

Overall Working Video on Securities borrowing and lending (SBL) in TWSE:

https://youtu.be/1aJIENMQ_8

Testing day date:

2 Dec 2022

Finding

- In TWSE, borrowing is quite common. From the testing day, it is approximately 7.2 stocks borrowed which is more than 2% of its available number of shares per 5 minutes.
- As the trading hour is short, the gap could be large when the market opens due to non-trading hour factors.
- SBL Short Sales Trading Volume of testing date is 120,085k shares with a trading value of NT \$6,050,638,460. Among all SBLs, the Security ticker is \$2330.TW has the largest SBL Short Sales Trading value of NT \$567,031,500, as it is Taiwan Semiconductor Mfg. Co. Ltd, so it makes sense by this volume.

\$2330.TW has a slight drop with -1.2% on that day, given that the SBL of that day is more than its 10 days average of NT \$410,896,650 ($567,031,500 > 410,896,650$). It is because its chairman spoke about Taiwan's power supply issue, while \$2330.TW production heavily relies on energy supply, bringing downward pressure on the stock price. Renewable energy has once again attracted attention, and wind power concept stocks have been turning bullish.

- The 25th largest SBL Short Sales Trading value is a wind power concept stock - CHUNG-HSIN ELECTRIC & MACHINERY MFG. CORP. (\$1513.TW). SBL Short Sales Trading value of the previous trading day dropped from NT \$57,005,000 to NT \$51,910,200 and SBL. Together with the SBL dropped, the stock price rose 10% on the testing day and rocketed around 40% since the 2022 start. The rise is potentially due to the resurgence of the power supply problem and echoes with \$2330.TW's chairman's concern.



Affect on daily work

- The top 15 stocks that have the highest lending available shares decreased compared to their SMA will be shown, meaning a player outside wants to short or sell, either to hedge or bet the delta, which will bring downward pressure to that stock. Real-time monitoring of these stocks can be useful for daily work.
- News of Taiwan (TVBS and Taipei Times) is put inside the web, so we can monitor any news and data in real time. I would link to Bloomberg if I got access to it! However, I currently do not have access.
- Day Start lending available shares column has been added, a side note is that it needs to be run at 9:00 in order to gather data. The daily movement of the target stocks could be used as a reference by traders.

The screenshot shows a web application interface. At the top left, there is a form with 'Enter threshold:' and a 'Submit' button. Below it, it says 'threshold of difference: 0.99'. The main content area is divided into two columns. The left column contains a table with the following data:

stock_code	free_shares_SBL	free_shares_SBL_SMA	day_start	difference
1305	110230	112896.66666666667	117230.0	-0.023620419852962926

The right column contains three sections: 'Indexes', 'Breaking News', and 'TVBS'. The 'Indexes' section shows a table with the following data:

Index	Value	Change
Formosa	17122.26	-0.19%
TAIEX	14970.42	-0.28%
TPEX	191.72	0.73%
TX122	14895.00	-0.57%

The 'Breaking News' section is titled 'Taipei Times' and lists several news items: '2022 ELECTIONS: DPP routed across the board', 'Outdoor mask rule to be lifted Dec. 1', '2022 ELECTIONS: Chiang Wan-an claims victory in Taipei election', 'Vote "not likely" to affect 2024 result', and 'US identifies four invasion possibilities'. The 'TVBS' section lists several news items: 'IMF總裁下馬訪中 將討論清零措施與債務減免 全球 35分鐘前', '觀點 / 世代對話的第一步 開羅金融科普對話 理財房地產 1小時前', '嚴格清零政策衝擊經濟 IMF總裁從大陸結束對台 大陸 1天前', '停滯性通膨重現? 韓金權曝央行政策 預期Q4投資動能 生活 2022/11/29 16:16', and '儀式升息? 韓金權點出台灣經濟和緊縮政策4原因 生活 2022/11/29 16:16'.

- Daily average of SBL could be scraped on this [web](#). Our real-time data can also be gathered 24/7 outside trading hours to give us a more detailed analysis. By comparing current SBL to those averages, traders can find out which companies are outliers. This gives Schonfeld's trading team an edge over other traders, because they can prepare for those outliers before market open, for example, by doing more research and adding these stocks to the watchlist on the system before the market open.

