Empirical Research Partners

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Global Portfolio Strategy July 2018

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Big Data: Exploiting Short Pressure in the International Arena

The Activity of Short-Sellers is Worth Tracking

- In our initial foray into Big Data we identified two variables drawn from the securities lending market that helped inform the outlook for individual U.S. stocks. One of the variables, short pressure, gauges the demand by short-sellers to borrow a stock. The data vendor constructs it on a daily basis by dividing the shares on loan by those available to lend. We found that if the ratio was unusually low it foreshadowed outperformance, while the opposite was true if it was high. The short sellers were at least directionally correct. The vendor also provides stock loan rates, with that variable proving useful too. We found the new two indicators are superior to other short-selling related constructs we've used before, the short interest and days-to-cover ratios, because they're more timely, and we've incorporated them into our U.S. core and failure models.
- In this research we extend that work into the international equity arena (i.e., non-U.S. developed world), where we find comparable results. International issues in the lowest quintile of short pressure have led by nearly +3 percentage points per annum in this decade, while those in the highest quintile have lagged by a similar amount. The short pressure gauge worked best among cyclicals, that dominate the international universe. Save for Japan, the signals from short pressure and loan rates worked across regions, particularly in Europe and Canada. Much like in the U.S. they proved more effective in situations where there was a controversy.

The Short Pressure Gauge: An Edge for Value Investors

- As we found in the U.S., in the international markets there's been a real synergy between short pressure and valuation. Issues drawn from the lowest quintile of valuation that also have low short pressure have outperformed by +7 percentage points per year in the 2010s, while those with the highest pressure have lagged by about (3) points. The lowest-pressure issues priced to the highest free cash flow yields, have led by +8 points. Appendix 1 on pages 11 and 12 lists non-U.S. developed world value stocks residing in the lowest and highest quintiles of short pressure. Among those with the lowest pressure, financials and capital equipment issues make up more than half of the list.
- The signal from the short pressure indicator also improved timing decisions in other circumstances. Since 2010, for example, stocks with the best price trends went on to lead by +5 percentage points per year if their short pressure was low. If the price trend was weak, high short pressure validated that the stock was indeed vulnerable, with those issues lagging by (6) percentage points per year. Short pressure also informed the outlook of controversial issues as measured by arbitrage risk (i.e., idiosyncratic volatility). If it was low the controversy was resolved to the benefit of the bulls, while the opposite was true if shorts had targeted the stock.

A Signal That's Investable, Additive to Our International Modeling Efforts

- Contrary to many of the Big Data databases we've come across the longevity of the short pressure and lending rate signals isn't short lived, making it useful for *investors*. If a stock appears in either the lowest or highest quintiles of those variables that informs how it's likely to perform over the next two years. Albeit stocks with high pressure are smaller and less traded, the skew isn't big enough to undermine the practicality of the data.
- The supply/demand data is additive to our international modeling efforts. Stocks in the top quintile of our international stock selection model with the lowest short pressure have outperformed their high-pressure peers by about +5 percentage points per year since 2010. Pan-European failure candidates with high pressure have lagged the market by (13) percentage points per annum. Encouraged by the results, we'll incorporate the short pressure and loan rate variables into our non-U.S. models.

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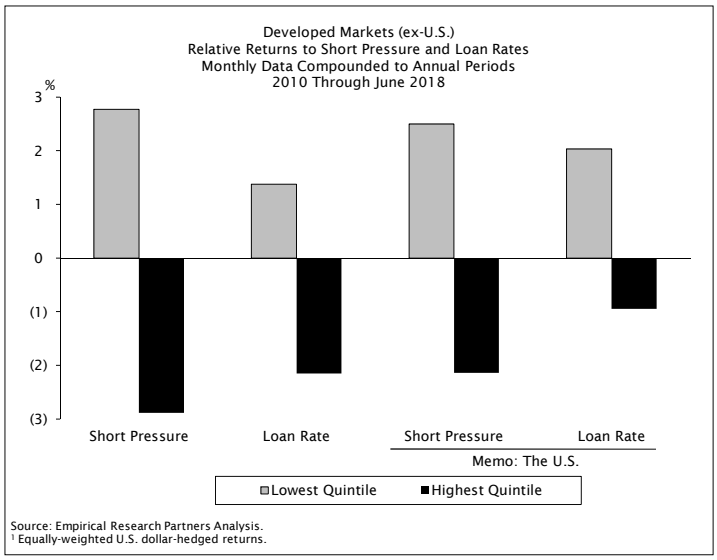
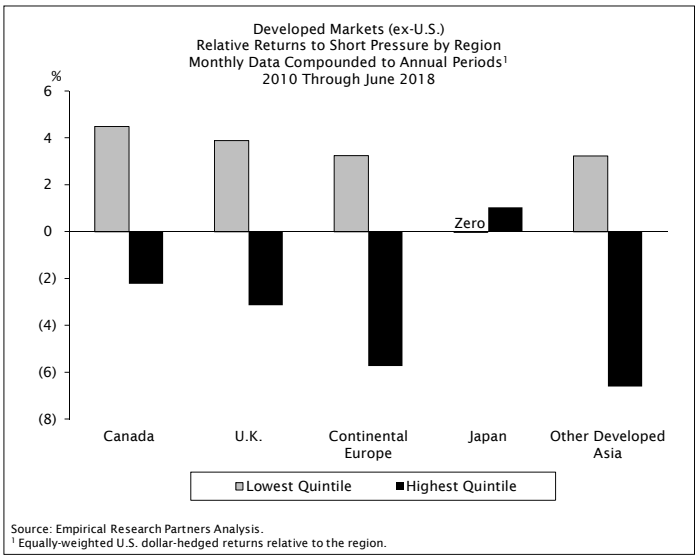
Conclusions in Brief

- In the international arena the signals from short sellers have proven exploitable…



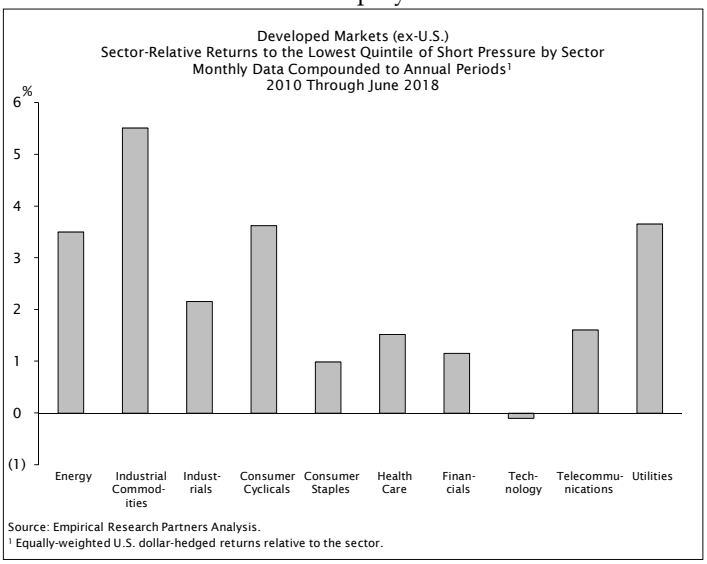
Source: Empirical Research Partners Analysis.
[1] Equally-weighted U.S. dollar-hedged returns.

- …With consistent results across most regions, save Japan:



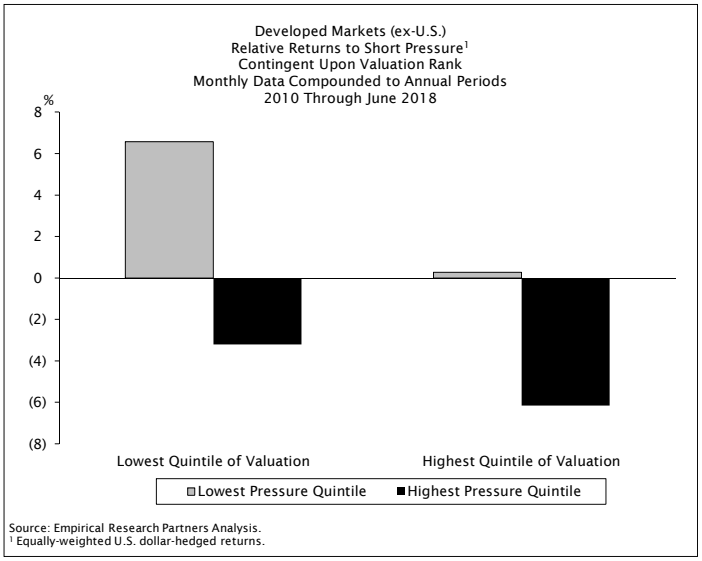
Source: Empirical Research Partners Analysis.
[1] Equally-weighted U.S. dollar-hedged returns relative to the region.

