Securities lending and price efficiency:

The case of dividend enhancement strategies

Abstract:
Stock loans are extensively used by offshore investors to enhance their after-tax dividend yield on US stocks. We examine the impact of these off-market transactions on the price formation process in US stock markets. We document that dividend enhancement strategies result in a substantial tightening of the market for stock lending, especially for stocks with a high dividend yield. This tightening of the market has a dramatic impact on the price formation process. Stocks in the top quintile in terms of dividend yield that are also on special a month before the ex dividend date, experience an average price increase of 2% in the month leading up to the ex dividend date. After the ex dividend date these same stocks experience an average price reversal of about 2%.

According to a recent US Senate report, the United States loses an estimated $100 billion per annum due to a practice referred to as "dividend enhancement," "yield enhancement," or "dividend uplift". Dividend enhancement strategies typically involve multi-million-dollar equity swaps or stock loans between U.S. financial institutions and offshore investors. The transactions are entered into a few days before the dividend record date, and exploit the difference between the 30% tax rate that typically applies to US stock dividends paid to non-US persons, and the 0% tax rate on '*dividend equivalents*' paid to non-US persons as part of a swap. [1] In this study, we examine the impact of these (off-market) transactions in the securities lending market on the price formation process in the US stock markets.

Our data on transactions between beneficial owners of lendable shares and their counter parties come from Dataexplorers Ltd. The Dataexplorers database provides aggregated inventory information for over 22,000 funds who lend through over 100 wholesale stock lending market participants across 33 countries.[2] Dataexplorers provide daily security-level information on the quantity of shares available for lending, as well as volume (and price) information for loan transactions. The former provides daily information on the level of beneficial ownership and is measured as the total number of shares held by all beneficial owners divided by the total number of shares outstanding. The latter provides daily

[1] According to the US senate report: "in one of the most blatant forms of this type of transaction, a few days before a stock is scheduled to issue a dividend, an offshore hedge fund sells its stock to a U.S. financial institution and simultaneously enters into a swap agreement with the financial institution, temporarily replacing its stock holdings with a swap agreement tied to the economic performance of the same stock. After the dividend is issued, the offshore hedge fund receives from the financial institution a "dividend equivalent" payment under the swap agreement equal to the full dividend amount less a fee. A few days after the dividend date, the offshore hedge fund terminates the swap agreement and repurchases the stock, leaving the offshore hedge fund with the same status it had before the transaction was undertaken."

[2] See www.dataexplorers.co.uk. Further details of the Dataexplorers database can be found in Saffi and Sigurdsson (2007).

information on the level of stock loans and is measured as the total number of shares lent, divided by the number of shares outstanding.

We first establish that dividend enhancement strategies result in a substantial increase in activity on the share loan market. This increase is most noticeable on the day before the record date when the total increase in the percentage shares that is on loan is about four times larger than the increase in the percentage of shares that is on loan as a result of on-market short sales, whereas on a typical day almost all of the increases in stock loans are due to short sales in the stock market. In the days after the record date, the percentage of shares on loan reverts to a normal level. Dividend enhancement strategies therefore result in a predictable and significant tightening of the market for short sales in the period around the record date. For example, the percentage of stocks that are 'on special' increases from 9% a month before the record date, to 16% the day before the record date. Over this same period, the percentage of stocks on special increases from 15% to 27% for the stocks in the top quintile in terms of dividend yield, whereas the increase is from 7% to 12% for stocks in the bottom decile in terms of dividend yield.