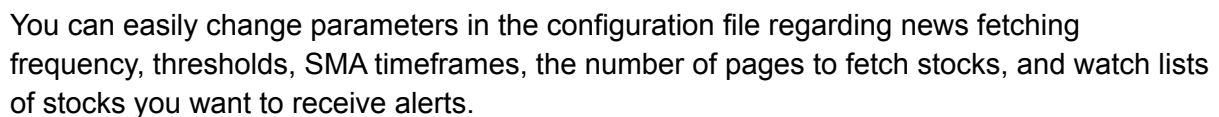
Methodology on Scraping

- The python program leverages the selenium library to imitate browser behavior such as clicking the dropdown list button and switching pages.
- The program will first open the website url and click on the maximum records of stocks per table. After getting into the correct state of the website content, the program will start to scrap the data.
- it scraps the table of “Real Time Available Volume for SBL”, which include stock code, remaining short sales quota, and last modified time, and get the first one at the start of the day.
- Once the program got the data needed for calculation, it will start to calculate the simple moving average of the configured timeframe of short sales quota for each stock, the difference between the current and SMA short sales.
- Then, the program will filter out those rows with zero elements in short sales quota to avoid program bugs.
- Next, the program will scrap News on Taipei times and TVBS for the most popular and recent news.
- While the program is preparing data for presentation, another thread of the program already starts the Flask app of website hosting to accept user requests.
- When the program finished getting all the data, it will update the front automatically without affecting the user experience.
- The program will also log the program start time and duration of running.
- The data on the difference between SMA and the current short sales quota will also be output in CSV file for a reference check.

```
df_sma_diff_current_price.csv — TwStockShortQuota
1  ,stock_code,free_shares_SBL,day_start,difference,free_shares_SBL_SMA
2  0050,0050,98636.0,118636.0,1.0,98636.0
3  00500,00500,10143.0,10143.0,1.0,10143.0
4  00809,00809,155806.0,155806.0,1.0,155806.0
5  00887,00887,23377.0,23377.0,1.0,23377.0
6  00886,00886,18609.0,18609.0,1.0,18609.0
7  00885,00885,3632600.0,3632600.0,1.0,3632600.0
8  00848,00848,21658.0,21658.0,1.0,21658.0
9  00891,00891,992943.0,992943.0,1.0,992943.0
10 00830,00830,21177.0,21177.0,1.0,21177.0
11 00881,00881,96336.0,96336.0,1.0,96336.0
12 00878,00878,250.0,250.0,1.0,250.0
13 00877,00877,168322.0,168322.0,1.0,168322.0
14 00876,00876,37579.0,37579.0,1.0,37579.0
15 00875,00875,33272.0,33272.0,1.0,33272.0
16 00870,00870,11779.0,11779.0,1.0,11779.0
17 00882,00882,776810.0,776810.0,1.0,776810.0
18 00892,00892,674854.0,674854.0,1.0,674854.0
19 00893,00893,1386141.0,1386141.0,1.0,1386141.0
20 00894,00894,148377.0,148377.0,1.0,148377.0
21 00909,00909,119581.0,119581.0,1.0,119581.0
22 00908,00908,85888.0,85888.0,1.0,85888.0
23 00907,00907,100228.0,100228.0,1.0,100228.0
24 00906,00906,1408.0,1408.0,1.0,1408.0
25 00895,00895,60883.0,60883.0,1.0,60883.0
26 00904,00904,149502.0,149502.0,1.0,149502.0
27 00903,00903,422602.0,422602.0,1.0,422602.0
28 00902,00902,557624.0,557624.0,1.0,557624.0
29 00901,00901,81053.0,81053.0,1.0,81053.0
30 00900,00900,213.0,213.0,1.0,213.0
31 00899,00899,192.0,192.0,1.0,192.0
32 00898,00898,97980.0,97980.0,1.0,97980.0
33 00897,00897,162328.0,162328.0,1.0,162328.0
34 00896,00896,149485.0,149485.0,1.0,149485.0
35 00895,00895,164590.0,164590.0,1.0,164590.0
36 00878,00878,310.0,310.0,1.0,310.0
37 00910,00910,9559.0,9559.0,1.0,9559.0
38 00858,00858,12202.0,12202.0,1.0,12202.0
39 00853,00853,12407.0,12407.0,1.0,12407.0
40 00840,00840,10113.0,10113.0,1.0,10113.0
41 00836,00836,11612.0,11612.0,1.0,11612.0
42 00834,00834,11513.0,11513.0,1.0,11513.0
43 00831,00831,200.0,200.0,1.0,200.0
44 00830,00830,467658.0,467658.0,1.0,467658.0
45 00798,00798,10776.0,10776.0,1.0,10776.0
46 00841,00841,10743.0,10743.0,1.0,10743.0
47 00795,00795,78567.0,78567.0,1.0,78567.0
48 00793,00793,11893.0,11893.0,1.0,11893.0
```

```
127.0.0.1 -- [02/Dec/2022 12:03:06] "GET /data_json HTTP/1.1" 200 -
127.0.0.1 -- [02/Dec/2022 12:03:06] "GET /watch_list HTTP/1.1" 200 -
```

