

By contrast, price to tangible book ratios remain compressed, relative to history, as bank capital has increased at a faster rate than profitability, primarily due to regulatory requirements. Note that the return of significant bank dividends may attract investors, as banks have traditionally been viewed as stable income producers.

Figure 6. Median Price to Pre-Provision Net Revenue & Price to Tangible Book Value - Russell 3000® Banks 1990-2017



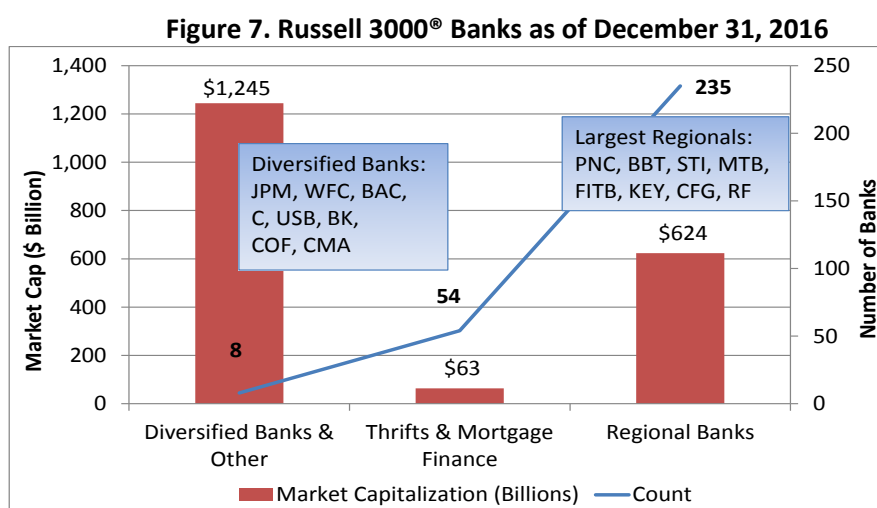
Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of March 31, 2017.

² The efficiency ratio is essentially an expense/income ratio. A decrease in the ratio equates to better expense performance.

³ The median ratio reached a low of 56.3% in late 2000.

2 Factor Formulation and Testing – United States

Despite years of consolidation, the U.S. banking industry remains highly fragmented, with almost 6,000 FDIC insured institutions⁴ and over 400 publicly-traded banks with a share price greater than one dollar. Figure 7 shows the Russell 3000[®] bank universe, the test universe for the U.S. banking data, which contained an average of 250 banks over the test period (1990-2016). It consists primarily of regional banks (235 at year-end 2016) and thrifts (54) with a handful of very large money-center banks and other diversified financials.



Source: S&P Global Market Intelligence Quantamental Research.

Factor categories in sections 2.1 to 2.5 are ordered based on signal strength, from strongest (most predictive) to weakest (least predictive). For information on factor construction, backtest methodology, and statistic definitions, see the [Data and Methodology](#) section.

NOTE: This paper includes test results for a multi-factor bank model for the Russell 3000[®] built on the factors identified in this section – see [Appendix B](#). (The model generated a long-only annualized active return of 10.8%, a long-only information ratio of 2.06, and a long-only hit ratio of 77%, all significant at the 1% level.)

2.1 Valuation

“Valuing banks, insurance companies and investment banks has always been difficult, but the market crisis of 2008 has elevated the concern to the top of the list of valuation issues.” - Aswath Damodaran⁵

Valuation is the strongest category of bank investment metrics for the Russell 3000[®]. One major difference between valuation and all other categories of factors tested is that valuation metrics worked best prior to the financial crisis, whereas most non-valuation ratios worked best subsequent to the crisis.

This disparity reflects a simple reality: when the banking industry is doing well, differences in income- and balance-sheet ratios are less pronounced, and investors focus more on valuation. However, when bank survival is at stake, investors place a laser-like focus on capital adequacy and credit quality metrics, while valuation also becomes harder to determine as underlying financials swing dramatically.

⁴ FDIC “Statistics at a Glance,” as of the fourth quarter of 2016.

⁵ “Valuing Financial Firms” <http://people.stern.nyu.edu/adamodar/pdffiles/papers/finfirm09.pdf>

All three of the valuation factors worked strongly from 1992 to 2006. For example, the second-strongest overall valuation factor, pre-provision net revenue to price, had a long-short spread of 22.3% between 1992 and 2006 and just 1.5% between 2007 and 2016.

Table 1. Valuation Factor Definitions

Factor/Signal	Definition	Sort Order
Core EPS / Price	Core earnings per share on a diluted basis divided by price. Core income is net income after taxes and before extraordinary items, less net income attributable to noncontrolling interest, gain on the sale of held to maturity and available for sale securities, amortization of intangibles, goodwill and nonrecurring items. The assumed tax rate is 35%	D
Pre-Provision Net Revenue / Price	Bank operating revenue less expenses but before provision for loan losses on a per share basis as a % of price	D
Tangible Book Value (TangCE) / Price	Tangible common equity on a per share basis as a % of price	D

Note: sort order codes are D = Descending or A = Ascending

The top-performing valuation metric is core EPS to price (Table 2), which is also the strongest performing metric tested in the U.S. Note that pre-provision net revenue (PPNR) to price has a very low correlation⁶ (0.09) to core EPS to price. This low correlation likely reflects the fact that during bank downturns PPNR decreases modestly, while increased provisioning, charge offs, and share counts can cause big declines in EPS. PPNR is also the key financial metric U.S. regulators use to assess bank stress tests.

(See [How to Read the Performance Summary Tables](#) for statistic definitions.)

Table 2. Valuation Performance Summary – Russell 3000® Banks from Start Date to December 2016

Factor/Signal	Sort Order	Start Date	Avg Quintile Count	Ann. Long-Only Active Rtrn	Ann Long Only Info Ratio	Long-Only Hit Rate	Ann. Long/Short Active Rtrn	Average 1-Month IC
Core EPS / Price	D	Jan-90	47	7.41%***	1.02	68%***	15.09%***	0.066***
Pre-Provision Net Revenue / Price	D	Jan-90	49	5.32%**	0.49	62%***	12.35%***	0.058***
Tangible Book Value (TangCE) / Price	D	Jan-90	48	3.35%	0.29	55%*	9.17%***	0.037***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

⁶ The correlation among the monthly long-short returns for the two ratios over the test period.

2.2 Asset Quality

“I sincerely believe...that banking establishments are more dangerous than standing armies; and that the principle of spending money to be paid by posterity, under the name of funding, is but swindling futurity on a large scale.” – Thomas Jefferson⁷

Asset quality is a vital measure of bank financial health that receives the most investor attention when economic or industry conditions deteriorate. While asset quality metrics performed moderately-well *prior to* the financial crisis,⁸ their performance strengthened during and after the crisis, especially on the short-side. Asset quality ratios also perform well across [interest rate regimes](#).

Table 3. Asset Quality Factor Definitions

Factor/Signal	Definition	Sort Order
Texas Ratio (Modified) 1Yr Chg	The 1-year change in the ratio of non-performing assets and loans 90-days or more past due but still accruing interest divided by total equity and loan loss reserves	A
Nonaccrual Loans / Total Assets VolAdjGr	Volatility adjusted 1-year growth of non-accrual loans divided by total assets	A
Loan Loss Reserve / Non-Performing Assets Stability	Stability ratio of the loan loss reserve divided by non-performing assets and loans 90 days or more past due but still accruing interest	D
Provision Ratio Stability	Stability ratio of the provision for loan losses divided by total assets	A
Net Charge-Off Ratio VolAdjGrw	Volatility adjusted 1-year growth of net charge-offs divided by average loans	A
Nonperforming Loan Coverage Ratio 1Yr Chg	The 1-year change of the ratio of the reserve for loan losses divided by non-performing loans	D
Nonperforming Loan Ratio Stability	Stability ratio of nonperforming loans divided by net loans	A

Note: sort order codes are D = Descending or A = Ascending

Over the entire test period (1990-2016), all seven factors posted impressive summary statistics (Table 4), with average long-only and long-short active returns and 1-month information coefficient (IC), all statistically significant at the 1% level.

A number of widely-used banking ratios have historically been predictive, particularly in the form of year-to-year change or volatility-adjusted change.⁹ Gerard Cassidy, of RBC Capital Markets, created the now widely-used Texas ratio, to help forecast bank insolvency. Table 4 shows that the one-year change in the Texas Ratio has been the strongest performing asset quality factor. (Note that our ratio uses total equity, instead of the more-commonly used tangible equity, in the denominator.)

Two other asset quality ratios that performed particularly well over the test period are nonaccrual loans to total assets (volatility adjusted growth) and loan loss reserve to nonperforming assets (stability), a variant of the nonperforming loan coverage ratio. These ratios tell us that in assessing the quality of a bank’s underwriting it’s important to look at the magnitude of non-performing assets relative to equity, reserves, and total assets.

(See [How to Read the Performance Summary Tables](#) for statistic definitions.)

⁷ Letter to John Taylor, <https://founders.archives.gov/documents/Jefferson/03-10-02-0053>.

⁸ Average long-only annualized excess returns for asset quality metrics from 1992 to 2006 ranged from 1.2% to 3.6%, with four of the seven factors significant at the 1% level and two at the 5% level.

⁹ Volatility-adjusted change is the one-year change in the ratio divided by the eight-quarter standard deviation of the one-year change.

Table 4. Asset Quality Performance Summary – Russell 3000® Banks from Start Date to December 2016

Factor/Signal	Sort Order	Start Date	Avg Quintile Count	Ann. Long-Only Active Rtrn	Ann Long Only Info Ratio	Long-Only Hit Rate	Ann. Long/Short Active Rtrn	Average 1-Month IC
Texas Ratio (Modified) 1Yr Chg	A	Jan-90	48	5.69%***	0.89	65%***	14.53%***	0.046***
Nonaccrual Loans / Total Assets VolAdjGr	A	Jan-90	47	4.93%***	0.93	60%***	9.15%***	0.030***
Loan Loss Reserve / Non-Performing Assets Stability	D	Jan-90	46	3.46%***	0.77	58%***	6.66%***	0.027***
Provision Ratio Stability	D	Jan-90	44	3.36%***	0.47	60%***	4.66%***	0.021***
Net Charge-Off Ratio VolAdjGrw	A	Jan-90	44	3.23%***	0.60	60%***	6.73%***	0.021***
Nonperforming Loan Coverage Ratio 1Yr Chg	D	Jan-90	47	3.13%***	0.61	59%***	5.12%***	0.018***
Nonperforming Loan Ratio Stability	A	Jan-90	47	3.00%***	0.52	57%**	7.00%***	0.031***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

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2.3 Profitability

“According to American Action Forum (AAF) research, Dodd-Frank has imposed more than \$36 billion in final rule costs and 73 million paperwork hours [over the past six years].”