- The pressure gauge is efficacious among cyclicals, that dominate the international equity market…



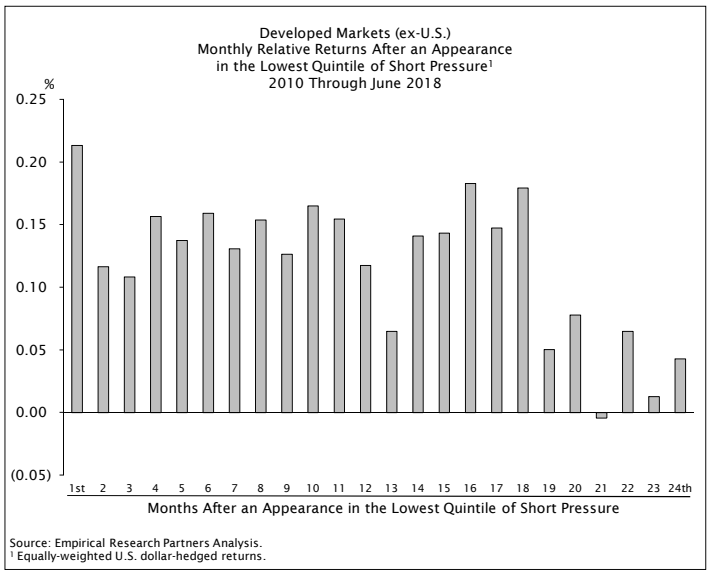
Source: Empirical Research Partners Analysis.
[1] Equally-weighted U.S. dollar-hedged returns relative to the sector.

- …And it should help us pick among value stocks:



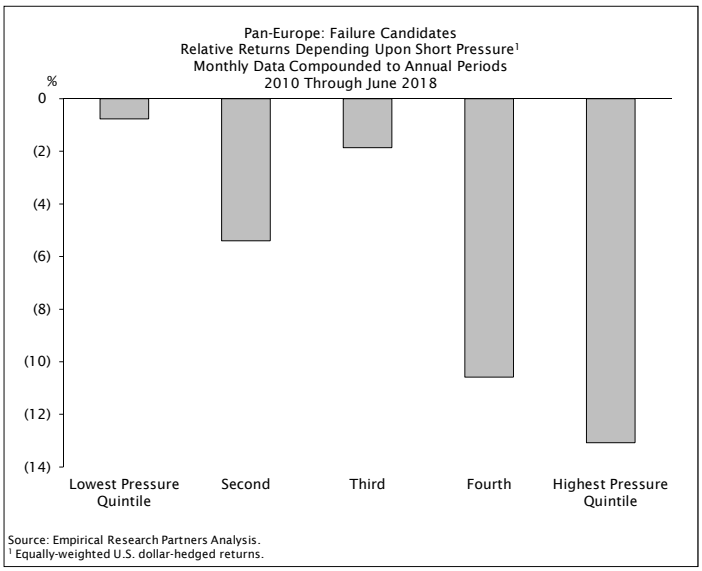
Source: Empirical Research Partners Analysis.
[1] Equally-weighted U.S. dollar-hedged returns.

- The signal from short pressure isn't quickly exhausted, making it useful for investors…



Source: Empirical Research Partners Analysis.
[1] Equally-weighted U.S. dollar-hedged returns.

- …And it should help us pick among failure candidates too:



Source: Empirical Research Partners Analysis.
[1] Equally-weighted U.S. dollar-hedged returns.

Big Data: Exploiting Short Pressure in the International Arena

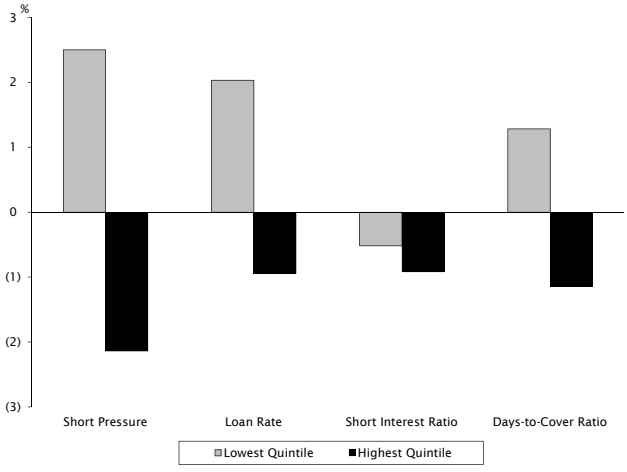
The Activity of Short-Sellers is Worth Tracking

In our initial foray into Big Data we found that two variables that inform the supply/demand situation in the U.S. stock lending market, short pressure and lending rates, helped us pick stocks.[1] The provider of that data, FIS Astec, collects it from lending agents, third-party lenders, the beneficial owners of the securities as well as prime brokers. They construct a daily short pressure indicator, that takes the shares on loan and divides them by the shares available to lend. When the ratio is high it means there's substantial demand to short the stock relative to its supply, a situation that more often than not has resulted in the stock underperforming, as the shorts were proven right. On the other hand, when the pressure is low, the outcome has generally been in the bulls' favor. Stock lending rates, also provided by the data vendor, proved informative as well, albeit their efficacy wasn't as impressive.

Of note we found that in the U.S. short pressure and loan rates proved to be more useful than other short-selling related constructs we've used in the past, like short interest and days-to-cover ratios (see Exhibit 1). What we gathered from our work in the U.S. was that the short pressure and loan rate indicators told us something about the stock we didn't already know. Confident that the two variables will be additive we've incorporated them into our U.S. core and failure models.

In this research we extend that work to the international equity arena (i.e., non-U.S. developed world), where we found the efficacy of the short pressure and lending rate indicators to be comparable to what we discovered in the U.S. (see Exhibit 2). Non-U.S. developed world issues in the lowest quintile of short pressure outperformed that universe by close to +3 percentage points per annum, while those in the highest quintile lagged by a comparable amount.[2] Similar to the case in the U.S., when loan rates were used as the operative variable they produced less impressive results.

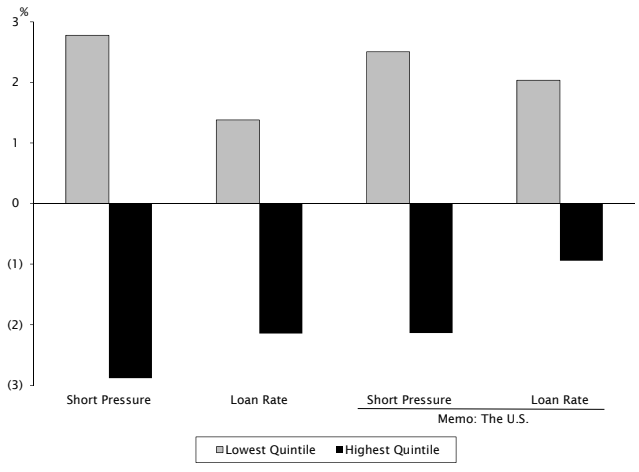
Exhibit 1: U.S. Large-Capitalization Stocks
Relative Returns to Short Pressure and Other Short-Selling-Related Constructs[1]
Monthly Data Compounded to Annual Periods
2010 Through June 2018



Source: Empirical Research Partners Analysis.

[1] Equally-weighted returns.

Exhibit 2: Developed Markets (ex-U.S.)
Relative Returns to Short Pressure and Loan Rates[1]
Monthly Data Compounded to Annual Periods
2010 Through June 2018



Source: Empirical Research Partners Analysis.

