

# THE STATISTICAL FOUNDATIONS OF FINANCIAL SOUNDNESS INDICATORS

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## Summary

Financial soundness indicators (FSIs) are a new field of economic statistics that seek to assess the soundness and vulnerabilities of financial systems. FSIs are one of several important initiatives of the IMF undertaken in response to recent widespread and severe financial sector crises that have imperiled fiscal and monetary policy in numerous countries. The focus of FSIs on the soundness of the financial sector is unique and has resulted in an innovative statistical framework that draws on traditional macroeconomic statistics and bank supervisory information. The paper briefly describes how FSIs were identified, the key elements of the internally coherent income and expense statement and balance sheet that comprise the heart of the FSI framework, and the aggregation and consolidation methods needed to compile the sector-wide measures of income and capital. The IMF has just completed a *Compilation Guide on Financial Soundness Indicators* that defines FSIs and provides compilers with advice on the collection of data and compilation of FSIs. The coordinated compilation exercise (CCE), which will involve about sixty countries in the compilation of a benchmark set of indicators, is described.

## 1. WHAT ARE FSIs?

Financial Soundness Indicators (FSIs) are indicators of the current financial health and soundness of the financial institutions in a country, and of their corporate and household counterparts. FSIs are compiled and disseminated to support macroprudential analysis, which is the assessment and surveillance of the strengths and vulnerabilities of financial systems, hopefully limiting the likelihood of financial system failure. This paper will describe how concerns over financial sector crises created a demand for new macroeconomic statistics that focus on the risks and soundness of financial systems, how FSIs were identified, the key elements of the internally consistent income and expense statement and balance sheet that comprise the heart of the FSI framework, and the aggregation and consolidation methods needed to compile sector-wide measures of income and capital. The paper will also describe the just finalized *Compilation Guide on Financial Soundness Indicators (Guide)* that defines FSIs and provides compilers with advice on the collection of data and compilation of FSIs, and the coordinated compilation exercise (CCE), which will involve about sixty countries in the compilation of a benchmark set of indicators.

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<sup>1</sup> This paper will be presented by Neil Patterson (IMF). This paper should not be reported as representing the views of the IMF. The views expressed are those of the author and do not necessarily reflect the views of the IMF or IMF policy.

Early interest in macroprudential analysis and FSIs began during the global recession and financial sector crises of the late 1980's and early 1990's, which affected many economies. The recessions in many countries shared some common characteristics:

- Collapses in asset prices, including unusually strong declines in real estate prices
- High debt burdens of corporations and households made them vulnerable to the downturn
- Severe banking crises
- Traditional monetary and macroeconomic policy actions proved unusually ineffective, and a view developed that the resumption of economic growth was being delayed until debt levels came down, corporations reliquified their balance sheets, and the banking sector recovered.

Work began in numerous countries and in international organizations, such as the BIS and IMF, to understand the causes and policy ramifications of financial sector crises.<sup>2</sup> Although analysis of financial soundness was undertaken at the IMF, it received relatively limited emphasis until the completion of a 1996 study entitled *Financial Soundness and Macroeconomic Analysis*. The study reviewed the prevalence and severity of financial crises in IMF member countries from about 1980 to 1994. The conclusions highlighted the seriousness of the problem;

- About three-quarters of countries had experienced financial sector crises or near-crises. Financial sector instability became recognized as a common problem, not an isolated condition that affected individual countries.
- The costs of financial crises were sometimes very severe. For example, the fiscal costs of recapitalizing banking sector sometimes exceeded 10 percent of GDP, and this was just one of many economic and social costs that occur during financial sector crises.
- Financial sector crises were found to impair the effectiveness of monetary policy. For example, interest rate signals were distorted, or needed policy tightening could not be introduced without damaging the financial sector and through that the entire economy.

As a result, financial stability became part of the agenda of the IMF. Unfortunately, soon thereafter in late 1997 the Asian crisis erupted, which was unusually severe. Some new elements of that crisis were rapid contagion of crises between countries and the role that the

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<sup>2</sup> At that time, this field of research was referred to as “macroprudential analysis” and the indicators as “macroprudential indicators,” or MPIs. The name was later changed to FSIs.

foreign-currency exposure of corporations had in destabilizing financial sectors. Dealing with the Asian Crisis was a severe test for the IMF, and a key result was that crisis prevention became a top priority of the IMF.

The need for more timely and better data was recognized early on. A number of steps were taken to enhance the timeliness and relevance of data provided to and used by the IMF. Among these actions were new standards and procedures covering data provision to the IMF by its members, the International Reserves Template, the promulgation of external debt statistics, and the development of FSIs.