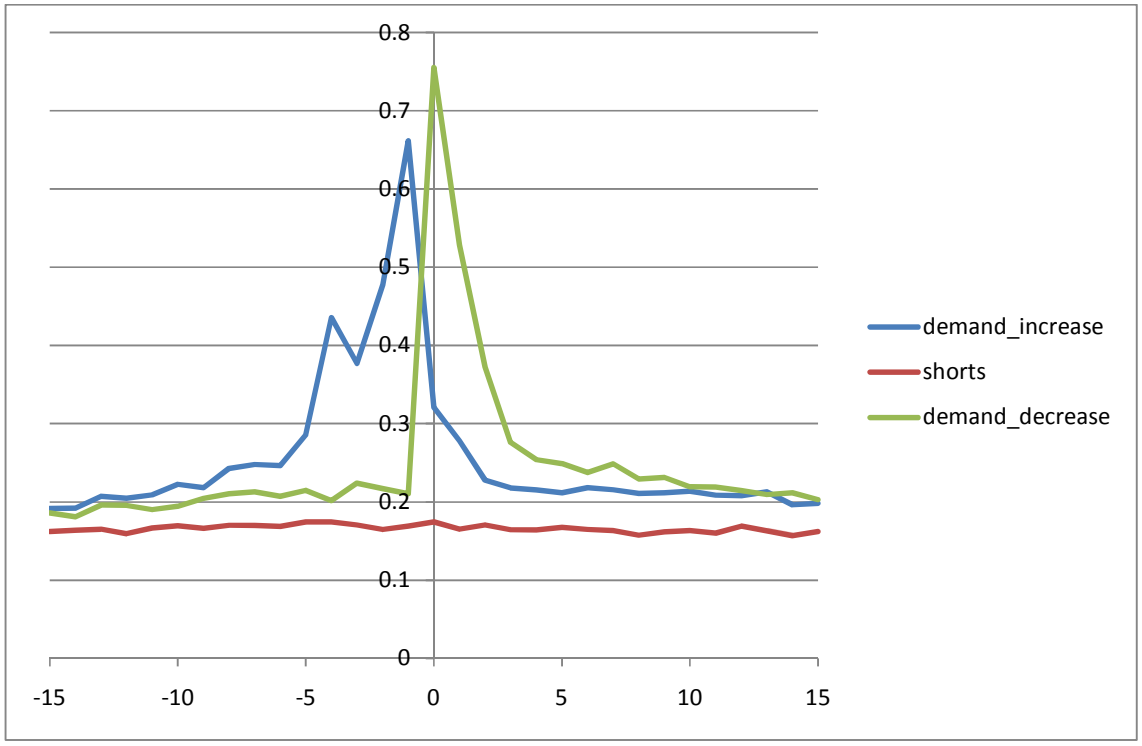
Our second research question is whether these recurring episodes of tightening of the securities lending market have an impact on the price formation process. We find that it does. Stocks that are in the top quintile in terms of dividend yield and that are also on special a month before the ex dividend date, experience an average price increase of about 2% in the month leading up to the ex dividend date. After the ex dividend date these same stocks experience an average price reversal of about 2%. More in general, we find that the returns in the period before the ex dividend day are an increasing function of dividend yield and the utilisation of the supply in the market for lendable shares, and that returns in the period after the ex dividend day are an decreasing function of dividend yield and the utilisation of the

supply in the market for lendable shares. Our results are robust after controlling for firm size and liquidity costs and hold for a variety of measurement windows.

This study is related to several other research areas. First, several studies analyze the interrelation between derivative markets and the market for underlying shares. These studies typically find no evidence that trading activity on the derivative market has a predictable impact on the price formation of the underlying shares. Our results stand in sharp contrast to these studies and show how information on the dividend yield and the state of the securities lending market can be used to predict returns before and after the ex dividend date. Second, our study is related to recent studies that use information from the securities lending market. These studies generally find that stocks with a high rebate rate display significant underperformance in the subsequent month or quarter. Our results for the period before the ex dividend date, are exactly opposite: stocks with a high rebate rate tend to have significantly positive returns. Finally, our study is related to the literature on ex dividend day price changes. Most importantly, our results indicate that a substantial part of the ex-dividend day drop-off is related to the extent to which dividend enhancement strategies result in a tightening of the securities lending market. This part of the ex-dividend return is related to the off-market transactions of a hitherto ignored dividend clientele: off-shore investors trying to enhance their dividend yield.

1. Dividend enhancement strategies and securities lending

The graph below shows the (gross) increase in stock loans and the (gross) decrease in stock loans around the ex-dividend date (day 0). The graph also shows "shorts" which is the daily sum of the short sales (ie on market gross increase in short interest). All variables are expressed as % of shares outstanding.



- 'Shorts' are available for only 1/3 of the total sample of about 8000 events. The reason is that shorts are from RegSho data and that stops somewhere in 2007.
- I limit the sample to stocks with a price > $1 and beneficial ownership larger than 1% of all shares outstanding
- There is a bit of a timing issue. Short sales on day T, will show up in the DXP database on the day the share market transaction is settled (T+3). The securities lending market has same day settlement. The problem is that the off-market dividend enhancement trades are settled on the same day (we need to check this