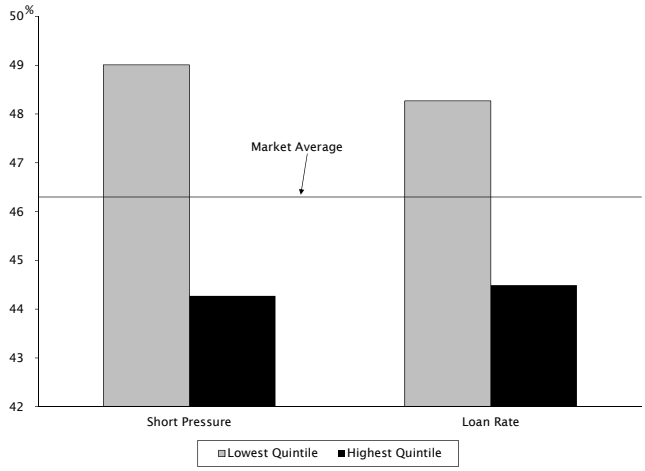
[1] Equally-weighted U.S. dollar-hedged returns.

The win rates tell a similar story, with about 49% of stocks in the lowest quintile of short pressure outperforming over one-year holding periods, while only 44% of those in the highest quintile have led, compared to an overall win rate across the entire market of just over 46% (see Exhibit 3). Stocks residing the lowest quintile of short pressure have outperformed in over 65% of all months, while those in the highest quintile did so in only 40% of them (see Exhibit 4).

[1] *Stock Selection: Research and Results* May 2018. "Big Data: Exploiting Short Pressure."

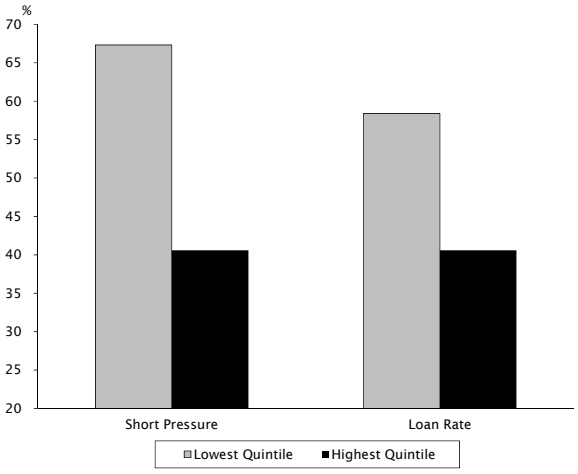
[2] We've looked at the data since 2010 due to poor coverage prior to that year. Moreover, because of regional dividend tax arbitrage strategies and idiosyncrasies in stock lending markets, in the international arena we've compared the short pressure and loan rate variables on a region-neutral basis to avoid biases (i.e., the stocks are ranked within each region).

Exhibit 3: Developed Markets (ex-U.S.)
Share of Stocks Outperforming
by Short Pressure and Loan Rate
Over One-Year Holding Periods
2010 Through June 2018



Source: Empirical Research Partners Analysis.

Exhibit 4: Developed Markets (ex-U.S.)
Share of *Months* Outperforming
by Short Pressure and Loan Rate
Over One-Month Holding Periods
2010 Through June 2018

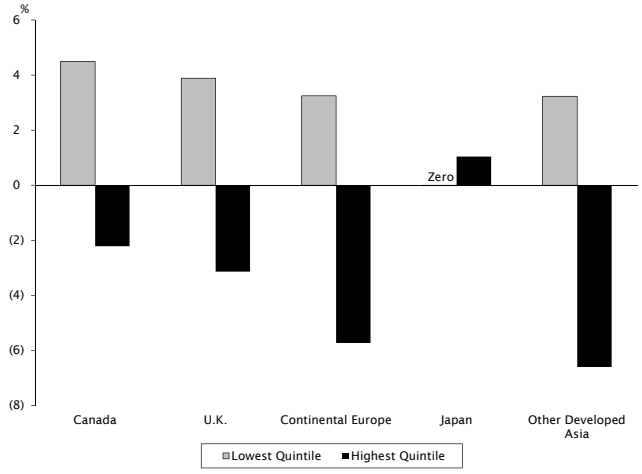


Source: Empirical Research Partners Analysis.

Exhibit 5 presents the relative returns to short pressure at the regional level, where with the exception of Japan the data proved helpful. Exhibit 6 presents the equivalent results when loan rates were used as the discriminating variable. Both variables were efficacious in Canada and Continental Europe in particular.

On a sector basis the short pressure gauge was particularly useful in picking winners among cyclical stocks, that dominate the international universe (see Exhibit 7). High short pressure proved a bad omen across most sectors (see Exhibit 8).

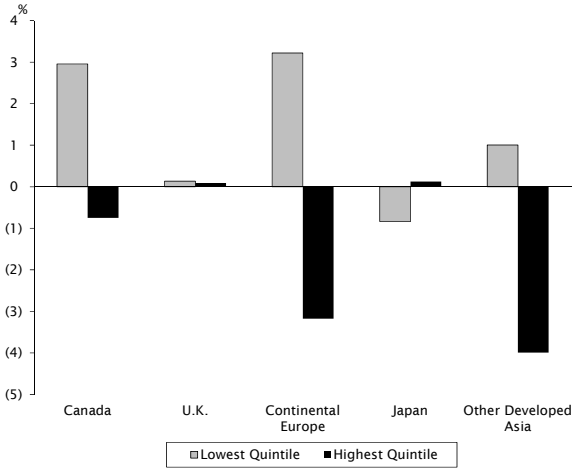
Exhibit 5: Developed Markets (ex-U.S.)
Relative Returns to Short Pressure by Region
Monthly Data Compounded to Annual Periods[1]
2010 Through June 2018



Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns relative to the region.

Exhibit 6: Developed Markets (ex-U.S.)
Relative Returns to Loan Rate by Region
Monthly Data Compounded to Annual Periods[1]
2010 Through June 2018



Source: Empirical Research Partners Analysis.

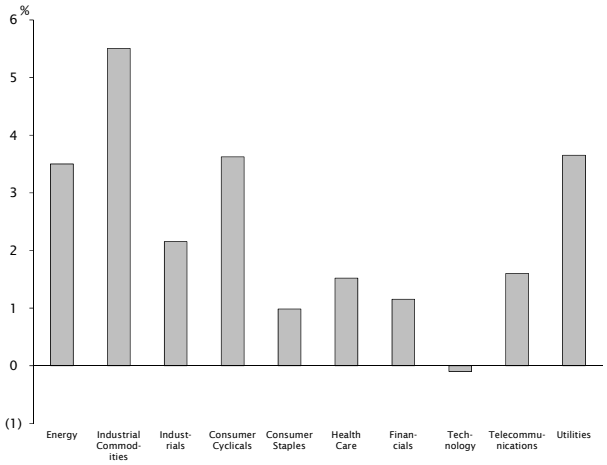
[1] Equally-weighted U.S. dollar-hedged returns relative to the region.

Short Pressure is Useful When Picking Among Value Stocks…

In our U.S. work we found that short pressure and loan rates have synergistic relationships with our valuation framework, as cheap stocks with low short pressure outperformed, while those with high pressure lagged. In the international arena we found that to be true as well, and the lowest-valued issues with the lowest short pressure have led by nearly +7 percentage points per annum, as shown by the grey bar on the far left of Exhibit 9. On the

other hand, value stocks targeted by shorts lagged by close to (3) percentage points per year. We also found that expensive stocks with high short pressure have underperformed by about (6) percentage points per annum, as captured by the black bar on the far right of the chart. That was also true when loan rates were used as the operative variable, as shown in Exhibit 10. In the context of valuation the signal from loan rates was about half as effective as that of short pressure.

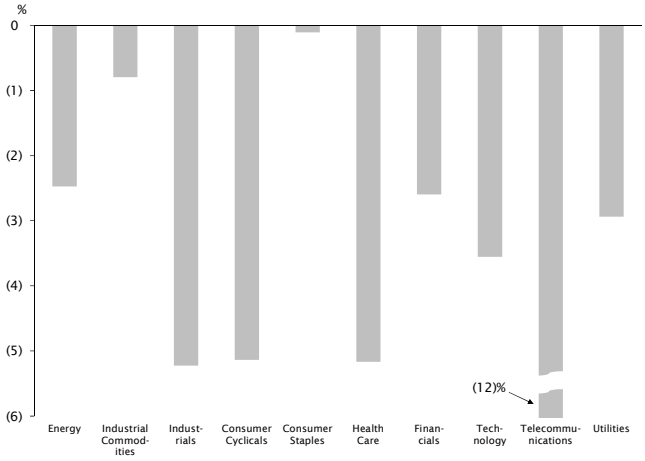
Exhibit 7: Developed Markets (ex-U.S.)
***Sector*-Relative Returns to the Lowest Quintile of Short Pressure by Sector**
Monthly Data Compounded to Annual Periods[1]
2010 Through June 2018



Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns relative to the sector.

