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Financial Conditions Indexes for Asian Economies

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ADB Economics Working Paper Series



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Margarita Debuque-Gonzales and Maria Socorro Gochoco-Bautista
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ABSTRACT

Financial conditions indexes (FCIs) are constructed for five Asian economies, namely, Hong Kong, China; Japan; the Republic of Korea; Malaysia; and Singapore, using a principal component analysis (PCA) methodology from Hatzius et al. (2010) and quarterly data. Various financial stress indicators are included, allowing the constructed Financial Condition Index to capture important episodes in each economy's financial history. The predictive power of the constructed FCIs is higher than that of benchmark AR models and they generally outperform single financial indicators. A decomposition of the FCIs sheds light on particular sources of financial stress. A regional FCI based on the individual economy FCIs is also constructed.

Keywords: financial conditions index, Asia, principal component analysis

JEL Classification : E44, F37, G17

I. INTRODUCTION

Changes in monetary policy are assumed to initially affect conditions in financial markets before ultimately affecting real economic activity. Thus, for example, an open market sale of government bonds by the central bank or an increase the central bank's overnight lending rate would lead to an increase in market interest rates and a fall in the prices of financial assets. However, the lag in the effects of monetary policy is not known with certainty and therefore, neither is the link between intermediate and ultimate targets of policy.

A financial conditions index (FCI) attempts to bridge this divide between the state of financial markets and real economic activity. It summarizes the current state of financial variables which are linked to real economic activity. Financial variables which influence economic activity both contain information about and are also assumed to affect the future state of economic activity. Thus, an FCI is a summary indicator based on current financial variables that should, to some extent, be able to presage the future state of economic activity. In order to be useful as a predictor of future economic activity, it is important that an FCI measure financial shocks, or only exogenous shifts in financial conditions.

Interest in constructing FCIs has been heightened by the occurrence of the global financial crisis (GFC) of 2008–2009. Paying close attention to the state of financial and asset markets because of the subsequent deleterious effects of a financial crisis on the real sector is an important lesson that policymakers distilled from the GFC and from prior financial crises. Asia itself learned this lesson from having experienced two major financial crises in the last 15 years: the home-grown Asian financial crisis (AFC) of 1997–1998 and the externally-originated GFC.

Large spillovers to domestic financial markets from shocks abroad were observed during the GFC. This makes it important even for policymakers in countries that had not been at the center of the recent global financial storm, such as those in Asia, to find import in an indicator that can inform about the future state of the economy. In Asia, economies principally suffered a collapse in external demand due to the global credit crunch. The region also saw spillovers to domestic financial conditions as foreign turbulence precipitated a drop in domestic asset prices, a widening of risk spreads and a tightening of credit standards. So far, however, only a few FCIs have been constructed either for individual economies in Asia or for the region.

This study aims to add to the literature by constructing FCIs for some individual Asian economies, namely, Japan; the Republic of Korea; Hong Kong, China; Singapore; and Malaysia and use these as components to construct an Asian FCI. Principal component analysis (PCA) methodology based on Hatzius et al. (2010) is used in this study because of features that make it an improvement over earlier measures. These features include: the capacity to cover a wide array of financial data, the use of unbalanced panel techniques to lengthen the history of the index, and isolation of data from macroeconomic influences in order to work with pure financial shocks. While this methodology has its distinct advantages over others, it is important to bear in mind certain caveats that apply to all FCIs:¹ a single measure of financial conditions may not be adequate to summarize all predictive content; the importance of non-monetary factors in affecting the economy may vary over time; the response of an FCI to policy changes may vary over time; non-financial conditions affect the performance of the economy as well; the Lucas critique applies in that policymakers cannot tell ex-ante how or to what extent a policy change

¹ Hatzius, et al., 2010, pp. 4–5.

affects behavioral responses and how these are reflected in an FCI, the lack of a structural model basis for an FCI, etc.

The study is divided into the following sections: Section 2 provides a review of the literature on FCIs, specifically how they have evolved through the years, and includes a brief survey of already-existing ones for Asia; Section 3 discusses the econometric approaches to constructing FCIs; Section 4 constructs individual FCIs for the more developed Asian economies such as Japan; the Republic of Korea; Singapore; Hong Kong, China; and Malaysia; Section 5 evaluates these individual FCIs in terms of historical validity, forecasting ability, and compares them with unadjusted FCIs, in which financial variables included have not been purged of their endogenous macroeconomic component; and the conclusions are presented in Section 6.

II. EXISTING FCIs FOR ASIAN ECONOMIES

Prior to the construction of FCIs, a number of central banks used a simple monetary conditions index (MCI), typically an average of changes in a short-term interest rate and the exchange rate against a base period with weights derived from relative effects of variables on aggregate demand. Freedman (1994) originally argued for such an indicator citing the need to take into account exchange rate movements when assessing the stance of monetary policy in small open economies.

MCIs became popular by the late 1990s though their use as an operating target had been limited to only a handful of countries (e.g., Canada and New Zealand). The practice of using such indicators to evaluate how interest rates should be adjusted to compensate for swings in the exchange rate eventually had to be given up in these countries due to problems associated with incorrect identification of macroeconomic shocks.

MCIs still gained widespread use as a simple indicator of monetary policy stance. Attempts were subsequently made to widen the range of variables in order to accommodate more transmission channels, deriving indexes that summarized broader financial conditions. Those identified in the literature as pioneers in the construction of FCIs include Macroeconomic Advisers (1998), a private research firm, and Dudley and Hatzius (2000), who base the weights of financial variables on large-scale macro-econometric models (from Swiston, 2008).

Goodhart and Hofmann (2001) and Mayes and Virén (2001) both add asset prices, specifically house and stock prices, to IS-curve-based calculations of FCIs for the UK and Finland, respectively, to assess how these variables affect aggregate demand and to examine any additional information they may contribute in terms of predicting future economic outcomes such as growth and inflation. Gauthier et al. (2004), in evaluating various methods for constructing Canadian FCIs that include vector autoregression and factor analysis, additionally incorporate measures of corporate bond yield risk premiums in their computations.

In the latest wave of papers on FCIs, Guichard and Turner (2008) and Swiston (2008), use either reduced-form or VAR estimation and feature the role of credit availability, as reflected by a survey of lending standards, in driving financial conditions and economic activity in the United States (US). Guichard et al. (2009) extend their approach, which highlights lending attitudes, to Japan, the United Kingdom and the euro area, with the US as reference point for the calibration of their indexes.

Taking advantage of the ability of PCA to extract common factors from a large data set, English et al. (2005) estimate models for the US, United Kingdom (UK) and Germany that accommodate between 35 to 47 financial variables per country, including measures of bank sector health and performance and household and business financial strength. Using a similar methodology, Hatzius et al. (2010) build a factor model for the US that features a wide array of financial indicators, 45 in all, adding variables that have not been fully covered by existing FCIs (e.g. quantity- and survey-based credit indicators). Brave and Butters (2010, 2011) augment the PCA approach and segue into a dynamic factor framework in order to come up with a high-frequency index that uses information from 100 financial indicators capturing developments in US money markets, debt and equity markets, and the banking system.²

For the most part, it appears that broadening the scope of financial variables has helped produce better indicators of financial conditions particularly in terms of improving their forecasting power. Having evolved to become a useful source of information, particularly on the stance of financial conditions, FCIs are now being valued as a convenient measure for evaluating the macroeconomic environment at a time when key variables may diverge (Guichard and Turner, 2008). Given still imperfect knowledge of policy transmission mechanisms, they are now also seen as a practical way to assess the impact of non-traditional monetary measures in countries where policy rates have already been pushed to the extreme (i.e. to near-zero levels in the US) and, more generally, as a valuable guide in periods when the connection between policy settings and financial conditions appears weak (Hatzius et al., 2010).

While the use of FCIs has evolved, a review of the literature finds little work done in terms of constructing such measures for Asian economies apart from basic calculations made by central banks and private financial firms.³ Poon (2010) constructs an “augmented MCI” for ASEAN economies based on a reduced-form model of aggregate demand estimated through an ARDL procedure that incorporates various monetary transmission channels, including credit and asset prices. However, only conventional variables, the interest rate and the exchange rate, are assigned weights (the estimated long-run elasticities) in the final indicator. Shinkai and Kohsaka (2010) build an FCI with focus on credit market conditions using VAR methodology specifically for Japan as a way to examine the role of the financial linkage in business cycle transmission.

The International Monetary Fund (IMF) has built an FCI for Asia based on an unrestricted VAR that highlights the real economy impact of several major financial variables reflecting external and domestic financial conditions: namely, private sector credit growth, real lending rates, interest rate spreads, lending standards (where available), equity price movements and real effective exchange rate changes (IMF, 2010).⁴ IMF staff economists have combined this method with a dynamic factor model to construct an index for Asian economies that can be used as a leading indicator (Osorio et al, 2011). They have also calculated a financial stress index (FSI) designed to identify periods when a financial system falls under pressure with application to emerging economies, including those in Asia (Balakrishnan et al., 2009). Such episodes are typically marked by asset price drops, an increase in risk premiums, tighter access to credit, and a deterioration of bank balance sheets.

² Known as the National Financial Conditions Index (NCFI), this series is now being maintained by the Federal Reserve Bank of Chicago along with the National Activity Index (CFNAI). It is updated on a weekly basis.

³ Only conventional MCIs or very narrow FCIs are typically computed. Goldman Sachs, however, computes FCIs for a number of Asian economies on a monthly basis.

⁴ Individual FCIs have been computed for Australia; the People's Republic of China; Hong Kong, China; India; Indonesia; Japan; the Republic of Korea; Malaysia; New Zealand; the Philippines; Singapore; Thailand; and Taipei, China.

Asian monetary authorities have similarly constructed FSIs using equal-variance weighting to pinpoint when a financial system's ability to intermediate is hampered due to domestic or external events. The Monetary Authority of Singapore (2009), for example, created an index incorporating variables that indicate shifts in fund supply and capture developments in securities markets, foreign exchange markets and the bank sector. These include the following: stock market returns, stock returns volatility, sovereign spreads, changes in official foreign reserves, exchange rate volatility, a computed bank index beta, an equity-based bank risk measure, a short-term interbank rate and bank credit ratings. The set of Asian economies covered include the People's Republic of China (PRC); Hong Kong, China; India; Indonesia; the Republic of Korea; Malaysia; Philippines; Thailand; and Taipei, China.

The Hong Kong Monetary Authority (2010) built an FSI for Hong Kong, China that tries to capture episodes of financial strain through simple averages of financial subcomponents comprising stock returns volatility for the equities market, the five-year yield spread for the sovereign debt market, the 12-month at-the-money option-implied volatility for the foreign exchange market, and three financial variables representing bank conditions. The latter include the TED spread equivalent for Hong Kong, China, the inverted term spread, and a banking distress index.

III. ECONOMETRIC APPROACHES TO CONSTRUCTING FCIs

Two basic approaches have been used to construct FCIs.⁵ The first, called the weighted-sum approach, generally assigns weights on each financial variable based on the estimated relative impacts of changes in these on real GDP. Statistical methods commonly used to estimate the weight of the financial components include: (i) simulation of structural macro-econometric models, (ii) estimation of reduced-form aggregate demand equations, and (iii) estimation of VAR systems and their impulse response functions. The second approach involves estimating common factors from a set of financial variables through PCA or related methodology. The assumption is that common factors, which capture the greatest common variation in the set of financial variables, can be seen as representing the fundamental forces influencing the financial system and can be used as the FCI or added to the central bank policy rate to create an FCI.

The various strategies to calculate the weight of financial variables have been chosen for diverse reasons. While large-scale macro-econometric models are often considered to be superior – i.e. they try to capture the structure of the economy and have wider coverage of indicators – they are quite unwieldy and difficult to run. Reduced-form models that typically consist of an aggregate demand equation relating the output gap or output growth to FCI components have been commonly used. They have modest requirements and are simple to estimate, while the impact of potential transmission channels can be easily identified.

The VAR framework, which imposes minimal structure with no particular view on transmission mechanisms, has also been widely used because of the ability to capture dynamic interactions between variables. Unlike reduced-form aggregate demand analysis, all variables are made endogenous. Aside from estimating the linkage between financial markets and the real economy, VAR analysis also captures the feedback mechanisms among the financial components, specifically the impact of financial shocks (Swiston, 2008). The downside is that only a limited number of indicators can be accommodated in view of relatively small degrees of freedom.

⁵ Hatzius et al, 2010, p. 7.

PCA can be considered a practical alternative since it can extract information from a large number of indicators and can be conveniently run at higher frequency. Like the VAR, it does not depend on any particular kind of economic model (English et al., 2005; Gauthier et al., 2004). The method also gauges the contribution of financial indicators consistent with the historical importance to fluctuations in the broader financial system and allows for an interpretation of the systemic importance of each component (Brave and Butters, 2011).

This study uses common factor analysis precisely for its wider data coverage and relative ease of use compared to large-scale structural models. A methodology developed by Hatzius et al. (2010) that also lengthens the data history by allowing for unbalanced panels (i.e. time series of different lengths) is adopted. This is a useful feature when dealing with limited data sets. The methodology works with financial shocks by removing cyclical influences from financial series.

To estimate an FCI under this approach, each financial indicator is purged of the endogenous macroeconomic component using the following regression

$$X_{it} = A_t(L)Y_t + v_{it} \quad (1)$$

where X_{it} represents the i th financial variable at time t and Y_t the vector of macroeconomic variables.

The error term, v_{it} , which is uncorrelated with current and lagged values of Y_t , is regarded as the financial indicator isolated from business cycle movements. It can be further decomposed as

$$v_{it} = \lambda_i' F_t + u_{it} \quad (2)$$

where F_t is a $k \times 1$ vector of unobserved financial factors. The error term u_{it} is unrelated with both F_t and Y_t and assumed to be uncorrelated (or weakly correlated) across variables such that F_t captures the common variation of financial components.

F_t is computed using least squares estimation following the literature on estimating common factors. Provided there are a reasonably large number of indicators over a reasonably large sample period, the least squares method will result in sufficiently accurate estimators that can be used for subsequent regression as well as structural analysis and forecasting (Hatzius et al., 2010).⁶

All financial series are transformed as needed (e.g. for stationarity) and standardized (series with means subtracted and divided by their standard deviations) prior to estimation to prevent volatility and measurement units from dominating the estimation of common factors. They are then regressed against lagged values of indicators of real activity and inflation to isolate each variable from cyclical movements.

⁶ Seminal contributions in this area include works by Stock and Watson (1989, 1998, 2002).

With residuals \hat{v}_{it} as estimates of v_{it} , the least squares estimator \hat{F}_t solves the problem $\min_{\{\lambda_t\}, \{F_t\}} \sum_{i,t} (\hat{v}_{it} - \lambda_i' F_t)^2$. Given the unbalanced nature of the data set, an iterative process is used to find a solution to the minimization problem instead of a straightforward computation of the principal components of \hat{v}_{it} (i.e. as eigenvectors of the sample covariance matrix). \hat{F}_t computed from a one-factor model comprises the financial conditions index in this paper, with the weight of each financial indicator proportional to its coefficient λ_{it} .

IV. CONSTRUCTING INDIVIDUAL ECONOMY ASIAN FCIs

In this study, all the available data reflecting current financial conditions in each Asian economy are selected for the more financially developed economies of Japan; the Republic of Korea; Singapore; Hong Kong, China; and Malaysia.⁷ These traditionally include determinants of net exports as well as of investment and consumption spending. Based on this, the data set includes the real exchange rate, which reflects relative prices; interest rates, which measure the user cost of capital as well as the tradeoff between present and future consumption; and asset prices, especially of equities and property, which simultaneously influence household wealth, firms' demand for new capital and the general capacity to borrow taking into consideration balance sheet effects.

Also taken into account are interest rate spreads that reveal market risk perception and risk tolerance and capture added funding costs for risky borrowers. The equivalent of the TED spread (the 3-month interbank offer rate minus the 3-month Treasury bill), for instance, reflects the risk premium banks charge each other where a large spread indicates high counterparty and funding liquidity risk. The term spread (the shape of the yield curve) similarly implies scarcity of short-term liquidity as well as diminished bank profitability when the short-term rate exceeds the long-term rate (i.e. yield inversion). The spread between commercial paper and Treasury bills, or the short-term credit spread, measures the perception of corporate default risk. Spreads on long-term loans such as for houses and vehicles meanwhile indicate financial intermediaries' willingness to lend to consumers.

The constructed FCIs incorporate other important indicators of credit availability such as liquidity levels, loan quantities, and financial conditions of intermediaries. Special note is taken of the strength and performance of banks, which remain at the center of financial systems in Asia. In addition to credit quantities and interest rate spreads capturing corporate default probabilities mentioned above, available measures of bank health, including the relative riskiness of banks (the banking sector beta) and a rough approximation of their distance to default are also included. Unfortunately, long-enough time series on lending standards such as through surveys of lending attitudes that can help gauge access to credit are available only for the Republic of Korea and Japan.

⁷ A complete list of the financial components and their description can be found in the Data Appendix.

Measures of asset price returns and volatilities are also considered to determine periods of potential financial disruption. Volatility of collateral values, for instance, may signal deterioration in financial conditions since this can serve as a barrier to obtaining credit. Similarly, stock index volatility may indicate possible credit impairment while reflecting market risk and investor uncertainty about fundamental values. Exchange rate volatility serves as an important indicator of financial stress, especially in export-oriented regions, as sharp price movements in either direction could negatively influence trade. However, for economies that attempt to peg the exchange rate or keep this within a band, movements in international reserves may instead be a better indicator. An exchange market pressure index (EMPI) that captures foreign reserves depletion is incorporated for similar reasons. This study also adopts the sovereign debt spread as a measure of market perception of sovereign risk, an important indicator for developing economies given the substantial impact on access to foreign credit.⁸

V. EVALUATING THE NEWLY CONSTRUCTED ASIAN FCIs

In this section, the newly constructed Asian FCIs are presented to see how well they capture financial developments in each economy and how accurately they can forecast real activity. The indexes are decomposed to identify the main sources of fluctuations. The FCIs are then compared with measures that are not adjusted for business cycle influences to see if there are important differences. Finally, higher-frequency FCIs for Japan and the Republic of Korea are constructed, where available data allow such indexes to be built, to assess their potential usefulness in monitoring financial stability and presaging economic outcomes.

A. Historical Validity

Figures 1a to 1e display the FCIs constructed for selected Asian economies based on the one-factor variant of the econometric model described in Section 3 and using quarterly data.⁹ The indexes are standardized to have zero mean and unit standard deviation. Scaled this way, a zero value means that the financial system is operating at its historical average compatible with the stage of the business cycle, while a +1 (–1) reading means financial conditions are better (worse) than normal by 1 standard deviation.

⁸ The data set used likewise includes the international term structure as captured by the US term spread (10-year Treasury note less 3-month Treasury bill) which reflects foreign liquidity conditions as well as expectations of growth.

⁹ In the estimated model for each economy, real GDP and its deflator were included in the macroeconomic vector except for Malaysia and Singapore where industrial or manufacturing production and the CPI are used to obtain a longer series.

Figure 1a: New FCI for Japan (first principal component)

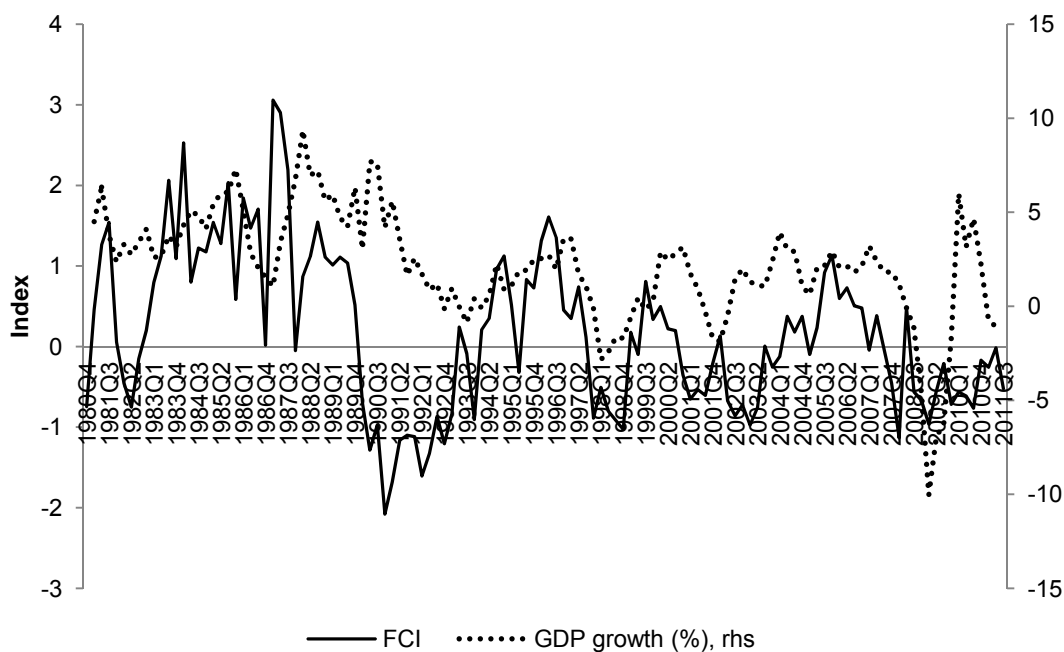


Figure 1b: New FCI for the Republic of Korea (first principal component)



