

Measuring Panic in Banking System

Dingqian Liu

Abstract: Panic in banking system has the possibility to trigger economic recession. However, a solid argument requires a measurement of banking panic which is difficult for historical data. Using machine search on Commercial and Financial Chronicle, this paper generates an innovative weekly Banking System Panic Index (BSPI). It can not only serve as a relatively accurate way to identify the start of panic, but also is helpful to uncover the causal relationship between bank panic and economic contraction. Combined with business cycle data from NBER, the empirical result shows that the causality is a case by case issue, and both direction appeared in the period (1867.06.01--1892.11.05) investigated in this paper.

Keywords: Panic, Machine Search, Economic Contraction

1. Introduction

Banking System is the core of modern financial system. Real economy relies on banks for liquidity to perform investments, especially big ones. On the other hand, banks link all the real economy entities together, as a certain rate of bank loan default threatens banks' ability to provide liquidity to other companies. Furthermore, banks also perform inter-bank lending. When a bank performs acquisition and merge, it becomes a big bank, having business with many banks and companies. People call these big banks "system-important" banks.

The importance of banking system makes banking crisis a big issue to the society. Kindleberger and Minsky see banking crisis as an essential part of the business cycle. In contrary, Calomiris blames governmental regulations, which encourage banks with risk-taking behavior. In my opinion, it is natural that several banks in the banking system suffer from liquidity or similar problems. However, it's important to identify when this failure or the fear of systematic failure becomes a universal issue. As panic acts like an infection, it changes the expectation of bankers, the public and finance managers, and hence change their behavior. It is possible that it is this shift of expectation that cause the severity of the bank crisis in the history.

However, there are two challenges as pointed out by Jalil (2015). First, it is hard to identify when the panic starts. Second, it is hard to tell the mutual causal relationship between panic in the banking system and the downturn of the economy.

Following Jalil's methodology, this paper measures the panic in the banking system, using the weekly newspaper Commercial and Financial Chronicle (CFC) (1867.06.01--1892.11.05)¹ with machine search. The result delivers weekly measure of the panic in the system.

2. Methodology

This paper performs machine search on the weekly CFC (1867.06.01--1892.11.05). The terms, which also follows Jalil, are shown as follows:

- (1) bank failure, bank suspension, bank run, bank closure, bank crisis, bank panic, bank disturbance
- (2) financial crisis, financial disturbance, financial revulsion
- (3) suspension of payments, suspension of specie payments
- (4) crash, crisis, panic, revulsion, run, suspension

It is important to point out that, the keywords above should cover all the panic emotion in the banking system (if not, it is still close). Category (1) delivers the direct measurement of panic in the banking system, while category (2) also captures the negative emotion in financial system, which is inner-correlated with banking system. Category (3) and (4) captures the default or panic related to individual company, or worries on projects related to several companies. Therefore, the results from machine search of these terms should be a comprehensive measurement of panic in the banking system. As stated in the introduction part, banking system naturally connects real economy and financial system, and the panic in banking system would potentially shift people's expectation.

¹ All the weekly newspapers are downloaded as PDF format, which needs to be transformed into TXT format, as this is the required input file format for Python to process textual analysis. The computer takes some time to transfer all the files, this time period is the most I can achieve before the deadline.

The steps of generating this Banking System Panic Index (BSPI) is as follows:

- (1) Search all the keywords in the weekly newspaper;
- (2) Aggregate them together and calculate standard deviation (SD), and the Raw Index (RI)

$$RI = \frac{\text{Aggregated \# of key words}}{SD}, \text{ then calculate the mean of RI (M);}$$

- (3) Calculate Banking System Panic Index (BSPI), $BSPI = \frac{RI}{SD * M} * 100$.

Using the same methodology, this paper also provides direct measurement of banking panic (BSPI-B) with term category (1), panic in financial system (BSPI-F) with category (2), and company level panic (BSPI-C) with category (3) and (4). Importantly, as the keywords in BSPI-C covers partial words in (1) and (2), the RI of BSPI-C will exclude the counts using (1) or (2).

3. Empirical Result

The weekly BSPI is shown in Figure 1.