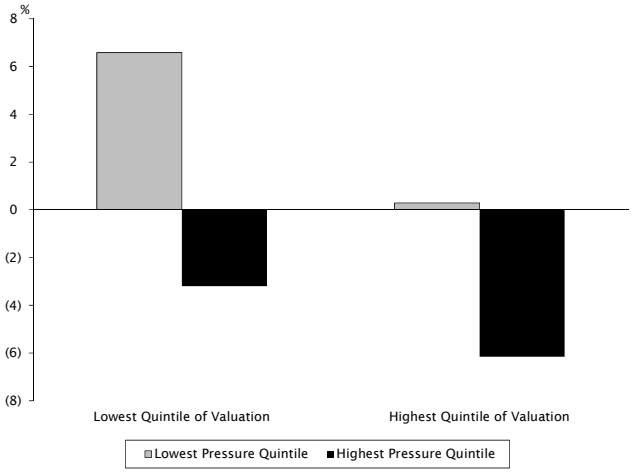
Exhibit 8: Developed Markets (ex-U.S.)
***Sector*-Relative Returns to the Highest Quintile of Short Pressure by Sector**
Monthly Data Compounded to Annual Periods[1]
2010 Through June 2018



Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns relative to the sector.

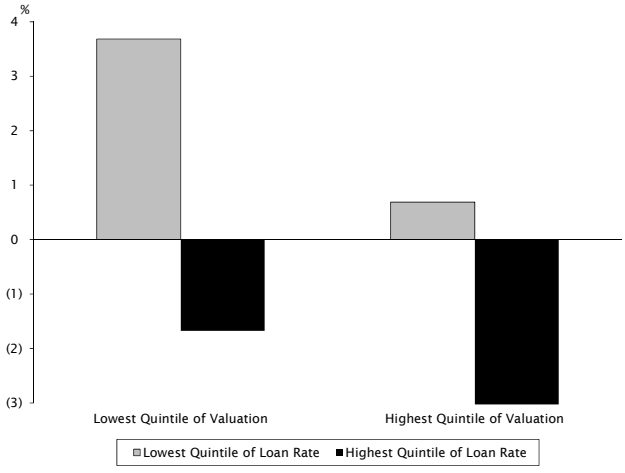
Exhibit 9: Developed Markets (ex-U.S.)
Relative Returns to Short Pressure[1]
Contingent Upon Valuation Rank
Monthly Data Compounded to Annual Periods
2010 Through June 2018



Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

Exhibit 10: Developed Markets (ex-U.S.)
Relative Returns to Loan Rates[1]
Contingent Upon Valuation Rank
Monthly Data Compounded to Annual Periods
2010 Through June 2018

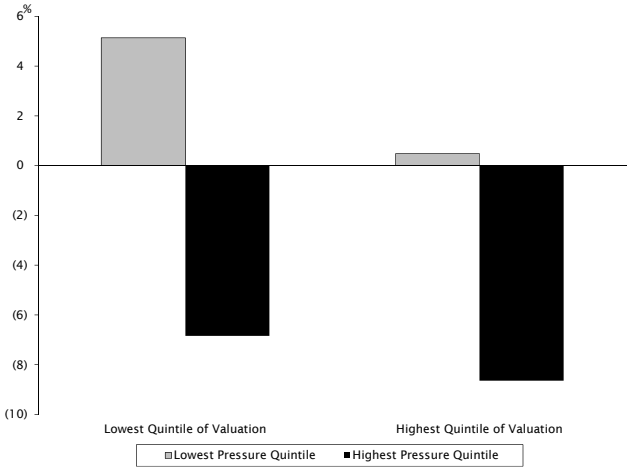


Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

The two bars on the left in Exhibit 11 present the relative returns to short pressure among value stocks in Continental Europe, where those with the lowest pressure have led by +5 percentage points per annum since 2010, while those with the highest short pressure have trailed by nearly (7) percentage points. In Japan, where we didn't find the signal from short pressure useful on a stand-alone basis, it did prove informative when value stocks were concerned (see Exhibit 12). Unlike the case in Europe, though, a high pressure reading among value issues wasn't met with underperformance in Japan.

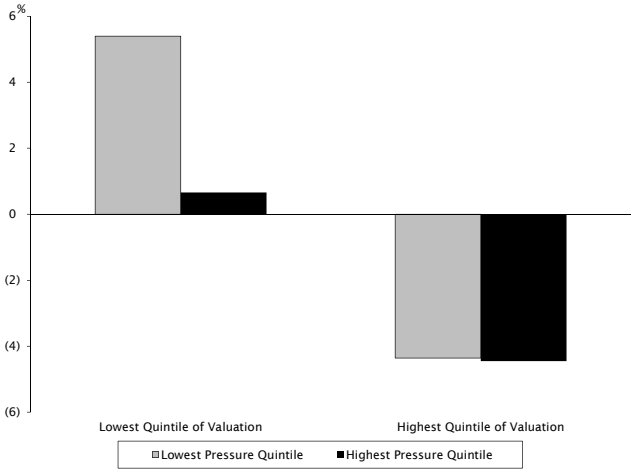
Exhibit 11: Continental Europe
Relative Returns to Short Pressure[1]
Contingent Upon Valuation Rank
Monthly Data Compounded to Annual Periods
2010 Through June 2018



Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns relative to Continental Europe.

Exhibit 12: Japan
Relative Returns to Short Pressure[1]
Contingent Upon Valuation Rank
Monthly Data Compounded to Annual Periods
2010 Through June 2018



Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns relative to Japan.

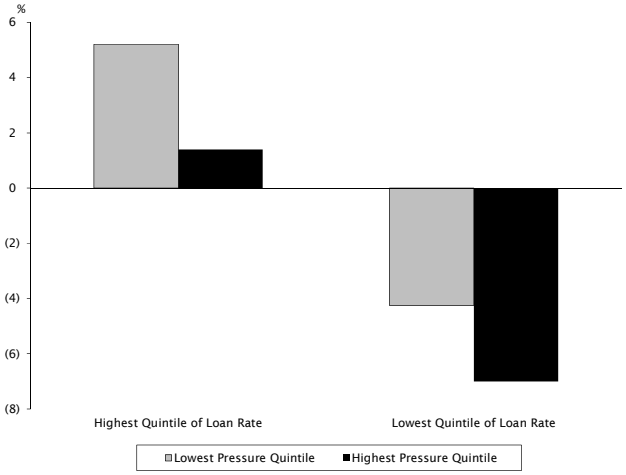
A low short pressure reading among stocks priced to the highest free cash flow yields (a variable that excludes financials) meant the skepticism priced into the stocks proved misbegotten, and those issues have led by about +8 percentage points per year this decade (see Exhibit 13). Short pressure proved a better signal than loan rates here too (see Exhibit 14).

Exhibit 13: Developed Markets (ex-U.S.)
Relative Returns to Short Pressure[1]
Contingent Upon Free Cash Flow Yield
Monthly Data Compounded to Annual Periods
2010 Through June 2018

Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

Exhibit 14: Developed Markets (ex-U.S.)
Relative Returns to Loan Rate[1]
Contingent Upon Free Cash Flow Yield
Monthly Data Compounded to Annual Periods
2010 Through June 2018



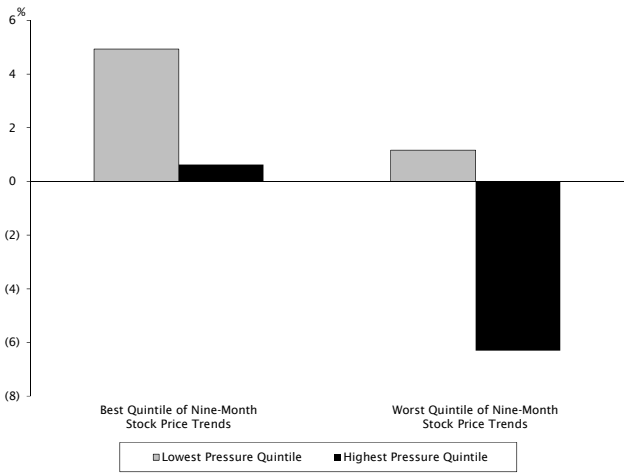
Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

...And Works Well in Other Provocative Situations

We also looked at whether the short pressure and loan rate variables told us something useful in other situations that were also provocative. Among stocks exhibiting the best price trends those with the lowest short pressure have led by +5 percentage points per year since 2010, while those targeted by short sellers generated market-like returns (see Exhibit 15). If the price trend was poor a high short pressure validated the stock's vulnerability, and those issues have lagged by about (6) percentage points per annum. Similarly, a weak price trend coupled with a high stock-borrowing rate proved a toxic combination, and those issues have underperformed by about (9) percentage points per year as seen by the black bar on the far right of Exhibit 16.