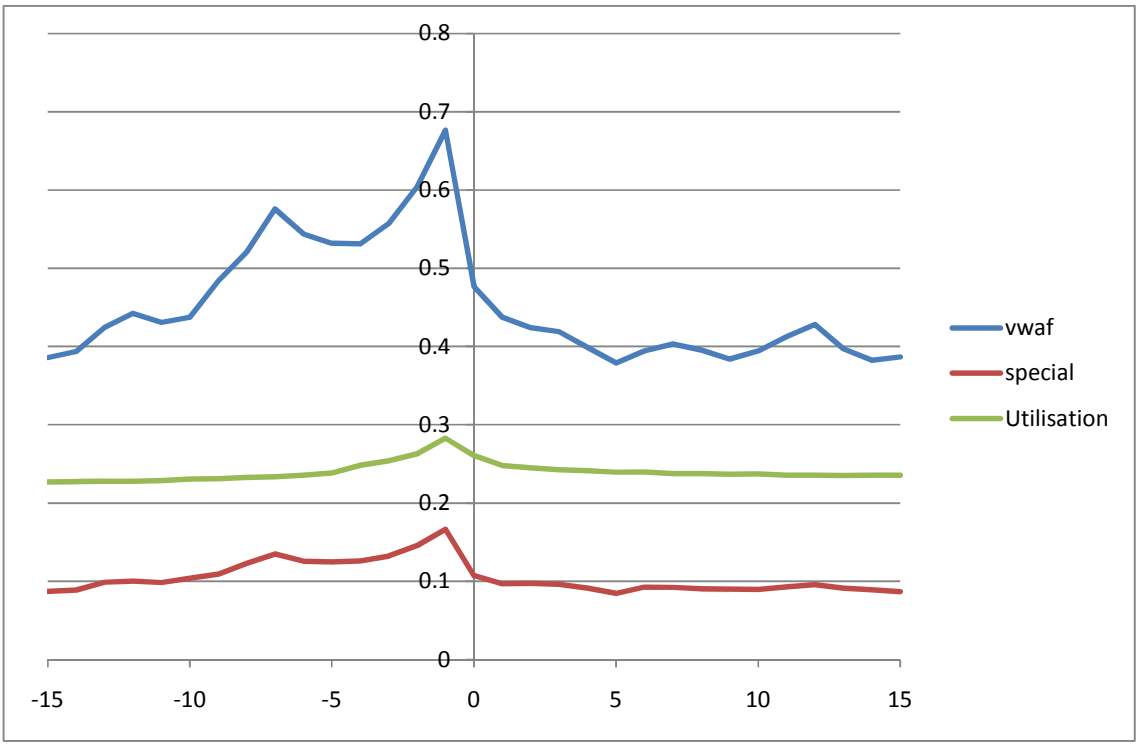
with DXP). Since we cannot separate the two, I always adjust the DXP data as if T+3 applies. However this is likely to be wrong in the graph above when we are close to the ex-date (day 0). The real peaks in the demand_increase and decrease are on event day +2 and event day +3. That is: the day before the record day and the day after the record day (which are 3 days after the ex date…because of T+3 settlement).

- The same timing issue plays a role in the VWAF graphs below (vwaf is the rebate rate) and the graphs on the % of stocks that is on special. Around the ex-div date, these graphs should be shifted 3 days (again: that is what I think…we need to check with DXP).
- I'm not sure yet what to make of the fact that the stock prices of high yield stocks reach their maximum on the day *before* the ex-dividend date, whereas the market is at its most tight on the day before the record date (ie 3 days later). I think this could mean that the tightening of the securities lending market is one thing (and the market is clearly very tight on the ex-date as well). However, there must be on-market demand that peaks on the day before the ex-date that is causing the price to reach its max on the day before the ex-div date (and not on the record date). This is most likely due to dividend capture traders or maybe tax-exempt institutions …..the amazing thing is that they are trading at prices that are about 2% too high on the day before the ex-date in order to get a dividend yield that is on average substantially lower than 2% (and results in an almost equivalent price decrease on the ex date). This is a puzzle!
- I thought that part of the price increase is caused by recalls, but this is not likely to be the only reason as you'd expect recalls to peak on the day before the record date (and not on the day before the ex-div date)…ie who are the idiots buying