The work on FSIs identified two sets of indicators – a core set of twelve high-priority indicators, and a larger set of encouraged indicators that countries could compile if there was a specific national reason. The **core set** consists of twelve indicators covering banks only which are widely agreed to be important and which should be prepared by all countries. The **encouraged set** consists of additional indicators that may be important in specific countries. Countries may choose to compile these if they are relevant to their economy and resources and information permit. The encouraged set includes additional indicators for deposit takers, but also has some FSIs for other sectors. In general, the FSIs for the other sectors need to be further developed. The core and encouraged sets are listed on the last page.

## 2. THE METHODOLOGY OF FSIs

FSIs are a new body of economic statistics that is an amalgam of microeconomic and macroeconomic influences – bank prudential standards, financial accounting, and macroeconomic measurement frameworks. The goal of compiling FSIs is to construct aggregate statistics on the condition of the financial sector as a whole, including unambiguous measures of sector income, capital, and risks, but with flexibility to focus in on key segments of the sector that are important to assess financial soundness and risks. An important criterion in developing these statistics was that they should provide the best available information about current risks and resilience of the financial sector. The *Compilation Guide on Financial Soundness Indicators* was prepared to present the methodology, and to serve as a reference for future development work.

FSIs for deposit-takers (banks) mostly consist of ratios that make use of data drawn from aggregate income statements and balance sheets of banks. The preparation of the aggregate income statements and balance sheets is a critical first step in compiling FSIs. Internal consistency between the income statement and balance sheet is needed to make many of the FSIs meaningful. The macroeconomic perspective of FSIs requires that the data on the condition of deposit takers be compiled in accordance with an agreed set of rules so that the data can be aggregated. Also, each transaction or position should be treated comparably by the creditors and debtors within the sector.

In constructing the aggregate income statement and balance sheet a number of innovative statistical methods are employed. The list below presents some of the key elements in the FSI methodology described in the *Guide*. Some of the methods are unique, because of the new focus on identifying the elements of risk and soundness, and differ from practices in other macroeconomic statistics. We will discuss each briefly.

- Aggregation
- Consolidation

- Accrual of interest
- Nonperforming loans
- Gains and losses on financial instruments
- Income calculation
- Sector-level adjustments

## 2.1 Aggregate data on the financial sector

Aggregate data on the financial sector are needed because macroeconomic and microeconomic behaviors can differ. For example, tightening of bank credit during a recession is rational from the individual bank view, but this action carried out by all banks tightens overall credit and can worsen the recession. The use of aggregate FSIs can help in identification of any unique behaviors of the aggregate financial sector, permits ready comparison with standard national macroeconomic statistics, and allows comparison between countries. The aggregate data also allow quick review of overall conditions to pinpoint areas that should be further investigated, and also act as a norm from which outliers can be identified.

However, aggregate data can mask important information about individual behavior or structural features of the sector, and therefore it is important to be able to analyze data at more disaggregated levels. Typically, this is through construction of peer groups in which all members have some specific characteristic (i.e., all foreign-owned), or through statistical measures that describe the population but do not identify individual members (such as use of the standard deviation, Gini index, etc.).

## 2.2 Consolidated sector information

Consolidation is a key element of the FSI methodology.<sup>3</sup> FSIs seek unambiguous measures of the activity, income, capital, and risk of the population; to do so, transactions and positions between members of the population must be consolidated out, similar to what is done for the national accounts.

FSIs differ from other statistics with regards to consolidation because it is recognized that different consolidations are needed for different analytic purposes.

- The required consolidation for FSIs covers domestically-controlled banks and their foreign subsidiaries and branches. This is equivalent to aggregated and consolidated information on the banking institutions supervised on a home-country basis.
- Authorities may also choose to compile aggregated and consolidated FSIs covering all banks operating (resident) within the economy (including both domestically-controlled and foreign-controlled). These FSIs provide

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<sup>3</sup> Consolidation involves the elimination of transactions and positions between all members of a statistical grouping in order to arrive at a unique measure of the activity of the group and its interactions with all units outside the statistical grouping.

information on banking activity within the country and can be readily compared with other national macroeconomic statistics.

- Other consolidations are possible should authorities choose to compile them.