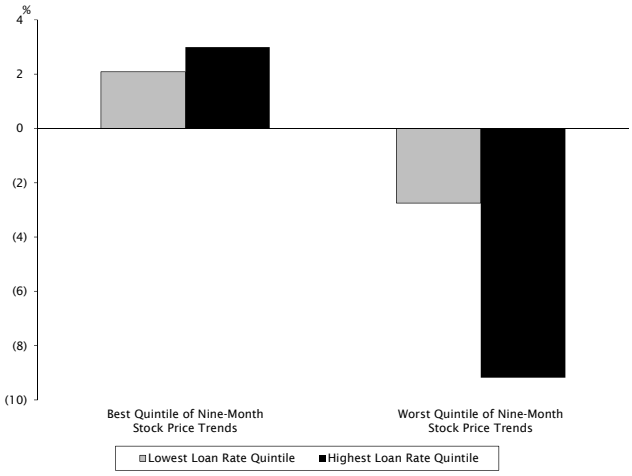
Exhibit 15: Developed Markets (ex-U.S.)
Relative Returns to Short Pressure[1]
Contingent Upon Nine-Month Stock Price Trends
Monthly Data Compounded to Annual Periods
2010 Through June 2018



Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

Exhibit 16: Developed Markets (ex-U.S.)
Relative Returns to Loan Rates[1]
Contingent Upon Nine-Month Stock Price Trends
Monthly Data Compounded to Annual Periods
2010 Through June 2018

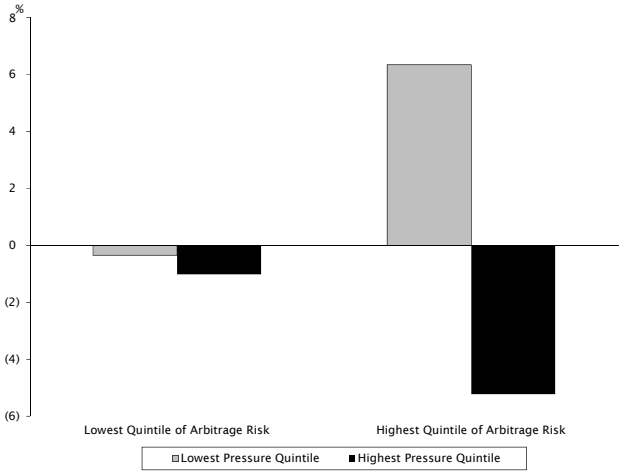


Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

The short pressure gauge was more informative among stocks engulfed in controversy than among those with very little of it, as evaluated by arbitrage risk, that captures the stock price volatility unexplained by beta (see Exhibit 17). If the short pressure was high, the dispute was resolved to the benefit of the bears, while if it was low it was the bulls that won. A high borrowing cost in a controversial stock favored the bears' case (see Exhibit 18).

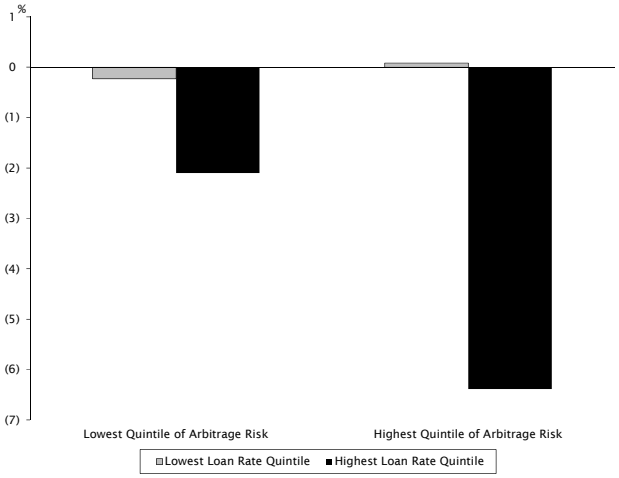
Exhibit 17: Developed Markets (ex-U.S.)
Relative Returns to Short Pressure[1]
Contingent Upon Arbitrage Risk (Dispute)
Monthly Data Compounded to Annual Periods
2010 Through June 2018



Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

Exhibit 18: Developed Markets (ex-U.S.)
Relative Returns to Loan Rates[1]
Contingent Upon Arbitrage Risk (Dispute)
Monthly Data Compounded to Annual Periods
2010 Through June 2018

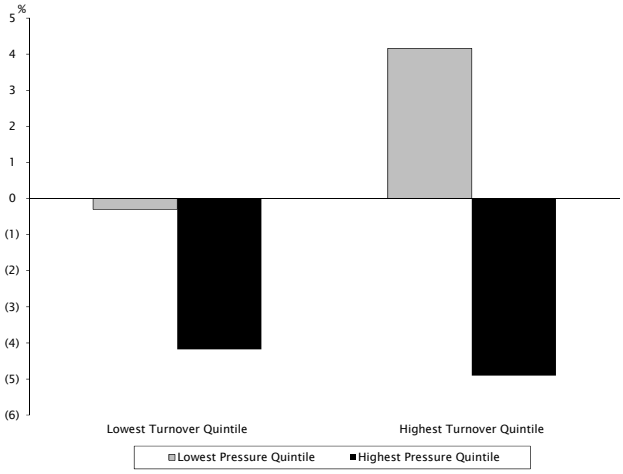


Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

Lastly we looked at the interaction of short pressure and loan rates with share turnover, finding that among the most traded names the short pressure variable proved a differentiator (see Exhibit 19). Those where there was high demand to short have lagged by about (5) percentage points per year in this decade, while those where the demand was low outperformed by about +4 points. A high cost of borrowing in a high turnover stock correctly identified vulnerability (see Exhibit 20).

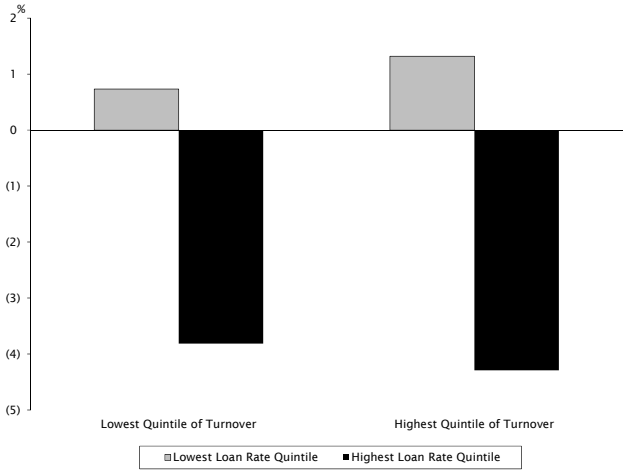
Exhibit 19: Developed Markets (ex-U.S.)
Relative Returns to Short Pressure[1]
Contingent Upon Share Turnover
Monthly Data Compounded to Annual Periods
2010 Through June 2018



Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

Exhibit 20: Developed Markets (ex-U.S.)
Relative Returns to Loan Rate[1]
Contingent Upon Share Turnover
Monthly Data Compounded to Annual Periods
2010 Through June 2018



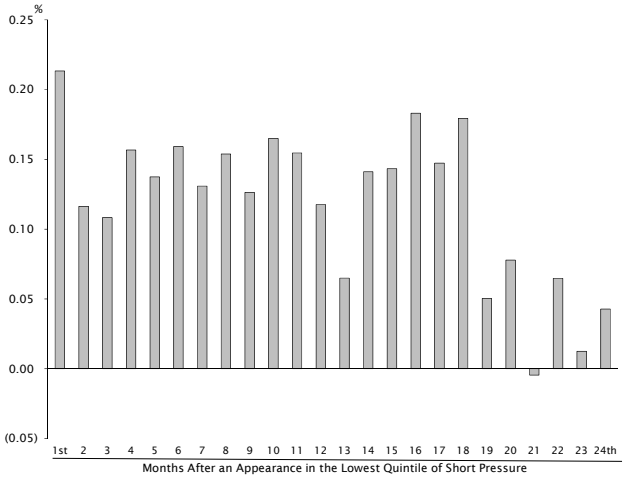
Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

A Signal That's Investable

Our Big Data initiative has involved combing through hundreds of databases, seeking out only those that provide information that can be of use to *investors*. However, we've found that most of them offer data only useful over a very-short horizon. That's not true of the short pressure and loan rate indicators, as their signal isn't quickly exhausted. Since 2010, for example, once a stock made its appearance in the lowest quintile of short pressure it generally went on to outperform over the following two years (see Exhibit 21). Following an appearance in the highest quintile of short pressure, however, the signal didn't prove to be as long-lasting (see Exhibit 22). Exhibits 23 and 24 present the alpha longevities when the loan rate was used as the operative variable, where the signal had a long shelf life as well.