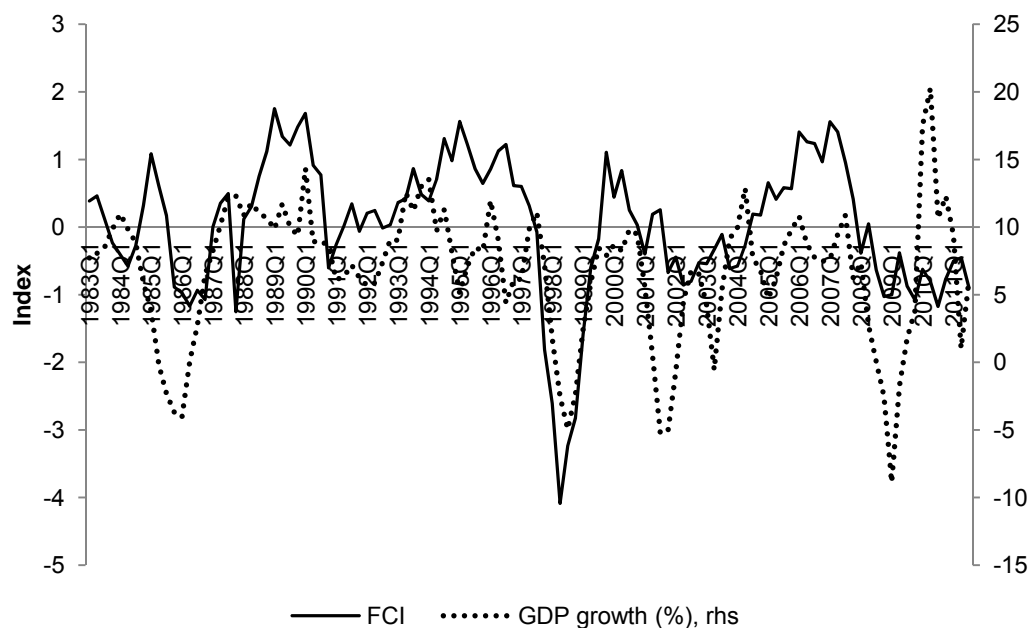
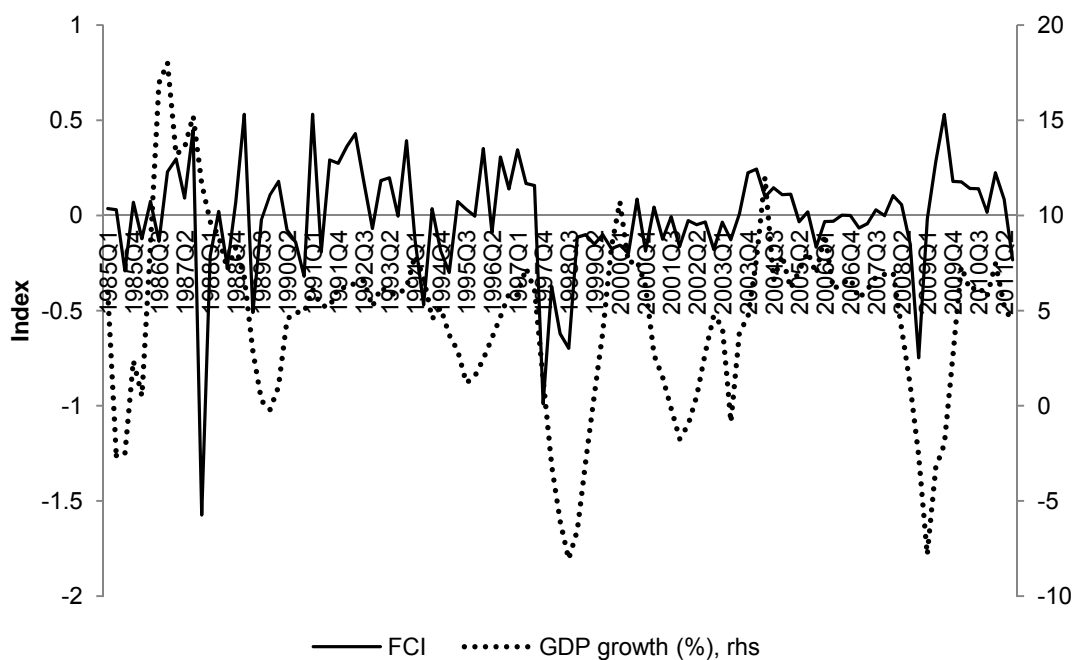
Figure 1c: New FCI for Singapore (first principal component)**Figure 1d: New FCI for Hong Kong, China (first principal component)**

Figure 1e: New FCI for Malaysia (first principal component)

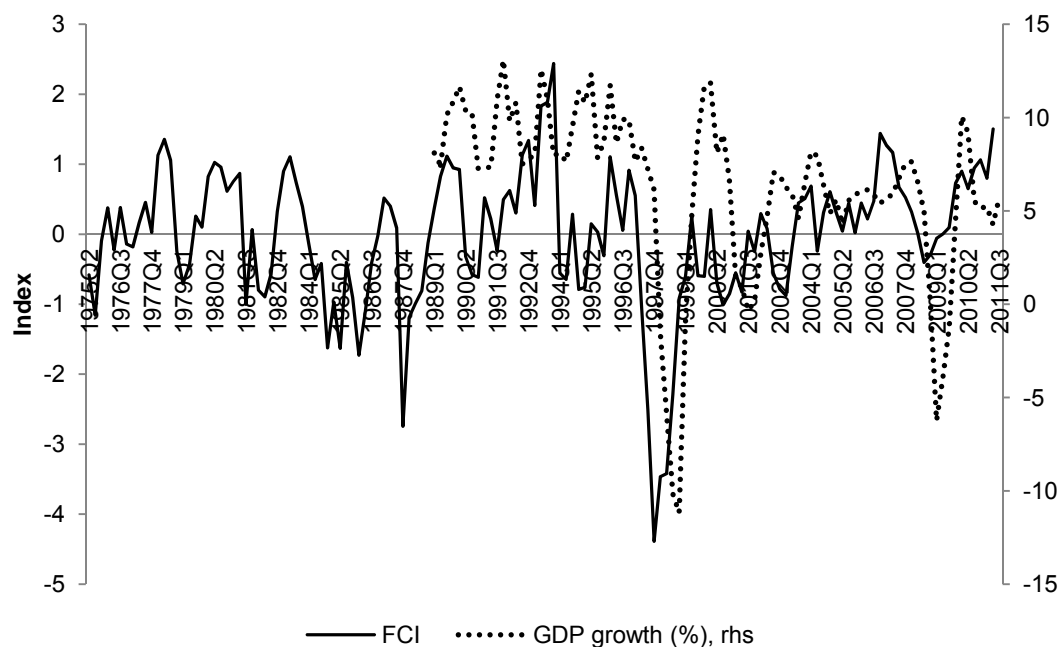
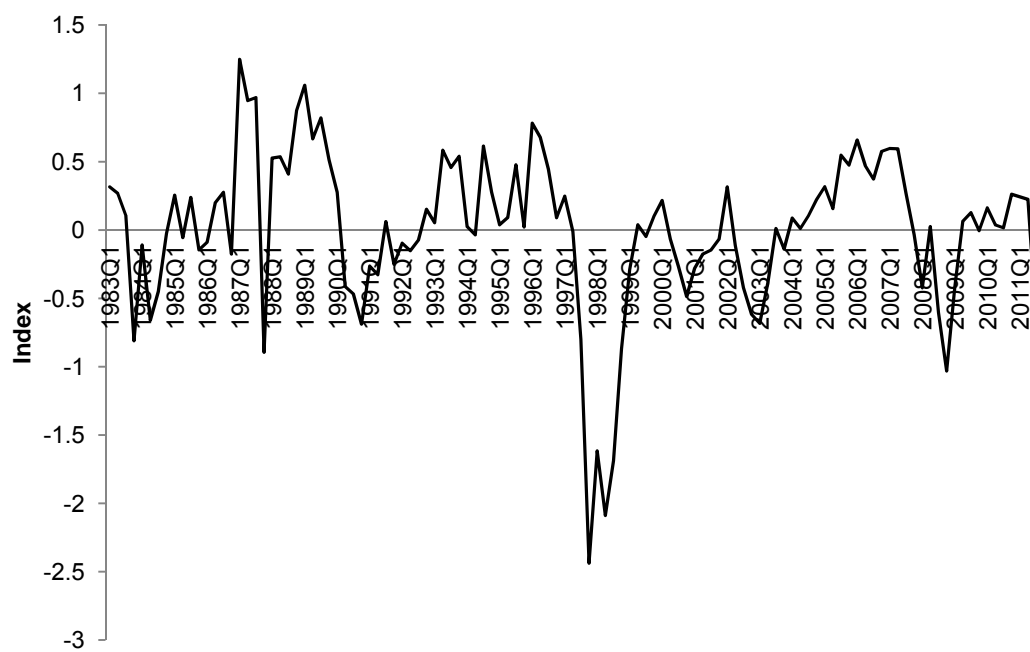


Figure 1f: New FCI for Asia (average)



The computed series extend back at least three decades for most economies in our set owing to the methodology adopted and its handling of unbalanced panels which allow information from new indicators to be incorporated as they become available.¹⁰ Figures 2a to 2e, which chart the number of variables used per period, illustrate the steady expansion in the coverage of the data set.

Figure 2a: Number of Financial Indicators Used in Common-factor Estimation by Date (Japan)

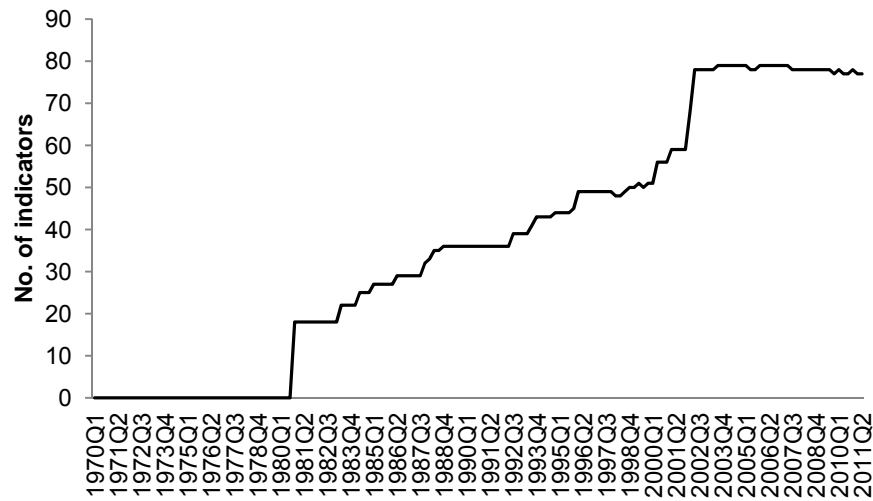
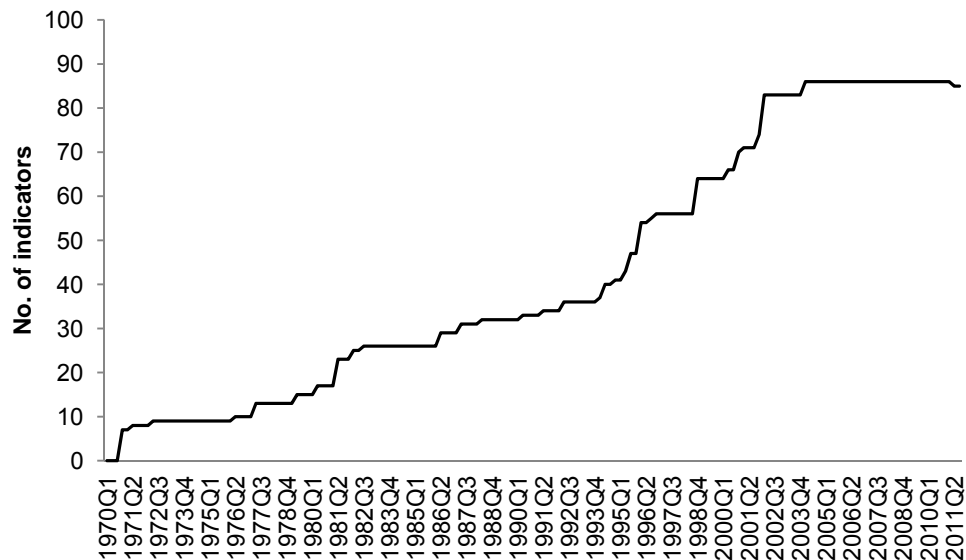


Figure 2b: Number of Financial Indicators Used in Common-factor Estimation by Date (Republic of Korea)



¹⁰ Following Hatzius et al. (2010), the condition set was that at least 11 variables should be utilized per period.

Figure 2c: Number of Financial Indicators Used in Common-factor Estimation by Date (Singapore)

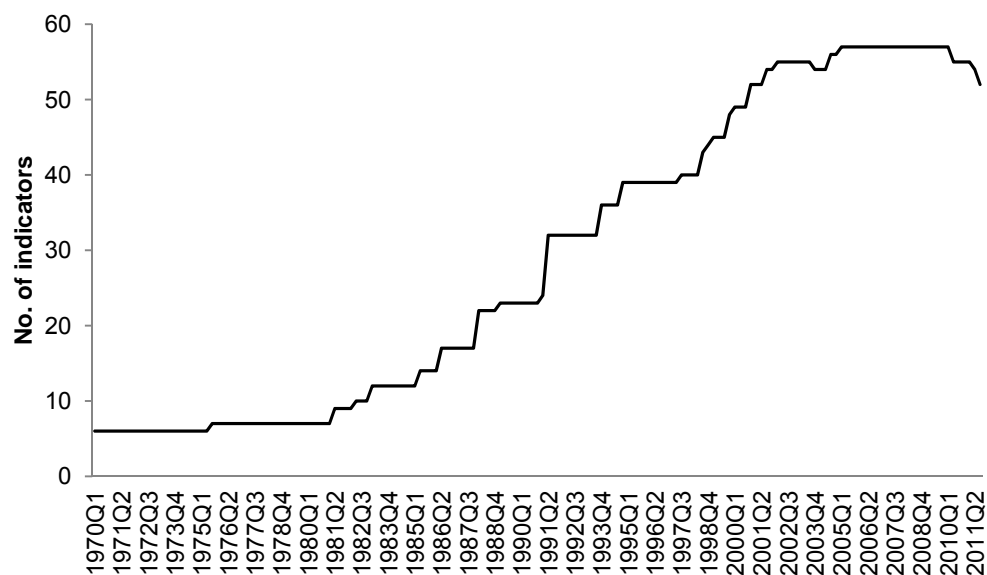


Figure 2d: Number of Financial Indicators Used in Common-factor Estimation by Date (Hong Kong, China)

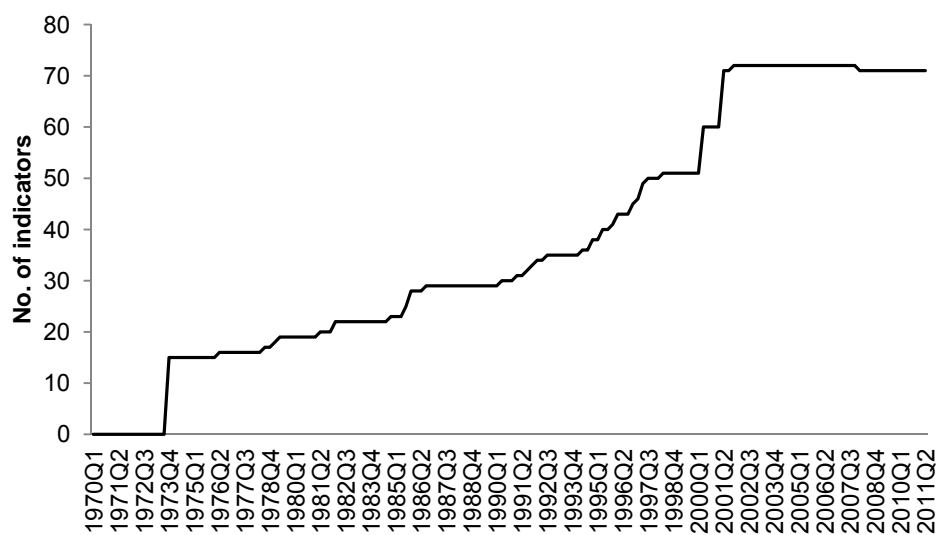
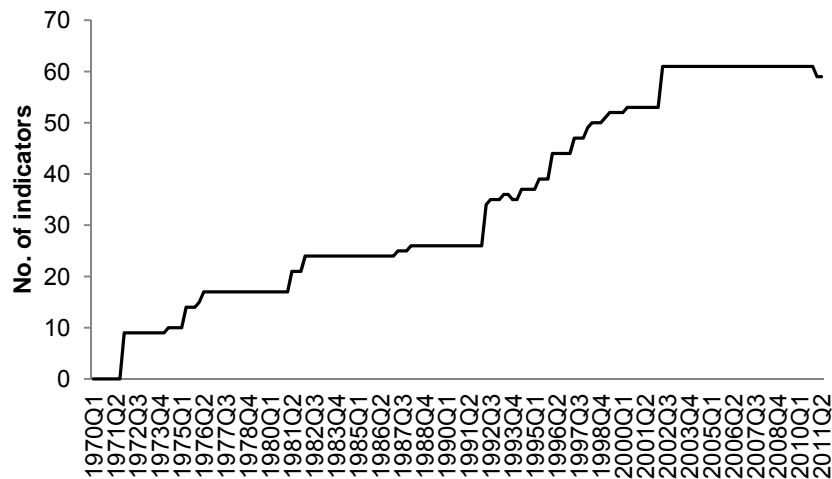


Figure 2e: Number of Financial Indicators Used in Common-factor Estimation by Date (Malaysia)



One way to gauge if the indexes adequately represent financial conditions is to see how they correspond to events in an economy's financial history. On the whole, the FCIs appear to capture crisis episodes as well as periods of relative financial stability quite well. The index for Japan, for instance, shows a sharp deterioration of financial conditions even prior to the recession that began in 1991. Similarly, the individual FCIs for Asia generally showed declines prior to the large declines in GDP growth during the AFC that began in third quarter of 1997 (July) and whose effects were intensely felt in most of the economies in early 1998. The deterioration in the FCI before the GFC is also seen in the cases of Japan and the Republic of Korea starting from at least 2006, and Malaysia and Singapore from early 2007 while GDP growth suffered the largest declines in late 2008 or early 2009. Hong Kong, China's FCI is somewhat of an exception as financial conditions and output growth seem to be more or less contemporaneously related.

A very rudimentary regional FCI for Asia, constructed as a simple average of the individual FCIs for the different Asian economies above, shows a general worsening of the financial climate in Asia during periods of strong external shocks. This regional FCI shows negative readings around the time of the AFC in 1997-98, the bursting of the US technology bubble and subsequent US recession in 2001-2002, the severe acute respiratory syndrome (SARS) downturn in 2003, and the GFC in 2008-2009 (Figure 1f). The ongoing problems in the Eurozone, which can be dated as having started in the fourth quarter of 2009 when the Greek debt problem first came to light, only seem to be reflected in the low or deteriorating FCIs of Japan; Singapore; and Hong Kong, China, the important financial centers of the region in this period. The Republic of Korea's FCI as well as the regional FCI only show a deterioration in 2011 while Malaysia's actually shows improving financial conditions since the end of the GFC in 2009. The latter finding could be because financial markets in Asia are not as connected to Eurozone financial markets or because these countries had implemented expansionary policies during the GFC whose effects had not worn off completely, or both.

The estimated lambda coefficients, $\hat{\lambda}_i$ s, and therefore the weights of the financial indicators in the computed indexes mostly have the correct sign despite several idiosyncratic results, further supporting the validity of the measure (Figures 3a to 3e). Negative coefficients for the most part can be observed for interest rate spreads, asset price volatility and other indicators of risk in financial markets, implying worsening financial conditions.

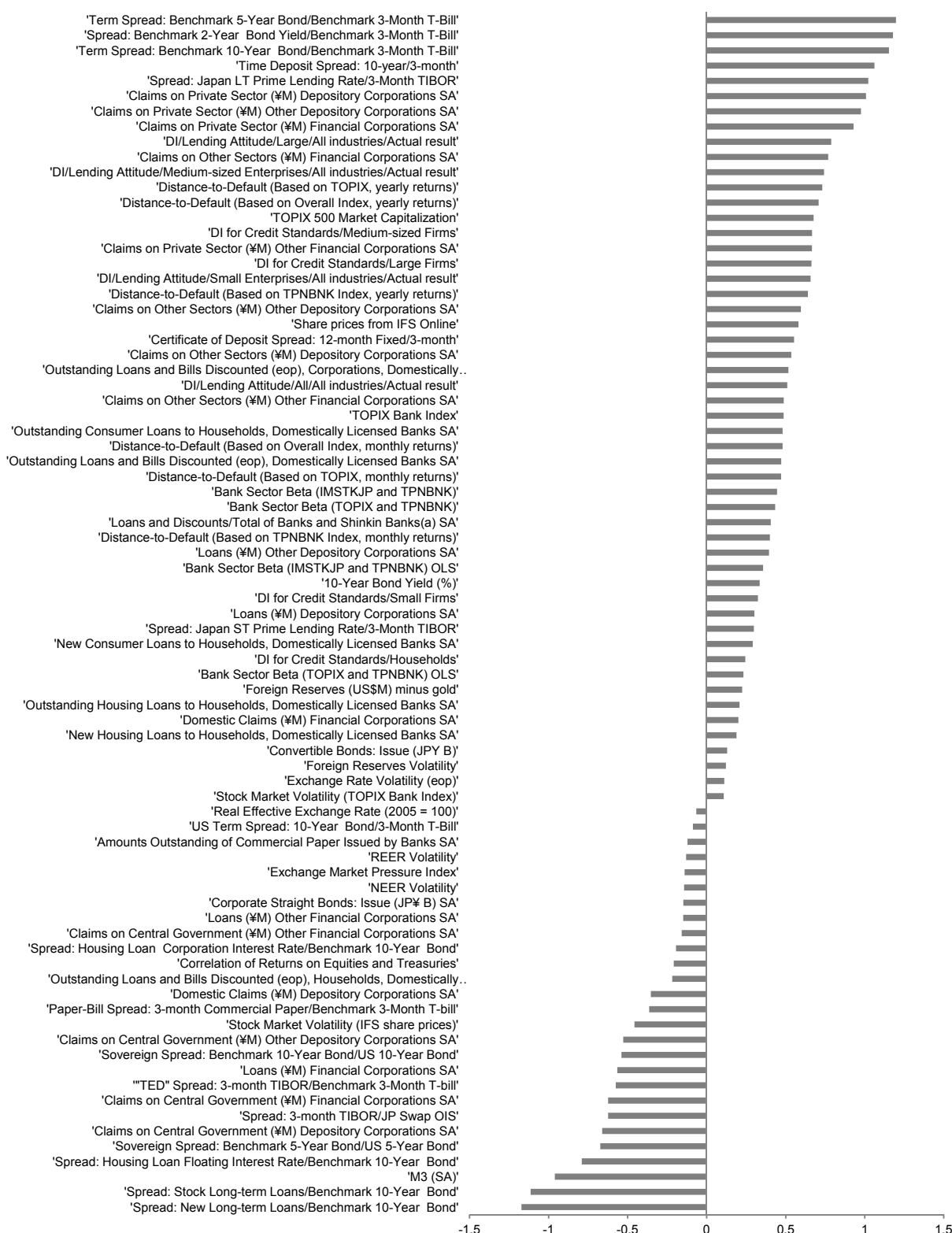
Figure 3a: Ranking of Variables in Japan (by lambda value)

