Economic Letter 2019/03

A simple financial conditions index for Hong Kong

Kent Yau
Senior Economist

March 2019

Abstract

This article proposes a simple financial conditions index (FCI) that comprises five finance-related indicators as a tool for quick assessment of Hong Kong's overall financial conditions. Apart from discussing the construction of the index, the article also observes that the proposed FCI is able to highlight the exceptionally tight financial conditions in Hong Kong during the Asian Financial Crisis and Global Financial Tsunami, and to forewarn against some of the major economic and stock market downturns in the past two decades. Several technical caveats for the FCI's potential users would be raised in the article as well.

香港金融狀況指數

摘要

本文提出以五個金融相關指標簡單構成的金融狀況指數，對香港的金融狀況作出快速和整體性的評估。文中除探討指數的建立方法外，同時亦觀察到金融狀況指數能夠指出香港金融狀況於亞洲金融風暴和環球金融海嘯時所出現的極端緊縮，以及預警於過去二十年間，其中數次經濟和股市大幅下滑。本文亦為金融狀況指數的潛在使用者，指出數個利用該指數時需注意的技術限制。

I. INTRODUCTION

1. In a modern economy, there are strong linkages between the financial sector and real economic activities. Financial conditions can be transmitted into the real economy through many channels: the availability and cost of credit, which influence businesses' investment decisions; the performance of asset markets, which have a bearing on consumption through wealth effects; and movements in exchange rates, which could impact an economy's trade competitiveness as well as its rate of inflation.

2. There is no lack of information for monitoring financial conditions, and data are often available at high frequencies or even in real time. However, the tremendous volume of such information may not be very conducive to making an overall assessment. The often-conflicting signals offered by different indicators may actually hamper monitoring efforts at times, even for professionals.

3. Meanwhile, univariate indicators such as gross domestic product (GDP), unemployment rates, non-performing loan ratios, and stock market indices (including the Hang Seng Index, HSI, in Hong Kong) are well-established methods of measuring the general performance of specific aspects of the macroeconomy and financial markets.

4. Armed with the above considerations, this article will discuss the construction of a univariate Financial Conditions Index (FCI) as a tool for facilitating quick assessment of overall financial conditions in Hong Kong. It aims to be an indicator that is easy to understand for different types of users, ranging from the general public to professional analysts. The article will propose the data and methodology used for constructing a simple FCI, discuss observations arising from the index's values over the past two decades or so, briefly review a number of potential uses for such an FCI, and highlight some caveats for using the index.

II. INTERNATIONAL EXAMPLES

5. Recognising the usefulness of FCIs, a number of international organisations, central banks and data providers publish various versions of such indices either regularly or on an ad hoc basis. Nevertheless, their compilation methodologies and approaches diverge noticeably:

- Some of the FCIs (for instance, those compiled by Bloomberg and US regional Federal Reserve Banks, including the Chicago Fed and the Kansas City Fed) confine the coverage of factors to finance-related indicators[1] only, whereas others (such as the International Monetary Fund, IMF, and the Asian Development Bank, ADB) include real economy indicators[2] in the aggregated FCIs as well;

- Meanwhile, coefficients for indicators, when compiling FCIs, could be equal-weighted (Bloomberg) or determined by analytical methods like Principal Component Analysis (PCA; adopted by the ADB and the Federal Reserve) and Vector Auto-Regression (VAR; adopted by the IMF); and
- In terms of geography, the ADB and the IMF constructed FCIs for five Asian economies and over 40 global economies respectively, while Bloomberg offers FCIs for selected economies and regions. On the other hand, the Federal Reserve regional banks' focuses are naturally on US domestic financial conditions.

6. For Hong Kong, the Hong Kong Monetary Authority (HKMA) published a research memorandum in September 2016[3] proposing two sets of FCIs and investigated their effectiveness in adding value to projections of GDP growth in Hong Kong.