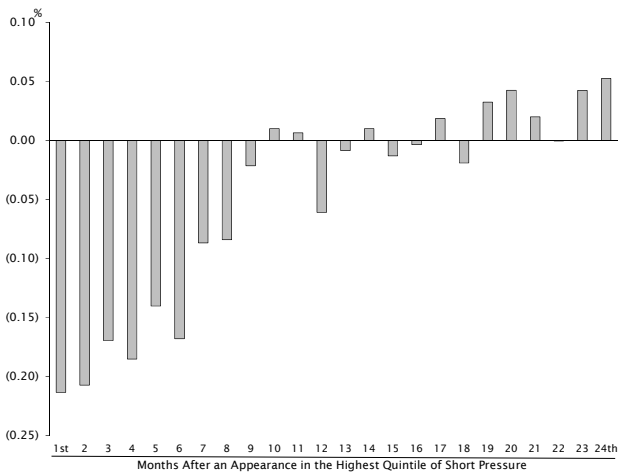
Exhibit 21: Developed Markets (ex-U.S.)
Monthly Relative Returns After an Appearance
in the Lowest Quintile of Short Pressure[1]
2010 Through June 2018



Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

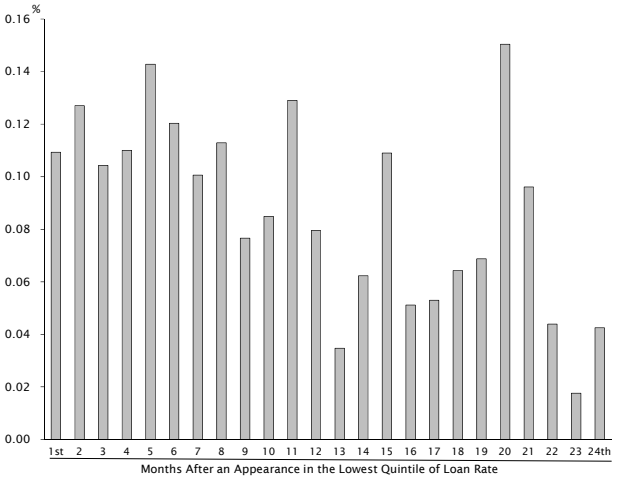
Exhibit 22: Developed Markets (ex-U.S.)
Monthly Relative Returns After an Appearance
in the Highest Quintile of Short Pressure[1]
2010 Through June 2018



Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

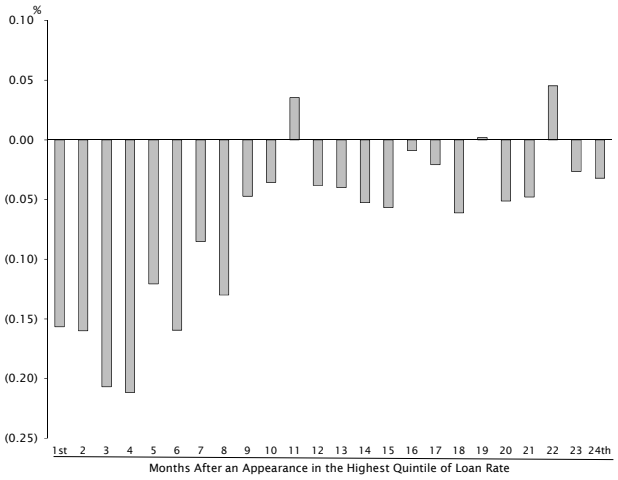
Exhibit 23: Developed Markets (ex-U.S.)
Monthly Relative Returns After an Appearance
in the Lowest Quintile of Loan Rate[1]
2010 Through June 2018



Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

Exhibit 24: Developed Markets (ex-U.S.)
Monthly Relative Returns After an Appearance
in the Highest Quintile of Loan Rate[1]
2010 Through June 2018

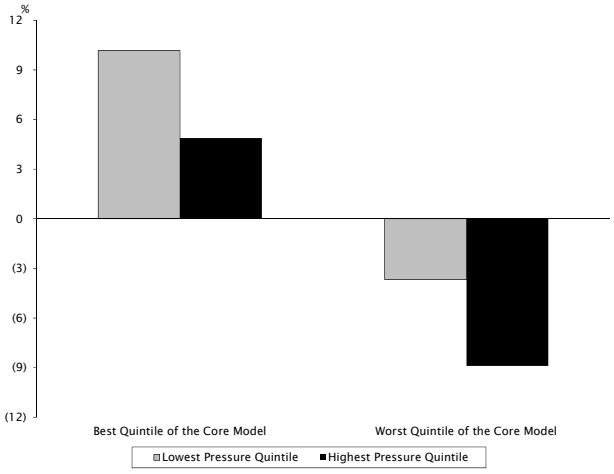


Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

The results borne out of our work on short pressure and loan rates in the U.S. led us to conclude that those variables should prove additive to our modeling efforts, and hence we've incorporated them into our U.S. core and failure models. We believe our international modeling efforts also stand to benefit from their use. For example, among stocks in the best quintile of our international core model, those with the lowest short pressure have come out ahead this decade, as seen when comparing the two bars on the left of Exhibit 25. Meanwhile, among those in the worst quintile of the model, high short pressure correctly pointed out vulnerability, as evident when comparing the bars on the right of the chart. The signal from loan rates proved effective too, albeit to a lesser extent (see Exhibit 26).

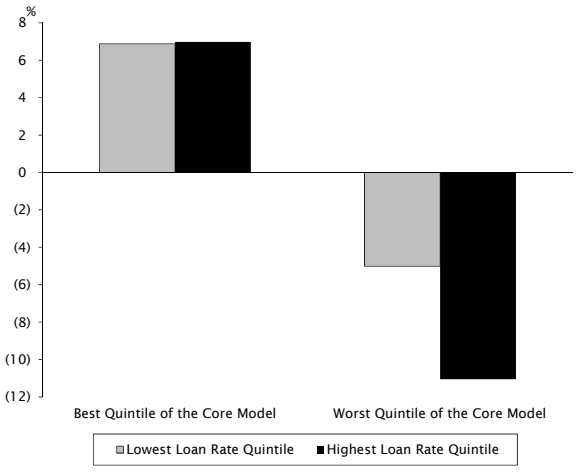
Exhibit 25: Developed Markets (ex-U.S.)
Relative Returns to Short Pressure[1]
Contingent Upon the Core Model Rank
Monthly Data Compounded to Annual Periods
2010 Through June 2018



Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

Exhibit 26: Developed Markets (ex-U.S.)
Relative Returns to Loan Rates[1]
Contingent Upon the Core Model Rank
Monthly Data Compounded to Annual Periods
2010 Through June 2018

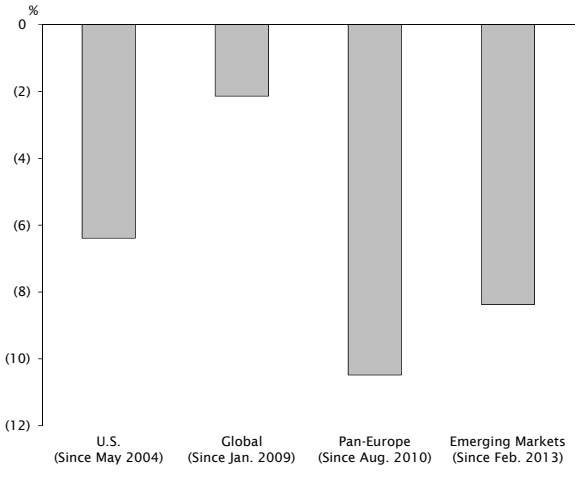


Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

We also tested whether the short pressure and loan rate variables could prove additive to our Pan-European failure model, given their effectiveness in pointing out vulnerability. It's been running live for about eight years, and it's been one of our best uses of quantitative tools (see Exhibit 27). Exhibit 28 documents the relative returns to short pressure among Pan-European failure candidates (i.e., the worst 10% of issues). Since 2010 failure candidates with the highest short pressure lagged their peers, a surprising result given how narrowly-defined that subset of stocks is. We found a similar outcome when the loan rate was used as the discriminating variable.