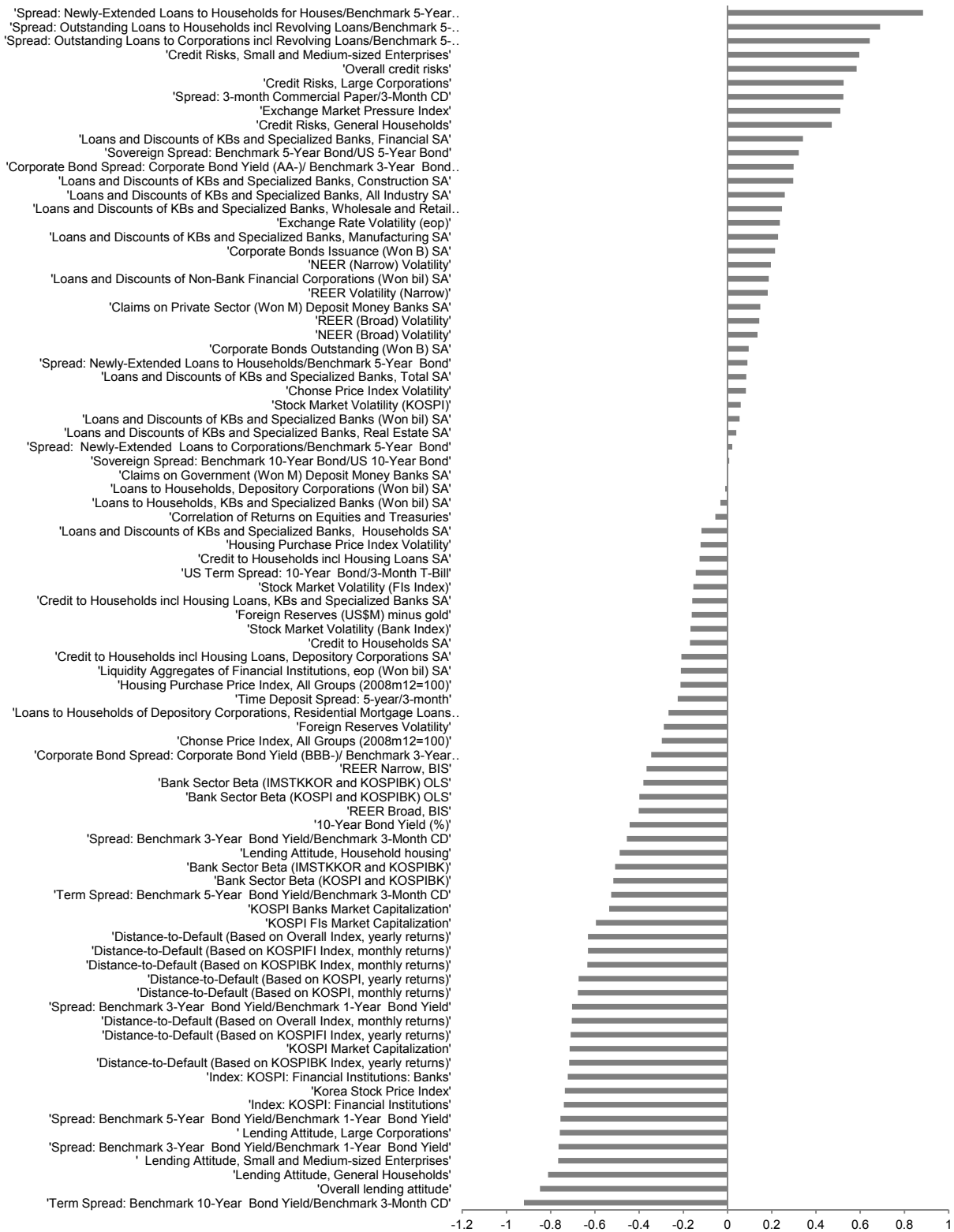
Figure 3b: Ranking of Variables in the Republic of Korea (by lambda value)

Figure 3c: Ranking of Variables in Singapore (by lambda value)

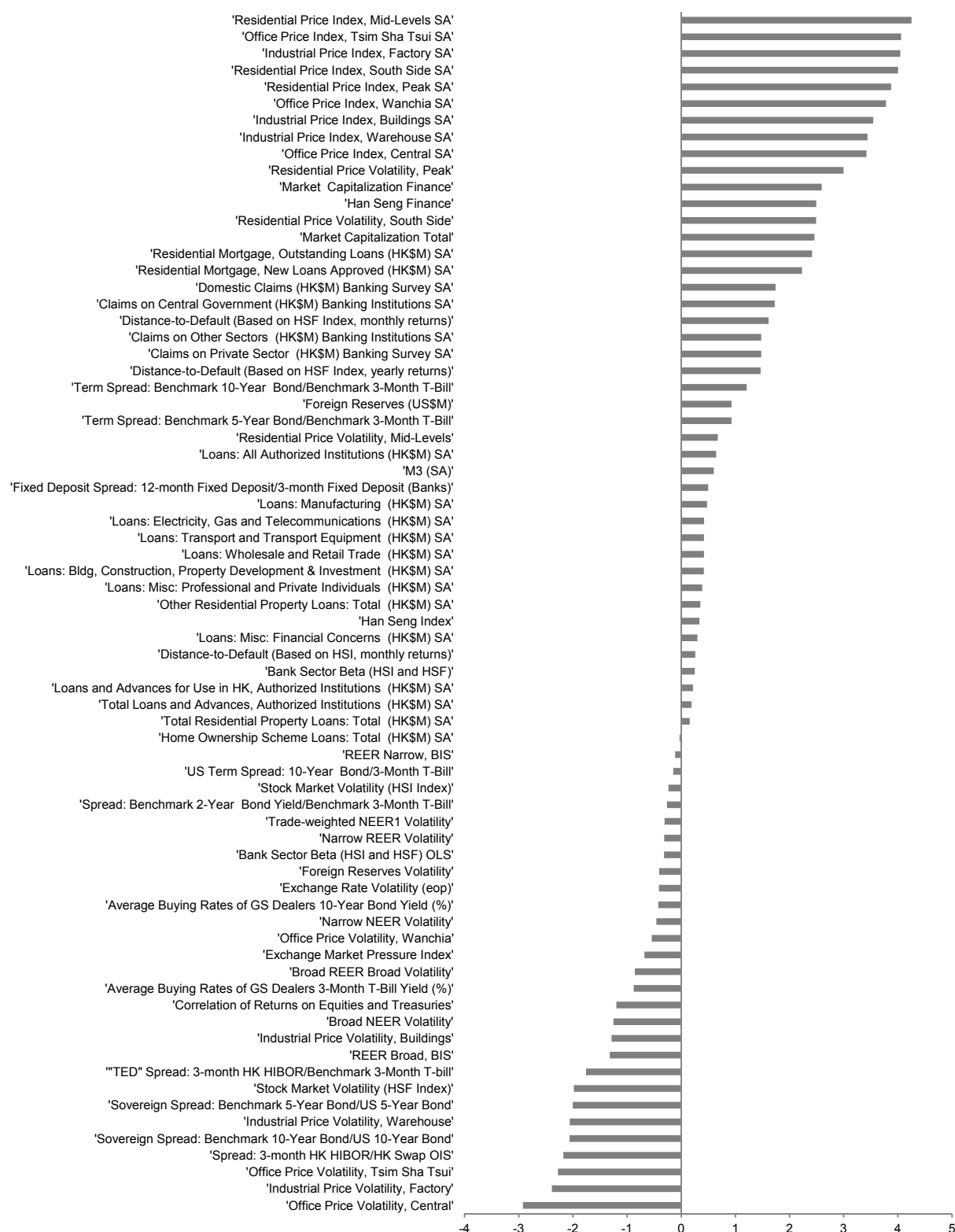
Figure 3d: Ranking of Variables in Hong Kong, China (by lambda value)

Figure 3e: Ranking of Variables in Malaysia (by lambda value)

Positive coefficients meanwhile largely characterize credit flows, liquidity measures, asset prices, and indicators of bank sector health. Improved lending attitudes and more relaxed lending standards in countries where survey data are available also noticeably contribute to a rise in the FCIs.

B. Forecasting Power

To assess the new index's predictive power for real activity in each economy, a comparison with single financial indicators commonly mentioned in the forecasting literature is made. These include, where available: (i) a short-term interest rate or another relevant variable reflecting policy conditions,¹¹ (ii) an indicator of the term spread (iii) a short-term credit spread; (iv) real money supply, and (v) a stock market index.

Following Hatzius et al. (2010), this study adopts an approach similar to Bernanke (1990) which gauges the marginal forecasting performance of the financial indicators after considering the autoregressive structure of the activity variable. The exact specification takes the form:

$$y_{t+h} - y_t = \alpha + \sum_{i=1}^{p_y} \beta_i \Delta y_{t+1-i} + \sum_{i=1}^{p_x} \gamma_i \Delta x_{t+1-i} + e_{t+i} \quad (3)$$

where y_t represents the economic activity variable (logarithms of real GDP and of the manufacturing or industrial production index) while x_t represents the financial variables mentioned above (specifically, the first difference of the short-term interest rate, the level of interest rate spreads, and the log first difference of real money supply and the stock market index) as well as, in this application, the FCI estimated from a one-factor model.

The regression specification is estimated with six lags ($p_x = p_y = 6$) using quarterly data under three horizons ($h = 2, 4, 6$). Forecasting power is tested using post-sample prediction analysis, where y_{t+h} is computed based on coefficients estimated using data from the start of the sample period to time t , imposing a minimum of 40 quarterly observations for the initial forecast, and repeating the process for the next period ($t+1$) and subsequent periods up until the end of the sample.¹² The autoregressive structure is chosen based on the BIC (or SIC) criterion with lags of the activity variable ranging from 0 to 6 and those of the financial indicators ranging from 1 to 6. Such recursively estimated “pseudo-out-of-sample” forecasts are then compared with a pure autoregressive (AR) specification (i.e. excluding financial indicators from the regression) to see if these are able to improve upon predictions made based on historical movements alone.

¹¹ For Singapore, the log first difference of the nominal effective exchange rate was used to directly reflect monetary policy.

¹² In-sample tests were run but only the post-sample prediction analysis is featured here especially since good in-sample properties do not necessarily translate to good forecasting power. That said, in-sample analysis generally yielded respectable results for the computed FCI for the different economies – that is, better than or equal to single financial indicators at explaining the variability of growth (higher partial R-squared results and significant F statistics). However, like single financial indicators, they also displayed considerable coefficient instability (significant QLR statistics). Test results can be obtained from the authors.

Prediction errors for the various regression specifications are shown in Tables 1a to 1e where results for the various forecast periods are presented in five sub-periods beginning 1991–1994 and ending in 2007–2010. The first panel shows the root mean square errors (RMSEs) for the AR models of real GDP and industrial or manufacturing production that exclude financial indicators. The second displays the relative RMSEs of models that include the new FCI (i.e. the ratio of RMSEs for the regressions incorporating the principal component from the one-factor model to the corresponding RMSEs of AR models) as well as their averages across the two activity variables. The third panel presents similarly computed average relative RMSEs for forecasting models using single financial indicators, while the last summarizes the main results for specifications that incorporate FCIs of various formulations.

Table 1a: Pseudo-out-of-sample Regression Results for Japan - Root Mean Square Forecast Errors

Forecast Horizon	h=2					h=4					h=6				
Sub-periods	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011
RMSE for autoregressive models															
Real GDP	5.15	3.58	3.4	2.23	9.25	3.36	3.42	2.16	0.81	5.51	3.65	2.92	1.93	0.85	5.39
Industrial production	7.25	6.22	7.69	6.28	30.2	7.11	4.98	6.54	3.06	18.5	6.02	5.05	5.41	2.47	14.6
Average	6.20	4.90	5.55	4.26	19.73	5.24	4.20	4.35	1.94	11.98	4.84	3.99	3.67	1.66	10.00
Relative RMSE for forecasting models using the new FCI (1-factor model)															
Real GDP	0.80	0.98	0.84	1.06	0.94	0.6	1.04	0.75	1.59	0.95	0.62	1.49	0.90	1.28	0.92
Industrial production	0.81	0.91	0.84	0.98	0.9	0.46	1.00	0.94	0.97	0.96	0.43	0.97	0.99	1.27	0.97
Average	0.81	0.95	0.84	1.02	0.92	0.53	1.02	0.85	1.28	0.96	0.53	1.23	0.95	1.28	0.95
Average relative RMSEs for models with single financial indicators															
Policy rate	-	1.45	0.99	0.99	0.93	-	0.92	0.95	0.96	0.98	-	0.5	0.96	1.12	0.97
Term spread	-	-	-	1.24	0.98	-	-	-	1.12	0.97	-	-	-	1.5	0.92
Short-term credit spread	-	-	-	0.98	0.97	-	-	-	0.64	1.1	-	-	-	-	0.93
Real M2	0.83	0.98	1.02	1.10	0.91	0.57	0.83	0.87	1.54	0.88	0.58	0.93	0.97	1.56	0.83
Stock price index	0.88	0.96	0.94	1.19	0.92	0.77	0.83	0.99	1.95	0.93	0.7	0.9	1.05	1.7	0.93
Average	0.86	1.13	0.98	1.10	0.94	0.67	0.86	0.94	1.24	0.97	0.64	0.78	0.99	1.47	0.92
Average relative RMSEs for models with financial factors															
FCI adjusted for cyclical influences	0.80	0.94	0.84	1.02	0.92	0.53	1.02	0.85	1.28	0.95	0.53	1.23	0.94	1.28	0.95
Unadjusted FCI	0.82	0.99	0.82	0.99	0.89	0.71	0.85	0.76	1.36	0.91	0.79	1.12	0.82	1.16	0.85

Table 1b: Pseudo-out-of-sample Regression Results for the Republic of Korea - Root Mean Square Forecast Errors

Forecast Horizon	h=2					h=4					h=6				
Sub-periods	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011
	RMSE for autoregressive models														
Real GDP	3.46	11.5	5.05	4.51	7.72	2.53	7.65	3.67	3.18	5.56	2.69	7.37	3.82	3.31	5.17
Industrial production	6.27	13.95	10.55	8.22	15.30	4.88	11.32	7.16	3.08	10.6	4.24	9.64	5.36	3.03	7.88
Average	4.87	12.72	7.80	6.37	11.50	3.71	9.49	5.42	3.13	8.07	3.47	8.51	4.59	3.17	6.53
	Relative RMSE for forecasting models using the new FCI (1-factor model)														
Real GDP	0.90	0.97	0.97	0.96	0.93	0.79	0.87	0.91	0.84	0.88	0.73	0.80	0.85	1.05	0.92
Industrial production	0.95	0.98	0.93	1.02	1.02	0.89	0.98	0.95	0.98	0.97	0.90	1.00	0.85	0.92	0.97
Average	0.93	0.98	0.95	0.99	0.98	0.84	0.93	0.93	0.91	0.93	0.82	0.90	0.85	0.99	0.95
	Average relative RMSEs for models with single financial indicators														
Policy rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Term spread	-	-	-	-	0.9	-	-	-	-	1.08	-	-	-	-	0.99
Short-term credit spread	-	-	-	0.26	0.89	-	-	-	1.20	0.79	-	-	-	-	0.64
Real M2	0.97	0.99	0.93	0.96	0.97	1.00	0.95	0.85	1.05	0.96	0.91	0.96	0.75	0.96	0.95
Stock price index	0.93	1.01	0.90	0.91	0.89	0.82	0.94	0.79	1.00	0.94	0.82	0.91	0.9	1.12	0.97
Average	0.95	1.00	0.92	0.71	0.91	0.91	0.95	0.82	1.08	0.94	0.87	0.94	0.83	1.04	0.89
	Average relative RMSEs for models with financial factors														
FCI adjusted for cyclical influences	0.92	0.97	0.95	0.99	0.97	0.84	0.93	0.93	0.91	0.93	0.81	0.90	0.85	0.98	0.95
Unadjusted FCI	0.93	0.95	1.02	1.00	0.95	0.83	0.94	0.94	0.84	0.92	0.81	0.89	0.92	0.98	0.95

Table 1c: Pseudo-out-of-sample Regression Results for Singapore - Root Mean Square Forecast Errors

Forecast Horizon	h=2					h=4					h=6				
Sub-periods	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011
RMSE for autoregressive models															
Real GDP	3.45	9.89	8.27	5.70	11.60	3.30	5.40	5.52	2.49	7.83	3.03	4.51	4.34	2.57	6.41
Industrial production	6.71	13.95	22.54	13.86	30.87	4.26	7.83	13.11	6.42	17.68	3.71	6.25	9.04	7.12	14.26
Average	5.08	11.92	15.41	9.78	21.24	3.78	6.62	9.32	4.46	12.76	3.37	5.38	6.69	4.85	10.34
Relative RMSE for forecasting models using the new FCI (1-factor model)															
Real GDP	1.06	1.11	1.07	1.05	0.99	-	1.00	1.00	1.03	0.93	-	1.25	1.01	0.91	0.91
Industrial production	1.05	1.15	0.98	1.04	0.99	-	0.98	0.99	1.02	0.91	-	1.37	1.58	0.95	0.82
Average	1.06	1.13	1.03	1.05	0.99	-	0.99	1.00	1.03	0.92	-	1.31	1.30	0.93	0.87
Average relative RMSEs for models with single financial indicators															
Policy rate (NEER)	1.08	1.00	1.04	0.99	0.98	1.03	0.99	1.03	0.94	0.99	1.02	1.02	1.10	0.85	0.94
Term spread	-	-	0.94	1.35	1.01	-	-	1.10	1.46	1.00	-	-	0.79	1.35	0.94
Short-term credit spread	-	-	1.16	1.05	0.98	-	-	1.16	1.09	1.01	-	-	1.01	1.08	0.98
Real M2	-	-	0.99	1.05	0.93	-	-	-	1.29	0.97	-	-	-	1.13	0.98
Stock price index	-	1.21	1.10	0.81	0.87	-	1.50	1.02	0.96	0.95	-	1.53	1.06	0.94	1.00
Average	1.08	1.11	1.05	1.05	0.95	1.03	1.25	1.08	1.15	0.98	1.02	1.28	0.99	1.07	0.97
Average relative RMSEs for models with financial factors															
FCI adjusted for cyclical influences	1.05	1.14	1.03	1.05	0.99	-	0.99	1.00	1.02	0.92	-	1.30	1.30	0.93	0.87
Unadjusted FCI	0.96	1.16	0.98	1.03	0.96	-	1.01	1.02	1.03	0.89	-	1.32	1.28	1.00	0.89

Table 1d: Pseudo-out-of-sample Regression Results for Hong Kong, China - Root Mean Square Forecast Errors

Forecast Horizon	h=2					h=4					h=6				
Sub-periods	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011
RMSE for autoregressive models															
Real GDP	3.47	10.07	6.59	3.92	7.66	3.09	7.62	4.42	1.79	5.63	3.70	8.16	4.71	1.50	5.44
Industrial production	3.21	10.71	8.92	21.18	7.05	4.11	8.95	8.66	14.25	7.06	6.96	9.27	7.20	14.51	6.51
Average	3.34	10.39	7.76	12.55	7.36	3.60	8.29	6.54	8.02	6.35	5.33	8.72	5.96	8.01	5.98
Relative RMSE for forecasting models using the new FCI (1-factor model)															
Real GDP	1.19	1.01	1.03	0.98	0.99	1.06	1.00	1.01	0.96	1.01	1.12	1.00	1.00	1.19	0.95
Industrial production	1.09	1.09	1.00	1.01	1.00	1.07	1.02	0.99	1.02	1.00	0.26	0.81	0.97	0.96	1.01
Average	1.14	1.05	1.02	1.00	1.00	1.07	1.01	1.00	0.99	1.01	0.69	0.91	0.99	1.08	0.98
Average relative RMSEs for models with single financial indicators															
Policy rate	-	-	-	1.47	0.98	-	-	-	1.50	0.86	-	-	-	1.94	0.82
Term spread	-	-	-	1.25	1.13	-	-	-	2.00	0.87	-	-	-	-	0.83
Short-term credit spread	1.10	1.05	0.86	1.18	0.96	1.08	1.00	0.86	1.40	0.98	1.04	1.03	0.78	1.87	0.94
Real M2	-	-	-	-	0.70	-	-	-	-	0.67	-	-	-	-	0.85
Stock price index	1.00	0.99	0.95	0.94	0.95	1.08	1.00	0.92	1.02	1.00	0.95	0.98	0.91	1.14	1.10
Average	1.05	1.02	0.91	1.21	0.94	1.08	1.00	0.89	1.48	0.88	1.00	1.01	0.85	1.65	0.91
Average relative RMSEs for models with financial factors															
FCI adjusted for cyclical influences	1.14	1.05	1.02	0.99	1.00	1.07	1.01	1.00	0.99	1.00	0.69	0.90	0.98	1.07	0.98
Unadjusted FCI	1.35	1.04	0.97	1.00	0.99	1.06	1.03	0.97	1.03	0.99	1.05	0.99	0.96	1.10	1.02

Table 1e: Pseudo-out-of-sample Regression Results for Malaysia - Root Mean Square Forecast Errors

Forecast Horizon	h=2					h=4					h=6				
Sub-periods	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011
RMSE for autoregressive models															
Real GDP	-	-	5.76	2.20	7.99	-	-	3.84	1.01	5.25	-	-	2.76	0.92	4.60
Industrial production	8.28	13.61	13.35	6.46	13.75	3.10	9.35	8.89	4.43	10.67	3.83	8.17	7.23	4.42	10.24
Average	-	-	9.56	4.33	10.87			6.37	2.72	7.96	-	-	5.00	2.67	7.42
Relative RMSE for forecasting models using the new FCI (1-factor model)															
Real GDP	-	-	0.89	1.84	1.04	-	-	0.79	1.96	1.08	-	-	0.94	2.12	1.17
Industrial production	1.15	1.04	1.02	1.15	1.00	1.00	0.96	0.98	1.16	1.04	1.10	1.04	0.98	1.07	0.95
Average	-	-	0.96	1.50	1.02	-	-	0.89	1.56	1.06	-	-	0.96	1.59	1.06
Average relative RMSEs for models with single financial indicators															
Policy rate	-	-	0.95	1.07	0.96	-	-	0.98	1.01	1.00	-	-	1.00	1.03	0.98
Term spread	-	-	-	0.86	1.00	-	-	-	0.87	0.95	-	-	-	1.21	0.87
Short-term credit spread	-	-	-	-	0.99	-	-	-	-	0.99	-	-	-	-	0.73
Real M2	-	-	0.98	1.12	0.94	-	-	1.04	1.01	1.00	-	-	0.96	1.33	0.98
Stock price index	-	-	0.81	1.31	0.84	-	-	0.80	1.25	0.94	-	-	0.86	1.24	0.94
Average	-	-	0.91	1.09	0.95	-	-	0.94	1.04	0.98	-	-	0.94	1.20	0.90
Average relative RMSEs for models with financial factors															
FCI adjusted for cyclical influences	-	-	0.95	1.49	1.02	-	-	0.88	1.56	1.06	-	-	0.96	1.57	1.06
Unadjusted FCI	-	-	1.10	1.59	0.92	-	-	0.98	1.61	0.98	-	-	1.06	1.72	0.94

Table 2a: Pseudo-out-of-sample Regression Results for Japan Using Monthly Data - Root Mean Square Forecast Errors

Forecast Horizon	h=3						h=6					
Sub-periods	1987– 1990	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011	1987– 1990	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011
	RMSE for autoregressive models											
Industrial production	6.69	8.06	6.99	7.11	6.34	14.49	2.36	3.80	3.19	3.51	1.91	9.58
Unemployment rate	7.42	5.46	5.76	4.14	5.89	8.20	5.55	3.93	4.45	2.56	4.55	6.34
Employment	0.49	0.49	0.60	0.72	0.45	2.06	0.38	0.32	0.47	0.56	0.26	1.47
Average	4.87	4.67	4.45	3.99	4.23	8.25	2.76	2.68	2.70	2.21	2.24	5.80
	Relative RMSE for forecasting models using the new FCI (1-factor model)											
Industrial production	1.02	0.95	0.97	0.96	1.00	0.99	1.10	0.71	0.83	0.87	1.13	0.94
Unemployment rate	1.05	0.97	0.91	1.03	1.06	1.02	1.00	0.95	0.81	1.15	0.93	1.04
Employment	1.05	1.00	0.96	0.93	1.00	1.00	0.98	1.02	0.98	0.86	0.97	0.97
Average	1.04	0.97	0.95	0.97	1.02	1.00	1.03	0.89	0.87	0.96	1.01	0.98
	Average relative RMSEs for models with single financial indicators											
Policy rate	0.84	1.07	0.99	0.96	1.00	0.99	0.61	1.16	0.98	1.02	0.93	1.02
Term spread	-	-	0.89	0.98	1.10	1.00	-	-	0.80	1.10	1.34	0.98
Short-term credit spread	-	-	0.75	0.91	0.97	0.76	-	-	-	0.99	1.02	0.71
Real M2	0.92	0.94	0.96	0.99	1.00	0.98	0.90	0.82	0.95	1.00	1.11	0.94
Stock price index	1.09	1.02	1.00	1.00	0.99	0.99	1.14	1.01	0.97	0.98	1.02	0.94
Average	0.95	1.01	0.92	0.97	1.01	0.94	0.88	1.00	0.93	1.02	1.08	0.92