### **2.3 Consolidation adjustments are made at two levels**

In order to construct consolidated data, data collection and adjustments are needed at the level of the individual reporting institutions and at the sector level. *At the individual unit level*, for example, consolidated data can be compiled on a cross-border basis including nonresident branches and subsidiaries, or on a national residency basis only. Different data requirements exist for the two consolidations, and the resulting data at the individual unit level can look quite different. *At the aggregated, macro level*, several additional adjustments are needed to complete the consolidation process and provide unambiguous measures of sector income and capital. These adjustments, which are described in the *Guide*, are needed to avoid double counting of income or capital, and to treat transactions and positions between units within the sector comparably to avoid discrepancies within the sector accounts.

Such consolidation adjustments are similar to what is done in the national accounts, and are thus standard statistical practice.

### **2.4 Accrual accounting**

Accrual accounting is needed to be able to assess the effective flow of resources to the unit. Accrual accounting provides measures of current activity and value and hence is the best method to assess current financial health or risk. For example, the FSI for return on assets seeks to provide sensitive current information of changes in profitability which is available only on an accrual basis. An important aspect of this is that because there is effectively no income earned on nonperforming loans, accrual of income on nonperforming loans should be ended in order to not misstate current income.

### **2.5 Impairment and nonperforming loans**

Prompt identification of impairment is important as a signal of difficulty facing the financial system, although it is a lagging indicator. There is some international convergence around the use of a 90-day period of nonpayment of principal or interest as a standard for classifying a financial asset as nonperforming. The *Guide* has adopted this standard, but also recognizes that stricter national practices could result in assets being classified as impaired in under 90-days. When an asset is classified as nonperforming, interest should not be accrued, and a specific provision applied to reduce the carrying value of the asset, or the asset should be reduced to its current market or fair value. The *Guide's* recommendations on identification of impairment, valuation of nonperforming loans, and nonaccrual of income on nonperforming loans are significant departures from the SNA recommendations.

### **2.6 Valuation of financial instruments**

For assessing current financial soundness, it is important to have realistic current values of assets and liabilities, which directly affects the size of capital, which is a residual of the value of assets less the value of liabilities. Moreover, the effective value of financial assets can affect units' behavior – it is important in the evaluation of the behavior of the units' portfolio

to be able to examine the effects of asset price movements and actions taken to mitigate them. For such reasons, in the FSI methodology, marketable financial assets should be valued on a market value basis, or an equivalent fair value basis.

It is recognized that prices of financial instruments can be volatile, which in turn affects recorded income and the value of capital. This point was extensively discussed in the deliberations on the definitions of FSIs, and it was concluded that such volatility is not artificial, but is a reflection of actual conditions and that information on volatility, in itself, is important to the understanding of stability and soundness. To an extent, FSI information about volatility due to valuation changes emulates information that units seek in risk modeling of their own portfolios and thus it is in line with contemporary practice.

## 2.7 Income calculation

FSIs seek to have sensitive indicators of the current net income of the sector, and the changes in income that occur during the current period. This is done by (1) using accrued income, (2) including only income on performing assets, and (3) including within income both realized and unrealized gains and losses on financial instruments carried at market or fair value on the balance sheet. This results in consistency in reporting of income and changes in the balance sheet, which improves the quality of FSIs such as ROE – Return on Equity – that compare income and balance sheet data.<sup>4</sup>

## 2.8 The new methodology and its implications

As described above, taken altogether, the methodology for FSIs for banks requires compilation of underlying sectoral income statements and balance sheets to provide the series needed to calculate FSIs. A number of specific rules are needed to construct the underlying statements that capture the needed information on risk and soundness. Because the framework has innovative features, issues of the acceptability of the methodology and the ease of its implementation are important. This section will briefly discuss the IMF's approaches in this regard.

First, there has been an extensive consultation process, which involved three major phases. In 2000, a survey was taken of the IMF membership on the types of financial soundness information needed, the availability of data, what data were disseminated to the public, and what accounting standards were used. The response to the survey demonstrated a high degree of interest in authorities around the world in obtaining the information provided by FSIs. The survey allowed precise identification of the FSIs that were most needed and gave good information on where information was readily available and gaps in coverage. Second, a working group was constituted comprised of experts in the field and international and regional organizations which reviewed the methodology as it was developed. Potentially contentious issues, such as the market/fair valuation of financial instruments and the inclusion of unrealized holding gains and losses in income, were debated and accepted into the methodology because they were found to provide good information on financial sector risk and resilience. And third, eight regional outreach seminars were held in 2003 and 2004 to explain the methodology to compilers and other officials from over 100 countries and regional organizations. Participants at the seminars were very supportive of the effort to compile FSIs, and the methodology was widely accepted.