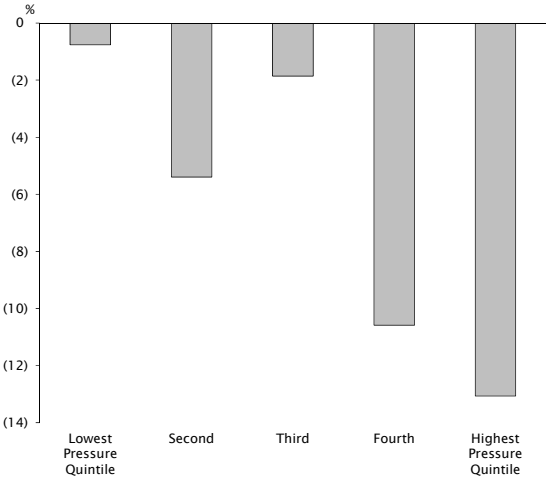
Exhibit 27: Failure Models
***Real-Time* Relative Returns[1]**
Monthly Data Compounded to Annual Periods
Inception Through June 2018



Source: Empirical Research Partners Analysis.

[1] Equally-weighted returns. Stocks ranked across and returns relative to each respective universe.

Exhibit 28: Pan-Europe: Failure Candidates
Relative Returns Contingent Upon Short Pressure[1]
Monthly Data Compounded to Annual Periods
2010 Through June 2018



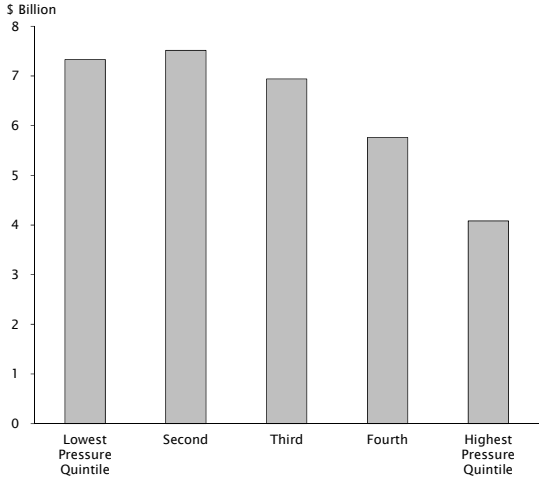
Source: Empirical Research Partners Analysis.

[1] Equally-weighted U.S. dollar-hedged returns.

Much like in the U.S. in the international arena stocks with the lowest short pressure tended to be of greater capitalization than the rest, while the opposite was true for those with the highest short pressure (see Exhibit 29). We found similar results when assessing trading volumes (see Exhibit 30). However, we don't think the skew is large enough to undermine the practicality of the data.

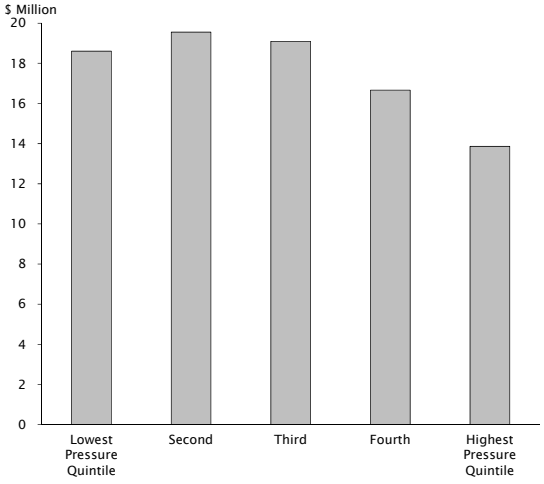
Given the constructive set of results in the international arena we'll be incorporating the short pressure and loan rate variables into our non-U.S. stock selection and failure models.

Exhibit 29: Developed Markets (ex-U.S.)
Median Market Capitalization
by Short Pressure Quintile
2017 Through June 2018



Source: Empirical Research Partners Analysis.

Exhibit 30: Developed Markets (ex-U.S.)
Median Average Daily Trading Volume
by Short Pressure Quintile
2017 Through June 2018



Source: Empirical Research Partners Analysis.

Conclusion: An Edge for Value Investors

Much like in the U.S. the activity of short sellers in the rest of the developed world has been directionally correct and worth tracking. The short pressure and loan rate indicators are particularly useful to value investors, as the supply/demand data improved timing decisions when the situation was provocative. Appendix 1 on pages 11 and 12 lists non-U.S. developed world value stocks, as judged by our valuation framework, in the lowest and highest quintiles of short pressure. We've restricted both lists to capitalizations above $3 billion. Among those with the lowest pressure, financials and capital equipment issues account for more than half of the list.

Appendix 1: Developed Markets (ex-U.S.)
Stocks in the Lowest Quintile of Valuation by Short Pressure[1]
Sorted by Market Capitalizations Above $3 Billion
As of Early-July 2018