Forecast Horizon	h=9						h=12					
Sub-periods	1987– 1990	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011	1987– 1990	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011
	RMSE for autoregressive models											
Industrial production	1.69	2.7	2.44	2.94	1.16	7.96	1.14	2.52	2.08	2.35	0.77	6.08
Unemployment rate	4.96	3.54	3.98	1.89	4.35	5.36	4.77	3.32	3.60	1.89	4.20	4.82
Employment	0.34	0.29	0.45	0.52	0.16	0.94	0.34	0.28	0.43	0.50	0.16	0.69
Average	2.33	2.18	2.29	1.78	1.89	4.75	2.08	2.04	2.04	1.58	1.71	3.86
	Relative RMSE for forecasting models using the new FCI (1-factor model)											
Industrial production	1.00	0.63	0.86	0.89	1.39	0.92	0.90	0.57	0.90	0.92	1.70	0.94
Unemployment rate	0.94	1.03	0.90	1.32	1.11	1.07	1.00	0.98	0.89	1.33	1.14	1.01
Employment	0.99	1.00	0.96	0.92	1.02	0.93	1.03	1.01	0.97	0.86	0.98	0.91
Average	0.98	0.89	0.91	1.04	1.17	0.97	0.98	0.85	0.92	1.04	1.27	0.95
	Average relative RMSEs for models with single financial indicators											
Policy rate	0.53	1.29	1.02	0.98	1.02	1.02	0.80	1.31	1.00	0.97	1.14	1.00
Term spread	-	-	0.85	1.17	1.70	0.96	-	-	0.94	1.14	1.69	0.96
Short-term credit spread	-	-	-	0.98	1.15	0.75	-	-	-	0.97	1.26	0.83
Real M2	0.89	0.76	0.90	1.00	1.21	0.95	0.93	0.71	0.88	1.02	1.29	0.96
Stock price index	1.12	0.99	0.94	0.97	1.10	0.94	1.14	0.97	0.88	1.01	1.26	0.94
Average	0.85	1.01	0.93	1.02	1.24	0.92	0.96	1.00	0.93	1.02	1.33	0.94

Table 2b: Pseudo-out-of-sample Regression Results for the Republic of Korea Using Monthly Data - Root Mean Square Forecast Errors

Forecast Horizon	h=3						h=6					
Sub-periods	1987– 1990	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011	1987– 1990	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011
	RMSE for autoregressive models											
Industrial production	8.05	6.64	9.92	6.80	6.75	10.71	4.28	3.51	5.58	4.08	3.50	6.23
	Relative RMSE for forecasting models using the new FCI (1-factor model)											
Industrial production	1.02	0.96	0.96	1.06	0.98	1.00	0.99	0.90	0.95	1.08	0.99	0.98
	Relative RMSEs for models with single financial indicators											
Policy rate	-	-	-	-	1.06	1.02	-	-	-	-	1.01	1.04
Term spread	-	-	-	1.36	1	1	-	-	-	0.98	1	0.95
Short-term credit spread	-	-	2.26	1.15	1.02	1.04	-	-	-	1.06	1	1.02
Real M2	1	1	1	1	1	1	1.03	1	0.97	0.98	1.02	0.99
Stock price index	1.09	1	1.03	1.13	1.02	0.9	0.97	0.88	1.02	1.11	0.92	0.92
Average	1.05	1.00	1.43	1.16	1.02	0.99	1.00	0.94	1.00	1.03	0.99	0.98

Forecast Horizon	h=9						h=12					
Sub-periods	1987– 1990	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011	1987– 1990	1991– 1994	1995– 1998	1999– 2002	2003– 2006	2007– 2011
	RMSE for autoregressive models											
Industrial production	3.11	2.58	4.92	3.37	2.19	4.98	2.53	2.04	4.00	2.71	1.74	3.88
	Relative RMSE for forecasting models using the new FCI (1-factor model)											
Industrial production	0.97	0.94	0.94	1.06	1.00	0.88	1.05	0.90	0.92	0.93	0.98	0.92
	Relative RMSEs for models with single financial indicators											
Policy rate	-	-	-	-	0.96	1.06	-	-	-	-	1.01	1.08
Term spread	-	-	-	1.17	0.87	0.9	-	-	-	0.84	0.91	0.96
Short-term credit spread	-	-	-	1.25	0.9	0.95	-	-	-	0.88	0.93	0.97
Real M2	0.96	0.98	0.98	0.97	1.01	1	1	1	1	0.98	0.97	1
Stock price index	1.02	0.99	0.96	0.86	0.94	0.9	1	0.95	0.96	0.93	0.98	0.96
Average	0.99	0.99	0.97	1.06	0.94	0.96	1.00	0.98	0.98	0.91	0.96	0.99

Some of the noteworthy findings for the various economies can be summarized as follows:

- Forecast errors of the AR models are particularly low for the mid-2000s (from 2003 to 2006), the period right before the latest global financial crisis, for Japan and to some extent the Republic of Korea. For Singapore and Hong Kong, China forecast errors are lowest for the early 1990s (from 1991 to 1994), which preceded the Asian financial crisis.
- For Japan, models incorporating the FCI track real activity slightly better than benchmark AR models, with relative RMSEs at less than one for most sub-periods. On average, they also produce more accurate forecasts than models including single financial indicators at the two-quarter horizon, though not clearly so at the four- and six-quarter horizons.
- For the Republic of Korea, models that include the FCI turn out consistently better forecasts than AR models. They also typically outperform specifications with single financial variables at longer horizons, even those incorporating the stock market index which is the best of the available indicators.
- FCI models outperform AR models for Singapore. However, they generally do better than single-financial-indicator models at tracking real activity with the exception of specifications that include the nominal effective exchange rate (NEER), which was used to reflect monetary policy in the absence of an official policy rate.¹³
- FCI models have weaker predictive power for Malaysia and Hong Kong, China relative to that in the other countries. They still outperform AR models but are typically outperformed by forecasting regressions including single financial indicators.

Overall, the results suggest the new FCI can be quite helpful in gauging of the future state of the economy although forecasting accuracy appears to be higher for countries with a more complete range of financial data. The caveat of course derives from possible instabilities in the relationship between financial factors and real economic activity that show up in the analysis as variability of forecasting precision across time. However, this is generally true of all financial indicators examined and likely stems from the evolving relationship between financial factors and the real economy.

The FCI can be decomposed to see how the different financial components contribute to movements in the index.¹⁴ A tool that can help pinpoint what underlies financial conditions at any point in time is clearly useful for policymakers seeking to form the correct policy response.

¹³ However, weak in-sample properties computed for the NEER in an earlier study (specifically, negative partial R^2 s and insignificant F-statistics which indicate a failure to explain the variability of real activity variables) lead us to treat this result with caution.

¹⁴ This is done by multiplying each purged financial indicator by its computed weight which is proportional to the lambda coefficient.

Figure 4a: Decomposition of the FCI in Japan

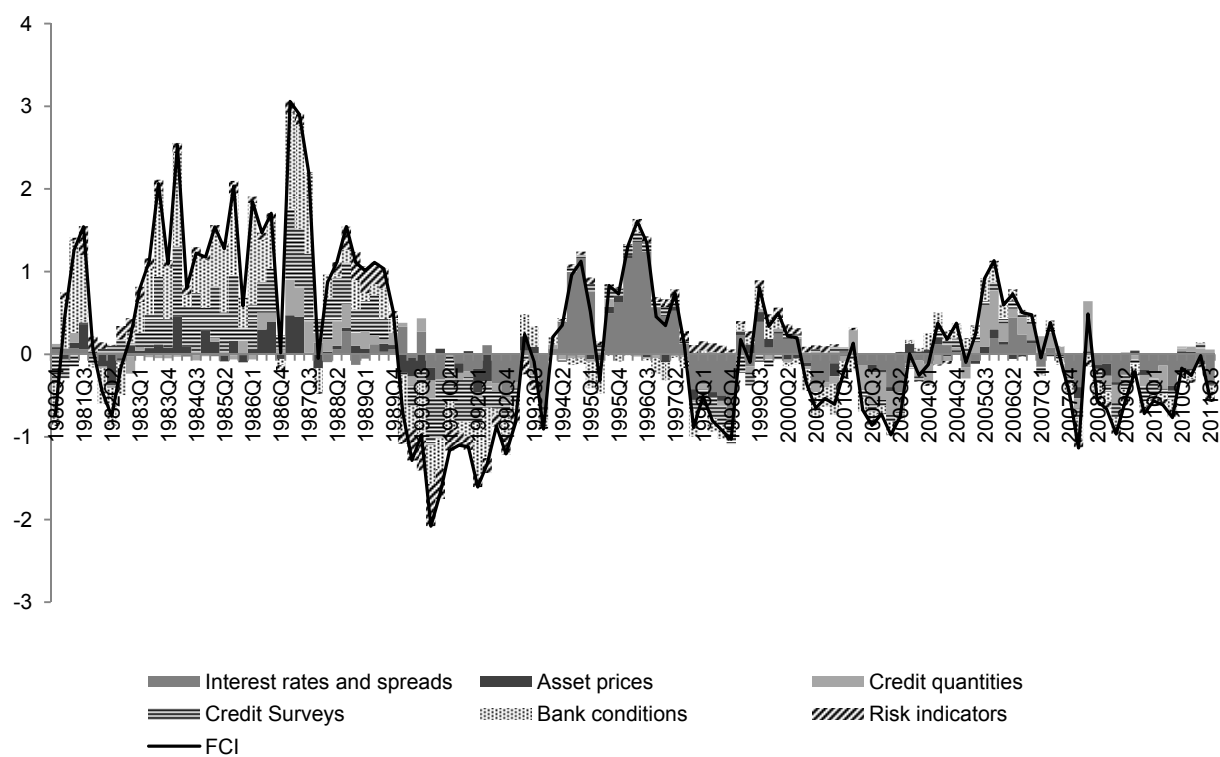
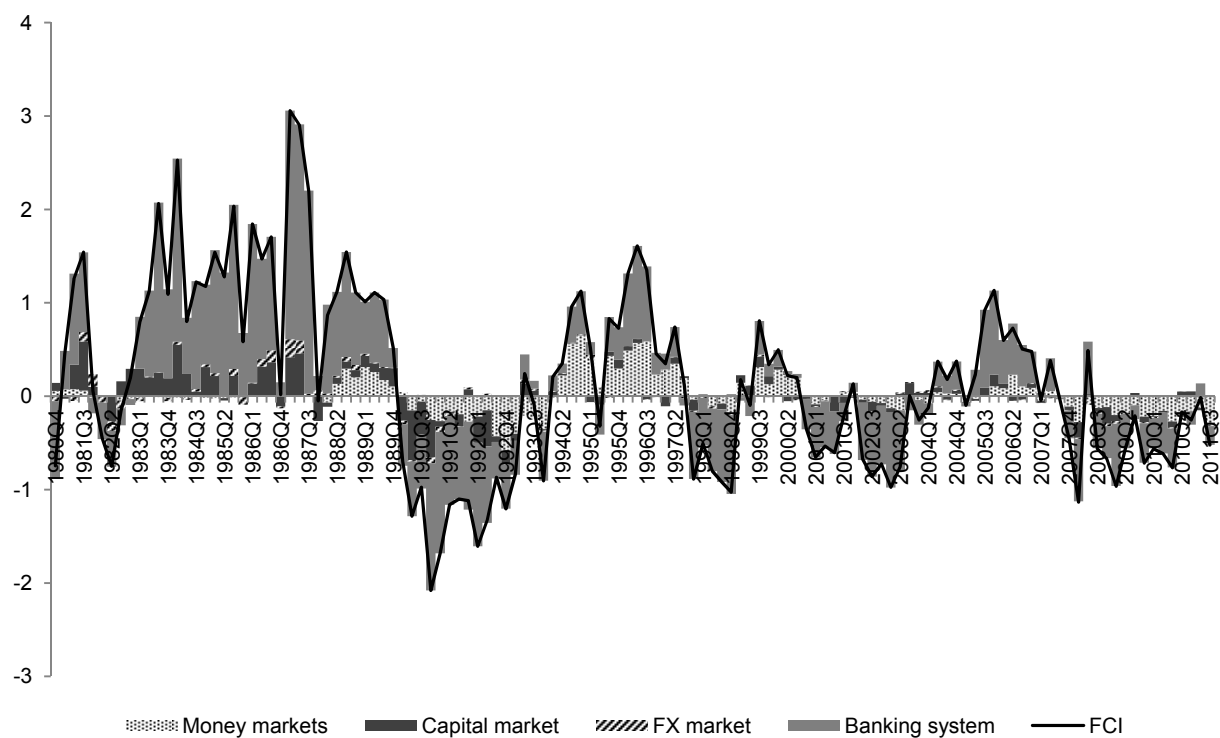


Figure 4b: Decomposition of the FCI in the Republic of Korea

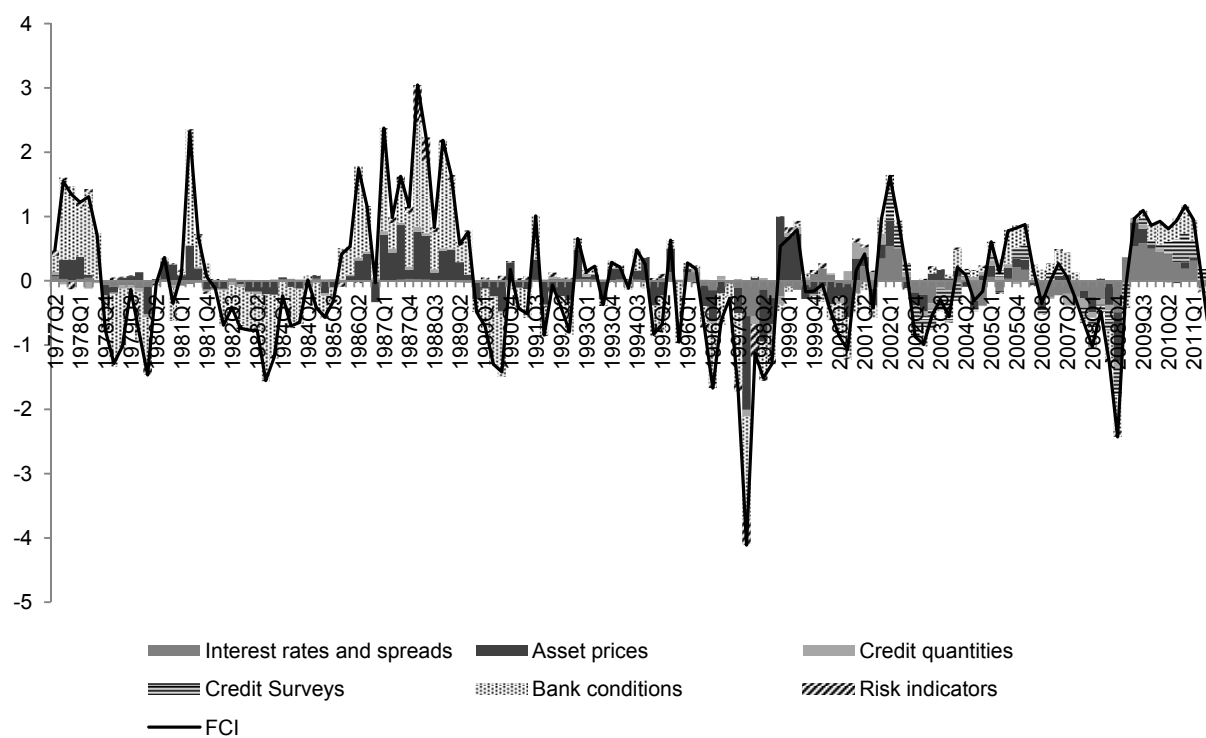
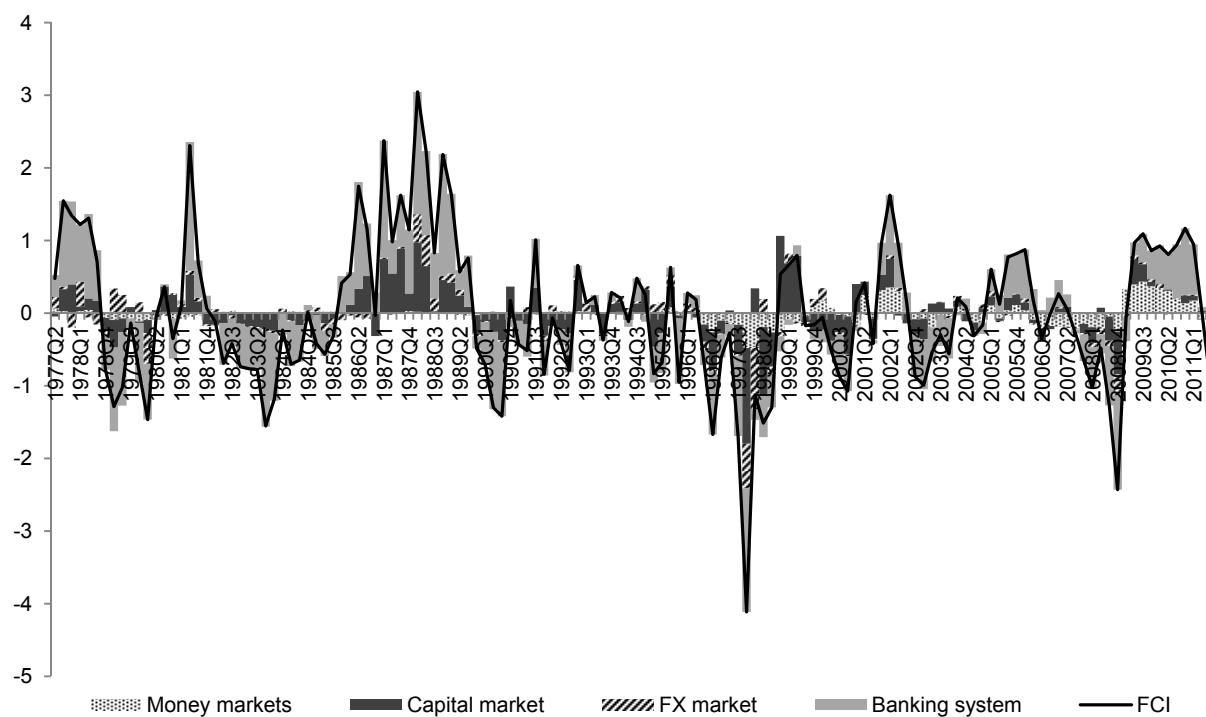


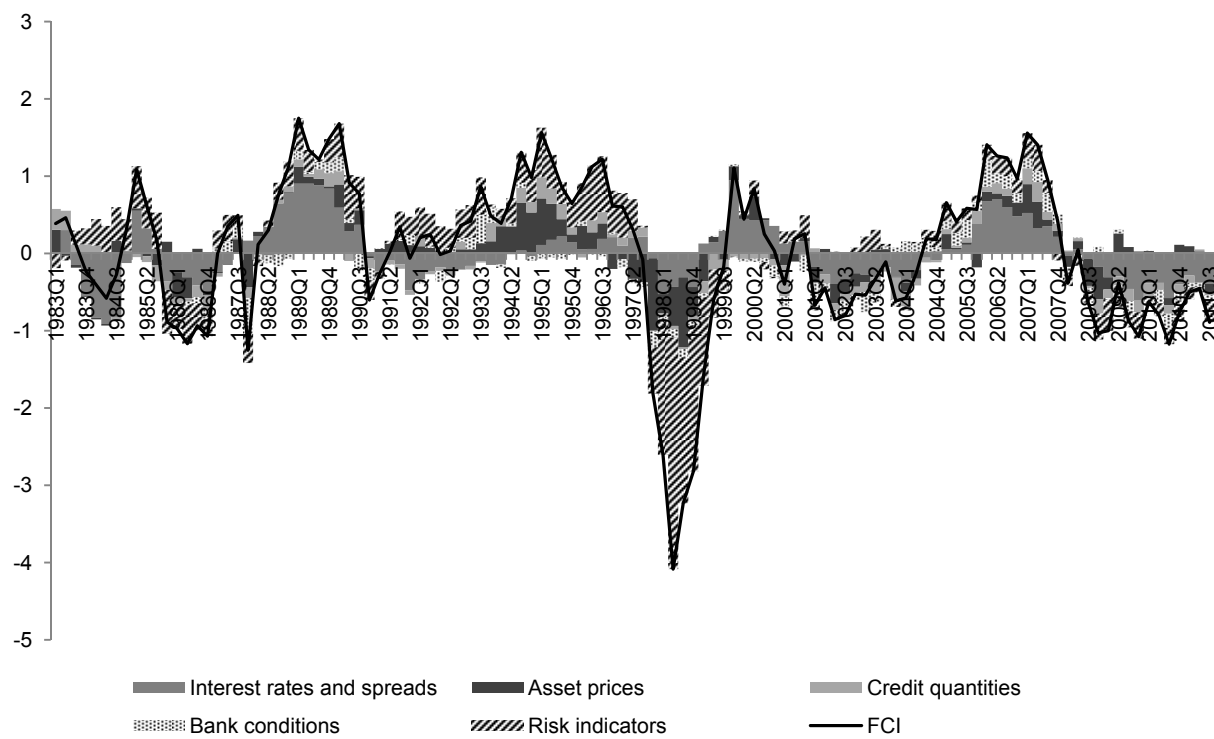
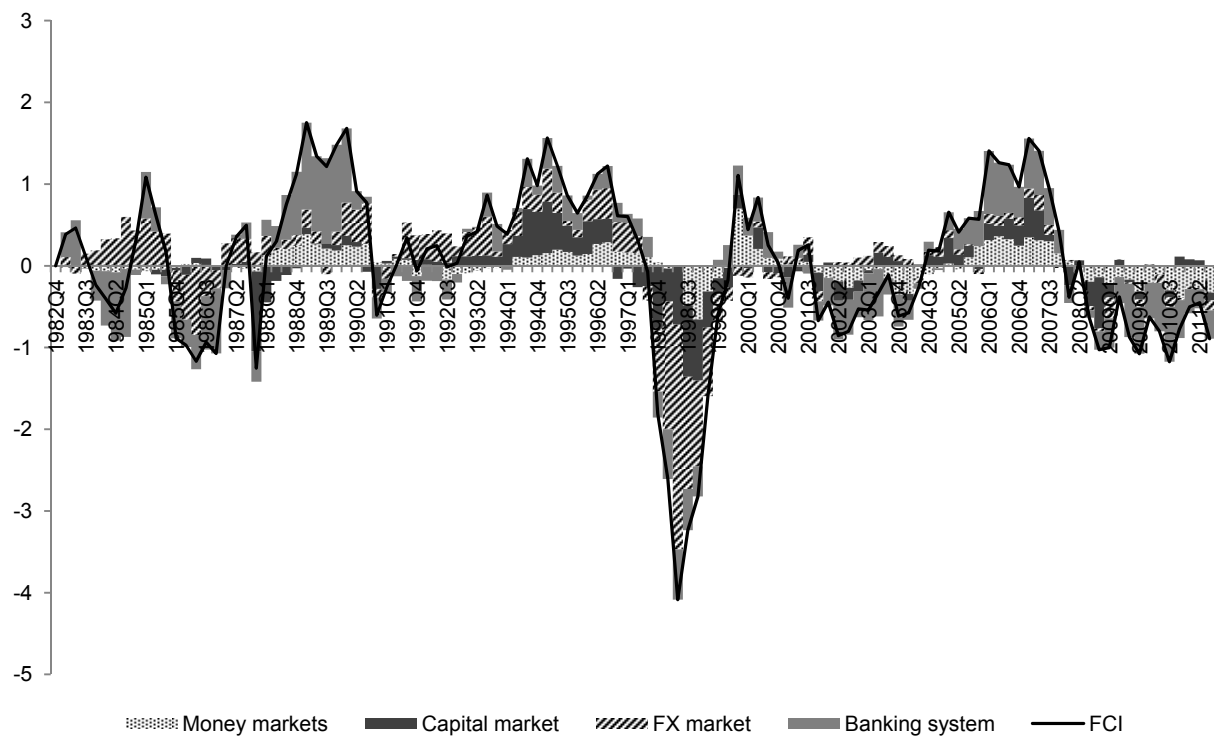
Figure 4c: Decomposition of the FCI in Singapore