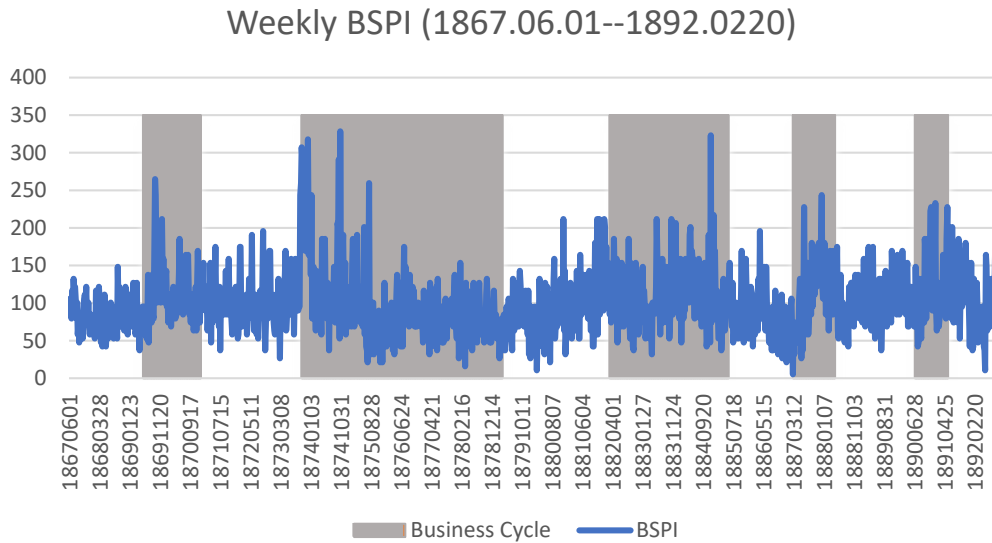


Figure 1 Weekly BSPI

In Figure 1, gray area shows the contraction of business cycle according to NBER definition². It is apparent that bank panic accompanies with every economic contraction. However, look closer,

² <https://www.nber.org/cycles.html>

one can tell that the causal relation between each economic contraction and panic in banking system is different. Since time series is an acyclic process, it is worth to argue that for recession 1873-1878 and recession 1882-1885, banking system panic led the economic contraction. In contrast, recession 1869-1870, recession 1887-1888 and recession 1890-1891, economic contraction led the banking system panic.

Without a solid econometric practice, I can just give a vague statement that there's a strong correlation between banking system panic and economic contraction. However, the direction of causal relationship is underdetermined. As it can be seen from Figure 1 that the direction can reverse depending on which recession. Still, it delivers an important information to policy makers, monitoring panic in banking system is an essential part to prevent economic contraction, as it is possible that a severe bank panic can trigger the economic contraction.

However, apparently it is not the only reason of economic downturn. For example, during 1873-1878 crisis, even though the BSPI turned down (lower than the mean 100) for a long while since 1876, the recession still continued. In this case, BSPI can act as a warning for the policy makers to look for other aspect of economy for risks.

The result of Figure 1 can also provide new evidence of when the panic started. Jalil (2015) demonstrated with tables that Kemmerer (1910) had incorrect measurement for several discrete time points. However, the BSPI index is perfectly consistent with neither, indicating the value of weekly frequency data.

Categorical Index plots are shown below.