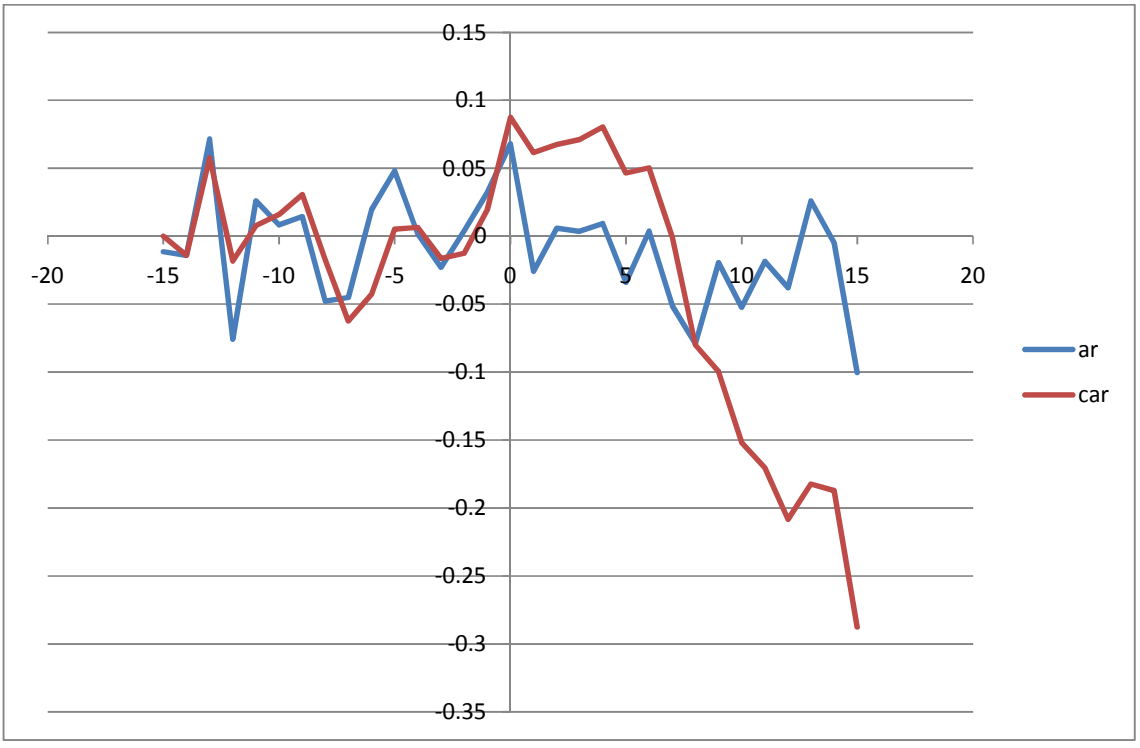
stocks with a high yield and binding short sales constraints on the days before the ex date.

It is clear from the graph above that on normal days most of the increases and decreases in stock loans are due to on-market shorts, and that around the ex dividend date most of the activity s off-market transactions related to dividend enhancement.

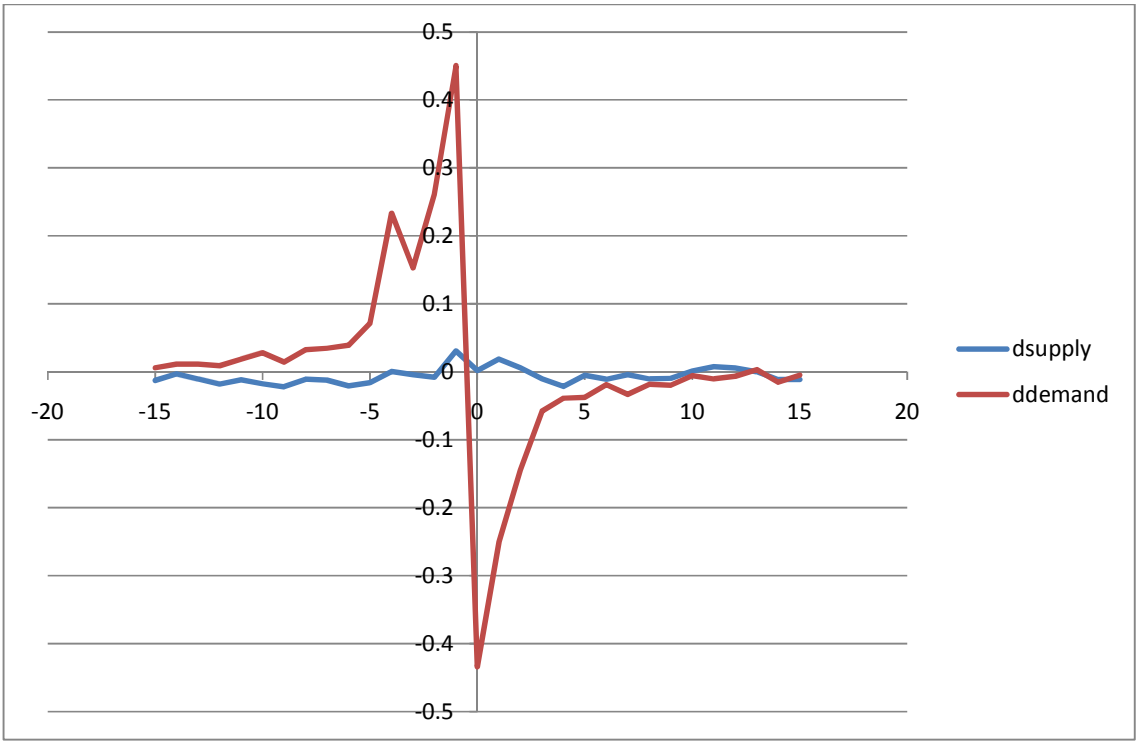
Next question is what do these off-market transactions do to the state of the securities lending market. I look at three statistics (NB same timing issues as above apply as, for example, vwaf is the rebate rate on the most recent stock loans). VWAF is the rebate rate. It is 0 for general collateral loans and goes up to 5 for stocks with an extreme rebate rate. Special is 0 for stocks with vwaf=0 or vwaf=1 and equal to1 for vwaf>1. Utilisation is defined as 'stocks on loan'/stocks available for lending. The graph below reports the average for each day across all 8000 events. Clearly shorting becomes more expensive as the record date comes closer and then reverts pretty quickly to a normal level.