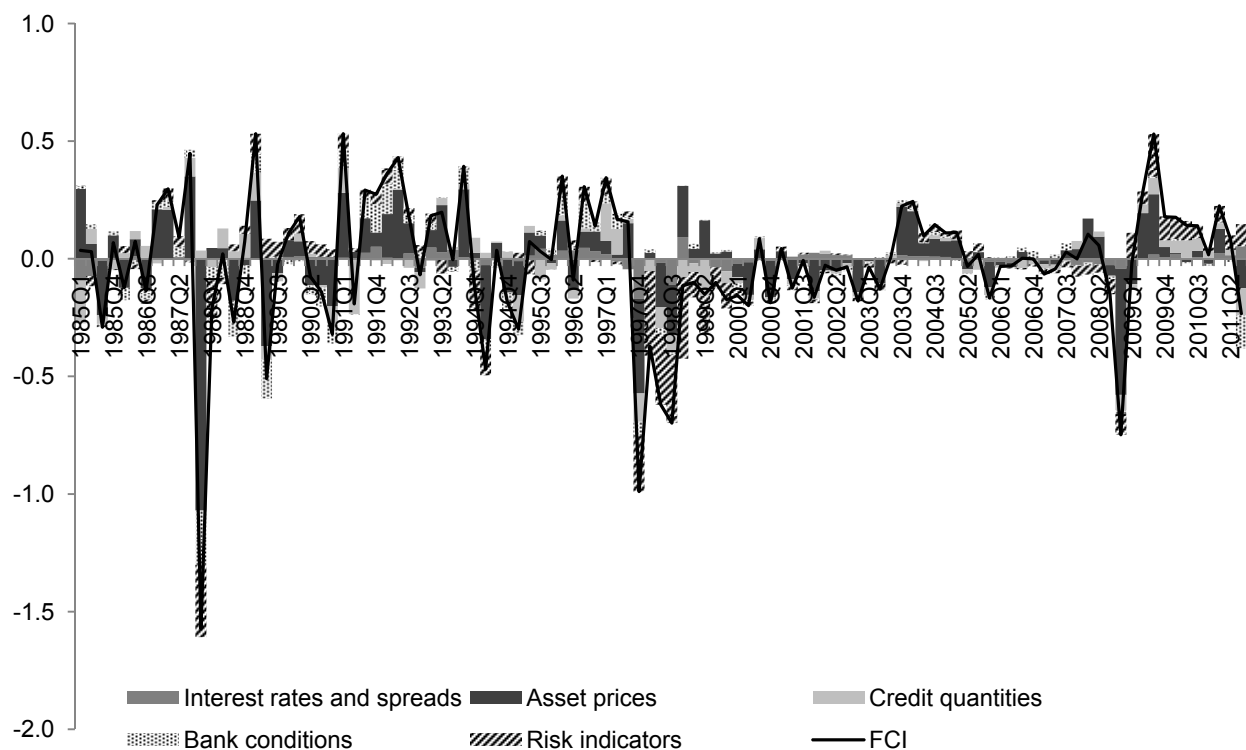
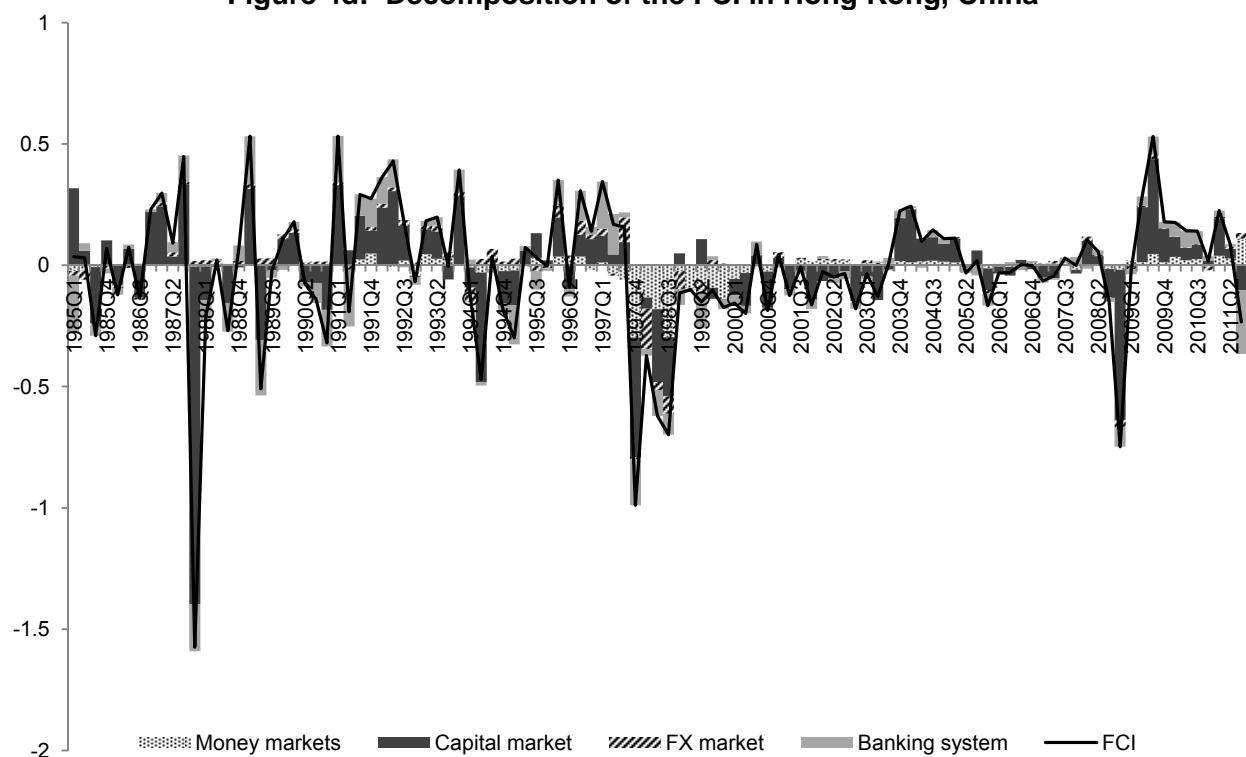
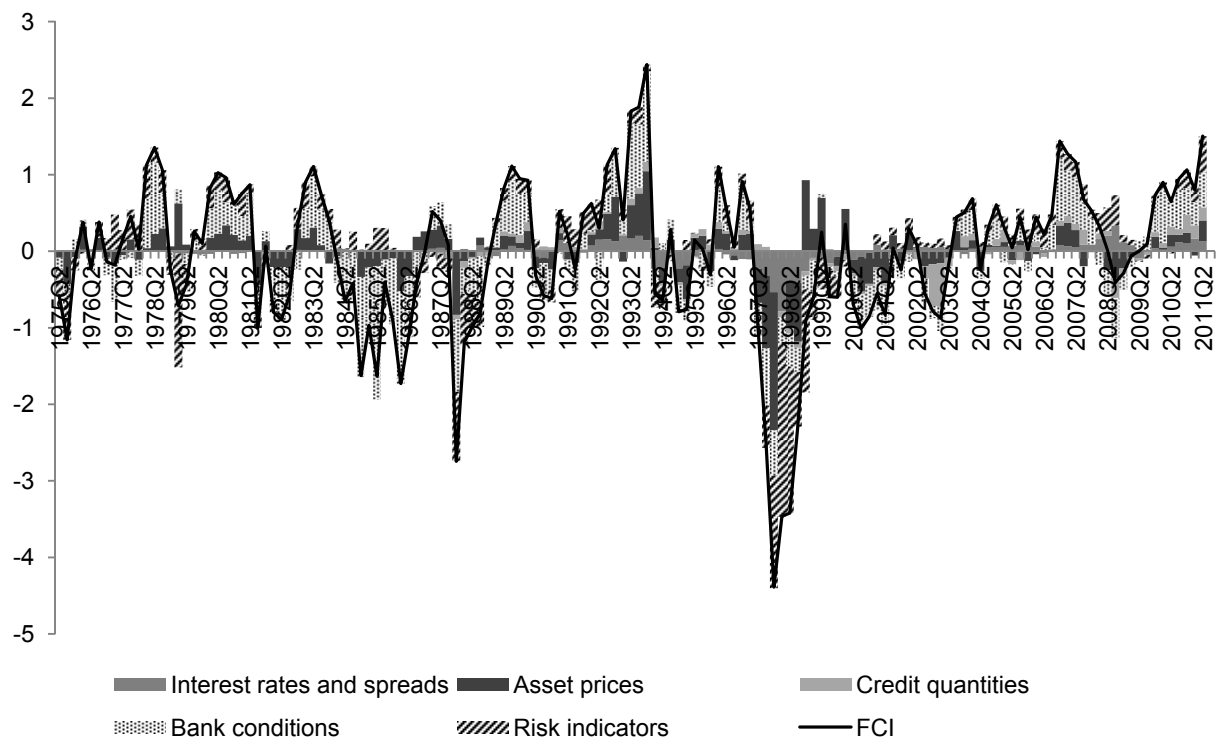
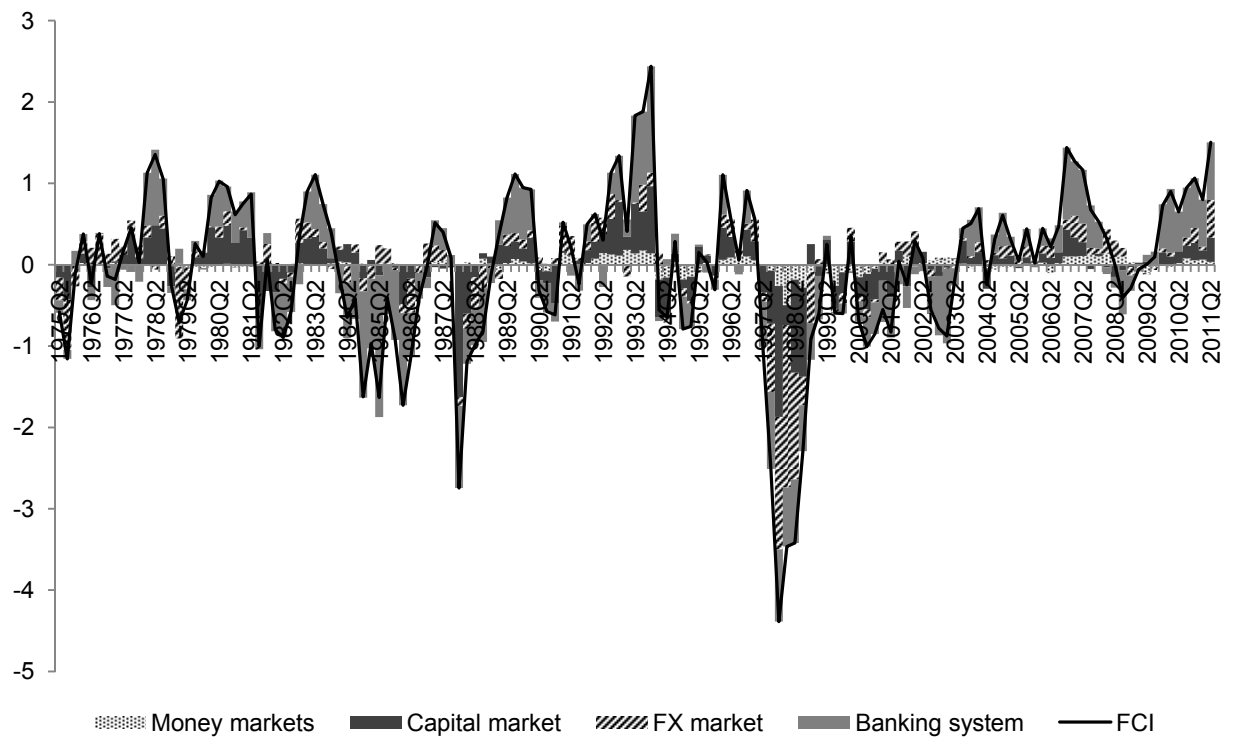
Figure 4d: Decomposition of the FCI in Hong Kong, China

Figure 4e: Decomposition of the FCI in Malaysia



In this study, indicators are classified according to the financial sector represented, namely: (i) money markets, for short-term borrowing and lending; (ii) capital markets, for both equity and debt securities; (iii) foreign exchange markets; and (iv) the banking system. This decomposition sheds light on how each segment of the financial system has contributed to the index across time, especially during crisis periods. Also, variables used to construct the FCI can be categorized as follows: (i) asset prices, (ii) interest rates and spreads, (iii) credit quantities and liquidity measures, (iv) credit surveys (where available), (v) bank conditions, and (vi) other risk indicators. This classification also has the potential to yield information vital to policymakers as well as researchers (Figures 4a to 4e).

During the early 1990s, when financial conditions were at their lowest point in Japan, the banking system clearly was the biggest driver of the country's FCI. During the AFC, which deeply affected majority of the economies included here, the order of importance of the various financial indicators varied but not significantly. For the Republic of Korea, banks followed by foreign exchange and capital markets explained much of the decline in the index. For Singapore and Malaysia, foreign exchange markets had been the most important source of movement followed by capital markets and banks. Developments in capital markets largely drive Hong Kong, China's FCI. The latest GFC led to a slide in Asian FCIs in most cases due to a perception of heightened risk in the banking system and capital markets.

From the same figures, it is clear that the decline in Japan's FCI in the early 1990s previously attributed to the banking system corresponded mainly to bank conditions indicators, particularly equity-based risk measures, and the credit climate as reflected by surveys. The deterioration of the index during the AFC can generally be explained by asset prices and stress indicators comprising mainly measures of asset market volatility and sovereign risk. Deteriorating risk indicators also largely account for the deterioration in the FCIs of the other countries, especially those of Singapore; Hong Kong, China; and Malaysia. Asset prices and credit conditions, particularly interest rates and spreads, meanwhile, seem to have influenced movements in the FCIs of a number of economies during the latest GFC.

C. Comparison with Unadjusted FCIs

To further assess the FCIs, indexes that do not purge the financial data of macroeconomic influences were computed (i.e. where financial components are not initially regressed on real GDP and inflation), which can be useful tools as well for policymakers. These are shown in Figures 5a to 5e. They are read in the same way as adjusted FCIs except that they cannot be interpreted as being consistent with economic conditions.

Figure 5a: The FCI Without Adjustment for Macroeconomic Influences (Japan)

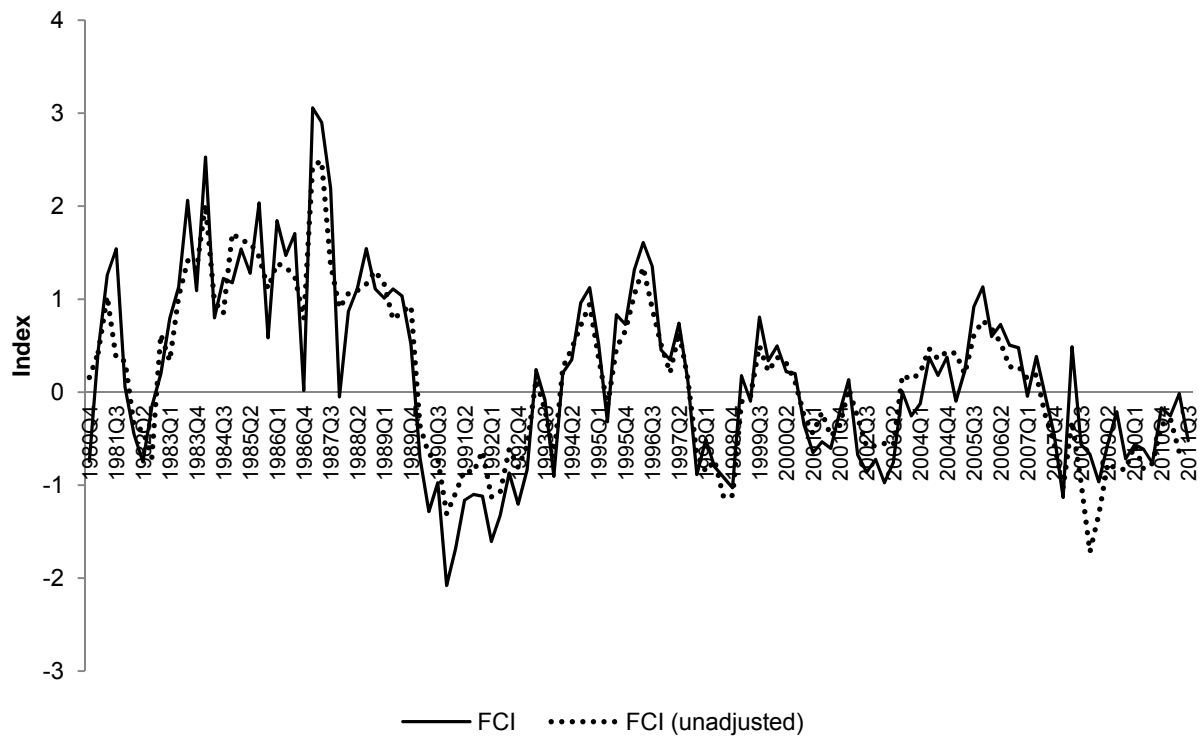


Figure 5b: The FCI Without Adjustment for Macroeconomic Influences (Republic of Korea)

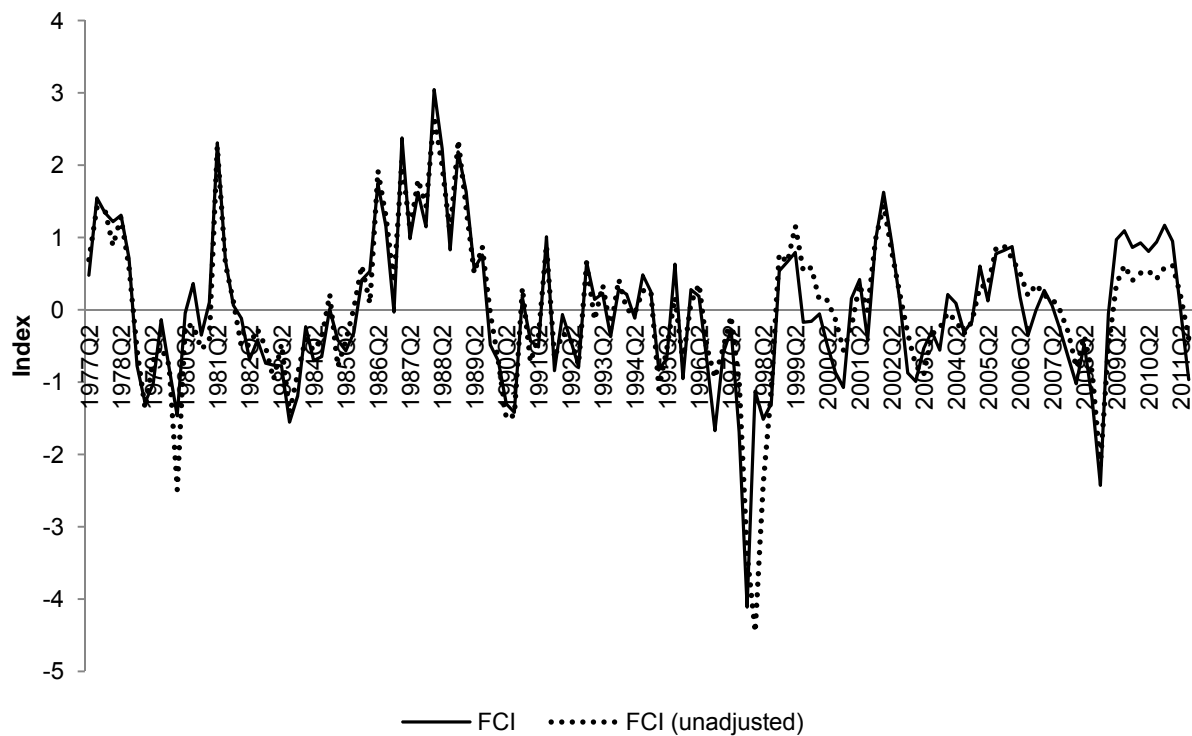


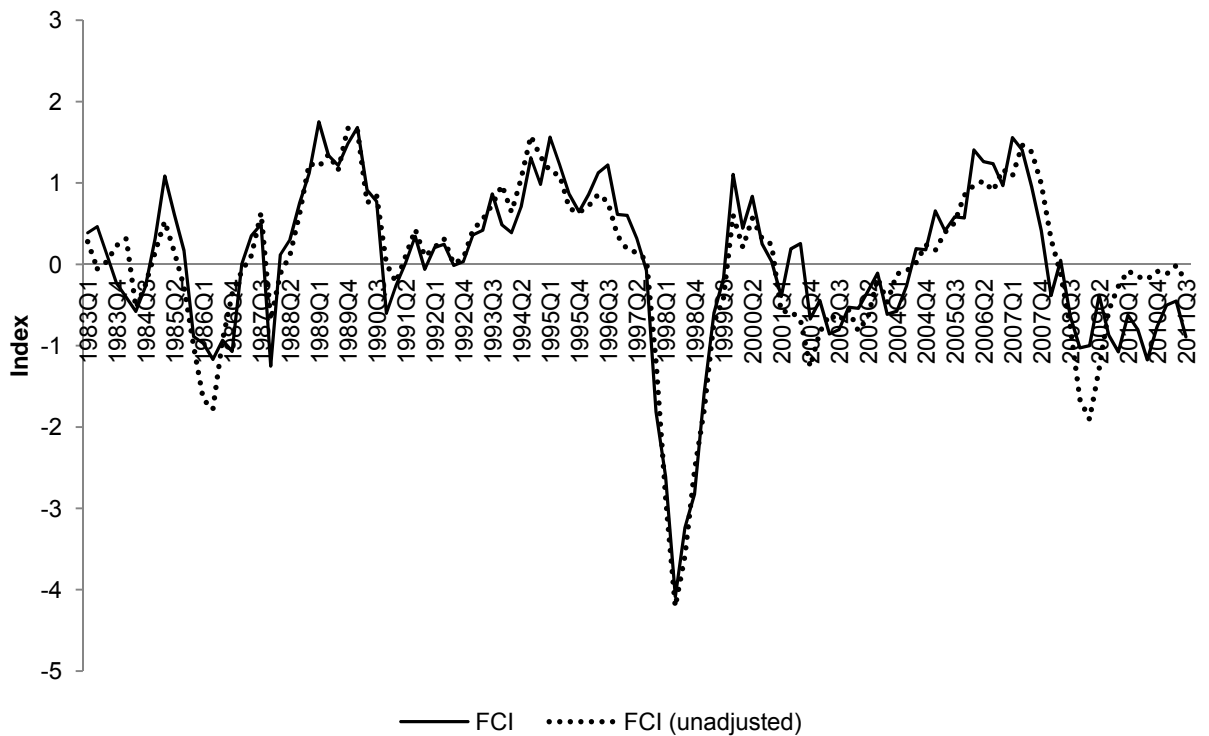
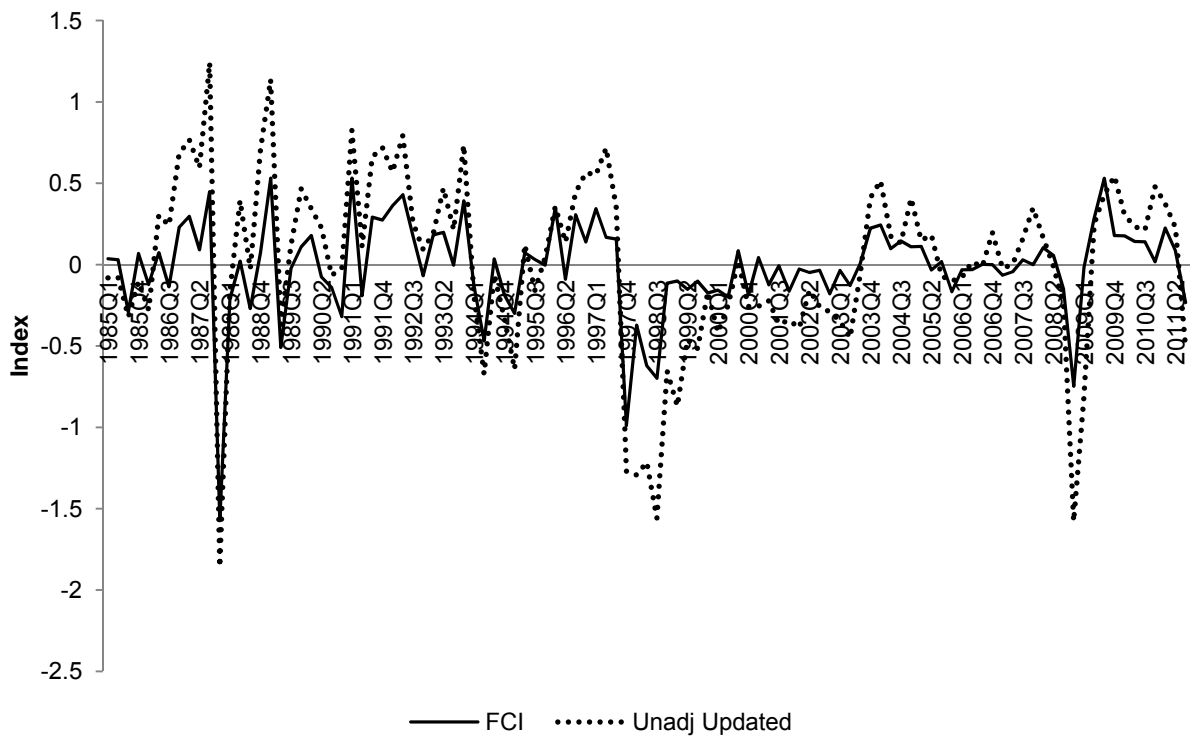
Figure 5c: The FCI Without Adjustment for Macroeconomic Influences (Singapore)**Figure 5d: The FCI Without Adjustment for Macroeconomic Influences (Hong Kong, China)**