- Sam Batkins and Dan Goldbeck¹⁰

Corporate profits drive stock price performance, and bank stocks are no exception. Profitability factors were historically predictive over the backtest horizon, although their effectiveness strengthened during and after the financial crisis. Profitability and cost-efficiency metrics are particularly important in the current era of high compliance costs resulting from Dodd-Frank and other post-crisis regulation.

Table 5. Profitability Factor Definitions

Factor/Signal	Definition	Sort Order
Operating Income / Tier 1 Common Equity 3Yr Chg	The 3-year change in the ratio of operating income (net interest income + noninterest income - noninterest expense - provision for loan losses) divided by Tier 1 common equity	D
Total Pretax Expense / Avg Assets 3Yr Chg	The 3-year change in the ratio of total pre-tax expense (interest expense + noninterest expense + provision for loan losses) divided by average assets	A
Efficiency Ratio 1Yr Chg	The 1-year change in the ratio of noninterest expense (less foreclosure expense, amortization of intangibles and goodwill impairment) divided by recurring revenue (net interest income + noninterest income - securities gains - nonrecurring revenue)	A
Return on Tangible Common Equity 1Yr Chg	The 1-year change in the ratio of net income less tax-adjusted amortization (if available) of intangibles divided by tangible common equity	D
Net Interest Margin 1Yr Chg	The 1-year change in the ratio of net interest income divided by average interest-earning assets	D

Note: sort order codes are D = Descending or A = Ascending

The strongest profitability metrics historically (Table 6) took the form of 3-year changes, suggesting that evaluating longer-term improvement or deterioration in profit or expense is critical. The strongest is a ratio not widely used by bank analysts: operating profit to Tier 1

¹⁰ “Six Years After Dodd-Frank: Higher Costs, Uncertain Benefits.”

<https://www.americanactionforum.org/insight/six-years-dodd-frank-higher-costs-uncertain-benefits/>

common equity. (The 3-year change in operating income to Tier 1 capital worked equally well.)

The second-strongest metric is an expense ratio: the 3-year change in total pretax expense (interest expense + noninterest expense + provision for loan losses) to average assets. This ratio worked well over the test horizon (although it worked significantly better post-financial crisis) highlighting the importance of expense control to a bank's financial performance.

Three *widely-used* profitability ratios were also predictive historically, when used in the form of 1-year changes. The 1-year change in the efficiency ratio, return on tangible common equity, and net interest margin were all effective as measured by annualized active returns or information coefficient (IC).

(See [How to Read the Performance Summary Tables](#) for statistic definitions.)

Table 6. Profitability Performance Summary – Russell 3000® Banks from Start Date to December 2016

Factor/Signal	Sort Order	Start Date	Avg Quintile Count	Ann. Long-Only Active Rtrn	Ann Long Only Info Ratio	Long-Only Hit Rate	Ann. Long/Short Active Rtrn	Average 1-Month IC
Operating Income / Tier 1 Common Equity 3Yr Chg	D	Jan-07	38	3.95%*	0.62	61%**	9.92%*	0.034**
Total Pretax Expense / Avg Assets 3Yr Chg	A	Jan-91	49	3.49%***	0.70	57%**	6.56%***	0.028***
Efficiency Ratio 1Yr Chg	A	Jan-90	48	2.76%***	0.69	59%***	8.24%***	0.023***
Return on Tangible Common Equity 1Yr Chg	D	Jan-92	48	2.44%**	0.46	54%	7.10%***	0.024***
Net Interest Margin 1Yr Chg	D	Jan-90	48	1.70%**	0.44	51%	4.49%***	0.013***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

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2.4 Capital Adequacy & Deposit Detail

“Starting in 1981, U.S. regulators issued rules that set out minimum capital-asset ratios. . . However, it is clear that the ratios mandated by rules were always too low, and that they were riddled with exceptions.” – Eric Posner¹¹

In a fractional-reserve banking system, capital adequacy is crucial not only to the survival of an individual bank, but also, due to the interrelationships between banks, to the entire financial system. We include deposit detail within capital adequacy because of the importance of funding loans through an adequate deposit base.

Table 7. Capital Adequacy & Deposit Detail Factor Definitions

Factor/Signal	Definition	Sort Order
Common Equity Tier 1 Ratio VolAdjGrw	Volatility adjusted growth of Tier 1 common equity (CET1) divided by average risk-weighted assets	D
Savings & MMDAs / Deposits	Savings and money market account deposits divided by total deposits	D
Avg Non-Int Bear Deposits / Deposits	Average non-interest bearing deposits divided by total deposits	D

Note: sort order codes are D = Descending or A = Ascending

¹¹ “How Bank Regulators Determine Capital Adequacy Requirements,” Harvard Law School Forum on Corporate Governance and Financial Regulation.

The common equity Tier 1 ratio (volatility adjusted growth) is the most effective capital adequacy signal. Regulators expect Tier 1 common equity, or ‘core’ capital, to consist mainly of capital from voting common shares, along with retained earnings. The FDIC considers these sources to be “the most loss absorbing form of capital.”¹² There are a number of ways banks can report key capital adequacy ratios under differing Basel capital regimes; the SNL Bank fundamental dataset captures each of these variations of capital metrics.

Low-cost core deposits are a critical source of bank funding, due to their stability and positive effect on net interest margin. Backtest results (Table 8) reinforce their significance: banks with a high percentage of savings and non-interest bearing checking accounts outperform, while those that need to access wholesale funding (brokered certificates of deposit, commercial paper, etc.) underperform. Deposit detail ratios were significant across the entire test horizon, although they showed stronger efficacy from 2007 forward.

Table 8. Capital Adequacy & Deposit Detail Performance Summary – Russell 3000® Banks from Start Date to December 2016

Factor/Signal	Sort Order	Start Date	Avg Quintile Count	Ann. Long-Only Active Rtrn	Ann Long-Only Info Ratio	Long-Only Hit Rate	Ann. Long/Short Active Rtrn	Average 1-Month IC
Common Equity Tier 1 Ratio VolAdjGrw	D	Jan-05	39	4.13%***	0.84	60%**	6.86%***	0.021***
Savings & MMDAs / Deposits	D	Jan-95	32	4.09%***	0.65	57%**	6.99%***	0.022***
Avg Non-Int Bear Deposits / Deposits	D	Jan-95	43	2.67%**	0.54	60%***	7.24%***	0.030***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

2.5 Growth

Although growth is often a closely-watched financial characteristic, empirical tests usually show the performance of growth factors to be weak. This may be due to the fact that investors overpay for growth expectations.¹³ Most of the ratios that work within the U.S. bank universe consider not simple growth, but the rate of change in growth (e.g., the 1-year or 3-year rate of change in the growth ratio itself).

Table 9. Growth Factor Definitions

Factor/Signal	Definition	Sort Order
Total Equity VolAdjGrw	The volatility adjusted 1-year growth rate of 1-year growth of total equity (i.e., the volatility adjusted rate of change in growth)	D
Pre-Provision EPS Growth	The 1-year growth rate of pre-provision earnings per share	D
Net Income Growth 1Yr Chg	The 1-year change in the 1-year growth rate of net income (i.e., the change in the rate of 1-year growth)	D
Total Assets Volatility Adj Growth	The volatility adjusted 1-year growth rate of 1-year growth of total assets	D
Total Deposits Volatility Adj Growth	The volatility adjusted 1-year growth rate of 1-year growth of total deposits	D

Note: sort order codes are D = Descending or A = Ascending

¹² <https://www.fdic.gov/regulations/safety/manual/section2-1.pdf>, p. 3.

¹³ See Arnott et al, “Clairvoyant Value and the Value Effect”, *Journal of Portfolio Management*, Vol 35, No. 3 (Spring 2009).

Table 10 shows that the two strongest growth factors are the volatility-adjusted growth rate of total equity and the 1-year growth rate of pre-provision EPS. Note that growth is an effective short-side factor (compare long-only and long-short returns) – that is, stocks that show large declines in growth metrics are punished by the market. Growth factors worked well during and after the financial crisis, but not as well prior to the crisis.