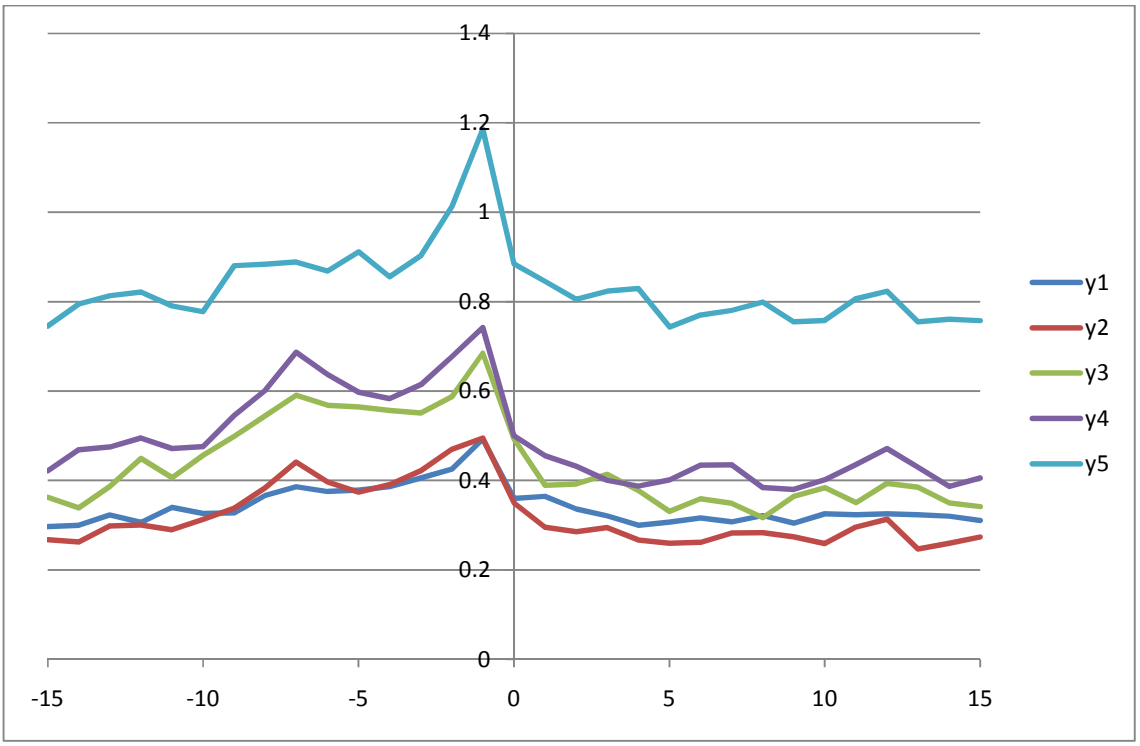
This graph gives the abnormal return + CAR around ex div dates…nothing spectacular.