Figure 5e: The FCI Without Adjustment for Macroeconomic Influences (Malaysia)

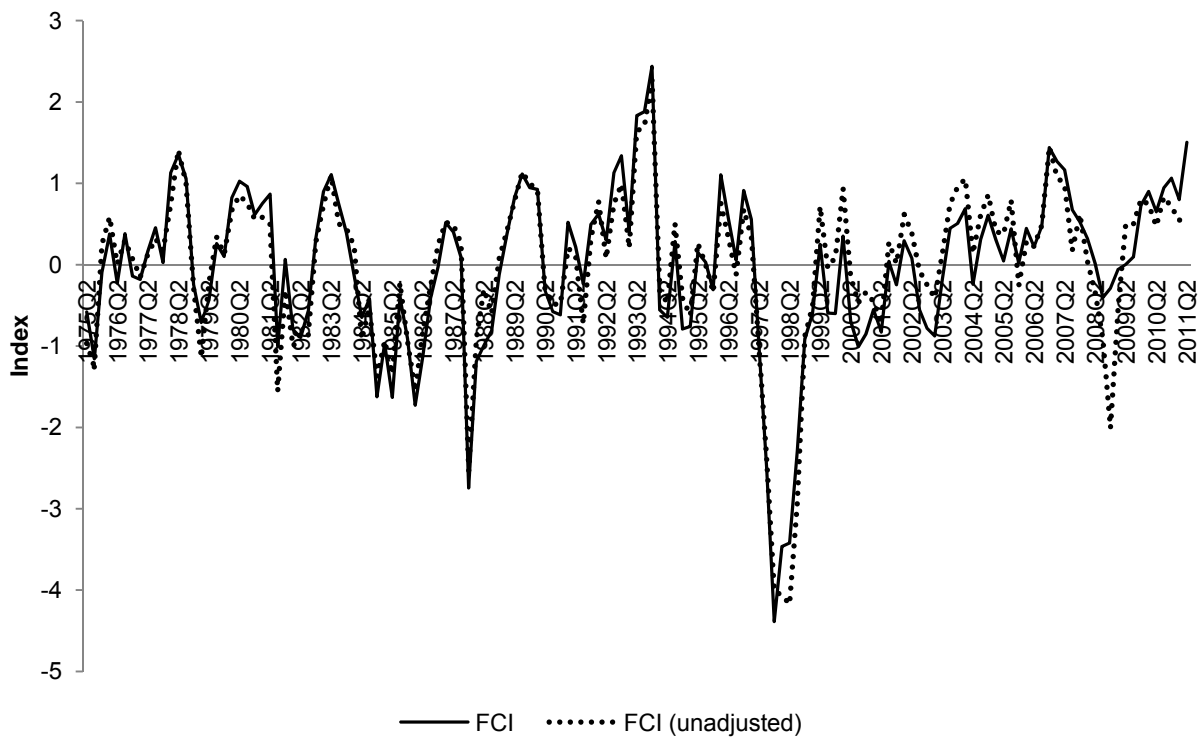
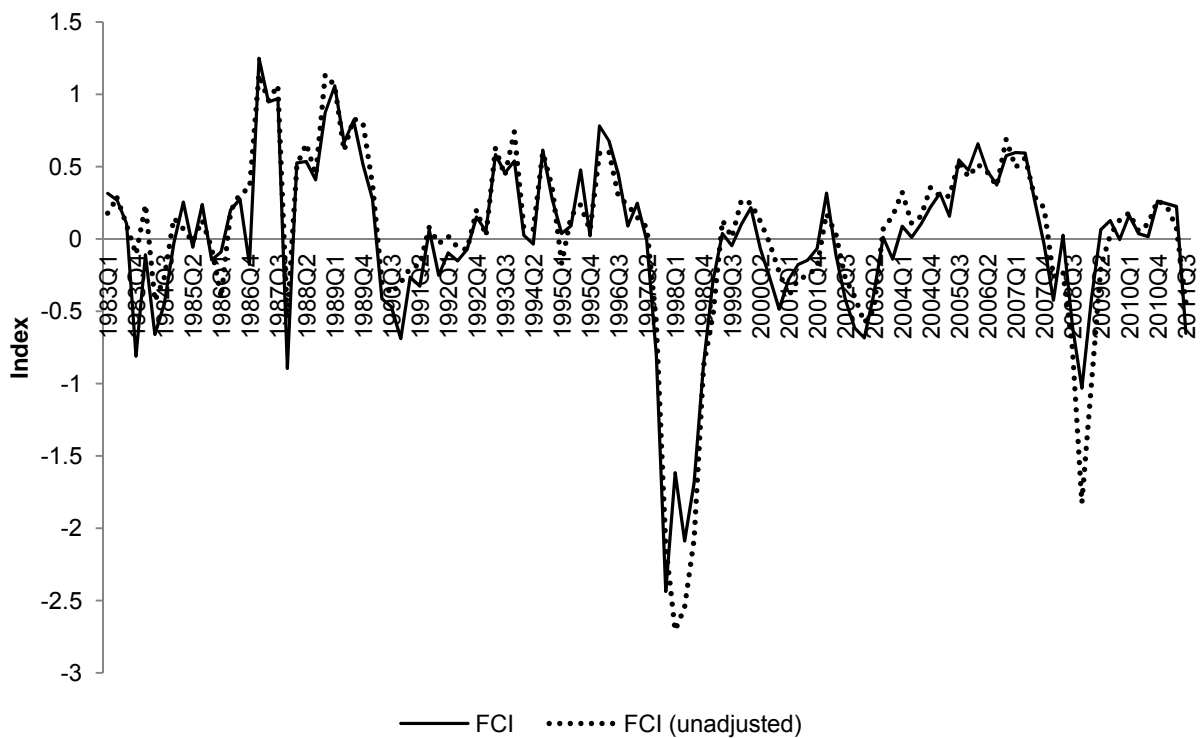


Figure 5f: The FCI Without Adjustment for Macroeconomic Influences (Asia)



Instances when the unadjusted FCI fell below the FCI isolated of macro influences imply that financial indicators during those times were actually better than could be expected in relation to the current stage of the business cycle. For a number of economies, this occurred during sharp downturns such as the Asian financial crisis in the late 1980s and the recent global financial crisis. In general, therefore, the new FCIs constructed here tend to convey more accurate signals about the future state of the economy.

Instances when the unadjusted FCI rose above the FCI indicate that financial indicators were in fact worse than could be considered as typical given existing economic conditions. While this often occurred during periods of relative calm, this happened in Japan during the recession in the early 1990s and more recently in Singapore, with the financial setting in the city state appearing to be still quite restrictive viewed against the nascent economic recovery. Hatzius et al. (2010) have similar findings in constructing an FCI for the US and view this odd result as holding negative implications for future real activity.

D. Higher-Frequency FCIs

After building and evaluating quarterly FCIs, indexes that mine information from high-frequency movements in financial markets are constructed. By tracking changes in financial conditions more closely in time, such measures would naturally be more valuable for predicting real activity and monitoring financial stability.

Higher-frequency FCIs have been constructed for only two countries in our set of economies, namely Japan and the Republic of Korea, where the required data are readily available.¹⁵ The resulting monthly measures, which are presented in 3-month moving-average form to smoothen volatility, have quite similar profiles as quarterly FCIs (Figures 6a and 6b). They also have analogous decompositions except that credit surveys, which are of quarterly frequency, could not be included (Figures 7a and 7b). Passed through the right filter, the monthly indexes should be able to catch important trends as they unfold.

¹⁵ Instead of real GDP and the GDP deflator which are available in only quarterly frequency, monthly industrial production and CPI data were used.

Figure 6a: Monthly FCI for Japan (first principal component)

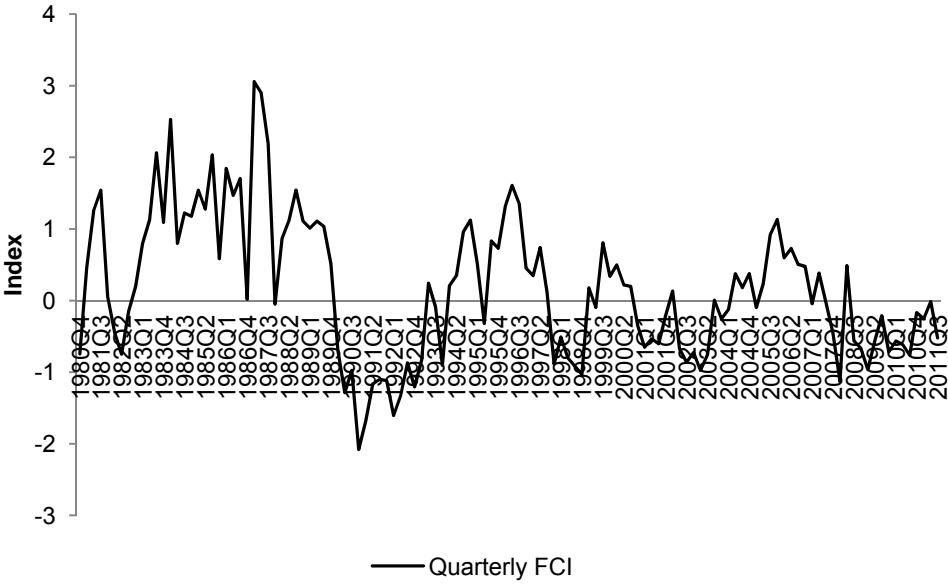
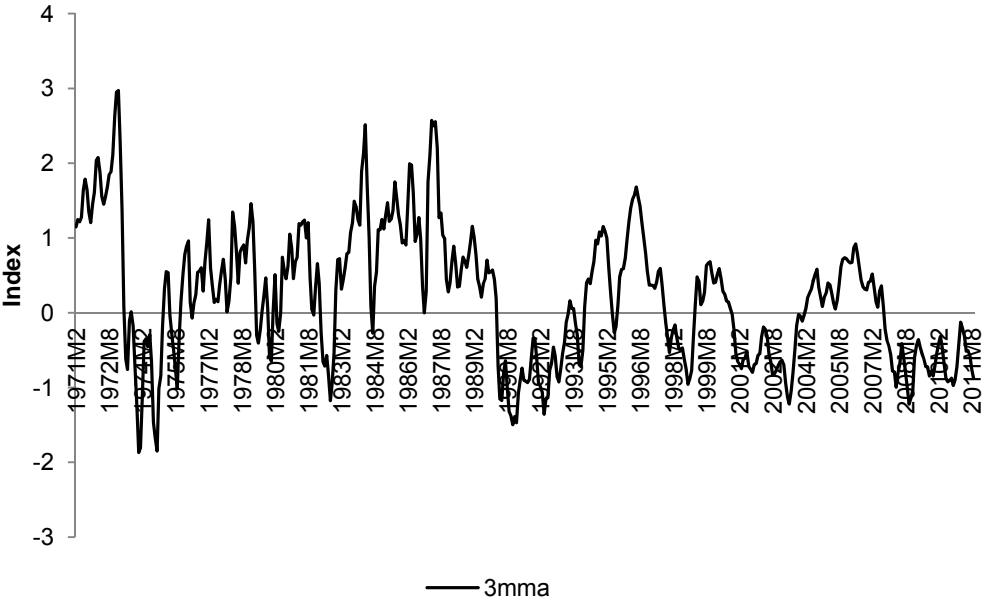


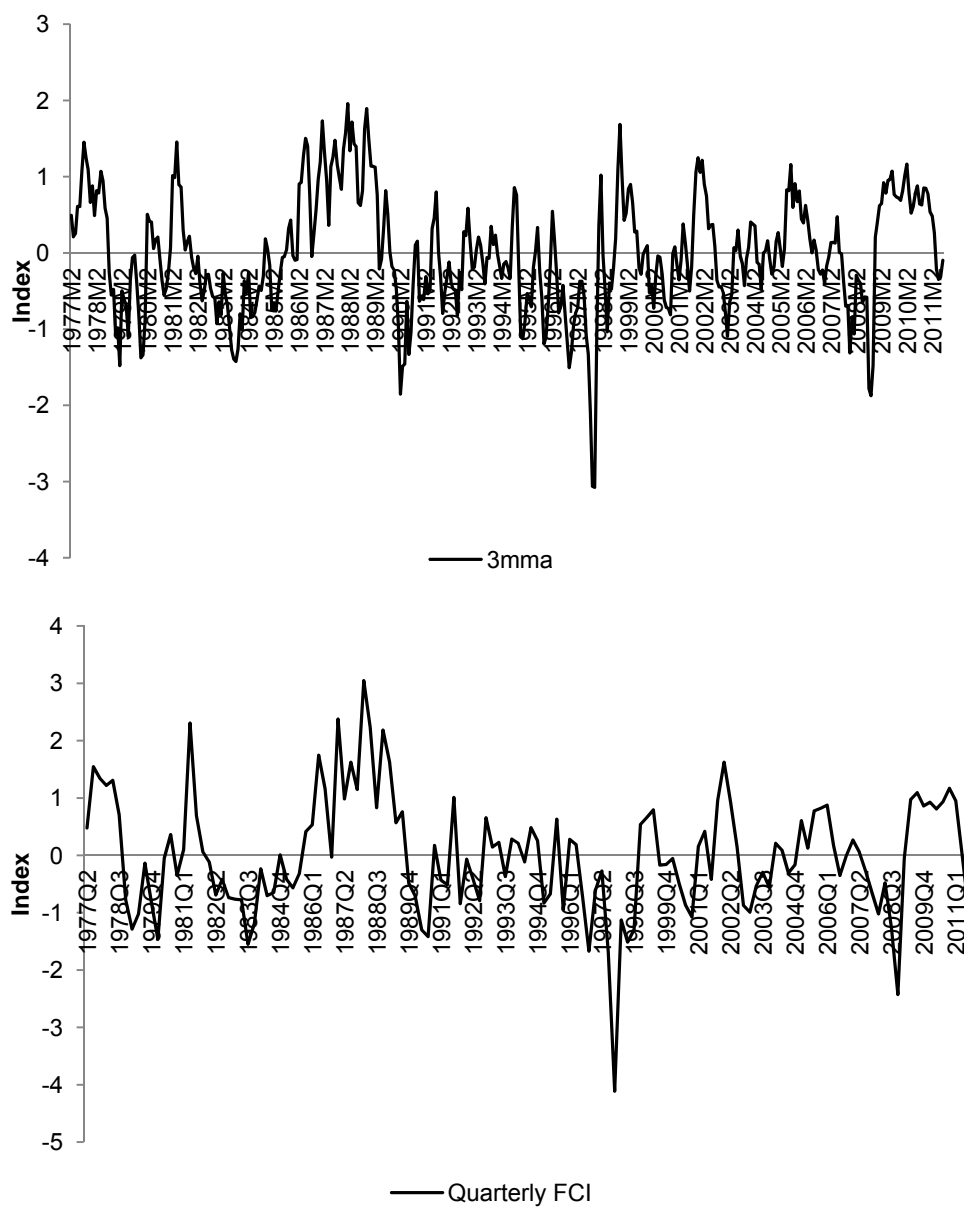
Figure 6b: Monthly FCI for the Republic of Korea (first principal component)

Figure 7a: Decomposition of Japan's Monthly FCI

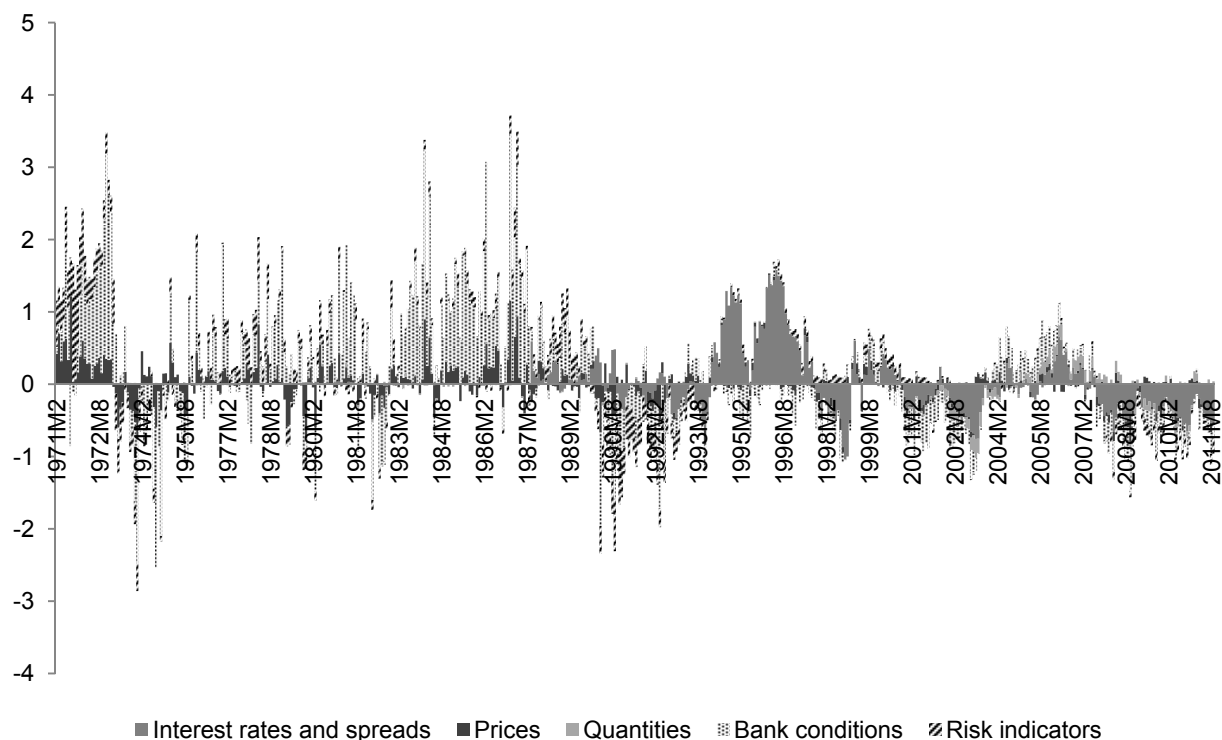
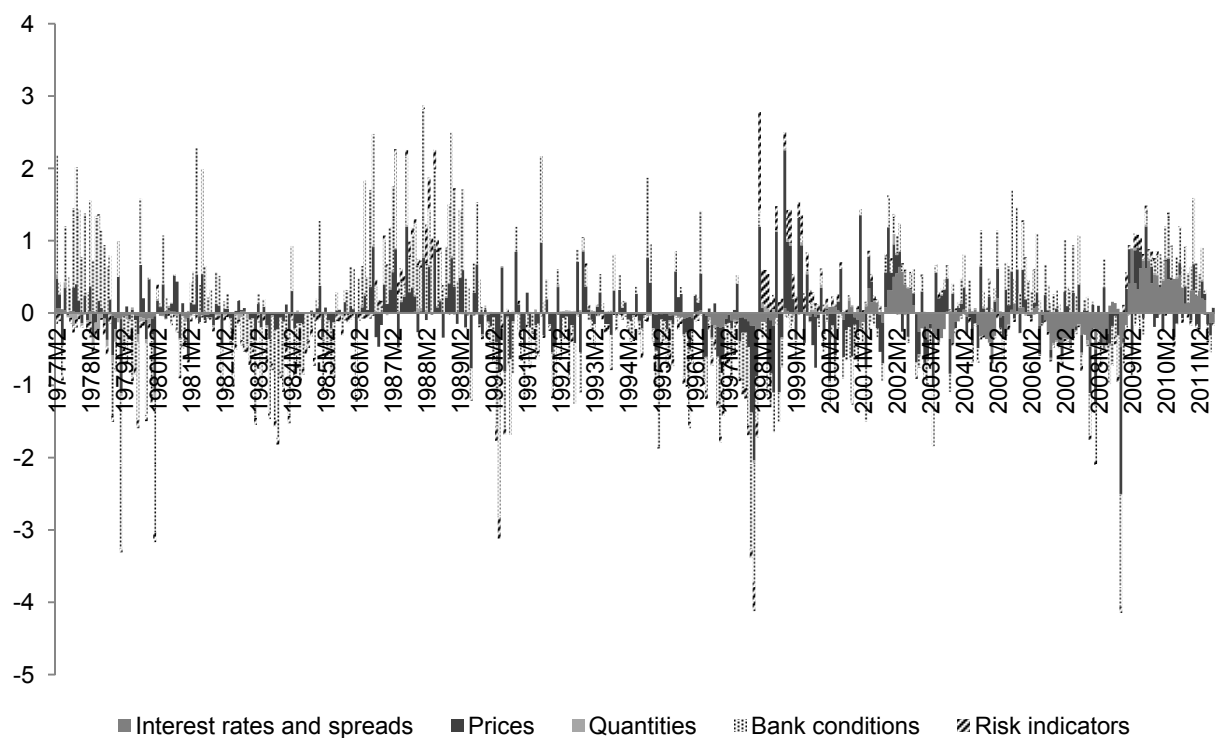


Figure 7b: Decomposition of the Republic of Korea's Monthly FCI



The higher-frequency FCIs also hold promise in terms of the capacity to predict real activity. The monthly index for Japan bested the AR model and single financial indicators on average based on half- and full-year forecasting horizons. Favorable results were also obtained for the Republic of Korea where the monthly FCI outperformed the benchmark and other indicators, especially for shorter horizons.