Table 10. Growth Performance Summary – Russell 3000® Banks from Start Date to December 2016

Factor/Signal	Sort Order	Start Date	Avg Quintile Count	Ann. Long-Only Active Rtrn	Ann Long Only Info Ratio	Long-Only Hit Rate	Ann. Long/Short Active Rtrn	Average 1-Month IC
Total Equity VolAdjGrw	D	Jan-90	47	3.19%***	0.60	56%**	8.09%***	0.019***
Pre-Provision EPS Growth	D	Jan-90	47	2.93%***	0.62	58%***	8.04%***	0.027***
Net Income Growth 1Yr Chg	D	Jan-90	48	2.46%**	0.41	58%***	6.02%***	0.015***
Total Assets Volatility Adj Growth	D	Jan-90	47	2.22%**	0.49	58%***	4.89%***	0.018***
Total Deposits Volatility Adj Growth	D	Jan-90	46	2.22%**	0.45	56%**	4.65%***	0.014***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

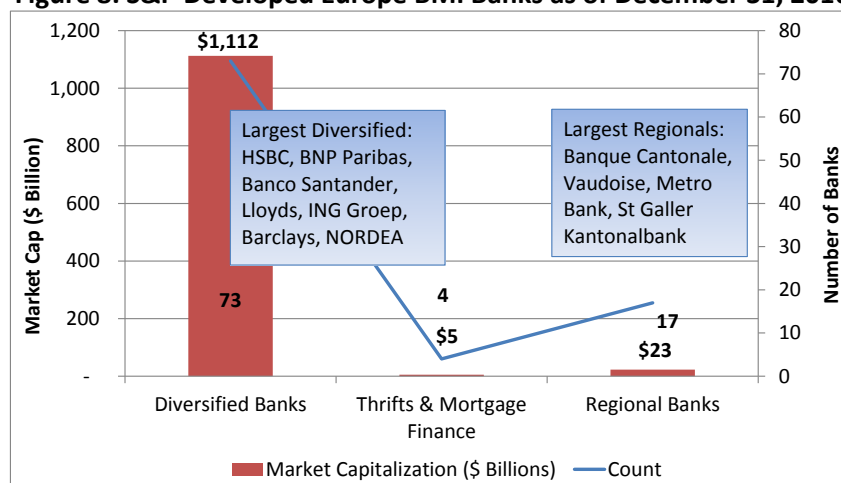
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3 Factor Formulation and Testing – Europe Developed Markets

Robust data coverage for items in the SNL Bank fundamental data for developed Europe begins in 2007. As a result, for most of the test period European banks have been experiencing financial-stress conditions. KPMG LLP estimates that as of October 2016 Europe’s banks still had 1.2 trillion Euros worth of bad loans “and will probably be stuck with them for decades.”¹⁴

Note that the structure of the European and U.S. banking industries differs: while the U.S. has a handful of big, diversified banks and many smaller regional banks and thrifts, Europe is dominated by large diversified banks (Figure 8). However, European diversified banks tend to be smaller than their U.S. counterparts, with an average market cap of \$15 billion, versus \$150 billion in the U.S. The European test universe, based on the S&P Developed Europe BMI index, has an average of 95 banks over the 2007-2016 test period.

Figure 8. S&P Developed Europe BMI Banks as of December 31, 2016



Source: S&P Global Market Intelligence Quantamental Research.

¹⁴ “KPMG Says,” by Richard Partington: <https://www.bloomberg.com/news/articles/2016-10-31/european-banks-stuck-with-1-3-trillion-of-bad-loans-kpmg-says>

The strength of the European factor tests reflects the duration of the European financial crisis. As observed in U.S. results, when the banking industry is in crisis, fundamental (income statement/balance sheet) metrics drive bank stock performance. As also shown in the U.S., valuation metrics are less relevant than fundamentals during crisis conditions.

Unlike what we observed in the U.S., the level of the financial ratios had stronger results in developed Europe than ratio trends (e.g., the one-year change in a ratio).

Factor categories in sections 3.1 to 3.5 are ordered based on signal strength, from strongest (most predictive) to weakest (least predictive). For information on factor construction, backtest methodology, and statistic definitions, see the [Data and Methodology](#) section.

NOTE: This paper presents backtest results on a variety of factors for both the S&P Developed Asia BMI and the S&P Emerging Market BMI – see [Appendix A](#).

This paper also includes test results for a multi-factor bank model for the S&P Developed Europe BMI built on the factors identified in this section – see [Appendix B](#). (The model generated a long-only annualized a historical active return of 13.6%, a long-only information ratio of 1.02, and a long-only hit ratio of 64%, all significant at the 1% level.)

3.1 Profitability

Profitability was the most predictive bank financial-ratio category in developed Europe over the past 10 years. The reason is not hard to find: for the past 10 years European banks have struggled with credit quality issues and profitable banks have been sought after.

Table 11. Profitability Factor Definitions – Developed Europe

Factor / Signal	Definition	Sort Order
Total Pretax Expense / Average Assets	The sum of interest expense, noninterest expense, and provision for loan losses divided by the average of assets	A
Gross Operating Revenue / Interest Expense	The sum of recurring gross revenue divided by the sum of interest expense. Recurring gross revenue is operating income before interest expense, taxes, and income/expense items not expected to occur again in the immediate future	D
Net Fee & Commission Income / Avg R.W. Assets	The sum of net fee and commission income divided by the average total risk-weighted assets	A

Note: sort order codes are D = Descending or A = Ascending

The results in Table 12 suggest that the importance of low-cost operations been overlooked by investors over the past several years and that expense control is as critical in Europe as it is in the U.S. Total pretax expense to average assets is the strongest factor tested in Europe, with a 10.8% average annual long-only active return and a 36.7% long-short return.

Gross operating revenue to interest expense (in essence, operating income with interest expense added back divided by interest expense) provides an idea of how effectively a company generates profit on its liabilities – deposits and borrowings. It is noteworthy that this ratio did not produce significant results in the U.S.

(See [How to Read the Performance Summary Tables](#) for statistic definitions.)

Table 12. Profitability Summary – Developed Europe BMI Banks from Start Date to December 2016

Factor/Signal	Sort	Start Date	Avg. Quintile Count	Ann. Long-Only Active Return	Ann. Long-Only Info Ratio	Long-Only Hit Rate	Annualized Long/Short Active Rtrn.	Average 1-Month IC
	Order							
Total Pretax Expense / Average Assets	A	Jun-07	17	10.84%***	1.00	62%**	36.67%***	0.102***
Gross Operating Revenue / Interest Expense	D	Jun-07	16	8.39%**	0.67	58%*	32.96%***	0.098***
Net Fee & Commission Income / Avg R.W. Asse	A	Jun-07	16	7.75%***	0.98	64%***	21.56%***	0.062***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

3.2 Capital Adequacy & Deposit Detail

Capital adequacy, asset quality, and profitability form three pillars of a bank's financial health¹⁵ and have been the most effective types of metrics for evaluating European banks since 2007. Table 13 shows the definitions of the two significant capital adequacy factors, as well as two related deposit structure factors.

Table 13. Capital Adequacy & Deposit Detail Factor Definitions – Developed Europe

Factor / Signal	Definition	Sort Order
Risk Based Capital Ratio	Total risk-based capital divided by total risk-weighted assets	D
Tier 1 Common Equity Ratio	Tier 1 common equity (CET1) divided by total average risk-weighted assets	D
Demand Deposits / Total Deposits	Demand deposits divided by total deposits	D
Loan to Deposit Ratio	Loans held for investment, net of reserves, divided by total deposits	A

Note: sort order codes are D = Descending or A = Ascending

The strongest capital adequacy measure in Europe is one that did not work as well in the U.S.: the risk-based capital ratio (Table 14). This ratio compares a bank's capital available to absorb bad loans (Tier 1 plus Tier 2 regulatory capital) to its total assets, also adjusted by risk category, done by Basel Accord standards. As in the U.S., the narrower Tier 1 common equity ratio, which excludes other capital instruments, also works.

Low-cost deposits are just as important in Europe as in the U.S., as shown by the demand deposits to total deposits ratio. Demand deposits, primarily checking accounts, are typically low-cost sources of bank funding. In addition, the loan to deposit ratio, which was *not* significant in the U.S. worked moderately-well in Europe. A higher loan-to-deposit ratio implies increased reliance on wholesale markets to fund loans.

(See [How to Read the Performance Summary Tables](#) for statistic definitions.)

¹⁵ They also form the C, the A, and the E (for earnings) of the CAMELS framework, widely used by regulators to determine the bank health.

Table 14. Capital Adequacy & Deposit Detail Summary – Developed Europe BMI Banks Start Date to December 2016

Factor/Signal	Sort Order	Start Date	Avg. Quintile Count	Ann. Long-Only Active Return	Ann. Long-Only Info Ratio	Long-Only Hit Rate	Annualized Long/Short Active Rtrn.	Average 1-Month IC
Risk Based Capital Ratio	D	Jun-07	16	11.72%***	1.20	67%***	31.32%***	0.091***
Tier 1 Common Equity Ratio	D	Jun-07	16	8.12%*	0.63	64%***	23.49%***	0.082***
Demand Deposits / Total Deposits	D	Jun-07	12	6.20%	0.36	59%*	13.76%*	0.050**
Loan to Deposit Ratio	A	Jun-07	17	5.33%*	0.58	60%**	6.02%	0.031**

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

3.3 Asset Quality

Asset quality metrics have been important in Europe over the past 10 years, as banks struggled with a sovereign debt crisis and bad loans. Note that significant differences exist between asset quality accounting in Europe and in the U.S.

In Europe, and internationally in general, problem loans have a much broader definition than they do in the U.S. As a result, problem loan ratios show much more significance in Europe than in the U.S.

Note that problem loans is a data item exclusive to the SNL Bank fundamental data. It entered as the problem loan value that the company most commonly presents. If the company reports multiple values, SNL selects based on the following priority: nonperforming loans, gross impaired loans, net impaired loans, and other problem loans.

Also, the definition of non-performing loans (NPLs) is inconsistent across Europe. However, impaired loans have a standard definition pan-Europe and we use it as one asset quality metric.

Table 15. Asset Quality Factor Definitions – Developed Europe

Factor / Signal	Definition	Sort Order
Problem Loans / Total Equity + Reserves	Problem loans divided by total equity plus loan loss reserves	A
Provision / Average Risk-weighted Assets	The provision for loan losses divided by the average of total risk-weighted assets	A
Loan Loss Reserve / Avg Risk-Weighted Assets	The loan loss reserve divided by total average risk-weighted assets	A
Impaired Loans / Avg Risk-Weighted Assets	Impaired loans divided by total average risk-weighted assets	A

Note: sort order codes are D = Descending or A = Ascending

Problem loans to total equity plus reserves might be thought of as the international version of the Texas ratio. It is the best European asset quality factor, with an annualized long-only active return of 10.1% and a long-short return of 30.6%, significant at the 5% and 1% levels, respectively (Table 16). Long-short returns are more significant than long-only returns in Europe, as one of the most important considerations over the past several years has been downside protection.

Likewise, the ratio of loan loss provision to risk-weighted assets has been an important factor as banks suffered high loan default rates. A high provision rate during a period of financial stress serves as an indicator of high cost relative to the risk inherent in the loan portfolio. Loan loss reserve and impaired loan metrics are also significant for the same reason.