III. DATA AND METHODOLOGY

7. The practices of the various organisations above are useful references for constructing a simple FCI for Hong Kong. The remainder of this article will describe the proposed FCI and highlight some observations regarding the index over the past two decades before concluding.

8. Salient features of the FCI for Hong Kong are as follows:

- The FCI will use a handful of finance-related indicators as factors, namely (1) the 3-month HIBOR-Exchange Fund Bill spread and (2) the 3-month HIBOR-US Treasury Bill spread (to gauge local liquidity conditions); (3) the Hong Kong Dollar 12-month forward rate and (4) the HSI Volatility Index (VHSI) (as indicators of investor sentiment); and (5) the Kansas City Financial Stress Index (KCFSI; to incorporate international financial conditions);

[1] Including interest rate spreads and levels, credit spreads, money supply, equity prices, indicators for equity market volatility and sectoral performance, and exchange rates.

[2] Including GDP, commodity prices, and property prices.

[3] "Financial Conditions Indexes for Hong Kong", *Research Memorandum 09/2016*, HKMA, September 2016.

- It is worth noting that factor (2) above would compare local liquidity conditions vis-à-vis international level and factor (5) uses a US financial conditions index as a crude proxy for global financial conditions, thereby help take into account the high degree of connectivity between Hong Kong's financial system and global financial markets;
- The FCI will be compiled with daily frequency, and the coefficients (or "loadings") assigned to the five factors in the FCI will be determined by PCA using data from January 1996 to December 2017;
- Values of all factors will be normalised (to means of zero and standard deviations of one) before the loading for each factor in the FCI is estimated[4], and consequently the FCI would have a mean of zero (though the FCI's standard deviation is not equal to one); and
- More specifically, a higher FCI value indicates tightening financial conditions in Hong Kong, while a lower value signifies more benign local financial conditions.

9. Given that the FCI has a mean of zero over the estimation period, a positive FCI can therefore be generally considered as reflecting "tighter-than-average" financial conditions in Hong Kong.

IV. RESULTS AND OBSERVATIONS

10. Applying the loadings found through PCA[5] to the normalised values of the five finance-related indicators mentioned in the preceding section, values of the simple FCI since 1996 are calculated and depicted in ***Chart 1***.

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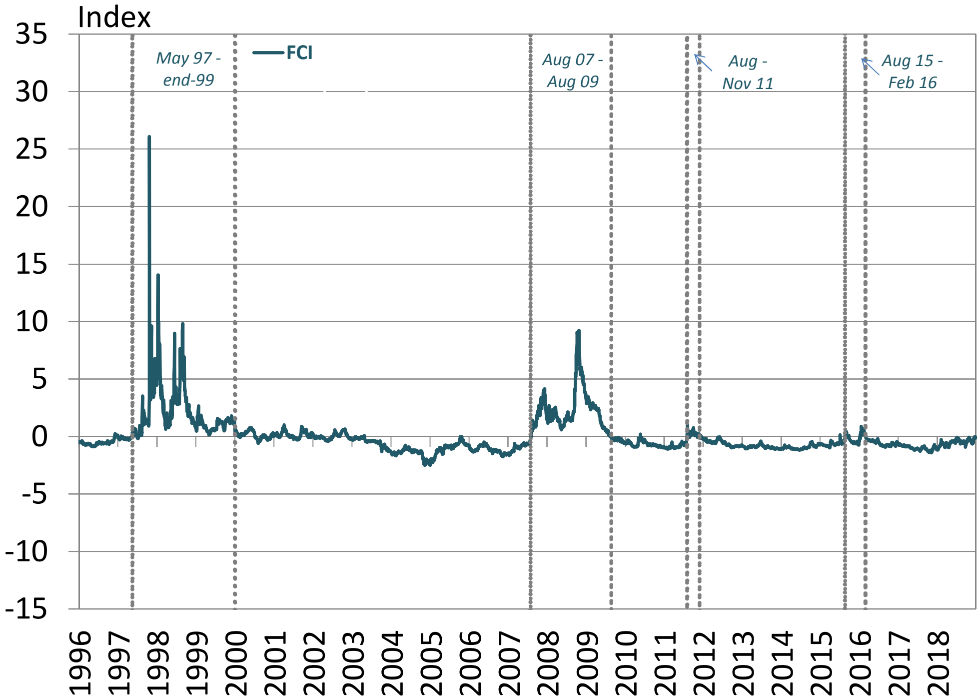
4 The VHSI has only been reported since January 2001. Normalised values of the VHSI from January 1996 to immediately before that date are set at zero.
The KCFSI is reported on a monthly basis. Normalised values of the KCFSI for individual months have been adopted for all the trading days that fall into that month.