VI. CONCLUDING REMARKS

Using the PCA methodology developed by Hatzius et al. (2010), FCIs for selected Asian economies were constructed and found to closely mark major episodes in the financial history of each economy, particularly those characterized by large external financial and economic shocks. For some economies, particularly those with a more complete range of financial data (i.e. including credit surveys), the FCIs had a higher degree of predictive power relative to benchmark AR models and, on average, outperformed single financial indicators typically mentioned in the literature.

The addition of financial stress indicators, especially of market volatilities characterizing periods of credit impairment in emerging market economies, has been very important in constructing credible indexes especially in terms of comparing severities of past crisis periods. How it affects predictive power, however, remains a topic for future research. There is, in any case, a need to improve forecast precision of the FCIs for some Asian economies. The results of the study imply that to increase forecasting accuracy, a broader range of financial data is needed and/or a better pre-selection of indicators as other studies suggest (e.g. Ng, 2011).

While much can still be done to refine the FCIs here, the measure in its present form already displays potential usefulness for both policymakers and financial market participants. Apart from the ability to gauge the state of the financial system at any point in time, the index by its decomposition can help locate underlying sources of stress, a property that should be valuable for monitoring financial market conditions and stability for timely and appropriate policy action. The monthly FCIs constructed also hold promise and could be improved upon in the direction of creating even higher-frequency measures that can provide vital real-time information.

Appendix: Data and Data Sources

HONG KONG, CHINA

FINANCIAL INDICATORS	SOURCE	START	END	FREQUENCY	TRANSFORMATION
INTEREST RATES & SPREADS					
Average Buying Rates of GS Dealers 10-Year Bond Yield (%)	HKMA	1996m10	2011m11	Monthly	First difference
Average Buying Rates of GS Dealers 3-Month T-Bill Yield (%)	HKMA	1991m6	2011m11	Monthly	First difference
Spread: Benchmark 2-Year Bond Yield/Benchmark 3-Month T-Bill	HKMA	1991m11	2011m11	Monthly	Level
Term Spread: Benchmark 10-Year Bond/Benchmark 3-Month T-Bill	HKMA	1996m10	2011m11	Monthly	Level
"TED" Spread: 3-month HK HIBOR/Benchmark 3-Month T-bill	HKMA	1991m6	2011m11	Monthly	Level
Spread: 3-month HK HIBOR/HK Swap OIS	HKMA	2001m8	2011m11	Monthly	Level
Fixed Deposit Spread: 12-month Fixed Deposit/3-month Fixed Deposit (Banks)	HKMA	1978m5	2011m11	Monthly	Level
Term Spread: Benchmark 5-Year Bond/Benchmark 3-Month T-Bill	HKMA	1994m9	2011m11	Monthly	Level
US Term Spread: 10-Year Bond/3-Month T-Bill	US Fed	1953m4	2011m11	Monthly	Level
PRICES					
REER Broad, BIS	CEIC	1994m1	2011m10	Monthly	Log first-difference
REER Narrow, BIS	CEIC	1963m10	2011m10	Monthly	Log first-difference
Han Seng Index	CEIC	1964m7	2011m11	Monthly	Log first-difference
Han Seng Finance	CEIC	1984m7	2011m11	Monthly	Log first-difference
Market Capitalization Total	CEIC	1985m3	2011m11	Monthly	Log first-difference
Market Capitalization Finance	CEIC	1985m3	2007m12	Monthly	Log first-difference
Foreign Reserves (US\$M)	HKMA	1997m1	2011m11	Monthly	Log first-difference
Residential Price Index, Peak SA	Bloomberg	2000q1	2011q2	Quarterly	Log first-difference
Residential Price Index, South Side SA	Bloomberg	2000q1	2011q2	Quarterly	Log first-difference
Residential Price Index, Mid-Levels SA	Bloomberg	2000q1	2011q2	Quarterly	Log first-difference
Office Price Index, Central SA	Bloomberg	2000q1	2011q2	Quarterly	Log first-difference
Office Price Index, Wanchia SA	Bloomberg	2000q1	2011q2	Quarterly	Log first-difference
Office Price Index, Tsim Sha Tsui SA	Bloomberg	2000q1	2011q2	Quarterly	Log first-difference
Industrial Price Index, Factory SA	Bloomberg	2000q1	2011q2	Quarterly	Log first-difference
Industrial Price Index, Warehouse SA	Bloomberg	2000q1	2011q2	Quarterly	Log first-difference
Industrial Price Index, Buildings SA	Bloomberg	2000q1	2011q2	Quarterly	Log first-difference

QUANTITIES

M3 (SA)	HKMA	1997m4	2011m10	Monthly	Log first-difference
Total Loans and Advances, Authorized Institutions (HK\$M) SA	HKMA	1978m12	2011m10	Monthly	Log first-difference
Loans and Advances for Use in HK, Authorized Institutions (HK\$M) SA	HKMA	1980m12	2011m10	Monthly	Log first-difference
Claims on Central Government (HK\$M) Banking Institutions SA	IFS	1990m1	2011m8	Monthly	Log first-difference
Claims on Private Sector (HK\$M) Banking Survey SA	IFS	1995m9	2011m8	Monthly	Log first-difference
Claims on Other Sectors (HK\$M) Banking Institutions SA	IFS	1995m9	2011m8	Monthly	Log first-difference
Domestic Claims (HK\$M) Banking Survey SA	IFS	1996m12	2011m8	Monthly	Log first-difference
Residential Mortgage, Outstanding Loans (HK\$M) SA	CEIC	2000m12	2011m10	Monthly	Log first-difference
Residential Mortgage, New Loans Approved (HK\$M) SA	CEIC	2000m12	2011m10	Monthly	Log first-difference
Loans: All Authorized Institutions (HK\$M) SA	CEIC	1965q2	2011q3	Quarterly	Log first-difference
Loans: Bldg, Construction, Property Development & Investment (HK\$M) SA	CEIC	1965q2	2011q3	Quarterly	Log first-difference
Loans: Misc: Financial Concerns (HK\$M) SA	CEIC	1965q2	2011q3	Quarterly	Log first-difference
Loans: Misc: Professional and Private Individuals (HK\$M) SA	CEIC	1965q2	2011q3	Quarterly	Log first-difference
Home Ownership Scheme Loans: Total (HK\$M) SA	CEIC	1981q4	2011q3	Quarterly	Log first-difference
Loans: Manufacturing (HK\$M) SA	CEIC	1965q2	2011q3	Quarterly	Log first-difference
Other Residential Property Loans: Total (HK\$M) SA	CEIC	1978q4	2011q3	Quarterly	Log first-difference
Total Residential Property Loans: Total (HK\$M) SA	CEIC	1981q4	2011q3	Quarterly	Log first-difference
Loans: Wholesale and Retail Trade (HK\$M) SA	CEIC	1965q2	2011q3	Quarterly	Log first-difference
Loans: Transport and Transport Equipment (HK\$M) SA	CEIC	1965q2	2011q3	Quarterly	Log first-difference
Loans: Electricity, Gas and Telecommunications (HK\$M) SA	CEIC	1990q4	2011q3	Quarterly	Log first-difference

BANK CONDITIONS

Bank Sector Beta (HSI and HSF)	CEIC	1986m6	2011m11	Monthly	Level
Bank Sector Beta (HSI and HSF) OLS	CEIC	1992m5	2011m11	Monthly	Level
Distance-to-Default (Based on HSF Index, monthly returns)	CEIC	1985m8	2011m11	Monthly	Level
Distance-to-Default (Based on HSF Index, yearly returns)	CEIC	1985m8	2011m11	Monthly	Level
Distance-to-Default (Based on HSI, monthly returns)	CEIC	1968m1	2011m11	Monthly	Level

OTHER RISK INDICATORS

Correlation of Returns on Equities and Treasuries	CEIC, HKMA	1995m9	2011m11	Monthly	Level
Stock Market Volatility (HSI Index)	CEIC	1968m1	2011m11	Monthly	Level
Stock Market Volatility (HSF Index)	CEIC	1985m8	2011m11	Monthly	Level
Foreign Reserves Volatility	HKMA	1988m2	2011m11	Monthly	Level
Broad REER Broad Volatility	CEIC	1995m2	2011m10	Monthly	Level
Narrow REER Volatility	CEIC	1969m2	2011m10	Monthly	Level
Trade-weighted NEER1 Volatility	IFS	1976m2	2011m12	Monthly	Level
Broad NEER Volatility	BIS	1995m2	2011m11	Monthly	Level
Narrow NEER Volatility	BIS	1964m11	2011m11	Monthly	Level
Exchange Rate Volatility (eop)	IFS	1958m2	2011m11	Monthly	Level
Exchange Market Pressure Index	HKMA, IFS	1997m2	2011m11	Monthly	Level
Sovereign Spread: Benchmark 10-Year Bond/US 10-Year Bond	HKMA, US Fed	1994m9	2011m11	Monthly	Level
Sovereign Spread: Benchmark 5-Year Bond/US 5-Year Bond	HKMA, US Fed	1996m10	2011m11	Monthly	Level
Residential Price Volatility, Peak	Bloomberg	2001q2	2011q2	Quarterly	Level
Residential Price Volatility, South Side	Bloomberg	2001q2	2011q2	Quarterly	Level
Residential Price Volatility, Mid-Levels	Bloomberg	2001q2	2011q2	Quarterly	Level
Office Price Volatility, Central	Bloomberg	2001q2	2011q2	Quarterly	Level
Office Price Volatility, Wanchia	Bloomberg	2001q2	2011q2	Quarterly	Level
Office Price Volatility, Tsim Sha Tsui	Bloomberg	2001q2	2011q2	Quarterly	Level
Industrial Price Volatility, Factory	Bloomberg	2001q2	2011q2	Quarterly	Level
Industrial Price Volatility, Warehouse	Bloomberg	2001q2	2011q2	Quarterly	Level
Industrial Price Volatility, Buildings	Bloomberg	2001q2	2011q2	Quarterly	Level

JAPAN

FINANCIAL INDICATORS	SOURCE	START	END	FREQUENCY	TRANSFORMATION
INTEREST RATES & SPREADS					
10-Year Bond Yield (%)	Bloomberg	1987m10	2011m11	Monthly	First difference
Spread: Benchmark 2-Year Bond Yield/Benchmark 3-Month T-Bill	Bloomberg	1992m7	2011m11	Monthly	Level
Term Spread: Benchmark 10-Year Bond/Benchmark 3-Month T-Bill	Bloomberg	1992m7	2011m11	Monthly	Level
Spread: New Long-term Loans/Benchmark 10-Year Bond	BOJ, Bloomberg	1993m10	2011m10	Monthly	Level
Spread: Stock Long-term Loans/Benchmark 10-Year Bond	BOJ, Bloomberg	1993m10	2011m10	Monthly	Level
Spread: Housing Loan Corporation Interest Rate/Benchmark 10-Year Bond	CEIC, Bloomberg	1987m10	2011m10	Monthly	Level
Spread: Housing Loan Floating Interest Rate/Benchmark 10-Year Bond	CEIC, Bloomberg	1987m10	2011m10	Monthly	Level
"TED" Spread: 3-month TIBOR/Benchmark 3-Month T-bill	Bloomberg	1995m11	2011m11	Monthly	Level
Spread: 3-month TIBOR/JP Swap OIS	Bloomberg	2002m3	2011m11	Monthly	Level
Paper-Bill Spread: 3-month Commercial Paper/Benchmark 3-Month T-bill	BOJ, Bloomberg	1994m9	2009m10	Monthly	Level
Certificate of Deposit Spread: 12-month Fixed/3-month	BOJ	1996m1	2011m10	Monthly	Level
Time Deposit Spread: 10-year/3-month	BOJ	1995m10	2011m10	Monthly	Level
Term Spread: Benchmark 5-Year Bond/Benchmark 3-Month T-Bill	Bloomberg	1992m7	2011m10	Monthly	Level
US Term Spread: 10-Year Bond/3-Month T-Bill	US Fed	1953m4	2011m11	Monthly	Level
Spread: Japan LT Prime Lending Rate/3-Month TIBOR	Bloomberg	1995m11	2011m10	Monthly	Level
Spread: Japan ST Prime Lending Rate/3-Month TIBOR	CEIC, Bloomberg	1995m11	2011m10	Monthly	Level
PRICES					
Real Effective Exchange Rate (2005 = 100)	BOJ	1970m1	2011m11	Monthly	Log first-difference
TOPIX Bank Index	Bloomberg	1983m1	2011m11	Monthly	Log first-difference
Share prices from IFS Online	IFS	1957m1	2011m10	Monthly	Log first-difference
TOPIX 500 Market Capitalization	CEIC	1998m12	2011m11	Monthly	Log first-difference
Foreign Reserves (US\$M) minus gold	IFS	1957m1	2011m10	Monthly	Log first-difference
QUANTITIES					
M3 (SA)	IFS	2003m4	2011m8	Monthly	Log first-difference
Claims on Central Government (¥M) Depository Corporations SA	IFS	2001m12	2011m8	Monthly	Log first-difference
Claims on Central Government (¥M) Other Depository Corporations SA	IFS	2001m12	2011m8	Monthly	Log first-difference
Claims on Private Sector (¥M) Depository Corporations SA	IFS	2001m12	2011m8	Monthly	Log first-difference
Claims on Private Sector (¥M) Other Depository Corporations SA	IFS	2001m12	2011m8	Monthly	Log first-difference
Claims on Other Sectors (¥M) Depository Corporations SA	IFS	2001m12	2011m8	Monthly	Log first-difference
Claims on Other Sectors (¥M) Other Depository Corporations SA	IFS	2001m12	2011m8	Monthly	Log first-difference
Domestic Claims (¥M) Depository Corporations SA	IFS	2001m12	2011m8	Monthly	Log first-difference
Loans (¥M) Depository Corporations SA	IFS	2001m12	2011m11	Monthly	Log first-difference
Loans (¥M) Other Depository Corporations SA	IFS	2001m12	2011m11	Monthly	Log first-difference
Loans and Discounts/Total of Banks and Shinkin Banks(a) SA	BOJ	2000m1	2011m11	Monthly	Log first-difference
Outstanding Loans and Bills Discounted (eop), Domestically Licensed Banks SA	BOJ	2000m10	2011m11	Monthly	Log first-difference
Outstanding Loans and Bills Discounted (eop), Corporations, Domestically Licensed Banks SA	BOJ	2000m10	2011m11	Monthly	Log first-difference
Outstanding Loans and Bills Discounted (eop), Households, Domestically Licensed Banks SA	BOJ	2000m10	2011m11	Monthly	Log first-difference
Amounts Outstanding of Commercial Paper Issued by Banks SA	BOJ	1998m6	2011m12	Monthly	Log first-difference
Corporate Straight Bonds: Issue (JP¥ B) SA	CEIC	1988m1	2011m10	Monthly	Log first-difference
Convertible Bonds: Issue (JPY B)	CEIC	1980m1	2011m10	Monthly	Log first-difference
Claims on Central Government (¥M) Financial Corporations SA	IFS	2001Q4	2011q2	Quarterly	Log first-difference
Claims on Central Government (¥M) Other Financial Corporations SA	IFS	2001Q4	2011q2	Quarterly	Log first-difference
Claims on Private Sector (¥M) Financial Corporations SA	IFS	2001Q4	2011q2	Quarterly	Log first-difference
Claims on Private Sector (¥M) Other Financial Corporations SA	IFS	2001Q4	2011q2	Quarterly	Log first-difference

Claims on Other Sectors (¥M) Financial Corporations SA	IFS	2001Q4	2011q2	Quarterly	Log first-difference
Claims on Other Sectors (¥M) Other Financial Corporations SA	IFS	2001Q4	2011q2	Quarterly	Log first-difference
Domestic Claims (¥M) Financial Corporations SA	IFS	2001Q4	2011q2	Quarterly	Log first-difference
Loans (¥M) Other Financial Corporations SA	IFS	2001Q4	2011q2	Quarterly	Log first-difference
Loans (¥M) Financial Corporations SA	IFS	2001Q4	2011q2	Quarterly	Log first-difference
New Housing Loans to Households, Domestically Licensed Banks SA	BOJ	1974q1	2011q3	Quarterly	Log first-difference
Outstanding Housing Loans to Households, Domestically Licensed Banks SA	BOJ	1974q1	2011q3	Quarterly	Log first-difference
New Consumer Loans to Households, Domestically Licensed Banks SA	BOJ	1986q1	2011q3	Quarterly	Log first-difference
Outstanding Consumer Loans to Households, Domestically Licensed Banks SA	BOJ	1986q1	2011q3	Quarterly	Log first-difference
<i>CREDIT SURVEYS</i>					
DI for Credit Standards/Large Firms	BOJ	2000q2	2011q1	Quarterly	Level
DI for Credit Standards/Medium-sized Firms	BOJ	2000q2	2011q1	Quarterly	Level
DI for Credit Standards/Small Firms	BOJ	2000q2	2011q1	Quarterly	Level
DI for Credit Standards/Households	BOJ	2000q2	2011q1	Quarterly	Level
DI/Lending Attitude/All/All industries/Actual result	BOJ	1974q2	2011q1	Quarterly	Level
DI/Lending Attitude/Large/All industries/Actual result	BOJ	1983q2	2011q1	Quarterly	Level
DI/Lending Attitude/Medium-sized Enterprises/All industries/Actual result	BOJ	1983q2	2011q1	Quarterly	Level
DI/Lending Attitude/Small Enterprises/All industries/Actual result	BOJ	1983q2	2011q1	Quarterly	Level
<i>BANK CONDITIONS</i>					
Bank Sector Beta (TOPIX and TPNBNK)	Bloomberg	1984m12	2011m11	Monthly	Level
Bank Sector Beta (IMSTKJP and TPNBNK)	IFS, Bloomberg	1984m12	2011m10	Monthly	Level
Bank Sector Beta (TOPIX and TPNBNK) OLS	Bloomberg	1993m6	2011m11	Monthly	Level
Bank Sector Beta (IMSTKJP and TPNBNK) OLS	IFS, Bloomberg	1993m6	2011m10	Monthly	Level
Distance-to-Default (Based on TPNBNK Index, monthly returns)	Bloomberg	1984m2	2011m11	Monthly	Level
Distance-to-Default (Based on TPNBNK Index, yearly returns)	Bloomberg	1984m2	2011m11	Monthly	Level
Distance-to-Default (Based on TOPIX, monthly returns)	Bloomberg	1951m2	2011m11	Monthly	Level
Distance-to-Default (Based on TOPIX, yearly returns)	Bloomberg	1951m2	2011m11	Monthly	Level
Distance-to-Default (Based on Overall Index, monthly returns)	IFS	1958m2	2011m10	Monthly	Level
Distance-to-Default (Based on Overall Index, yearly returns)	IFS	1958m2	2011m10	Monthly	Level
<i>OTHER RISK INDICATORS</i>					
Correlation of Returns on Equities and Treasuries	CEIC, Bloomberg	1988m10	2011m11	Monthly	Level
Stock Market Volatility (IFS share prices)	Bloomberg	1958m2	2011m10	Monthly	Level
Stock Market Volatility (TOPIX Bank Index)	Bloomberg	1984m3	2011m11	Monthly	Level
Foreign Reserves Volatility	IFS	1958m2	2011m10	Monthly	Level
REER Volatility	BOJ	1971m2	2011m11	Monthly	Level
NEER Volatility	BOJ	1971m2	2011m12	Monthly	Level
Exchange Rate Volatility (eop)	BOJ	1974m2	2011m12	Monthly	Level
Exchange Market Pressure Index	BOJ, IFS	1973m2	2011m12	Monthly	Level
Sovereign Spread: Benchmark 5-Year Bond/US 5-Year Bond	US Fed, Bloomberg	1988m4	2011m10	Monthly	Level
Sovereign Spread: Benchmark 10-Year Bond/US 10-Year Bond	US Fed, Bloomberg	1987m10	2011m11	Monthly	Level