Table 16. Asset Quality Performance Summary – Developed Europe BMI Banks from Start Date to Dec. 2016

Factor/Signal	Sort	Start Date	Avg. Quintile Count	Ann. Long-Only Active Return	Ann. Long-Only Info Ratio	Long-Only Hit Rate	Annualized Long/Short Active Rtrn.	Average 1-Month IC
	Order							
Problem Loans / Total Equity + Reserves	A	Jun-07	16	10.13%**	0.82	62%**	30.59%***	0.086***
Provision / Average Risk-weighted Assets	A	Jun-07	16	10.05%**	0.74	63%***	23.69%**	0.074***
Loan Loss Reserve / Avg Risk-Weighted Assets	A	Jun-07	16	8.80%**	0.66	62%**	25.52%***	0.080***
Impaired Loans / Avg Risk-Weighted Assets	A	Jun-07	15	7.84%*	0.64	63%***	25.47%**	0.073***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

3.4 Growth

Given that many European banks have been in survival mode over the past several years it is not surprising that growth metrics are the *least* important financial-statement metrics tested. The two significant growth metrics in Europe are EPS growth and dividend growth – what might be considered the most basic attributes of a bank from a shareholder's point of view.

Table 17. Growth Factor Definitions – Developed Europe

Factor / Signal	Definition	Sort Order
Dividend Growth	The 1-year growth rate of total dividends paid per share	D
Pre-Provision EPS Growth	The 1-year growth rate of pre-provision earnings per share	D

Note: sort order codes are D = Descending or A = Ascending

Pre-provision EPS growth, which gives insight into a bank's core earnings capacity, is a factor that worked well in both the U.S. and Europe, with results equally strong in both regions over the 2007-2016 timeframe.

Dividend growth was also significant in Europe, although less so than pre-provision EPS (Table 18 is sorted by long-only active return). By contrast, dividend growth did not work as a strategy in the U.S. **Dividends may have been a proxy for financial health in Europe:** peak-to-trough dividends fell by 96% in Europe (vs. 77% in the U.S.) and post-crisis dividend growth didn't begin in Europe until 2014 (2011 in the U.S.). Thus, maintaining or raising the dividend would have been a very positive sign for a European bank.

Table 18. Growth Performance Summary – Developed Europe BMI Banks from Start Date to December 2016

Factor/Signal	Sort	Start Date	Avg. Quintile Count	Ann. Long-Only Active Return	Ann. Long-Only Info Ratio	Long-Only Hit Rate	Annualized Long/Short Active Rtrn.	Average 1-Month IC
	Order							
Dividend Growth	D	Jun-07	16	6.19%*	0.57	57%	9.64%*	0.037**
Pre-Provision EPS Growth	D	Jun-07	16	5.18%**	0.73	54%	24.82%***	0.049***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

3.5 Valuation

U.S. results show that, while valuation factors worked extremely well prior to the 2008 financial crisis, they did not work well during and after the crisis. Although we don't have pre-crisis results for Europe, valuation factors in general did not work well in Europe over the past 10 years.

The only valuation-related factors of significance over the test horizon in Europe are dividend yield and dividend payout ratio. Dividends were essentially omitted in Europe from the end of 2007 through mid-2014. Thus, dividend yield and the percent of earnings paid out served as indicators of underlying financial strength or weakness during the crisis.

Table 19. Valuation Definitions – Developed Europe

Factor / Signal	Definition	Sort Order
Dividend Yield	Common dividends declared per share divided by the current share price	D
Dividend Payout Ratio	Total dividends paid per share divided by diluted earnings per share before extraordinary items	D

Note: sort order codes are D = Descending or A = Ascending

The dividend yield strategy is most significant for the short-side portfolios. These are likely companies that cut their dividends. Note that the payout ratio sorts companies in *descending* order, high to low. Thus, banks with *high* payout ratios outperform, and banks with *low* payout ratios underperform. This confirms the belief that dividend ratios in Europe have served as a proxy for financial health – healthy banks can afford to pay significant dividends, unhealthy banks cannot.

Table 20. Valuation Performance Summary – Developed Europe BMI Banks from Start Date to December 2016

Factor/Signal	Sort Order	Start Date	Avg. Quintile Count	Ann. Long-Only Active Return	Ann. Long-Only Info Ratio	Long-Only Hit Rate	Annualized Long/Short Active Rtrn.	Average 1-Month IC
Dividend Yield	D	Jan-07	16	7.01%	0.48	57%	16.01%**	0.060***
Dividend Payout Ratio	D	Jan-07	16	5.64%**	0.61	65%***	8.73%*	0.054***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

4 Economic Regime Analysis

In order to determine what types of banking industry environments the signals work best in, two regimes were examined: falling versus rising federal funds interest rates and high versus low financial stress. Regime analysis was conducted on the Russell 3000[®] bank universe only, due to limited data history in Europe.

4.1 Rising versus Falling Short-Term Interest Rates

Federal funds interest rate regimes are defined as tightening or easing: a rising (tightening) interest rate regime occurs when the Federal Reserve's federal funds rate is above its three-month moving average, and a falling (easing) regime occurs when the rate is below its average.

Rising federal funds interest rates often signal economic strength and may lead to higher bank net interest margins.¹⁶ Conversely, falling rates often signal economic weakness and may lead to margin compression. Whatever the effects may be, the level of short-term borrowing rates are obviously a critical aspect of a bank's operating environment.

The findings regarding short-term rates (Table 21) are clear: profitability, deposit structure, and growth factors perform the best in an environment of falling short-term interest rates. This reflects a need for increased investor focus on banks' financial health (versus valuation) as the economy declines, loan demand falls, and credit quality worsens.

Asset quality metrics work almost equally well in both rising and falling short-term interest rate environments – i.e., they are universally important. Note, however, that both asset quality metrics in Table 21 have significantly higher long-only and long-short returns during periods of falling interest rates, so asset quality also becomes more important as economic conditions deteriorate. Valuation ratios also tend to work across interest rate regimes.

Table 21. Rising Versus Falling Interest Rate Regime - Russell 3000® Banks through 2016

Factor/Signal	Sort Order	Number of Obs.		Ann. Long-Only Active Rtrn		Ann. Long-Short Active Rtrn	
		Rising Rates	Falling Rates	Rising Rates	Falling Rates	Rising Rates	Falling Rates
Profitability							
Operating Income / Tier 1 Common Equity 3Yr Chg	D	53	66	2.95%	4.76%*	4.36%	14.58%*
Cost Base / Average Assets 3Yr Chg	A	153	157	2.25%*	4.71%***	4.15%	8.95%***
Deposit Detail							
Savings & MMDAs / Deposits	D	134	129	1.26%	7.14%***	0.79%	13.85%***
Asset Quality							
Texas Ratio (Modified) 1Yr Chg	A	157	166	3.37%**	7.94%***	7.41%**	21.65%***
Loan Loss Reserve / Non-Performing Loans Stability	D	157	166	2.88%***	4.01%***	4.76%***	8.48%***
Growth							
Total Equity VolAdjGrw	D	157	166	1.94%	4.41%***	4.82%*	11.32%***
Net Income Growth 1Yr Chg	D	157	166	1.27%	3.63%*	2.36%	9.63%***
Valuation							
Core EPS / Price	D	157	166	6.47%***	8.29%***	11.73%***	18.36%***
Pre-Provision Net Revenue / Price	D	157	166	7.88%***	2.94%	16.56%***	8.49%*
Tangible Book Value / Price	D	157	166	4.69%*	2.12%	11.64%***	6.95%

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data, U.S. Federal Reserve. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

4.2 High vs. Low Financial Stress

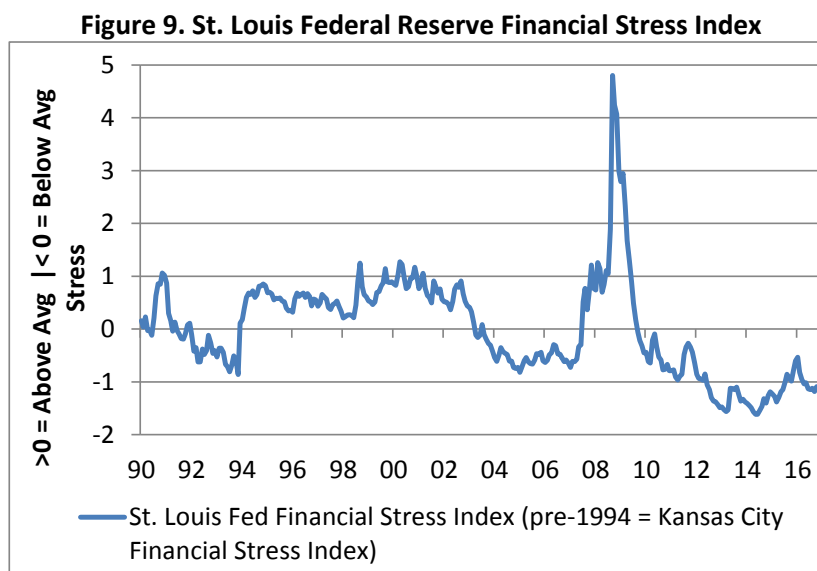
This regime study uses the St. Louis Fed Financial Stress Index to define high and low stress regimes.¹⁷ The index is constructed from 18 data series: seven interest rate series, six yield spreads, and five other indicators. The average value for the index is designed to be zero; therefore, a reading above zero is considered above-average stress and a reading below zero is below-average stress. Note that from January 1990 to November 1993, we

¹⁶ The latter relationship is more ambiguous. David Wheelock, Vice President of Research at the St. Louis Fed, writes an informative article in which he shows that due to banks' tendency to "lend long and borrow short" there is actually a negative short-term correlation between short-term rates and net interest margin: <https://www.stlouisfed.org/on-the-economy/2016/may/banks-more-profitable-interest-rates-high-low>

¹⁷ See <https://fred.stlouisfed.org/series/STLFSI>

use a similar index, the Kansas City Financial Stress Index, as the St. Louis index begins in December 1993.