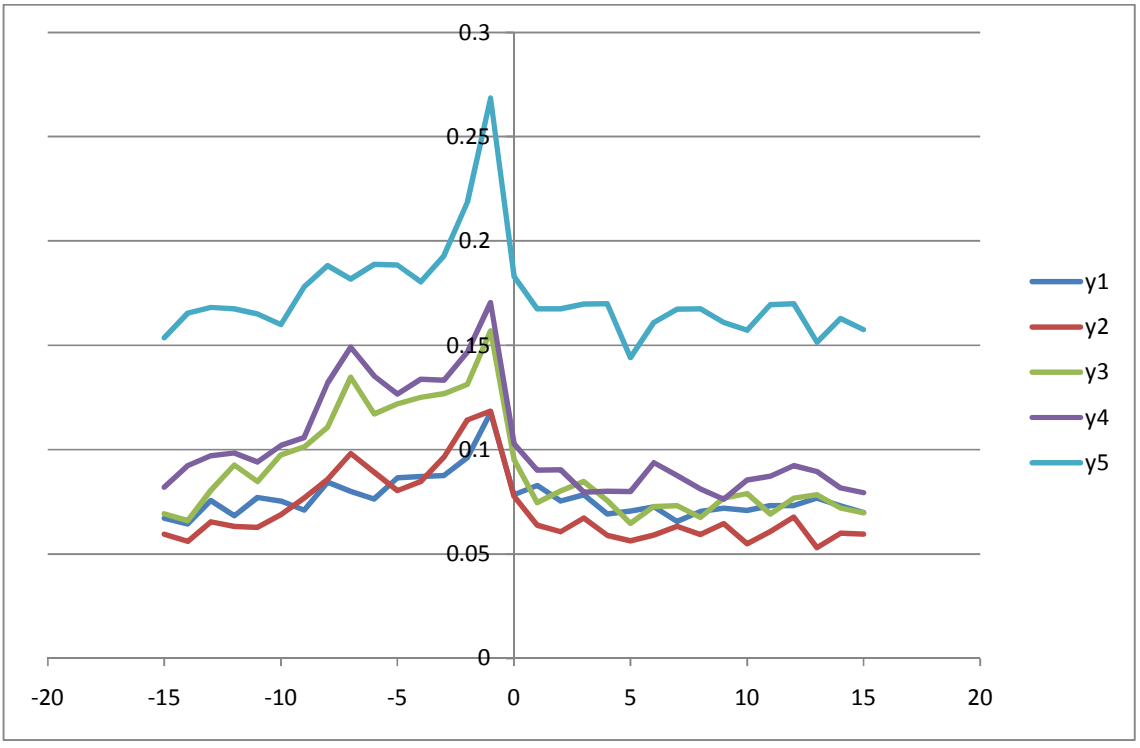
The graph below gives the average change in net demand (gross increase – gross decrease) and net supply, for each day. Clearly the total loans outstanding increase dramatically before the record date and then drop dramatically. The movements in the stocks owned by beneficial owners is pretty minimal in comparison.



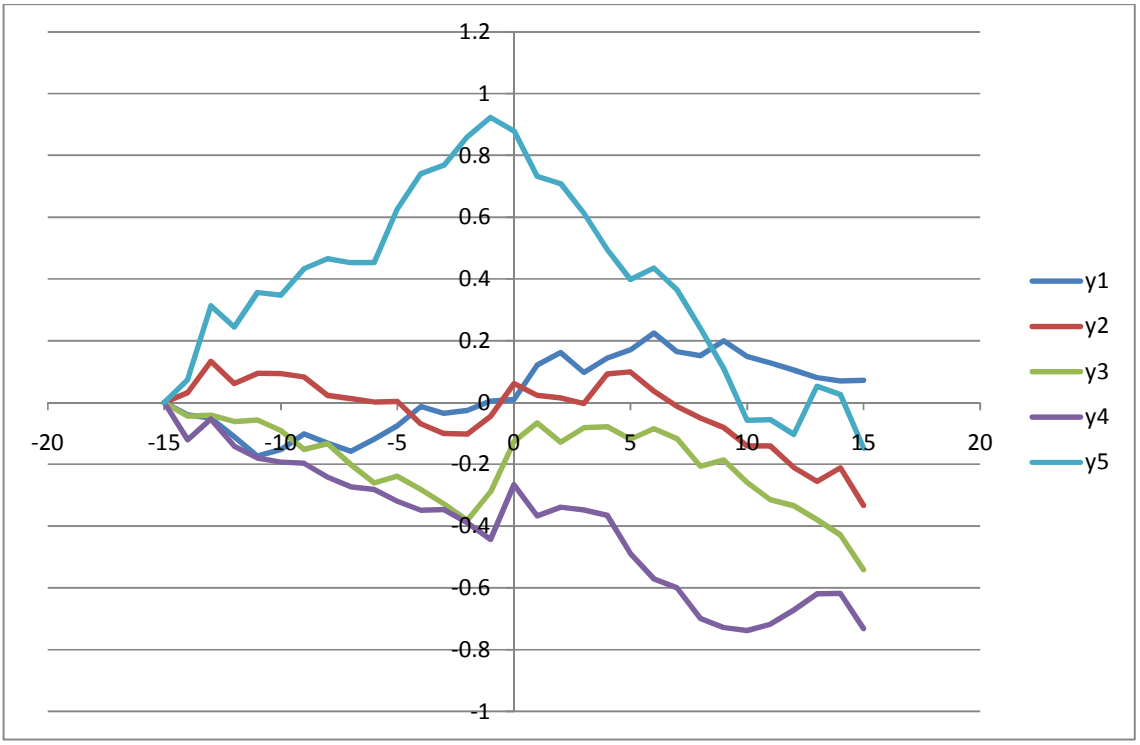
The next graph shows the average vwaf per dividend yield quartile. Y1 is the 20% stocks with the lowest dividend yield. Clearly y5 stocks start off at a higher vwaf, and experience a stronger increase as we get closer to the ex div date.