- ### The system code and config file (Using 5 min as the Sma and getting 400 stocks)



Design flagging/ Alert for significant events

- The top 15 stocks that have the highest lending available shares decreased compared to their SMA will be shown, and will alert the team when the drop in past minutes exceeded the threshold which is interactive on the web I design. It could flag significant events in the market.
- Note that percentage of the difference is used to filter out the effect of larger volume stocks will always appear on the top, so we compare the stock with its average rather than the volume and traded value of itself. This can fairly spot some significant events.
- Current holdings will be shown differently on the list with the **Red ticker**, so the traders can be careful and alerted when they saw these stocks in our holdings are being shorted or selling outside, i.e. stock ticker 53 is in our watchlist or holding.

stock_code	free_shares_SBL	day_start	difference	free_shares_SBL_SMA
1444	86219	88219.0	-0.007672918816682528	86885.66666666667
0053	953	953.0	0	953

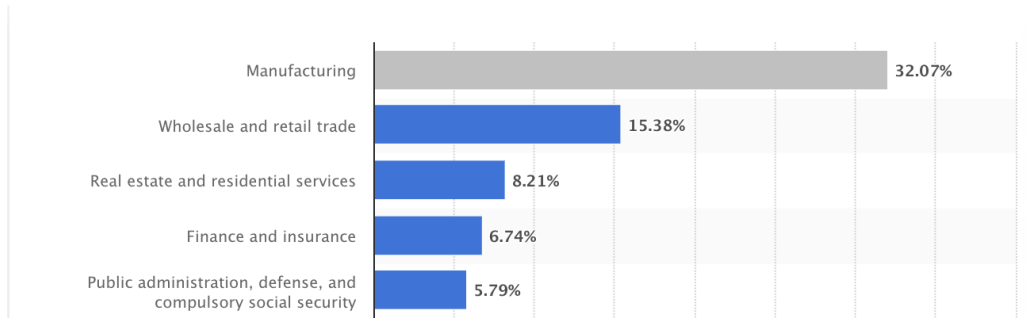
- The future of TW, TX122 (Can add MSCI later if have time) is added to see sudden movement by the market and flag the volatile market, which risk management measures should be conducted at once. ([Video](#))
- I could also get more real time data first, and make the threshold setting more scientific, but I would make it interactive to let the traders interact with it and filter out their optimised threshold for their trading style.
- Optimisation:
By combining daily and hourly data, traders could make even more precise analyses of the target stock's overall situation by analyzing the average and distribution of the SBL changes. A visual representation of the SBL is necessary to help traders compare it with the past few days and months and flag significant events.