The study period covers three stress periods. The St. Louis Financial Stress index defines two periods of above-average stress: from the start of the index (December 1993) until April 2003 and from August 2007 to September 2009 (Figure 9). Additionally, the Kansas City Financial Stress index, which we use from 1990 through 1994, showed a period of above-average stress beginning in August 1990 and ending in July 1991.



Source: Federal Reserve Bank of St. Louis, Federal Reserve Bank of Kansas City. Data as of March 2017.

As with the interest rate regime, profitability, deposit structure, and growth all work best during periods of above-average stress (Table 22). Asset quality metrics are important under both above- and below-average stress regimes. Capital adequacy (an indicator of bank's capacity to absorb losses) is far more important during periods of stress. Changes in short-term interest rates do not necessarily coincide with periods of bank stress.

Growth metrics (total equity growth and pre-provision EPS growth) were significant across periods of both above- and below-average stress. Stress indices are less correlated with periods of declining economic growth than are the interest rate regimes. Hence, bank growth can take place even when stress is elevated. Also note that valuation ratios appear to work better during periods when stress is elevated.

Table 22. Above-Average Versus Below-Average Financial Stress Regime – Russell 3000® Banks through 2016

Factor/Signal	Sort Order	Number of Obs		Ann. Long-Only Active Rtrn		Ann. Long-Short Active Rtrn	
		Above Avg Stress	Below Avg Stress	Above Avg Stress	Below Avg Stress	Above Avg Stress	Below Avg Stress
Profitability							
Banking Expense / Avg Assets 3Yr Chg	A	146	165	4.72%***	2.42%**	8.44%**	4.93%**
Operating Income / Tier 1 Capital 3Yr Chg	D	26	93	3.89%**	1.86%	9.07%**	2.56%
Capital Adequacy & Deposit Detail							
Common Equity Tier 1 Ratio VolAdjGrw	D	26	117	16.15%**	1.66%	29.19%**	2.46%
Savings & MMDAs / Deposits	D	127	136	7.97%***	0.62%	11.25%***	3.19%
Asset Quality							
Texas Ratio (Modified) 1Yr Chg	A	155	168	6.16%***	5.31%***	15.55%***	13.55%***
Nonaccrual Loans / Total Assets VolAdjGrw	A	155	168	6.03%***	3.83%***	11.40%***	7.09%***
Growth							
Total Equity VolAdjGrw	D	155	168	4.07%**	2.29%**	9.32%**	6.57%***
Pre-Provision EPS Growth	D	155	168	3.19%**	2.77%***	9.85%**	6.27%***
Valuation							
Core EPS / Price	D	155	168	11.25%***	3.89%***	22.33%***	9.01%***
Pre-Provision Net Revenue / Price	D	155	168	8.79%**	2.20%	18.59%***	6.73%**

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data, Federal Reserve Bank of St. Louis, Federal Reserve Bank of Kansas City. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

5 Data and Methodology

5.1 Factor Types and Performance Statistics

Our research indicated that many of the financial ratios we tested worked more effectively as 1-year or 3-year changes (etc.) than as straight ratios. Four types of factors are presented in this paper:

1. A straight financial ratio (e.g., Tangible Assets / Net Loans).
2. A 1-year or 3-year change (e.g., 1-Year Change in Efficiency Ratio).
3. “Volatility Adjusted Growth” (VolAdjGrw) – the 1-year change in the ratio divided by the standard deviation of that 1-year change over the past eight quarters. This ratio is also adjusted when the denominator of the 1-year growth rate is negative. (E.g., Tier 1 Common Capital Ratio VolAdjGrw.)
4. Stability – the average of eight quarters of 1-year changes in the ratio divided by the standard deviation of those eight 1-year changes (e.g., Non-Performing Loan Ratio Stability).

Table 23. How to Read the Performance Summary Tables

Average Quintile Count	The average number of issues over the test period for each of the five portfolios (quintiles) formed monthly for testing.
Annualized Long-Only Active Return	The average equal-weighted return of the top 20% of stocks minus average equal-weighted return of the benchmark. The average “excess” return.
Annualized Long-Only Information Ratio	A risk-adjusted return metric calculated as the annualized average long-only active return divided by the standard deviation of the active returns.
Long-Only Hit Rate	The percentage of months in which the portfolio return for the top 20% of stocks is higher than the benchmark return.
Annualized Long-Short Active Return	The equal-weighted return of the top 20% of stocks minus the equal-weighted return of the bottom 20% of stocks.
Average 1-Month IC	The average monthly information coefficient, which is the correlation between the stock rankings on a particular factor and the forward returns for those stocks.

5.2 Data

The SNL Bank fundamental data covers 50,000 public and private companies (30,000 active), spanning all markets globally: the Americas, Asia Pacific, Europe, the Middle East, and Africa. The database includes 100-600+ data items (excluding ratios), depending on the bank’s size and market. All items are hand-entered into a banking-specific template. Turnaround time averages 24 hours, and all data is updated within five days of publication. U.S. data generally begins in 1990, with international data beginning in 2005.

Data types covered include:

- Balance sheet (gross and net loans, reserves, available for sale (AFS), held to maturity and trading securities, derivative assets and liabilities, deposits, off-balance-sheet commitments etc.)
- Income statement, including comparable pre-impairment operating profit, impairment detail and yield/cost information
- Detailed credit quality metrics, including problem loans, impairments and provisions
- Regulatory capital details, including core Tier 1, total capital and risk-weighted assets, plus the associated capital ratios
- Consolidated as well as unconsolidated data available when relevant and applicable

5.3 Backtest Universes

We use four different indices to cover the U.S., Europe, Asia, and emerging markets: the Russell 3000[®], the S&P Developed Europe BMI, the S&P Developed Asia BMI, and the S&P Emerging Markets BMI.¹⁸ (Note that backtest results for Asia and emerging markets can be found in Appendix A.)

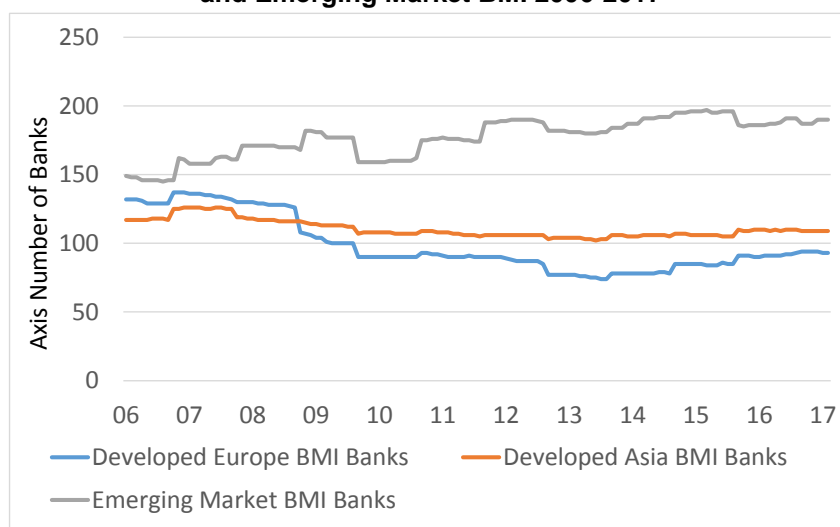
¹⁸ <https://us.spindices.com/indices/equity/sp-global-bmi-us-dollar>

All universes include banks by only using the banking industry group GICS code of 4010. The global banking universes are based on the S&P Global BMI (Broad Market Index), which is a comprehensive, rules-based index designed to measure global stock market performance. The index covers all publicly listed equities with float-adjusted market values of US\$100 million or more and annual dollar value traded of at least US\$50 million in all included countries.

The S&P Global BMI is made up of the S&P Developed BMI and the S&P Emerging BMI indices. The Developed Europe BMI is a subset of the S&P Developed BMI, which we create and narrow to only include banks. Likewise, the Developed Asia BMI is a subset of the same index, narrowed by country and industry.

Figure 10 shows the company count over time for the three international bank-specific indices we use for this paper.

Figure 10. Bank Universe Counts – S&P Developed Europe BMI, Developed Asia BMI, and Emerging Market BMI 2006-2017



Source: S&P Global Market Intelligence Quantamental Research, S&P Index Services. Data as of March 2017.

5.4 Backtest Methodology

All data was lagged to prevent look-ahead bias. U.S. quarterly data was lagged by two months, and annual data was lagged by three months. All ratios substitute annual data if quarterly data is not available for a stock. Portfolios are formed by dividing the universe into quintiles by factor ranks, with portfolios rebalanced monthly.

Returns are calculated as total returns, stock price appreciation plus dividends and cash distributions of value, over the forward one month following portfolio formation. All returns are equal-weighted and Winsorized to three standard deviations. The benchmark return for the Russell 3000[®] is also equal-weighted and Winsorized.

International testing (i.e., outside the U.S.) followed exactly the same procedures as in the U.S., except with regard to data lags. All international ratios are lagged by six months to prevent look-ahead bias. Since many international companies report semi-annually all factors use the following substitution hierarchy: 1) quarterly 2) semi-annual (if quarterly data is not available); 3) annual (if neither quarterly nor semi-annual data is available).

6 Conclusion

The SNL Bank fundamental data provides a rich set of bank data items with strong potential for historical research and model building. Our research shows that a variety of financial ratios work in terms of historically predicting returns over the backtest horizons in the U.S., Europe, [Asia, and emerging markets](#). The strongest categories of banking factors include asset quality, profitability, and valuation, which get to the heart of both bank financials and relative attractiveness. Also important are growth, capital adequacy, and a low-cost deposit base. Bank [stock-selection models](#) can be created by combining factors within each of these categories into a composite model for both the U.S. and Europe that have been shown to be predictive historically.

