Topics in Asset Pricing

Assignment 1: Mutual fund fire sales — Due on March 2nd.

The goal of this assignment is to study empirically the effect of mutual fund flows on stock prices. You can download at appli8.hec.fr/hombert/FireSales.zip a stata file that contains a panel dataset at the stock-month level with the following variables:

- *permno*: Stock identifier
- *date*, *month*: Month (in 2 different formats)
- *month_2*: Month of the year
- $mfflow$: Mutual fund selling pressure (see definition below)
- *ret*: Monthly return of the stock
- *prc*: Price of the stock at month end
- *shrout*: Number of shares outstanding
- *mv*: Market capitalization at month end ($= prc \times shrout$)
- *crsp_ew*: Monthly return of the equal-weighted CRSP index
- Fama-French factors: *mktrf* (excess market return), *hml* (return of portfolio long high B/M stocks/short low B/M stocks), *smb* (return of portfolio long small stocks/short large stocks)

The mutual fund selling pressure variable $MFFlow$ is constructed at the stock-quarter level by Edmans, Goldstein and Jiang (2012) hereafter EGJ12. For each stock-quarter, they construct the selling pressure induced by large mutual fund outflows assuming that mutual funds proportionally liquidate their existing holdings in response to outflows:

$$MFFlow_{i,t} = \frac{\sum_j \left(NetFlow_{j,t} \times w_{i,j,t-1} | \frac{NetFlow_{j,t}}{TotalAssets_{i,t-1}} \leq -0.05 \right)}{Volume_{i,t}},$$

where $NetFlow_{j,t}$ is the total new flow experienced by fund j in quarter t, and $TotalAssets_{i,t-1}$ is the fund's total assets at the end of the previous quarter; the sum is thus taken over funds j that experience outflows larger than 5% of their assets. $Volume_{i,t}$ is total dollar trading volume of stock i in quarter t, and

$$w_{i,j,t} = \frac{Shares_{i,j,t} \times P_{i,t}}{TotalAssets_{j,t}}$$

is the fraction of fund j's total assets in stock i at the end of quarter t (= number of shares of stock i held by fund j times price of stock i divided by total assets of fund j). Therefore, $MFFlow_{i,t}$ is negative and measures the selling pressure induced by large mutual fund outflows normalized by total trading volume. Finally, fire sale events are defined as stock-quarters such that $MFFlow_{i,t}$ falls below the 10^{th} percentile value of the full sample.

Question 1 One could have measured the selling pressure induced by mutual funds using actual changes in holdings (instead of assuming that changes in holdings are proportional to existing holdings):

$$AlternativeMFFlow_{i,t} = \sum_j \frac{(Shares_{i,j,t} - Shares_{i,j,t-1}) P_{i,t-1}}{Volume_{i,t}},$$

where as before the sum is taken over funds j for which $Outflow_{j,t} \geq 5\%$. Explain why $AlternativeMFFlow_{i,t}$ is not a good measure of flow-induced trading.

Question 2 Open the file *FireSale.dta*. Compute the average cumulative abnormal returns from 12 months before a fire sale event to 24 months after, following the methodology of EGJ12:

- Notice first that the data are monthly but $MFFlow$ is defined quarterly (it is constant over the three months of each quarter).
- Define fire sale events as described above (i.e., $MFFlow$ in the bottom decile of the sample distribution).
- For each firm-quarter that corresponds to a fire sale event, compute for the first month of the quarter (call this month m) the abnormal return of the fund in each month from $m-12$ to $m+26$ (call these abnormal returns $r(k)$, $k=-12,\ldots,26$), where the abnormal return is equal to the return of the fund minus the return of the equal-weighted CRSP index.
- Compute the average over all the fire sale events of the abnormal return $r(k)$ for each $k=-12,\ldots,26$ (call $\overline{r}(k)$ these average abnormal returns).
- Plot the cumulative average abnormal return from 12 months before the fire sale quarter to 24 months after: $CAAR(h)=\sum_{k=-12}^{h}\overline{r}(k)$ for $h=-12,\ldots,26$.

Show this graph. (It should look more or less like Figure 2 in EGJ12, but it is perfectly fine if you obtain a somewhat different figure—different methods can give different results; however if you don't obtain a price drop around $h=0$ then you probably made a mistake.)

In the next two questions, you are asked to discuss your empirical result from question 2. I assume that you obtain a price drop around $h=0$, but I make no assumption on the price changes you find before and after the fire sale. Your answers should therefore depend on your empirical results from question 2.

Question 3 Does the price start to decrease before the fire sale quarter? Give an economic interpretation of your result.

Question 4 Does the price continue to decline after the fire sale quarter? or does it revert? Give an economic interpretation of your result.

Figure 2 in EGJ12 suggests that buying stocks after a fire sale quarter is a profitable strategy. The do file LongShort.do implements the following strategy and computes its performance:

- Each month, sort stocks based on their past year MFFlow lagged by one quarter.
- Go \$1 long in the equal-weighted portfolio of stocks in the bottom decile and \$1 short in the equal-weighted portfolio of stocks in the nine other deciles.
- We then have a time-series of the monthly returns of the strategy. We compute:
  (a) the average return
  (b) the CAPM alpha
  (c) the 3-factor Fama-French alpha

Question 5 Explain why the alpha increases from (a) to (b) and decreases from (b) to (c).

Question 6 (c) indicates that the strategy loads strongly on HML. Explain why this was expected.

Question 7 (optional) Refine the strategy to improve its performance. Discuss.

The deadline for handing out your work is Monday 2 March before the beginning of the class. You must send to hombert@hec.fr (i) a pdf file with the answers, no longer than 3 pages for questions 1 to 6 (including the graph in question 2) and (ii) a do file that generates the graph for question 2.