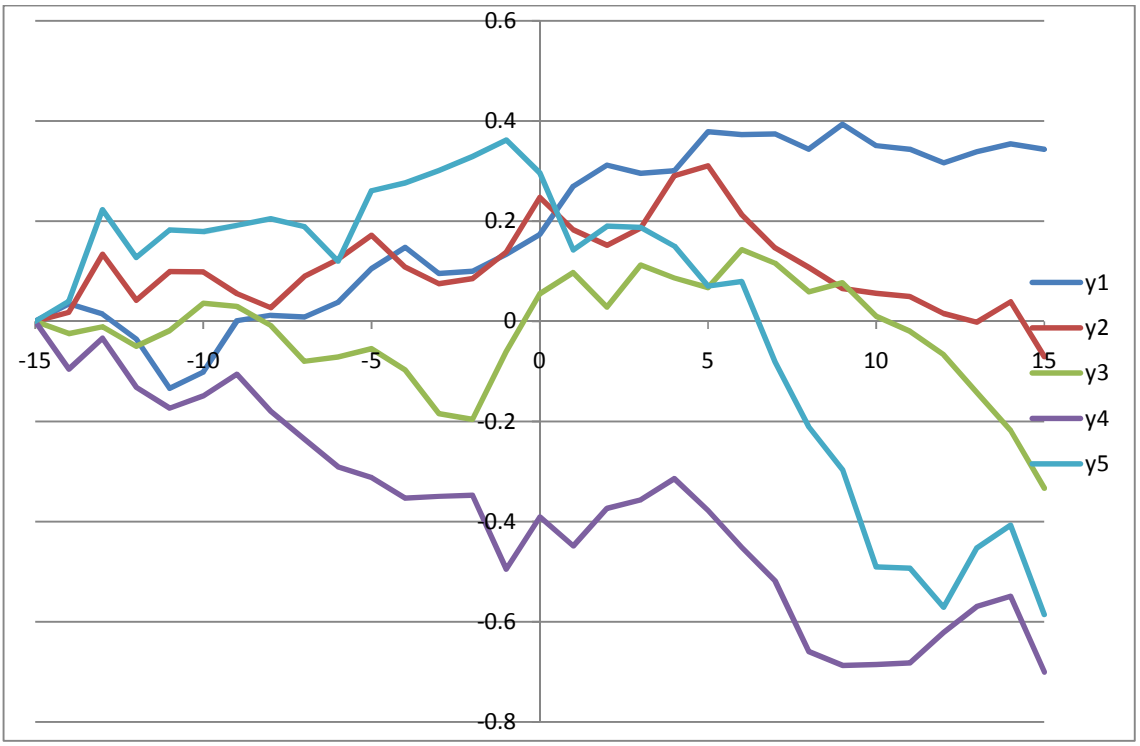
This graph is similar but shows the percentage of stocks that is on special. Again y5 stands out as most short sales constrained.



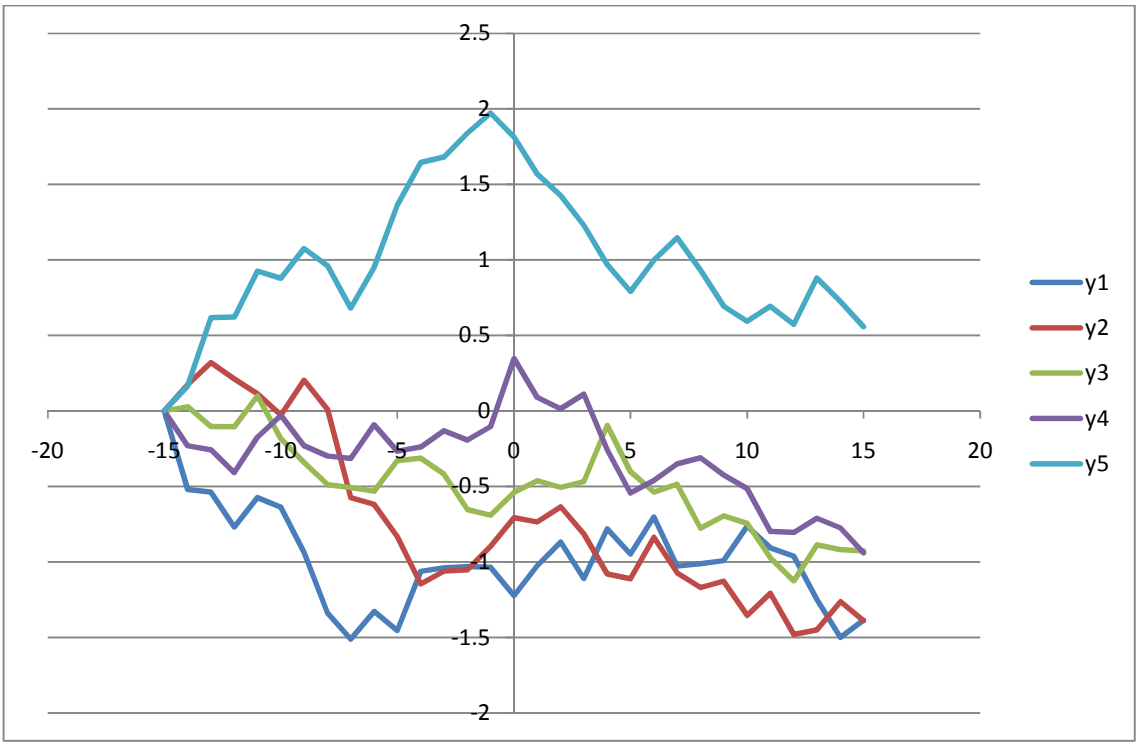
This graph shows the CAR around the ex-div date. Clearly y5 stocks show an up/down pattern. This pattern becomes stronger when we condition on the state of the securities lending market 20 days before the ex date (20 days before so the patterns are 'tradable')