Symbol	Company	Price (Local)	Local Currency	Quintiles (1=Lowest; 5=Highest) Valuation	Short Pressure	Forward P/E-Ratio	Market Capitalization (USD Billion)
Lowest Pressure Quintile							
9432 JP	Nippon Telegraph and Telephone Corporation	5,015.00	JPY	1	1	11.0 x	$92.3
SAN SM	Banco Santander S.A.	4.72	EUR	1	1	11.8	88.6
DTE GY	Deutsche Telekom AG	13.79	EUR	1	1	14.3	76.9
8306 JP	Mitsubishi UFJ Financial Group Inc.	615.60	JPY	1	1	8.6	76.2
INGA NA	ING Groep NV	12.53	EUR	1	1	9.3	56.9
8316 JP	Sumitomo Mitsui Financial Group Inc.	4,195.00	JPY	1	1	8.2	52.8
SHP LN	Shire PLC	42.68	GBP	1	1	11.0	51.0
16 HK	Sun Hung Kai Properties Limited	118.70	HKD	1	1	10.6	43.8
8058 JP	Mitsubishi Corporation	3,011.00	JPY	1	1	7.6	42.9
8411 JP	Mizuho Financial Group Inc.	185.10	JPY	1	1	8.5	42.3
1 HK	CK Hutchison Holdings Ltd	83.80	HKD	1	1	8.3	41.2
IMB LN	Imperial Brands PLC	29.13	GBP	1	1	10.7	36.8
MFC CT	Manulife Financial Corporation	23.51	CAD	1	1	8.9	35.5
6501 JP	HitachiLtd.	752.50	JPY	1	1	8.7	32.3
8031 JP	Mitsui & Co.Ltd	1,817.50	JPY	1	1	7.4	28.3
DANSKE DC	Danske Bank A/S	192.20	DKK	1	1	8.8	27.0
TEVA IT	Teva Pharmaceutical Industries Limited	87.30	ILS	1	1	9.1	26.5
5020 JP	JXTG Holdings. Inc.	775.70	JPY	1	1	6.8	23.7
SEBA SS	Skandinaviska Enskilda Banken AB Class A	85.20	SEK	1	1	10.5	21.1
8591 JP	ORIX Corporation	1,712.00	JPY	1	1	6.8	20.4
8725 JP	MS&AD Insurance Group Holdings Inc.	3,428.00	JPY	1	1	9.8	18.1
1COV GY	Covestro AG	74.84	EUR	1	1	7.3	17.5
CNP FP	CNP Assurances SA	19.61	EUR	1	1	10.2	15.5
8309 JP	Sumitomo Mitsui Trust Holdings Inc.	4,316.00	JPY	1	1	9.8	15.0
TECK/B CT	Teck Resources Limited Class B	32.53	CAD	1	1	7.1	14.2
AMUN FP	Amundi SA	59.00	EUR	1	1	12.4	13.7
9503 JP	Kansai Electric Power Company Incorporated	1,585.50	JPY	1	1	9.5	13.1
ACS SM	Actividades de Construccion y Servicios SA	35.09	EUR	1	1	12.7	12.7
8002 JP	Marubeni Corporation	820.20	JPY	1	1	6.1	12.6
SLA LN	Standard Life Aberdeen PLC	3.20	GBP	1	1	11.7	12.5
CNA LN	Centrica plc	1.62	GBP	1	1	11.9	12.2
8308 JP	Resona Holdings Inc.	569.80	JPY	1	1	6.6	11.8
III LN	3i Group plc	9.00	GBP	1	1	7.9	11.5
5802 JP	Sumitomo Electric Industries Ltd.	1,615.00	JPY	1	1	10.1	11.4
9502 JP	Chubu Electric Power CompanyIncorporated	1,655.00	JPY	1	1	12.3	11.2
8015 JP	Toyota Tsusho Corp.	3,545.00	JPY	1	1	8.6	11.0
5411 JP	JFE Holdings Inc.	2,017.00	JPY	1	1	6.9	11.0
FGR FP	Eiffage SA	94.80	EUR	1	1	15.2	10.8
WN CT	George Weston Limited	105.60	CAD	1	1	14.6	10.3
ADEN SW	Adecco Group AG	58.42	CHF	1	1	10.4	10.0
LUMI IT	Bank Leumi Le-Israel Ltd.	22.30	ILS	1	1	10.2	9.4
TLX GY	Talanx AG	31.78	EUR	1	1	9.0	9.3
4005 JP	Sumitomo Chemical Co. Ltd.	606.00	JPY	1	1	7.4	9.0
QAN AU	Qantas Airways Limited	6.37	AUD	1	1	9.8	7.9
1812 JP	Kajima Corporation	812.00	JPY	1	1	8.4	7.4
LEG GY	LEG Immobilien AG	93.64	EUR	1	1	10.9	7.0
6701 JP	NEC Corp.	2,971.00	JPY	1	1	23.6	6.9
1802 JP	Obayashi Corporation	1,080.00	JPY	1	1	7.8	6.7
ASRNL NA	ASR Nederland NV	35.16	EUR	1	1	10.1	6.0
EMP/A CT	Empire Co. Ltd. Class A	25.48	CAD	1	1	16.6	5.3
8593 JP	Mitsubishi UFJ Lease & Finance Company Limited	659.00	JPY	1	1	9.4	5.2
6448 JP	Brother Industries Ltd.	2,082.00	JPY	1	1	9.9	4.9
9513 JP	Electric Power Development Co. Ltd.	2,883.00	JPY	1	1	9.9	4.7
AC CT	Air Canada	21.00	CAD	1	1	NM	4.4
IAG CT	Industrial Alliance Insurance and Financial Services Inc.	50.63	CAD	1	1	9.3	4.2
INCH LN	Inchcape plc	7.79	GBP	1	1	11.9	4.2
KBCA BB	KBC Ancora SCA	45.74	EUR	1	1	16.0	4.1
6302 JP	Sumitomo Heavy Industries Ltd.	3,710.00	JPY	1	1	10.3	4.1
200 HK	Melco International Development Limited	20.30	HKD	1	1	13.5	4.0
SIS IM	Societa Iniziative Autostradali e Servizi S.p.A.	13.47	EUR	1	1	11.5	3.6
MMB FP	Lagardere SCA	22.53	EUR	1	1	12.3	3.4
WMH LN	William Hill PLC	3.01	GBP	1	1	11.9	3.3
DOW AT	Downer EDI Limited	7.10	AUD	1	1	14.0	3.1
BEZQ IT	Bezeq The Israel Telecommunication Corp. Ltd.	4.04	ILS	1	1	11.0	3.0

Source: Empirical Research Partners Analysis.

[1] Short pressure and valuation are ranked on a region-neutral basis.

Appendix 1 (cont.): Developed Markets (ex-U.S.)
Stocks in the Lowest Quintile of Valuation by Short Pressure[1]
Sorted by Market Capitalizations Above $3 Billion
As of Early-July 2018

Symbol	Company	Price (Local)	Local Currency	Quintiles (1=Lowest; 5=Highest) Valuation	Short Pressure	Forward P/E-Ratio	Market Capitalization (USD Billion)
Highest Pressure Quintile							
8001 JP	Itochu Corporation	1,952.50	JPY	1	5	6.7 x	$29.0
AAL LN	Anglo American plc	17.22	GBP	1	5	9.0	28.5
RNO FP	Renault SA	75.49	EUR	1	5	4.8	25.9
WPP LN	WPP Plc	11.70	GBP	1	5	10.0	19.0
IAG LN	International Consolidated Airlines Group SA	6.70	GBP	1	5	6.7	17.7
BPY-U CT	Brookfield Property Partners LP	25.68	CAD	1	5	9.2	13.7
CA FP	Carrefour SA	14.35	EUR	1	5	14.3	12.9
SBRY LN	J Sainsbury plc	3.27	GBP	1	5	15.9	9.3
4755 JP	Rakuten Inc.	720.30	JPY	1	5	14.0	9.1
5201 JP	AGC Inc.	4,180.00	JPY	1	5	11.2	8.6
MCRO LN	Micro Focus International plc	12.56	GBP	1	5	8.2	7.4
PNDORA DC	Pandora A/S	419.90	DKK	1	5	7.8	7.2
DUFN SW	Dufry AG	125.35	CHF	1	5	12.8	6.7
MKS LN	Marks and Spencer Group plc	3.09	GBP	1	5	11.8	6.7
RMG LN	Royal Mail plc	4.98	GBP	1	5	12.6	6.5
US IM	UnipolSai Assicurazioni S.p.A.	1.95	EUR	1	5	10.1	6.5
ICA SS	ICA Gruppen AB	276.60	SEK	1	5	15.9	6.4
2651 JP	Lawson Inc.	6,750.00	JPY	1	5	23.3	5.9
LDO IM	Leonardo SpA	8.63	EUR	1	5	12.0	5.8
9508 JP	Kyushu Electric Power CompanyIncorporated	1,237.00	JPY	1	5	9.2	5.3
8473 JP	SBI Holdings Inc.	2,634.00	JPY	1	5	9.9	5.1
ATC NA	Altice Europe N.V. Class A	3.17	EUR	1	5	NM	5.0
9831 JP	Yamada Denki Co. Ltd.	542.00	JPY	1	5	12.2	4.7
CO FP	Casino Guichard-Perrachon SA	36.25	EUR	1	5	13.7	4.6
B4B GY	METRO AG	10.63	EUR	1	5	10.1	4.4
UBI IM	Unione di Banche Italiane SpA	3.35	EUR	1	5	10.9	4.4
RXL FP	Rexel SA	12.40	EUR	1	5	11.3	4.4
GYC GY	Grand City Properties SA	21.76	EUR	1	5	8.5	4.2
BEN AT	Bendigo & Adelaide Bank Ltd.	11.04	AUD	1	5	13.0	3.9
5110 JP	Sumitomo Rubber Industries Ltd.	1,680.00	JPY	1	5	8.9	3.9
RPC LN	RPC Group Plc	7.20	GBP	1	5	9.4	3.8
MS IM	Mediaset S.p.A.	2.61	EUR	1	5	14.5	3.5
LIGHT NA	Signify NV	22.00	EUR	1	5	8.8	3.5
AF FP	Air France-KLM SA	6.91	EUR	1	5	6.0	3.4
CEC GY	CECONOMY AG	7.59	EUR	1	5	10.5	3.2
BOQ AT	Bank of Queensland Limited	10.41	AUD	1	5	11.6	3.1
SZU GY	Suedzucker AG	13.00	EUR	1	5	NM	3.1
MIC CT	Genworth MI Canada Inc.	43.40	CAD	1	5	8.6	3.0
INTRUM SS	Intrum AB	201.50	SEK	1	5	10.2	3.0

Source: Empirical Research Partners Analysis.

[1] Short pressure and valuation are ranked on a region-neutral basis.