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Appendix A – Developed Asia and Emerging Market Backtest Results

Table A1. Capital Adequacy Factor Definitions – Asia and Emerging Markets

Factor / Signal	Definition	Sort Order
Tier 1 Capital / Tangible Assets 1Yr Chg	The 1-year change in the ratio of tier 1 capital to tangible assets (a variation of the tier 1 capital ratio)	D
Risk-Based Capital Ratio 1Yr Chg	The 1-yr change in total risk-based capital to total risk-weighted assets	D
Risk-Based Capital Ratio	Total risk-based capital divided by total risk-weighted asset	D
Loans Held for Investment / Total Deposits	Loans held for investment divided by total deposits	A

Note: sort order codes are D = Descending or A = Ascending

Table A2. Capital Adequacy Performance Summary – S&P BMI Developed Asia and S&P BMI Emerging Markets from Start Date to December 2016

	Factor/Signal	Start Date	Avg Quintile Count	Ann. Long-Only Active Rtrn	Ann. Long-Only Active Rtrn	Ann Long-Only Info Ratio	Long/Short Active Rtrn	Average 1-Month IC
BMI Dev. Asia	Tier 1 Capital / Tangible Assets 1Yr Chg	Sep-09	19	4.23%	0.58	55%	7.25%*	0.016
	Risk-Based Capital Ratio 1Yr Chg	Sep-09	19	3.64%	0.58	56%	5.63%	0.019
BMI Emg Markets	Risk-Based Capital Ratio	Jan-08	28	4.63%	0.51	57%	11.57%**	0.040**
	Loans Held for Investment / Total Deposits	Jan-08	31	5.42%*	0.52	60%*	10.37%	0.031*

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

Table A3. Asset Quality Factor Definitions – Asia and Emerging Markets

Factor / Signal	Definition	Sort Order
Problem Loans / Total Assets	Problem loan divided by total assets	A
Problem Loans / Total Equity + Reserves	Problem loans divided by the sum of total equity and reserves for loan losses	A
Reserves / Total Assets	Loan loss reserves divided by total assets	A

Note: sort order codes are D = Descending or A = Ascending

Table A4. Asset Quality Performance Summary – S&P BMI Developed Asia and S&P BMI Emerging Markets from Start Date to December 2016

	Factor/Signal	Start Date	Avg Quintile Count	Ann. Long-Only Active Rtrn	Ann. Long-Only Active Rtrn	Ann Long-Only Info Ratio	Long/Short Active Rtrn	Average 1-Month IC
BMI Dev. Asia	Problem Loans / Total Assets	Sep-09	19	4.24%	0.29	58%	3.79%	0.012
	Problem Loans / Total Equity + Reserves	Sep-09	19	3.17%	0.19	55%	2.81%	0.012
	Reserves / Total Assets	Sep-09	20	3.19%	0.47	61%**	2.07%	0.011
BMI Emg Markets	Problem Loans / Total Equity + Reserves	Jan-08	30	6.47%	0.46	63%**	10.12%	0.033*
	Problem Loans / Total Assets	Jan-08	30	5.26%	0.37	60%*	9.39%	0.023

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

Table A5. Profitability Factor Definitions – Asia and Emerging Markets

Factor / Signal	Definition	Sort Order
Return on Avg Risk-Weighted Assets 1Yr Chg	The 1-year change in the ratio of net income to average risk-weighted assets	A
Return on Tangible Common Equity 1Yr Chg	The 1-year change in the ratio of the income to tangible common equity	A
Net Interest Income / Operating Income	Net interest income divided by operating income. Operating income is defined as net interest income + noninterest income - noninterest expense - provision for loan losses	A
Pre-Impairment Oper Profit / Avg Assets 1Yr Chg	The 1-year change in the ratio of the pre-impairment operating profit to assets. Pre-impairment operating profit is defined as recurring income before taxes and provision for loan losses	D
Pre-Provision Net Revenue / Avg Assets 1Yr Chg	The 1-yr change in the ratio of pre-provision net revenue to average assets. Pre-provision net revenue is defined as net interest income + noninterest income - noninterest expense	D
Operating Income / Average Assets 1Yr Chg	The 1-year change in the ratio of operating income to assets. Operating income is defined as net interest income + noninterest income - noninterest expense - provision for loan losses	D
Recurring EBIT / Interest Expense	Recurring EBIT divided by interest expense. Recurring EBIT is defined as recurring net earnings (i.e., excluding nonrecurring revenue/expense) before interest and taxes	D

Note: sort order codes are D = Descending or A = Ascending

Table A5. Profitability Performance Summary – S&P BMI Developed Asia and S&P BMI Emerging Markets from Start Date to December 2016

	Factor/Signal	Start Date	Avg Quintile Count	Ann. Long-Only Active Rtrn	Ann. Long-Only Active Rtrn	Ann Long-Only Info Ratio	Long/Short Active Rtrn	Average 1-Month IC
BMI Dev. Asia	Return on Avg Risk-Weighted Assets	Sep-09	17	7.32%*	0.68	59%*	5.41%	0.010
	Return on Tangible Common Equity	Sep-09	17	5.15%*	0.64	56%	4.78%	0.012
	Net Interest Income / Operating Income	Sep-09	19	4.40%	0.36	56%	6.22%	0.022
BMI Emg Markets	Pre-Impairment Oper Profit / Avg Assets	Jan-08	27	6.37%	0.49	60%*	15.75%**	0.031**
	Pre-Provision Net Revenue / Avg Assets	Jan-08	27	6.04%	0.47	60%*	14.22%**	0.031**
	Operating Income / Average Assets	Jan-08	27	3.16%	0.41	53%	10.41%	0.024*
	Recurring EBIT / Interest Expense	Jan-08	29	2.49%	0.15	58%	9.58%	0.047**

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

Table A6. Growth Factor Definitions – Asia and Emerging Markets

Factor / Signal	Definition	Sort Order
Operating Revenue Growth	The 1-year growth rate of the 4-quarter sum of net income + noninterest income - noninterest expense - provision for loan losses	D
Total Deposit Growth	The 1-year growth rate of total deposits	D
Pre-Provision EPS Growth	The 1-year growth rate of the 4-quarter sum of net income + noninterest income - noninterest expense	D

Note: sort order codes are D = Descending or A = Ascending

Table A7. Growth Performance Summary – S&P BMI Developed Asia and S&P BMI Emerging Markets from Start Date to December 2016

	Factor/Signal	Start Date	Avg Quintile Count	Ann. Long-Only Active Rtrn	Ann. Long-Only Active Rtrn	Ann Long-Only Info Ratio	Long/Short Active Rtrn	Average 1-Month IC
BMI Dev. Asia	Operating Revenue Growth	Sep-10	18	3.24%	0.55	51%	4.68%	0.014
	Total Deposit Growth	Sep-10	19	1.48%	0.11	51%	2.70%	0.017
BMI Emg Markets	Operating Revenue Growth	Jan-08	27	6.14%	0.43	53%	14.65%**	0.029**
	Pre-Provision EPS Growth	Jan-08	27	3.69%	0.39	58%	9.12%*	0.021

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

Table A9. Valuation Factor Definitions – Asia and Emerging Markets

Factor / Signal	Definition	Sort Order
Dividend Yield	Dividends per share divided by price per share	D
Book Value / Price	Common equity per share divided by price per share	D
Total Assets / Price	Total assets per share divided by price per share	D
Pre-Provision Net Revenue / Price	Pre-provision net revenue per share divided by price per share	D
Earnings Per Share / Price	Diluted earnings per share divided by price per share	D
Pre-Provision EPS / Price	Earning per share before provision for loan losses divided by price per share	D

Note: sort order codes are D = Descending or A = Ascending

Table A10. Valuation Performance Summary – S&P BMI Developed Asia and S&P BMI Emerging Markets from Start Date to December 2016

	Factor/Signal	Start Date	Avg Quintile Count	Ann. Long-Only Active Rtrn	Ann. Long-Only Active Rtrn	Ann Long-Only Info Ratio	Long/Short Active Rtrn	Average 1-Month IC
BMI Dev. Asia	Dividend Yield	Sep-08	19	10.24%*	0.57	58%	17.41%**	0.065***
	Book Value / Price	Sep-08	19	8.99%	0.50	58%	19.78%***	0.070***
	Total Assets / Price	Sep-08	19	8.89%	0.50	62%**	13.82%**	0.057***
	Pre-Provision Net Revenue / Price	Sep-08	18	8.55%	0.45	59%*	17.02%*	0.051*
BMI Emg Markets	Earnings Per Share / Price	Jan-07	27	11.02%	0.54	52%	18.53%*	0.031
	Pre-Provision EPS / Price	Jan-07	27	8.96%	0.21	48%	17.56%	0.010
	Dividend Yield	Jan-07	28	8.37%**	1.02	61%**	8.95%*	0.024*

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

Appendix B – Multifactor Models

Given the breadth and the depth of the SNL bank data, the research shows that effective multifactor stock-selection models can be built using banking data alone (i.e., no generic factors). It is well known that financial regulators use multifactor models to assess risk levels at particular banks.¹⁹ Here we use bank-specific factors to build stock-selection models.

U.S. Bank-Specific Model

The building blocks for both the U.S. and the developed Europe bank models are the banking factors we've shown in this paper. Each model is composed using the same five investment themes previously defined as model sub-components, and all factors are equal-weighted within each sub-component. A distinct weighting scheme is then used to combine the five themes into a composite score. Portfolios are rebalanced monthly over the test horizon.

Table B1 shows the summary performance of the U.S. banking composite model and sub-components from 1990 through 2016. The model generated a long-only annualized active return of 10.8%, a long-only information ratio of 2.06, and a long-only hit ratio of 77%, all significant at the 1% level. Note that valuation is the strongest sub-component, with an 8.4% long-only active return (16.7% long-short) followed by asset quality (6.0% and 13.0%) and profitability (4.7% and 11.3%). Average annual turnover for the top quintile is 26%.

A Note on Liquidity: The Russell 3000[®] contains a number of small-capitalization stocks that are challenging for institutional investors to build positions in. To address this concern, backtests were performed on the Russell 3000[®] bank universe three additional ways, by excluding the bottom 10%, 20%, and 30% of stocks by with the lowest liquidity (defined by past 66 days' average daily trading volume). The performance summaries for these backtests are found in [Appendix C](#). We find strong summary statistics across all performance metrics for each of these variations.