5 We propose picking PCA as our methodology to formulate the FCI as a simplified assessment of financial conditions because PCA can serve as a dimension-reduction tool for reducing a larger set of variables to a smaller set with the objective of preserving as much information and underlying trends from the larger set as possible.

Chart 1: A Simple FCI for Hong Kong – Values from 1996 to 2018



Source: Staff estimates.

11. One key observation is that, since 1996, the FCI stayed largely positive (i.e. signifying tighter-than-average financial conditions in Hong Kong) for two protracted periods: From May 1997 to December 1999 and from August 2007 to August 2009. It should be no surprise that these periods coincided with the two episodes of dire financial turmoil Hong Kong has experienced since the mid-1990s, i.e. the Asian Financial Crisis and the Global Financial Tsunami respectively.

12. Even so, the FCI displayed rather distinct patterns over the two periods:

- The tightening of local financial conditions appeared much sharper in 1997 to 1999 than that experienced in 2008 to 2009 when judging by the values of the FCI[6], which surged to as high as 26 in October 1997 as compared to a peak of under 10 in October 2008;
- There were also multiple high points for FCI values observed from 1997 to 1999 apart from October 1997, and the FCI rose to over 10 in January 1998 as well as to high single-digit levels in June and August 1998, suggesting frequent relapses of exceptionally tight financial conditions in Hong Kong over the period;

[6] Moreover, given that normalised values of VHSI are set at zero before 2001 (see footnote 4 for more details), values of the FCI spikes from 1997 to 1999 could be even higher if we incorporate any proxy estimates for volatility in the HSI in this period.

- Moreover, even after the FCI subsided from its relatively high level in August 1998, it remained in positive territory for most of the following four years; and
- On the other hand, the FCI only took about 10 months after reaching its peak in October 2008 to revert into negative territory and stayed below zero for a relatively extended period.

13. Another noticeable observation is that, since August 2009, the FCI has remained mostly below zero to indicate more benign-than-average financial conditions in Hong Kong over almost a full decade. Only two brief periods from August to November 2011 and from August 2015 to February 2016 were the exceptions, which were driven by the outbreak of the Euro debt crisis and a local stock market correction respectively. However, not only were these episodes of tighter-than-average local financial conditions short-lived (both lasting less than half a year), but also the FCI suggested that the deterioration in conditions was not severe especially when compared to the 1990s' Asian Financial Crisis and the late 2000s' Global Financial Tsunami.