The next graph is for stocks that are not on special 20 days before ex div date:



This is the CAR for the different yield-quintiles for all stocks that were on special (ie vwaf>1) on day -20. For the high yield stocks (y5 and a bit for y4) we see a clear up/down pattern.



Here are some regression where return_before is CAR over -2,-1 or -5,-1 or -10, -1 and return after is CAR over 0,1 or 0,4 or 0,9. BAS is bid-ask spread and size is mktcap. Yield is dividend yield, vwaf is the rebate rate rank and utilisation is shares on loan/shares available for lending.

All independent variables are transformed to decile ranks per quarter and the t-stats are based on 2-way clustered std errors.

The key-variables are in bold. It is clear that return_before increases in the tightness of the securities lending market and dividend yield and return_after decreases in the tightness of the securities lending market and dividend yield.

Return_before	2-day window			5-day window			10-day window	
Intercept	0.049	0.7		0.107	0.8		0.002	0.0
vwaf_m16	0.142	1.3		0.337	1.8		0.301	1.6
ryield	0.172	1.6		0.574	3.0		1.025	3.6
rsize	-0.072	-0.6		0.328	1.5		0.905	2.1
rbas	0.024	0.2		0.028	0.2		0.261	0.9
vwaf_m16_ryield	**0.656**	**2.6**		**0.976**	**2.0**		**2.170**	**3.7**
rsize_ryield	-0.178	-0.5		-0.182	-0.5		-0.682	-1.9
rbas_ryield	0.793	4.5		1.668	4.8		2.204	5.7
Return_after	2-day window			5-day window			10-day window	
Intercept	0.087	1.9		0.049	0.4		-0.097	-0.6
vwaf_m1	0.062	0.4		-0.099	-0.5		0.003	0.0
ryield	-0.533	-2.2		-0.797	-2.0		-1.021	-2.2
rsize	-0.197	-1.6		-0.083	-0.4		-0.019	-0.1
rbas	0.005	0.0		-0.037	-0.2		-0.009	0.0
vwaf_m1_ryield	**-0.746**	**-2.4**		**-1.052**	**-2.4**		**-0.411**	**-0.6**
rsize_ryield	-0.782	-1.6		0.661	0.6		0.489	0.5
rbas_ryield	-0.124	-0.2		0.589	0.5		0.385	0.3
Return_before	2-day window			5-day window			10-day window	
Intercept	0.023	0.5		0.040	0.3		-0.036	-0.2
util_m16	-0.082	-0.6		0.002	0.0		-0.321	-1.7
ryield	0.066	0.6		0.361	2.2		0.532	1.9
rsize	-0.099	-0.7		0.227	1.1		0.744	1.8
rbas	0.003	0.0		0.038	0.3		0.222	0.8
util_m16_ryield	**0.393**	**1.7**		**1.013**	**2.6**		**2.534**	**7.9**
rsize_ryield	-0.243	-0.6		-0.128	-0.3		-0.759	-1.7
rbas_ryield	0.873	5.8		1.887	5.0		2.726	8.3
Return_after	2-day window			5-day window			10-day window	
Intercept	0.080	1.7		0.061	0.6		-0.072	-0.5
util_m1	-0.162	-1.5		-0.128	-0.5		-0.473	-1.1
ryield	-0.259	-1.6		-0.526	-2.0		-0.762	-2.5
rsize	-0.197	-1.4		-0.056	-0.3		0.065	0.2
rbas	0.064	0.3		-0.007	0.0		-0.005	0.0
util_m1_ryield	**-0.571**	**-1.9**		**-0.657**	**-1.1**		**-1.303**	**-1.7**
rsize_ryield	-0.535	-1.2		0.729	0.8		0.800	1.2
rbas_ryield	-0.044	-0.1		0.472	0.4		0.502	0.4