Table B1. U.S. Bank-Specific Stock Selection Model Performance Summary – Russell 3000[®] 1990-2016

Factor/Signal	Start Date	Avg Quintile Count	Annualized Long-Only Active Return	Annualized Long-Only Info Ratio	Long-Only Hit Rate	Annualized Long/Short Active Return	Average 1-Month IC
Bank-Specific Model - Composite Model	Jan-90	49	10.80%***	2.06	77%***	24.70%***	0.084***
Bank Specific Model - Capital Adequacy	Jan-90	48	3.68%***	0.70	59%***	10.18%***	0.031***
Bank-Specific Model - Asset Quality	Jan-90	48	6.00%***	1.04	64%***	12.95%***	0.045***
Bank Specific Model - Profitability	Jan-90	48	4.69%***	0.80	65%***	11.30%***	0.039***
Bank Specific Model - Growth	Jan-90	48	3.50%***	0.73	60%***	9.18%***	0.026***
Bank Specific Model - Valuation	Jan-90	49	8.39%***	1.06	72%***	16.72%***	0.070***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

Tables B2 and B3 show model performance under differing interest rate and financial stress regimes. The main takeaway here is that, although the composite model performs better under falling rate and above-average stress regimes, it also performs well under the opposite conditions. The composite model has a 9.1% long-only excess return (18.7% long-short) under a rising rate regime – which appears to be currently occurring in the U.S. The

¹⁹ For example of such research, see Schuermann and Stiroh, “Visible and Hidden Risk Factors for Banks” (2006): https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr252.pdf

below-average stress regime (Table 29), which we also appear to be in, shows a long-only return of 8.3% (17.5% long-short).

Table B2. U.S. Bank-Specific Model Regime Analysis – Rising / Falling Interest Rates 1990-2016

Factor/Signal	Avg. 1-Month IC		Ann. Long-Only Active Rtrn		Ann. Long-Short Active Rtrn	
	Rising Rates	Falling Rates	Rising Rates	Falling Rates	Rising Rates	Falling Rates
Bank-Specific Model - Composite Model	0.071***	0.096***	9.05%***	12.60%***	18.70%***	30.93%***
Bank Specific Model - Capital Adequacy	0.016**	0.044***	1.73%*	5.52%***	5.19%**	15.12%***
Bank-Specific Model - Asset Quality	0.034***	0.055***	3.58%***	8.43%***	8.16%***	17.98%***
Bank Specific Model - Profitability	0.027***	0.049***	2.89%*	6.39%***	6.47%**	15.90%***
Bank Specific Model - Growth	0.020***	0.032***	2.13%*	4.78%***	5.47%**	12.88%***
Bank Specific Model - Valuation	0.075***	0.066***	8.75%***	8.09%***	17.64%***	16.12%***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

Table B3. U.S. Bank-Specific Model Regime Analysis – Above / Below-Average Financial Stress 1990-2016

Factor/Signal	Avg. 1-Month IC		Ann. Long-Only Active Rtrn		Ann. Long-Short Active Rtrn	
	Above Avg Stress	Below Avg Stress	Above Avg Stress	Below Avg Stress	Above Avg Stress	Below Avg Stress
Bank-Specific Model - Composite Model	0.097***	0.073***	13.84%***	8.28%***	33.59%***	17.46%***
Bank Specific Model - Capital Adequacy	0.033***	0.028***	5.59%***	2.03%**	14.00%***	6.76%***
Bank-Specific Model - Asset Quality	0.048***	0.043***	7.05%***	5.31%***	16.04%***	10.80%***
Bank Specific Model - Profitability	0.045***	0.033***	5.88%***	3.66%***	14.12%***	9.19%***
Bank Specific Model - Growth	0.028***	0.025***	3.06%*	3.86%***	9.98%**	8.45%***
Bank Specific Model - Valuation	0.085***	0.058***	11.96%***	5.34%***	24.08%***	10.66%***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

Developed Europe Bank-Specific Model

Factor selection for the European banking model was based on the European factors presented earlier. Otherwise, the same methodology and structure was used as in the U.S. model: factors are equal-weighted within each sub-component and sub-components are then combined using a proprietary weighting scheme. Regime analysis is not done for Europe due to the similarity of regimes over the relatively short test horizon.

Performance of this model is strong. However, this performance may be driven by the chaotic (inefficient) market for financial shares that has persisted in Europe due to a variety of banking-industry setbacks. The composite model has an average information coefficient of 0.12, indicating a strong relationship between model scores and subsequent returns. Average annualized active returns are 13.6% long-only and 44.9% long-short. Average annual turnover for the top quintile is 14%.

B4. Europe Bank Stock Selection-Model Performance Summary – S&P BMI Developed Europe 2007-2016

Factor/Signal	Start Date	Avg Quintile Count	Annualized Long-Only Active Return	Annualized Long-Only Info Ratio	Long-Only Hit Rate	Annualized Long/Short Active Return	Average 1-Month IC
Bank-Specific Model Composite	Jun-07	17	13.58%***	1.02	64%***	44.91%***	0.121***
Bank-Specific Model - Capital Adequacy	Jun-07	17	10.28%***	0.86	65%***	30.56%***	0.098***
Bank-Specific Model - Asset Quality	Jun-07	17	10.00%**	0.73	63%***	34.80%***	0.093***
Bank-Specific Model - Profitability	Jun-07	17	9.50%***	0.86	64%***	39.99%***	0.101***
Bank-Specific Model - Growth	Jun-07	17	8.29%***	0.90	53%	24.30%***	0.068***
Bank-Specific Model - Valuation	Jun-07	17	2.46%	0.17	59%*	19.42%*	0.057***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.\

Appendix C – U.S. Bank Model Liquidity Tests

Table C1. U.S. Bank-Specific Stock Selection Model Performance – Russell 3000® Top 90% by Liquidity 1990-2016

Model / Component	Start Date	Avg Quintile Count	Annualized Long-Only Active Return	Annualized Long-Only Info Ratio	Long-Only Hit Rate	Annualized Long/Short Active Return	Average 1-Month IC
Bank-Specific Model - Composite Model	Jan-90	44	9.59%***	1.84	74%***	22.19%***	0.081***
Bank Specific Model - Capital Adequacy	Jan-90	43	3.04%***	0.57	57%**	8.58%***	0.027***
Bank-Specific Model - Asset Quality	Jan-90	43	5.57%***	0.94	65%***	12.29%***	0.043***
Bank Specific Model - Profitability	Jan-90	43	4.50%***	0.77	62%***	11.05%***	0.038***
Bank Specific Model - Growth	Jan-90	43	2.87%***	0.60	57%**	7.88%***	0.022***
Bank Specific Model - Valuation	Jan-90	44	8.44%***	1.02	68%***	16.48%***	0.070***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

Table C2. U.S. Bank-Specific Stock Selection Model Performance – Russell 3000® Top 80% by Liquidity 1990-2016

Model / Component	Start Date	Avg Quintile Count	Annualized Long-Only Active Return	Annualized Long-Only Info Ratio	Long-Only Hit Rate	Annualized Long/Short Active Return	Average 1-Month IC
Bank-Specific Model - Composite Model	Jan-90	39	8.48%***	1.58	71%***	20.36%***	0.076***
Bank Specific Model - Capital Adequacy	Jan-90	38	2.83%***	0.50	53%	7.90%***	0.025***
Bank-Specific Model - Asset Quality	Jan-90	38	5.11%***	0.84	62%***	11.78%***	0.041***
Bank Specific Model - Profitability	Jan-90	38	4.17%***	0.71	63%***	10.31%***	0.037***
Bank Specific Model - Growth	Jan-90	38	2.49%***	0.50	57%**	7.38%***	0.021***
Bank Specific Model - Valuation	Jan-90	39	6.89%***	0.81	66%***	13.08%***	0.064***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

Table C3. U.S. Bank-Specific Stock Selection Model Performance – Russell 3000® Top 70% by Liquidity 1990-2016

Model / Component	Start Date	Avg Quinti	Annualized Long-Only Active Return	Annualized Long-Only Info Ratio	Long-Only Hit Rate	Annualized Long/Short Active	Average 1-Month IC
Bank-Specific Model - Composite Model	Jan-90	34	7.98%***	1.39	70%***	18.96%***	0.071***
Bank Specific Model - Capital Adequacy	Jan-90	33	2.44%**	0.42	50%	7.49%***	0.025***
Bank-Specific Model - Asset Quality	Jan-90	33	6.05%***	0.92	62%***	12.32%***	0.041***
Bank Specific Model - Profitability	Jan-90	33	3.68%***	0.60	58%***	9.02%***	0.036***
Bank Specific Model - Growth	Jan-90	33	2.11%**	0.41	58%***	6.73%***	0.019***
Bank Specific Model - Valuation	Jan-90	34	5.56%***	0.64	65%***	10.26%***	0.056***

*** = Significant at the 1% level; ** = Significant at the 5% level; * = Significant at the 10% level

Source: S&P Global Market Intelligence Quantamental Research, SNL Bank fundamental data. Data as of February 28, 2017. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results.

Our Recent Research

March 2017: [Capital Market Implications of Spinoffs](#)

Spinoff activities have picked up in recent years. In 2015, more than \$250 billion worth of spinoff transactions were closed globally - the highest level in the last 20 years. This report analyzes the short- and long-term performance of spun-off entities and their parent companies in the U.S. and international markets. We also examine a related but distinct corporate restructuring activity – equity carve-outs, which separate a subsidiary through a public offering.

January 2017: [U.S. Stock Selection Model Performance Review 2016](#)

2016 proved to be a challenging year for active investing. Against a backdrop of a sharp selloff in equities at the beginning of the year and political uncertainty over the course of the year, valuation was the only fundamental investing style that delivered positive excess returns. In this report, we review the performance of S&P Global Market Intelligence's four U.S. stock selection models in 2016.

November 2016: [Electrify Stock Returns in U.S. Utilities](#)

The U.S. utilities sector has performed especially well in the past several years as the Federal Reserve and central banks around the world enacted accommodative monetary policies to spur growth. As global active investors flock to the U.S. utilities sector in search of yields and high risk-adjusted returns, we explore a number of utility-specific metrics from a unique database that is dedicated to the utilities sector – S&P Global Market Intelligence's Energy (Source: SNL Energy) – to ascertain whether investors could have historically made stock selection decisions within the sector to achieve excess returns.