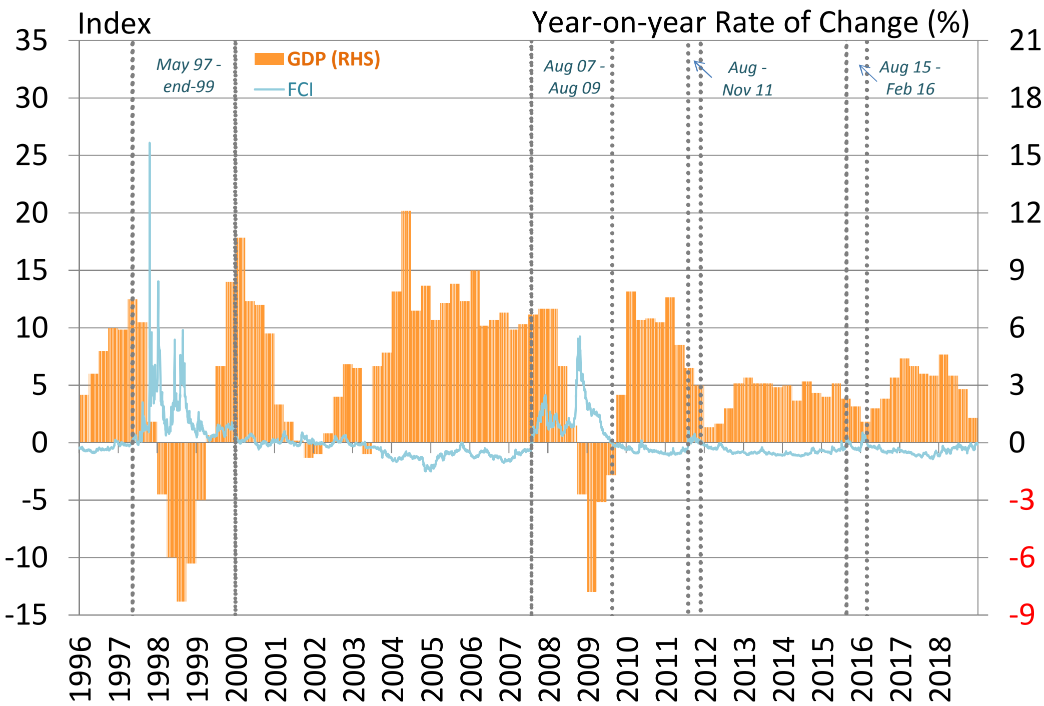
14. While the loadings for the FCI were estimated with data from 1996 to 2017, we may attempt to extend the index into 2018 by combining the loadings with the latest values of the five finance-related indicators. Values of the FCI synthesised in this manner suggest that financial conditions in Hong Kong in 2018 were generally benign when compared to the average from 1996 to 2017. Nevertheless, values of the FCI in late 2018 have been edging closer toward the zero mark, possibly hinting that local financial conditions have become less ample than the situation in late 2017 and early 2018.

V. POTENTIAL USES FOR THE FCI

15. While the values of the simple FCI since 1996 appeared to generally conform to the perceived development of financial conditions in Hong Kong over the period, we can also compare the movements of the FCI with indicators of the real economy and asset markets. This would provide further perspective on whether the index has properly captured local financial conditions through observing their interaction with the performance of the Hong Kong economy as well as our financial / asset markets. Moreover, if we can identify consistent patterns between the FCI and economic / financial / asset market indicators, the FCI can be a useful tool to complement existing macroeconomic and financial sector surveillance.

16. Adding year-on-year economic growth for Hong Kong since 1996 to the preceding ***Chart 1*** generally echoes the findings by the IMF, ADB and HKMA that there are strong linkages between financial and macroeconomic conditions (***Chart 2***).

Chart 2: Year-on-year GDP growth versus FCI for Hong Kong



Sources: C&SD and staff estimates.

17. More specifically, economic performance in Hong Kong was noticeably substandard during the two periods of protracted significantly positive FCI values, namely from Q2 1997 to Q4 1999 and from Q3 2007 to Q3 2009. More specifically, the rates of year-on-year changes in GDP deteriorated severely to -8.3% (Q3 1998) and -7.8% (Q1 2009) at one point within those periods respectively. Meanwhile, the slowdown in economic growth during the two short-lived periods with positive FCI values in 2011 and 2015-16 was relatively noticeable as well, although the rates of year-on-year changes in GDP managed to stay positive throughout the two periods.