REPUBLIC OF KOREA

FINANCIAL INDICATORS	SOURCE	START	END	FREQUENCY	TRANSFORMATION
INTEREST RATES & SPREADS					
10-Year Bond Yield (%)	BOK	2000m10	2011m11	Monthly	First difference
Spread: Benchmark 3-Year Bond Yield/Benchmark 3-Month CD	BOK	1995m5	2011m11	Monthly	Level
Spread: Benchmark 3-Year Bond Yield/Benchmark 1-Year Bond Yield	BOK	2000m2	2011m11	Monthly	Level
Term Spread: Benchmark 10-Year Bond Yield/Benchmark 3-Month CD	BOK	2000m10	2011m10	Monthly	Level
Spread: Benchmark 3-Year Bond Yield/Benchmark 1-Year Bond Yield	BOK	2000m10	2011m10	Monthly	Level
Spread: Newly-Extended Loans to Corporations/Benchmark 5-Year Bond	CEIC, BOK	1996m1	2011m10	Monthly	Level
Spread: Newly-Extended Loans to Households/Benchmark 5-Year Bond	CEIC, BOK	1996m1	2011m10	Monthly	Level
Spread: Newly-Extended Loans to Households for Houses/Benchmark 5-Year Bond	CEI C, BOK	2001m9	2011m10	Monthly	Level
Spread: Outstanding Loans to Corporations incl Revolving Loans/Benchmark 5-Year Bond	Bloomberg CEIC,	1987m10	2011m11	Monthly	Level
Spread: Outstanding Loans to Households incl Revolving Loans/Benchmark 5-Year Bond	Bloomberg BOJ,	1987m10	2011m10	Monthly	Level
Spread: 3-month Commercial Paper/3-Month CD	Bloomberg	1994m9	2011m11	Monthly	Level
Time Deposit Spread: 5-year/3-month	BOJ	1995m10	2011m11	Monthly	Level
Term Spread: Benchmark 5-Year Bond Yield/Benchmark 3-Month CD	BOK	1995m5	2011m11	Monthly	Level
Spread: Benchmark 5-Year Bond Yield/Benchmark 1-Year Bond Yield	BOK	2000m2	2011m11	Monthly	Level
US Term Spread: 10-Year Bond/3-Month T-Bill	US Fed	1953m4	2011m11	Monthly	Level
Corporate Bond Spread: Corporate Bond Yield (AA-)/ Benchmark 3-Year Bond Yield	CEIC, BOK	1995m5	2011m11	Monthly	Level
Corporate Bond Spread: Corporate Bond Yield (BBB-)/ Benchmark 3-Year Bond Yield	CEIC, BOK	2000m10	2011m11	Monthly	Level
PRICES					
REER Broad, BIS	CEIC	1994m1	2011m11	Monthly	Log first-difference
REER Narrow, BIS	CEIC	1963m10	2011m11	Monthly	Log first-difference
Rep. of Korea Stock Price Index	CEIC	1976m1	2011m11	Monthly	Log first-difference
Index: KOSPI: Financial Institutions	CEIC	1980m1	2011m11	Monthly	Log first-difference
Index: KOSPI: Financial Institutions: Banks	CEIC	1980m1	2011m11	Monthly	Log first-difference
KOSPI Market Capitalization	CEIC	1988m1	2011m11	Monthly	Log first-difference
KOSPI FIs Market Capitalization	CEIC	1994m1	2011m11	Monthly	Log first-difference
KOSPI Banks Market Capitalization	CEIC	1994m1	2011m11	Monthly	Log first-difference
Foreign Reserves (US\$M) minus gold	BOK	1971m1	2011m9	Monthly	Log first-difference
Housing Purchase Price Index, All Groups (2008m12=100)	BOK	1986m1	2011m11	Monthly	Log first-difference
Chonse Price Index, All Groups (2008m12=100)	BOK	1986m1	2011m11	Monthly	Log first-difference
QUANTITIES					
Liquidity Aggregates of Financial Institutions, eop (Won bil) SA	BOK	1986m1	2011m11	Monthly	Log first-difference
Claims on Government (Won M) Deposit Money Banks SA	IFS	1960m1	2011m9	Monthly	Log first-difference
Claims on Private Sector (Won M) Deposit Money Banks SA	IFS	1960m1	2011m9	Monthly	Log first-difference
Loans and Discounts of KBs and Specialized Banks (Won bil) SA	BOK	1960m1	2011m10	Monthly	Log first-difference
Loans and Discounts of Non-Bank Financial Corporations (Won bil) SA	BOK	1993m9	2011m11	Monthly	Log first-difference
Loans to Households, Depository Corporations (Won bil) SA	BOK	2003m10	2011m10	Monthly	Log first-difference
Loans to Households, KBs and Specialized Banks (Won bil) SA	BOK	2003m10	2011m10	Monthly	Log first-difference
Loans to Households of Depository Corporations, Residential Mortgage Loans (Won bil) SA	BOK	2003m10	2011m11	Monthly	Log first-difference
Corporate Bonds Issuance (Won B) SA	CEIC	1996m7	2011m11	Monthly	Log first-difference
Corporate Bonds Outstanding (Won B) SA	CEIC, BOK	1982m4	2011m11	Monthly	Log first-difference
Credit to Households SA	BOK	1995q4	2011q3	Quarterly	Log first-difference
Credit to Households incl Housing Loans SA	BOK	1995q4	2011q1	Quarterly	Log first-difference
Credit to Households incl Housing Loans, Depository Corporations SA	BOK	1995q4	2011q3	Quarterly	Log first-difference
Credit to Households incl Housing Loans, KBs and Specialized Banks SA	BOK	1995q4	2011q3	Quarterly	Log first-difference

Loans and Discounts of KBs and Specialized Banks, Total SA	BOK	1998Q3	2011q3	Quarterly	Log first-difference
Loans and Discounts of KBs and Specialized Banks, All Industry SA	BOK	1998Q3	2011q3	Quarterly	Log first-difference
Loans and Discounts of KBs and Specialized Banks, Manufacturing SA	BOK	1998Q3	2011q3	Quarterly	Log first-difference
Loans and Discounts of KBs and Specialized Banks, Construction SA	BOK	1998Q3	2011q3	Quarterly	Log first-difference
Loans and Discounts of KBs and Specialized Banks, Wholesale and Retail Trade SA	BOK	1998Q3	2011q3	Quarterly	Log first-difference
Loans and Discounts of KBs and Specialized Banks, Financial SA	BOK	1998Q3	2011q3	Quarterly	Log first-difference
Loans and Discounts of KBs and Specialized Banks, Real Estate SA	BOK	1998Q3	2011q3	Quarterly	Log first-difference
Loans and Discounts of KBs and Specialized Banks, Households SA	BOK	1998Q3	2011q3	Quarterly	Log first-difference
CREDIT SURVEYS					
Overall lending attitude	BOK	2002q1	2011q4	Quarterly	Level
Lending Attitude, Large Corporations	BOK	2002q1	2011q4	Quarterly	Level
Lending Attitude, Small and Medium-sized Enterprises	BOK	2002q1	2011q4	Quarterly	Level
Lending Attitude, General Households	BOK	2002q1	2011q4	Quarterly	Level
Lending Attitude, Household housing	BOK	2002q1	2011q4	Quarterly	Level
Overall credit risks	BOK	2002q1	2011q4	Quarterly	Level
Credit Risks, Large Corporations	BOK	2002q1	2011q4	Quarterly	Level
Credit Risks, Small and Medium-sized Enterprises	BOK	2002q1	2011q4	Quarterly	Level
Credit Risks, General Households	BOK	2002q1	2011q4	Quarterly	Level
BANK CONDITIONS					
Bank Sector Beta (KOSPI and KOSPIBK)	CEIC	1981m12	2011m11	Monthly	Level
Bank Sector Beta (IMSTKKOR and KOSPIBK)	CEIC	1981m12	2011m11	Monthly	Level
Bank Sector Beta (KOSPI and KOSPIBK) OLS	CEIC	1992m2	2011m11	Monthly	Level
Bank Sector Beta (IMSTKKOR and KOSPIBK) OLS	CEIC	1992m2	2011m11	Monthly	Level
Distance-to-Default (Based on KOSPIFI Index, monthly returns)	CEIC	1981m2	2011m11	Monthly	Level
Distance-to-Default (Based on KOSPIFI Index, yearly returns)	CEIC	1981m2	2011m11	Monthly	Level
Distance-to-Default (Based on KOSPIBK Index, monthly returns)	Bloomberg	1981m2	2011m11	Monthly	Level
Distance-to-Default (Based on KOSPIBK Index, yearly returns)	Bloomberg	1981m2	2011m11	Monthly	Level
Distance-to-Default (Based on KOSPI, monthly returns)	Bloomberg	1977m2	2011m11	Monthly	Level
Distance-to-Default (Based on KOSPI, yearly returns)	Bloomberg	1977m2	2011m11	Monthly	Level
Distance-to-Default (Based on Overall Index, monthly returns)	IFS	1979m2	2011m11	Monthly	Level
Distance-to-Default (Based on Overall Index, yearly returns)	IFS	1979m2	2011m11	Monthly	Level
OTHER RISK INDICATORS					
Correlation of Returns on Equities and Treasuries	BOK, CEIC	1996m5	2011m11	Monthly	Level
Stock Market Volatility (KOSPI)	CEIC	1977m2	2011m11	Monthly	Level
Stock Market Volatility (FIs Index)	CEIC	1981m2	2011m11	Monthly	Level
Stock Market Volatility (Bank Index)	CEIC	1981m2	2011m11	Monthly	Level
Foreign Reserves Volatility	BOK	1958m2	2011m9	Monthly	Level
REER (Broad) Volatility	CEIC	1995m2	2011m11	Monthly	Level
REER Volatility (Narrow)	CEIC	1964m11	2011m11	Monthly	Level
NEER (Broad) Volatility	CEIC	1995m2	2011m11	Monthly	Level
NEER (Narrow) Volatility	CEIC	1964m11	2011m11	Monthly	Level
Exchange Rate Volatility (eop)	BOJ	1991m4	2011m11	Monthly	Level
	BOK, CEIC				
Exchange Market Pressure Index	IFS	1990m4	2011m9	Monthly	Level
Sovereign Spread: Benchmark 5-Year Bond/US 5-Year Bond	US Fed, BOK	1988m4	2011m11	Monthly	Level
Sovereign Spread: Benchmark 10-Year Bond/US 10-Year Bond	US Fed, BOK	1987m10	2011m11	Monthly	Level
Housing Purchase Price Index Volatility	BOK	1987m2	2011m11	Monthly	Level
Chonse Price Index Volatility	BOK	1987m2	2011m11	Monthly	Level

MALAYSIA

FINANCIAL INDICATORS	SOURCE	START	END	FREQUENCY	TRANSFORMATION
INTEREST RATES & SPREADS					
10-Year Government Securities Yield (%)	CEIC	1992m2	2011m11	Monthly	First difference
Discount Rate on 3-Month T-Bills (%)	CEIC	1981m1	2011m10	Monthly	First difference
Spread: Benchmark 2-Year GS Yield/Discount Rate on 3-Month T-Bills	CEIC	1992m2	2011m10	Monthly	Level
Term Spread: Benchmark 10-Year Bond/Benchmark 3-Month T-Bill	CEIC	1992m2	2011m10	Monthly	Level
Spread: Lending Rate, KBs/Benchmark 10-Year GS	CEIC	1996m1	2011m10	Monthly	Level
Spread: Lending Rate, MBs/Benchmark 10-Year GS	CEIC	1996m1	2011m10	Monthly	Level
"TED" Spread: 3-month KLIBOR/Benchmark 3-Month T-bill	CEIC	1988m1	2011m10	Monthly	Level
Fixed Deposit Spread: 12-month Fixed Deposit/3-month Fixed Deposit (KBs)	CEIC	1996m1	2011m10	Monthly	Level
Fixed Deposit Spread: 12-month Fixed Deposit/3-month Fixed Deposit (MBs)	CEIC	1996m1	2011m10	Monthly	Level
Term Spread: Benchmark 5-Year Bond/Benchmark 3-Month T-Bill	CEIC	1992m2	2011m10	Monthly	Level
US Term Spread: 10-Year Bond/3-Month T-Bill	US Fed	1953m4	2011m11	Monthly	Level
Spread: Base Lending Rate/3-Month KLIBOR	CEIC	1996m1	2011m10	Monthly	Level
PRICES					
CPI-based REER (2005=100)	IFS	1975m1	2011m9	Monthly	Log first-difference
REER Broad, BIS	CEIC	1994m1	2011m11	Monthly	Log first-difference
FTSE Bursa Malaysia	CEIC	1974m1	2011m11	Monthly	Log first-difference
KL Finance	CEIC	1970m1	2011m11	Monthly	Log first-difference
Market Capitalization Mainboard	Bloomberg	1991m12	2011m11	Monthly	Log first-difference
Market Capitalization Composite	Bloomberg	1991m12	2011m11	Monthly	Log first-difference
Market Capitalization Finance	Bloomberg	1991m12	2011m11	Monthly	Log first-difference
Foreign Reserves (US\$M)	IFS	1959m8	2011m10	Monthly	Log first-difference
Total Official Reserve Assets and Other Foreign Currency Assets	CEIC	1997m12	2011m10	Monthly	Log first-difference
House Price Index: Malaysia SA	CEIC	1999q1	2011q3	Quarterly	Log first-difference
QUANTITIES					
M3 (SA)	CEIC	1987m1	2011m09	Monthly	Log first-difference
Bank Negara Malaysia Loans by Banking System SA	Bloomberg	1996m12	2011m10	Monthly	Log first-difference
Bank Negara Malaysia Loans by Commercial Banks and Islamic Banks SA	Bloomberg	1996m12	2011m10	Monthly	Log first-difference
Bank Negara Malaysia Loans by Merchant Banks SA	Bloomberg	1996m12	2011m10	Monthly	Log first-difference
Domestic Claims, Depository Corporations (MYR M) SA	IFS	2001m12	2011m09	Monthly	Log first-difference
Claims on Central Government, Depository Corporations (MYR M) SA	IFS	2001m12	2011m09	Monthly	Log first-difference
Claims on State and Local Government, Depository Corporations (MYR M) SA	IFS	2001m12	2011m09	Monthly	Log first-difference
Claims on Public Non-financial Corps., Depository Corporations (MYR M) SA	IFS	2001m12	2011m09	Monthly	Log first-difference
Claims on Private Sector, Depository Corporations (MYR M) SA	IFS	2001m12	2011m09	Monthly	Log first-difference
Claims on Other Financial Corps., Depository Corporations (MYR M) SA	IFS	2001m12	2011m09	Monthly	Log first-difference
Claims on Other Sectors, Depository Corporations (MYR M) SA	IFS	2001m12	2011m09	Monthly	Log first-difference
Loans, Depository Corporations (MYR M)	IFS	2001m12	2011m09	Monthly	Log first-difference
BANK CONDITIONS					
Bank Sector Beta (KLCL and KLFIN)	CEIC	1975m12	2011m09	Monthly	Level
Bank Sector Beta (IMFSTKMY and KLFIN)	IFS	1981m12	2011m10	Monthly	Level
Bank Sector Beta (KLCL and KLFIN) OLS	CEIC	1981m12	2011m10	Monthly	Level
Bank Sector Beta (IMFSTKMY and KLFIN) OLS	IFS	1981m12	2011m10	Monthly	Level
Malaysia Ratio of Net NPLs/Impaired Loans to Net total Loans (%)	Bloomberg	1998m1	2011m09	Monthly	Level
Malaysia ratio of General Provisions to Net Loans	Bloomberg	1998m1	2011m09	Monthly	Level
Distance-to-Default (Based on KLFIN Index, monthly returns)	CEIC	1971m2	2011m09	Monthly	Level
Distance-to-Default (Based on KLFIN Index, yearly returns)	CEIC	1971m2	2011m09	Monthly	Level
Distance-to-Default (Based on KLCL, monthly returns)	CEIC	1975m2	2011m09	Monthly	Level
Distance-to-Default (Based on KLCL, yearly returns)	CEIC	1975m2	2011m09	Monthly	Level

Distance-to-Default (Based on Overall Index, monthly returns)	IFS	1981m2	2011m09	Monthly	Level
Distance-to-Default (Based on Overall Index, yearly returns)	IFS	1981m2	2011m09	Monthly	Level
OTHER RISK INDICATORS					
Correlation of Returns on Equities and Treasuries	CEIC	1993m2	2011m11	Monthly	Level
Stock Market Volatility (KLCI Index)	CEIC	1975m2	2011m11	Monthly	Level
Stock Market Volatility (Overall Index)	CEIC	1981m2	2011m10	Monthly	Level
Stock Market Volatility (Financials Index)	CEIC	1971m2	2011m11	Monthly	Level
Foreign Reserves Volatility	IFS	1968m2	2011m10	Monthly	Level
Foreign Reserves and Other Foreign Currency Assets Volatility	CEIC	1999m1	2011m10	Monthly	Level
REER Volatility (CPI-based)	IFS	1976m2	2011m9	Monthly	Level
Broad REER Volatility	CEIC	1995m2	2011m11	Monthly	Level
NEER Volatility	IFS	1976m2	2011m10	Monthly	Level
Broad NEER Volatility	CEIC	1995m2	2011m11	Monthly	Level
Exchange Rate Volatility (eop)	IFS	1958m2	2011m11	Monthly	Level
Exchange Market Pressure Index	IFS	1967m2	2011m10	Monthly	Level
Sovereign Spread: Benchmark 10-Year Bond/US 10-Year Bond	CEIC, US Fed	1992m2	2011m11	Monthly	Level
Sovereign Spread: Benchmark 5-Year Bond/US 5-Year Bond	CEIC, US Fed	1992m2	2011m11	Monthly	Level
House Price Index Volatility	CEIC	2000q2	2011q3	Quarterly	Level
SINGAPORE					
FINANCIAL INDICATORS					
INTEREST RATES & SPREADS					
Average Buying Rates of GS Dealers 10-Year Bond Yield (%)	SGS	1998m6	2011m11	Monthly	First difference
Spread: Benchmark 2-Year Bond Yield/Benchmark 3-Month T-Bill	SGS	1988m1	2011m11	Monthly	Level
Term Spread: Benchmark 10-Year Bond/Benchmark 3-Month T-Bill	SGS	1998m6	2011m11	Monthly	Level
Spread: Financing Company Loans (Hire Purchase of New Vehicles for 3 Years)/Benchmark 2-Year Bond	SGS, MAS	1988m1	2011m10	Monthly	Level
Spread: Financing Company Housing Loans 15 Years/Benchmark 10-Year Bond	SGS, MAS	1998m6	2011m10	Monthly	Level
"TED" Spread: 3-month SGD SIBOR/Benchmark 3-Month T-bill	SGS, Bb	1999m8	2011m11	Monthly	Level
Spread: 3-month SGD SIBOR/SGD Swap OIS	SGS, Bb	2001m11	2011m11	Monthly	Level
Paper-Bill Spread: 3-month Commercial Bills/Benchmark 3-Month T-bill	MAS, SGS	1988m1	2011m11	Monthly	Level
Fixed Deposit Spread: 12-month Fixed Deposit/3-month Fixed Deposit (Banks)	MAS	1983m1	2011m11	Monthly	Level
Fixed Deposit Spread: 12-month Fixed Deposit/3-month Fixed Deposit (Finance Cos.)	MAS	1983m1	2011m10	Monthly	Level
Term Spread: Benchmark 5-Year Bond/Benchmark 3-Month T-Bill	SGS	1988m1	2011m11	Monthly	Level
US Term Spread: 10-Year Bond/3-Month T-Bill	US Fed	1953m4	2011m11	Monthly	Level
Spread: Singapore Prime Lending Rate/3-Month SGD SIBOR	MAS, Bb	1999m8	2011m11	Monthly	Level
Spread: Swap Offer Rate/Benchmark 3-Month T-Bill	SGS, Bb	1999m8	2011m11	Monthly	Level
PRICES					
CPI-based REER (2005=100)	IFS	1975m2	2011m9	Monthly	Log first-difference
FTSE Straits Times Financials Index	Bloomberg	1999m8	2011m10	Monthly	Log first-difference
Share prices from IFS Online (eop)	IFS	1985m1	2011m11	Monthly	Log first-difference
Singapore SGX Mainboard Market Capitalization	Bloomberg	1997m4	2011m11	Monthly	Log first-difference
Singapore SGX Mainboard Market Capitalization Finance	Bloomberg	1998m9	2011m11	Monthly	Log first-difference
Foreign Reserves (US\$M)	MAS	1981m1	2011m10	Monthly	Log first-difference
URA Property Price Index Residential All (SA)	Bloomberg	1993q3	2011q3	Quarterly	Log first-difference
URA Price Index Office Space in Central Region All Areas (SA)	Bloomberg	1993q3	2011q2	Quarterly	Log first-difference
URA Price Index Shop Space in Central Region All Areas (SA)	Bloomberg	1993q3	2011q3	Quarterly	Log first-difference
URA Price Index Industrial Space All Industrial	Bloomberg	1993q3	2011q1	Quarterly	Log first-difference
QUANTITIES					
M3 (SA)	IFS	1991m1	2011m9	Monthly	Log first-difference

CLAIMS ON GOVERNMENT (\$M) Deposit Money Banks	IFS	1969m6	2011m9	Monthly	Log first-difference
CLAIMS ON PRIVATE SECTOR (\$M) Deposit Money Banks	IFS	1969m6	2011m9	Monthly	Log first-difference
CLAIMS ON PRIVATE SECTOR (\$M) Finance Companies	IFS	1969m6	2011m9	Monthly	Log first-difference
TOTAL LOANS AND ADVANCES INCLUDING BILLS FINANCING (\$M) DBUs	MAS	1991m1	2011m10	Monthly	Log first-difference
LOANS TO BUSINESSES - MANUFACTURING (\$M) DBUs	MAS	1991m1	2011m10	Monthly	Log first-difference
LOANS TO BUSINESSES - BUILDING AND CONSTRUCTION * (\$M) DBUs	MAS	1991m1	2011m10	Monthly	Log first-difference
LOANS TO BUSINESSES - FINANCIAL INSTITUTIONS (\$M) DBUs	MAS	1991m1	2011m10	Monthly	Log first-difference
CONSUMER LOANS - HOUSING AND BRIDGING LOANS (\$M) DBUs	MAS	1991m1	2011m10	Monthly	Log first-difference
LOANS TO BUSINESSES - TOTAL (\$M) ACUs	MAS	2004m3	2011m10	Monthly	Log first-difference
CONSUMER LOANS - TOTAL (\$M) ACUs	MAS	2004m3	2011m10	Monthly	Log first-difference
TOTAL LOANS AND ADVANCES (\$M) FINANCE COMPANIES	MAS	1991m1	2011m10	Monthly	Log first-difference
ASSETS - LOANS AND ADVANCES TO NON-BANK CUSTOMERS (\$M) Merchant Banks (Dom and ACUs)	MAS	1991m1	2011m10	Monthly	Log first-difference
BANK CONDITIONS					
Bank Sector Beta (FSSTI and FSTFN)	Bloomberg	2001m7	2011m11	Monthly	Level
Bank Sector Beta (FSSTI and FSTFN) OLS	Bloomberg	2001m7	2011m11	Monthly	Level
Bank Capital and Reserves (% of Total Assets) DBUs	MAS	1991m1	2011m10	Monthly	Level
Distance-to-Default (Based on Financials Index, monthly returns)	Bloomberg	2000m9	2011m11	Monthly	Level
Distance-to-Default (Based on Financials Index, yearly returns)	Bloomberg	2000m9	2011m11	Monthly	Level
Distance-to-Default (Based on Overall Index, monthly returns)	IFS	1986m2	2011m10	Monthly	Level
Distance-to-Default (Based on Overall Index, yearly returns)	IFS	1986m2	2011m10	Monthly	Level
OTHER RISK INDICATORS					
Correlation of Returns on Equities and Treasuries	IFS, MAS, Bb	1989m1	2011m10	Monthly	Level
Stock Market Volatility (Overall Index)	IFS	1986m2	2011m10	Monthly	Level
Stock Market Volatility (Financials Index)	Bloomberg	2000m9	2011m11	Monthly	Level
Foreign Reserves Volatility	MAS	1982m2	2011m11	Monthly	Level
REER Volatility (ULC-based)	IFS	1985m2	2011m10	Monthly	Level
NEER Volatility (ULC-based)	IFS	1961m2	2011m11	Monthly	Level
Exchange Rate Volatility (eop)	IFS	1958m2	2011m11	Monthly	Level
Exchange Market Pressure Index	IFS, MAS	1981m2	2011m11	Monthly	Level
Sovereign Spread: Benchmark 10-Year Bond/US 10-Year Bond	SGS, US Fed	1998m6	2011m11	Monthly	Level
Sovereign Spread: Benchmark 5-Year Bond/US 5-Year Bond	SGS, US Fed	1988m1	2011m11	Monthly	Level
Property Price Volatility	Bloomberg	1994q4	2011q3	Quarterly	Level
Office Space Price Volatility	Bloomberg	1994q4	2011q2	Quarterly	Level
Shop Space Price Volatility	Bloomberg	1994q4	2011q3	Quarterly	Level

Notes:

(1) Following Balakrishnan et al. (2009), volatility measures are obtained through a GARCH (1,1) using period-over-period real returns with 12 lags for monthly data and 4 lags for quarterly data.

(2) Distance to default is computed as real returns over volatility as computed using (1) above.

(3) The bank beta is based on the CAPM and measures as the covariance of banking and market index returns divided by the variance of the market index.

Alternatively, it is computed through OLS regression of excess returns of the market on the banking index.

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Financial Conditions Indexes for Asian Economies

This study constructs financial conditions indexes (FCIs) for five Asian economies, namely, Hong Kong, China; Japan; the Republic of Korea; Malaysia; and Singapore. FCIs summarize the current state of financial variables linked to real economic activity. The study uses these indexes as components to build an Asian FCI. Principal component analysis (PCA) methodology based on Hatzius et al (2010) is used.

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