October 2016: [A League of their Own: Batting for Returns in the REIT Industry - Part 2](#)

SNL Financial's ("SNL") 1 global real estate database contains property level and geographical market-based demographic information that can be difficult for investors to obtain. These unique data points are valuable to investors seeking an understanding of the relationship between property level information and future stock price movement. In this report, we demonstrate how investors can use these data points as alpha strategies. Our back-tests suggest that metrics constructed from property level information may provide insights about future price direction not captured by fundamental or estimates data. Investors may want to consider incorporating information on a REIT's property portfolio when building a robust REIT strategy

September 2016: [A League of their Own: Batting for Returns in the REIT Industry - Part 1](#)

This month REITs (Real Estate Investment Trusts) have been separated from the GICS (Global Industry Classification Standard) Financial sector into a sector of their own. Even prior to the sector reclassification, investors have been attracted to REITs' strong performance and attractive yield. REITs differ from traditional companies in several important ways. Metrics that investors typically use to value or evaluate the attractiveness of stocks such as earnings yield or book-to-price are less meaningful for REITs. For active investors interested in understanding their REITs portfolio, an understanding of the relationship between REIT financial ratios and price appreciation is instructive. Is dividend yield relevant? What about funds from operations ("FFO"), one of the most widely used metrics?

August 2016: [Mergers & Acquisitions: The Good, the Bad and the Ugly \(and how to tell them apart\)](#)

In this study we show that, among Russell 3000[®] firms with acquisitions greater than 5% of acquirer enterprise value, post-M&A acquirer returns have underperformed peers in general. Specifically, we find that:

- Acquirers lag industry peers on a variety of fundamental metrics for an extended period following an acquisition.
- Stock deals significantly underperform cash deals. Acquirers using the highest percentage of stock underperform industry peers by 3.3% one year post-close and by 8.1% after three years.
- Acquirers that grow quickly pre-acquisition often underperform post-acquisition.
- Excess cash on the balance sheet is detrimental for M&A, possibly due to a lack of discipline in deploying that cash.

July 2016: [Preparing for a Slide in Oil Prices -- History May Be Your Guide](#)

With the price of West Texas Intermediate (WTI) in the mid-forties, oversupply concerns and the continued threat of a global slowdown have led many to fear a resumed oil price decline. The year-to-date performance of Oil & Gas (O&G) companies, particularly Integrated O&G entities has been strong, further contributing to concerns that oil may be poised to retrench.

June 2016: [Social Media and Stock Returns: Is There Value in Cyberspace?](#)

This review of social media literature represents a selection of articles we found particularly pragmatic and/or interesting. Although we have not done research in the area of social media, we are always on the hunt for interesting insights, and offer these papers for your thoughtful consideration.

April 2016: [An IQ Test for the “Smart Money” – Is the Reputation of Institutional Investors Warranted?](#)

This report explores four classes of stock selection signals associated with institutional ownership ('IO'): Ownership Level, Ownership Breadth, Change in Ownership Level and Ownership Dynamics. It then segments these signals by classes of institutions: Hedge Funds, Mutual Funds, Pension Funds, Banks and Insurance Companies. The study confirms many of the findings from earlier work – not only in the U.S., but also in a much broader geographic scope – that Institutional Ownership may have an impact on stock prices. The analysis then builds upon existing literature by further exploring the benefit of blending 'IO' signals with traditional fundamental based stock selection signals.

March 2016: [Stock-Level Liquidity – Alpha or Risk? - Stocks with Rising Liquidity Outperform Globally](#)

February 2016: [U.S. Stock Selection Model Performance Review - The most effective investment strategies in 2015](#)

January 2016: [What Does Earnings Guidance Tell Us? – Listen When Management Announces Good News](#)

December 2015: [Equity Market Pulse – Quarterly Equity Market Insights Issue 6](#)

November 2015: [Late to File - The Costs of Delayed 10-Q and 10-K Company Filings](#)

October 2015: [Global Country Allocation Strategies](#)

September 2015: [Equity Market Pulse – Quarterly Equity Market Insights Issue 5](#)

September 2015: [Research Brief: Building Smart Beta Portfolios](#)

September 2015: [Research Brief – Airline Industry Factors](#)

August 2015: [Point-In-Time vs. Lagged Fundamentals – This time i\(t\)'s different?](#)

August 2015: [Introducing S&P Capital IQ Stock Selection Model for the Japanese Market](#)

July 2015: [Research Brief – Liquidity Fragility](#)

June 2015: [Equity Market Pulse – Quarterly Equity Market Insights Issue 4](#)

May 2015: [Investing in a World with Increasing Investor Activism](#)

April 2015: [Drilling for Alpha in the Oil and Gas Industry – Insights from Industry Specific Data & Company Financials](#)

March 2015: [Equity Market Pulse – Quarterly Equity Market Insights Issue 3](#)

February 2015: [U.S. Stock Selection Model Performance Review - The most effective investment strategies in 2014](#)

January 2015: [Research Brief: Global Pension Plans - Are Fully Funded Plans a Relic of the Past?](#)

January 2015: [Profitability: Growth-Like Strategy, Value-Like Returns Profiting from Companies with Large Economic Moats](#)

November 2014: [Equity Market Pulse – Quarterly Equity Market Insights Issue 2](#)

October 2014: [Lenders Lead, Owners Follow - The Relationship between Credit Indicators and Equity Returns](#)

August 2014: [Equity Market Pulse – Quarterly Equity Market Insights Issue 1](#)

July 2014: [Factor Insight: Reducing the Downside of a Trend Following Strategy](#)

May 2014: [Introducing S&P Capital IQ's Fundamental China A-Share Equity Risk Model](#)

April 2014: [Riding the Coattails of Activist Investors Yields Short and Long Term Outperformance](#)

March 2014: [Insights from Academic Literature: Corporate Character, Trading Insights, & New Data Sources](#)

February 2014: [Obtaining an Edge in Emerging Markets](#)

February 2014: [U.S Stock Selection Model Performance Review](#)

January 2014: [Buying Outperformance: Do share repurchase announcements lead to higher returns?](#)

October 2013: [Informative Insider Trading - The Hidden Profits in Corporate Insider Filings](#)

September 2013: [Beggar Thy Neighbor – Research Brief: Exploring Pension Plans](#)

August 2013: [Introducing S&P Capital IQ Global Stock Selection Models for Developed Markets: The Foundations of Outperformance](#)

July 2013: [Inspirational Papers on Innovative Topics: Asset Allocation, Insider Trading & Event Studies](#)

June 2013: [Supply Chain Interactions Part 2: Companies – Connected Company Returns Examined as Event Signals](#)

June 2013: [Behind the Asset Growth Anomaly – Over-promising but Under-delivering](#)

April 2013: [Complicated Firms Made Easy - Using Industry Pure-Plays to Forecast Conglomerate Returns.](#)

March 2013: [Risk Models That Work When You Need Them - Short Term Risk Model Enhancements](#)

March 2013: [Follow the Smart Money - Riding the Coattails of Activist Investors](#)

February 2013: [Stock Selection Model Performance Review: Assessing the Drivers of Performance in 2012](#)

January 2013: [Research Brief: Exploiting the January Effect Examining Variations in Trend Following Strategies](#)

December 2012: [Do CEO and CFO Departures Matter? - The Signal Content of CEO and CFO Turnover](#)

November 2012: [11 Industries, 70 Alpha Signals -The Value of Industry-Specific Metrics](#)

October 2012: [Introducing S&P Capital IQ's Fundamental Canada Equity Risk Models](#)

September 2012: [Factor Insight: Earnings Announcement Return – Is A Return Based Surprise Superior to an Earnings Based Surprise?](#)

August 2012: [Supply Chain Interactions Part 1: Industries Profiting from Lead-Lag Industry Relationships](#)

July 2012: [Releasing S&P Capital IQ's Regional and Updated Global & US Equity Risk Models](#)

June 2012: [Riding Industry Momentum – Enhancing the Residual Reversal Factor](#)

May 2012: [The Oil & Gas Industry - Drilling for Alpha Using Global Point-in-Time Industry Data](#)

May 2012: [Case Study: S&P Capital IQ – The Platform for Investment Decisions](#)

March 2012: [Exploring Alpha from the Securities Lending Market – New Alpha Stemming from Improved Data](#)

January 2012: [S&P Capital IQ Stock Selection Model Review – Understanding the Drivers of Performance in 2011](#)

January 2012: [Intelligent Estimates – A Superior Model of Earnings Surprise](#)

December 2011: [Factor Insight – Residual Reversal](#)

November 2011: [Research Brief: Return Correlation and Dispersion – All or Nothing](#)

October 2011: [The Banking Industry](#)

September 2011: [Methods in Dynamic Weighting](#)

September 2011: [Research Brief: Return Correlation and Dispersion](#)

July 2011: [Research Brief - A Topical Digest of Investment Strategy Insights](#)

June 2011: [A Retail Industry Strategy: Does Industry Specific Data tell a different story?](#)

May 2011: [Introducing S&P Capital IQ's Global Fundamental Equity Risk Models](#)

May 2011: [Topical Papers That Caught Our Interest](#)

April 2011: [Can Dividend Policy Changes Yield Alpha?](#)

April 2011: [CQA Spring 2011 Conference Notes](#)

March 2011: [How Much Alpha is in Preliminary Data?](#)

February 2011: [Industry Insights – Biotechnology: FDA Approval Catalyst Strategy](#)

January 2011: [US Stock Selection Models Introduction](#)

January 2011: [Variations on Minimum Variance](#)

January 2011: [Interesting and Influential Papers We Read in 2010](#)

November 2010: [Is your Bank Under Stress? Introducing our Dynamic Bank Model](#)

October 2010: [Getting the Most from Point-in-Time Data](#)

October 2010: [Another Brick in the Wall: The Historic Failure of Price Momentum](#)

July 2010: [Introducing S&P Capital IQ's Fundamental US Equity Risk Model](#)

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