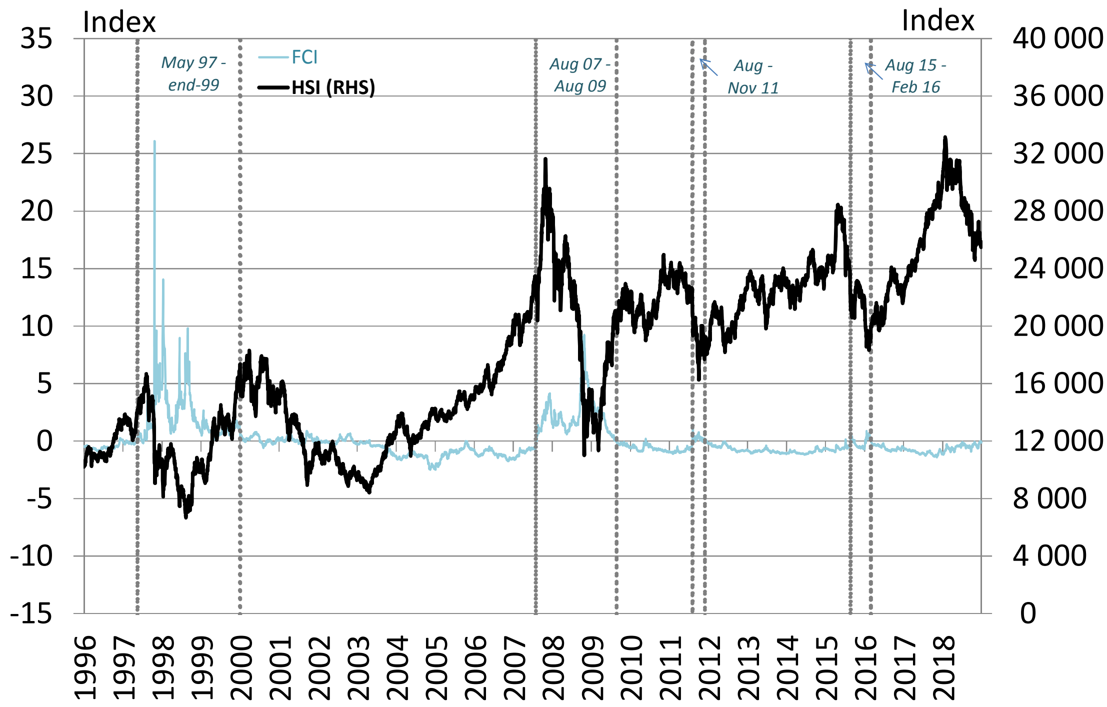
18. In addition to linkages to overall economic performance, financial and asset market indicators could also be influenced by overall financial conditions in Hong Kong. For example:

- Tightened financial conditions could raise the cost of borrowing (thus deterring demand for loans) as well as dampen the supply of credit when banks became more cautious in managing their loan portfolio;
- Local financial conditions could depend on the direction and magnitude of capital flows, which would affect asset price performance including stock prices as well; and
- Property prices, meanwhile, could be driven by both developments in the credit market (specifically, mortgage lending activities) and fund flows as mentioned above.

19. Yet it is conceivable that borrowers (for changes in credit market conditions) and investors (for asset prices) would react to other adverse economic developments apart from any significant changes in financial conditions, thus there may not necessarily be unambiguous or even generally consistent patterns between the FCI and the financial / asset market indicators mentioned above.

20. For instance, stock market performance (as proxied by the HSI) showed varied dynamics over periods with significantly positive FCI values (***Chart 3***). In the 1997-99 and 2007-09 cycles, the FCI turned positive to signal tighter-than-average financial conditions around three months prior to the peaking of the HSI. On the other hand, stock prices had already started retreating by November 2010 and April 2015 before the FCI recorded positive values in August 2011 and August 2015 respectively, hinting that equity investors had reacted to other adverse economic developments in these cycles even before financial conditions deteriorated more considerably. As for the stock price correction that started in March 2000, FCI values were actually on a steady downtrend since the HSI hit its bottom in August 1998. Afterwards, the FCI generally fluctuated around the zero-mark without experiencing any significant surge between March 2000 and April 2003, even though the HSI saw a cumulative loss of 54% over the period.