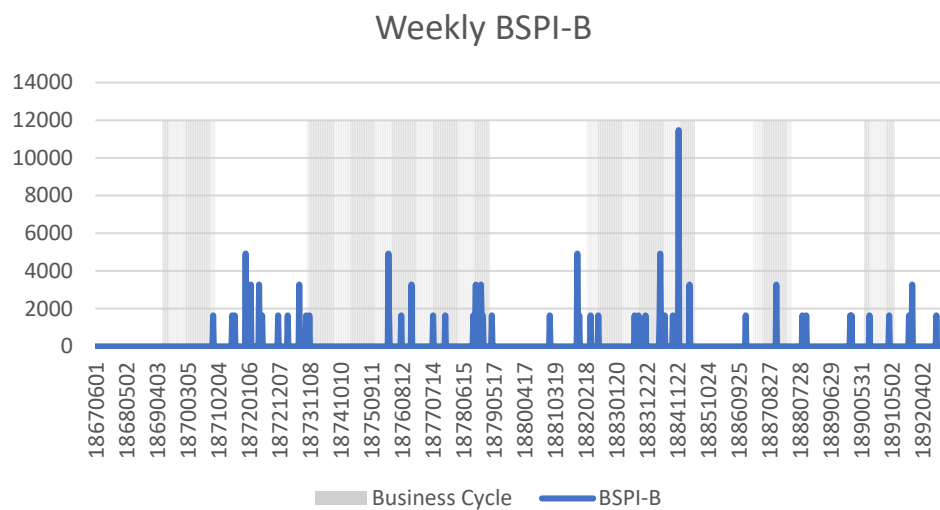


Figure 2 Weekly BSPI-B

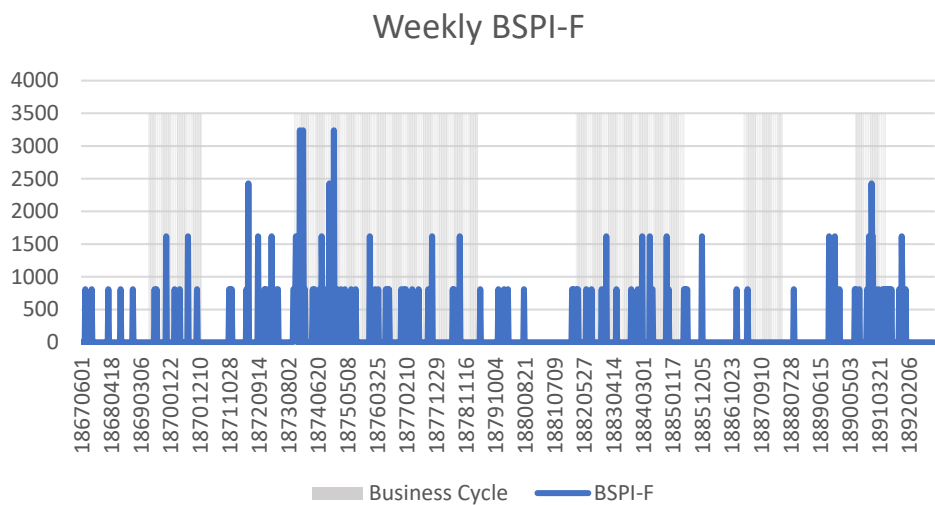


Figure 3 Weekly BSPI-F

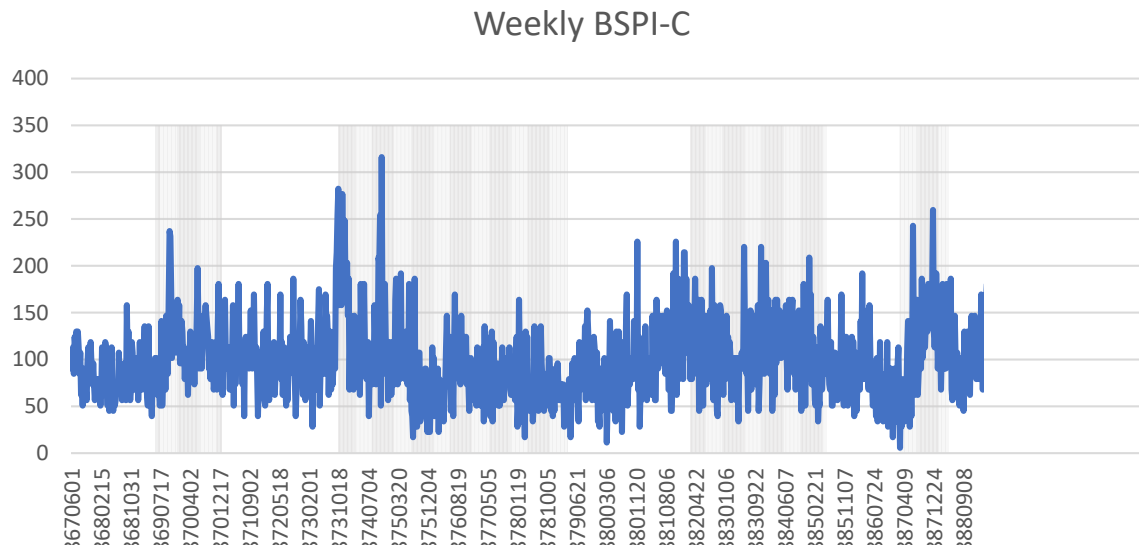


Figure 4 Weekly BSPI-C

Comparing the three Figures above, it is very clear that BSPI-C dominates other 2 category indexes. It fits the history that during 1867-1892, the system of banking was more uncentered, comparing to today's. And there was not such a thing called "systematic important". The phenomenon of the market is the aggregate result of individuals.

Specifically, for the 1882-1885 recession, evidently, there is a big spike of BSPI-B without such a big pike of BSPI-C. However, Figure 4 shows that the individual panic accumulated since 1879 before the 1882-1885 contraction, as BSPI-C increases along a trend since 1879.

4. Conclusion

Using machine search for key words, this paper generates a weekly Banking System Panic Index (BSPI). This index can serve as a useful indicator for the panic emotion in overall banking system. Clearly, for every economic contraction, it accompanied with a rising trend of BSPI. Yet, the causal relationship between economic downturn and the panic emotion in overall banking system is underdetermined. It is a case by case issue.

Due to the observation period (1867.06.01--1892.11.05), this BSPI is dominated by the aggregate behavior of individual companies or projects. I believe the categorical index's behavior changes for later historical period, requiring further work with the newspaper. If had a

long enough series of this index, I can probably move on to research the causal relationship with a VAR or TVP-VAR approach.

References

Calomiris, Charles W. "Banking crises yesterday and today." *Financial History Review* 17, no. 1 (2010): 3-12.

Diamond, Douglas W., and Philip H. Dybvig. "Bank runs, deposit insurance, and liquidity." *Journal of political economy* 91, no. 3 (1983): 401-419.

Jalil, A.J., 2015. A new history of banking panics in the United States, 1825-1929: construction and implications. *American Economic Journal: Macroeconomics*, 7(3), pp.295-330.

Kemmerer, Edwin Walter. Seasonal variations in the relative demand for money and capital in the United States: A statistical study. Vol. 588. US Government Printing Office, 1910.

Moen, Jon, and Ellis Tallman. "New York and the politics of central banks, 1781 to the Federal Reserve Act." (2003).

Sprague, Oliver Mitchell Wentworth. History of crises under the national banking system. Vol. 538. US Government Printing Office, 1910.