Trading Idea

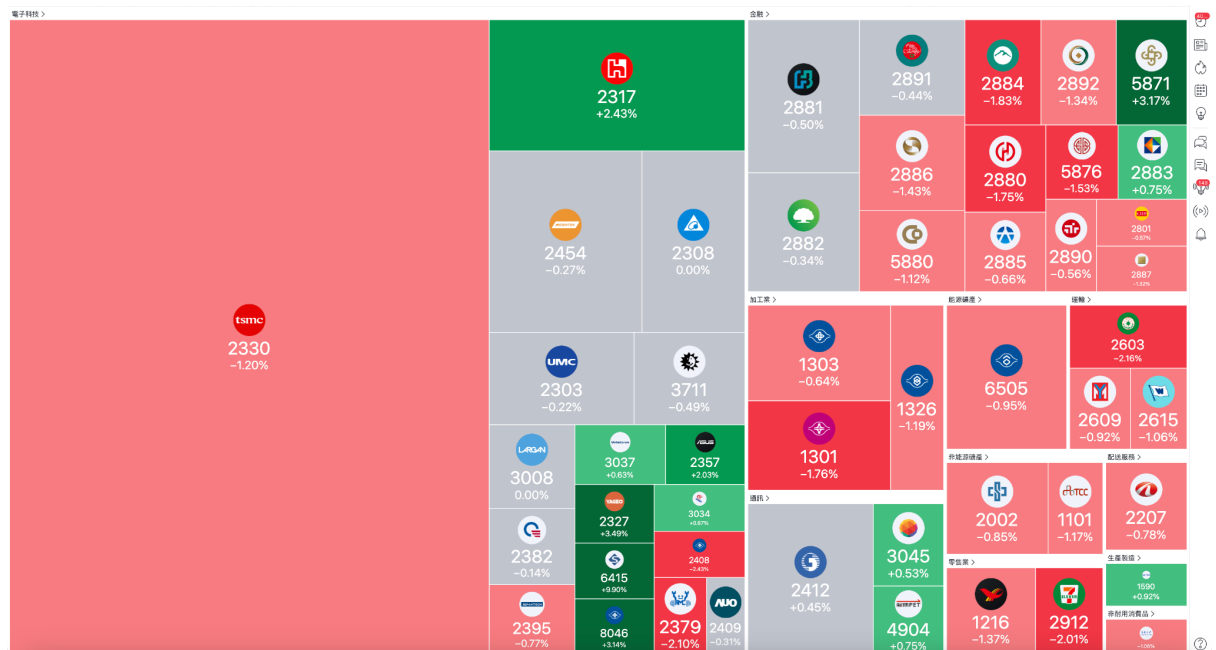
- Depending on resources and time, I may analyze not only intraday, but also the overall trend and changes of the SBL. In what ways and correlation has the stock price been affected by the trend and changes of SBL?
- When there is a non-equilibrium state, arbitrage by borrowing from other institutions at a lower rate and earning the interest spread can be conducted, which yields riskless profit (surely beware of the transaction fee and counterparty risk although the borrower provides collateral under the arrangement, against the risk that the future transfer of securities is not completed satisfactorily.)
- If a stock is on demand to be borrowed outside, meanwhile, that stock is in Schonfeld's holdings, and has no incentive to sell it. The action is to lend the stock to those short sellers, transfers any eligible securities to the borrower, and earn interest from short sellers.
- During the sign that outsiders are going to short that stock, it will be an ideal time to buy shares for clients in lower slippage when having the order to execute. It will also be a great time to shop after short sellers shorted.

Knowledge around TW exchange Mirco-structure

- From 7:40 to 8:40, the exchange broadcasts before-hour information. On all days of the week, except on Saturdays, Sundays, and holidays declared by the exchange in advance, it has normal trading sessions from 09:00 to 13:45.
- TW GDP is highly related to these few industries



Therefore, news of these industries will affect the index heavily and could increase the SBL of the overall market.



- Traded Volume of the testing day is NT \$ 223,099 M
- Order Book Depth average is NT\$ 11.27M per second ([Source](#))
- TAIEX measures the stock market performance of Taiwanese public companies by aggregating the performance of their listed stocks on TWSE.
- Testing day Top 5 Securities by Volume:
\$1605.TW, \$00632R.TW, \$1513.TW, \$2317.TW, \$2498.TW

Struggles on the project

- It is my first time touching the TW market, I do not even know the market hours beforehand, I know nothing except \$TSM.
- Since the program is real-time continuously getting data from websites, if we don't use multi-threading or asynchronous programming, we cannot achieve non-blocking concurrent running. However, it is needed for an efficient and good user experience.
- As I am not so familiar with frontend programming, especially in javascript and css, I self-taught myself to be able to build MVP products without bugs.
- The interactive and alert parts of the frontend program are also worth time tackling such as changing color with server-side updates.
- It is because it is a relatively simple project, and codes and UI are put as simply as possible. Codes could be reviewed more and organized.

Thank you!