Chart 3: HSI performance versus FCI for Hong Kong



Sources: Bloomberg and staff estimates.

21. Nevertheless, potential quantitative relationships between the FCI and financial / asset market indicators would warrant further investigation and exploration.

VI. CONCLUSION AND CAVEATS

22. The simple FCI proposed in this article appears to provide a useful gauge of financial conditions in Hong Kong, especially as it is able to highlight the two episodes of severe financial dislocation over the past two decades, namely the Asian Financial Crisis in the late 1990s and the Global Financial Tsunami from 2008 to 2009. By extending the FCI into 2018, the index suggests that the latest financial conditions remain benign when compared to the past two decades. Yet the less negative values of the FCI in most recent months could suggest a need for closer monitoring of the trends in local financial conditions.

23. Apart from measuring the general financial conditions in Hong Kong, the FCI also provides certain added value to macroeconomic surveillance given that periods of positive FCI values would hint at slowdowns in overall economic growth. In particular, in the periods of exceptionally tight financial conditions during the Asian Financial Crisis and Global Financial Tsunami, when the FCI stayed positive for protracted periods, the FCI actually turned positive before the beginning of the sharp deceleration in GDP growth rates. The FCI's relationships with financial and

asset market indicators may also be worth further exploration, although the monitoring of these indicators is likely to require attention to a wider array of factors beyond financial conditions.

24. Finally, we would like to highlight a few caveats on interpretation of the FCIs.

- First and foremost, an FCI value of zero should not be taken as a clear-cut threshold dividing tight and loose financial conditions, given that the absolute values of FCIs are very much dependent on the dataset used for their estimation;
- Moreover, the linear form imposed for the FCI's relationship with individual factors, while satisfying the objective of offering an easy to understand relationship between financial conditions and the five factors selected in the article, may compromise to a certain extent the ability of this single measure of financial conditions to summarise all the information content offered by the five factors;
- In addition, PCA analysis may not be able to capture the evolved relationship between financial conditions and the factors over time; and
- By the same token, attempting to extend the FCI beyond the sample period by combining the loadings found by PCA with the latest values of the indicators to assess financial conditions may fail to take into account any significant changes in the driving forces behind the financial conditions.

25. All in all, a univariate FCI is found to be useful in facilitating a quick assessment of overall financial conditions in Hong Kong. While its relationship with overall economic performance and financial / asset market variables would provide another helpful perspective in macroeconomic and financial market surveillance, any interpretations and predictions arising from the FCI should be taken with caution especially considering the various caveats concerning the specific way that the proposed FCI is constructed.

VII. REFERENCES (IN REVERSE CHRONOLOGICAL ORDER)

"Financial Conditions and Growth at Risk", *Global Financial Stability Report*, IMF, October 2017.

"Are Countries Losing Control of Domestic Financial Conditions?", *Global Financial Stability Report*, IMF, April 2017.

"Financial Conditions Indexes for Hong Kong", *Research Memorandum 09/2016*, HKMA, September 2016.

"Financial Conditions Indexes for Asian Economies", *ADB Economics Working Paper No. 333*, Margarita Debuque-Gonzales and Maria Socorro Gochoco-Bautista, January 2013.

"Monitoring Financial Stability: A Financial Conditions Index Approach", Federal Reserve Bank of Chicago *Economic Perspectives* (First Quarter 2011), Scott Brave and R. Andrew Butters, 2011.

"Financial Stress: What Is It, How Can It Be Measured, and Why Does It Matter?", Federal Reserve Bank of Kansas City *Economic Review* (Second Quarter 2009), Craig Hakkio and William Keeton, 2009.