Acceptance in principle is one thing and practical implementation within environments of resource shortages can be a very different matter. One on hand, it is clear that optimal implementation of the methodology involves the collection of some fairly detailed information and the construction of a database that is highly flexible and can be easily manipulated to produce different consolidations, specialized peer groups, or *ad hoc* analytical variables. In our consultations, we have been very encouraged about just how many authorities have been able to make excellent use of modern data collection techniques and information technology advances to produce powerful and flexible data systems suitable for

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<sup>4</sup> Under the new IFRS (International Financial Reporting Standards) an acceptable option is to carry all financial instruments at fair value. In this case, realized and unrealized gains and losses on all financial instruments are captured in current income.

compiling FSIs. For countries that are beginning the process, there are exemplars found in high income, emerging, and developing economies.

On the other hand, it is recognized that establishing and operating an accounting and reporting system and setting up compilation programs can be expensive and challenging. Countries are encouraged to exert best efforts to compile the FSIs in accordance with the new methodology. However, there is flexibility in making the best use of currently existing data and making adjustments to reflect local accounting and data compilation practices. The intent is avoid overburdening authorities by using available information and extracting from it the best possible information on financial soundness. Over time, statistical programs can progress towards the standards presented in the *Guide*, which will facilitate the analysis of the FSIs and foster greater cross-country comparability in FSIs. It is recognized that significant differences in practice between countries may exist for some time, and therefore it is important that extensive documentation (referred to as “metadata” – information about data) of the FSIs and the standards and practices under which they were compiled be available.

### **3. THE STEPS AHEAD**

There are already many applications of FSIs. At the country level, many countries are using FSIs and related information to assess risks to the financial system and its soundness, either through regular monitoring or through focused reviews of conditions and relevant policies published in regular annual or semiannual Financial Stability Reviews. Some countries are attempting to use FSIs in Early Warning Systems of financial crises. At the IMF, FSIs are often collected and analyzed in the course of regular consultations with countries. Also, FSIs are integral to the joint IMF-World Bank Financial Sector Assessment Program, which undertakes comprehensive reviews of the soundness of financial systems, where they are used in the general evaluation of the condition of the financial system and in the undertaking of stress testing of financial systems.

To support such activities and to provide a structured framework to assist country efforts to compile FSIs, the IMF is sponsoring a coordinated compilation exercise (CCE). The CCE is a voluntary undertaking, in which about 60 countries will undertake to compile and document a benchmark set of FSIs. The IMF provides the framework for the project, provides technical advice to participants through meetings in Washington and regional centers, collects the national contributions, and publishes the results. The participating countries agree to make a best effort attempt to compile the FSIs in accordance with the standards in the *Guide*, to prepare metadata for the FSIs, and to provide the data and metadata to the IMF for publication in a single release. It is hoped that this effort will succeed in quickly bringing about the compilation of FSIs in a large number of countries, permit us to learn about issues involved in compiling FSIs, and if needed to modify the FSIs or to change compilation advice.



## Financial Soundness Indicators: The Core and Encouraged Sets

<b>Core Set</b>	
Deposit-takers	Regulatory capital to risk-weighted assets
<i>Capital adequacy</i>	Regulatory Tier I capital to risk-weighted assets
	Nonperforming loans net of provisions to capital
<i>Asset quality</i>	Nonperforming loans to total gross loans
	Sectoral distribution of loans to total loans
<i>Earnings and profitability</i>	Return on assets
	Return on equity
	Interest margin to gross income
	Noninterest expenses to gross income
<i>Liquidity</i>	Liquid assets to total assets (liquid asset ratio)
	Liquid assets to short-term liabilities
<i>Sensitivity to market risk</i>	Net open position in foreign exchange to capital
<b>Encouraged Set</b>	
Deposit-takers	Capital to assets
	Large exposures to capital
	Geographical distribution of loans to total loans
	Gross asset position in financial derivatives to capital
	Gross liability position in financial derivatives to capital
	Trading income to total income
	Personnel expenses to noninterest expenses
	Spread between reference lending and deposit rates
	Spread between highest and lowest interbank rate
	Customer deposits to total (non-interbank) loans
	Foreign currency-denominated loans to total loans
	Foreign currency-denominated liabilities to total liabilities
	Net open position in equities to capital
Other financial corporations	Assets to total financial system assets
	Assets to GDP
Nonfinancial corporate sector	Total debt to equity
	Return on equity
	Earnings to interest and principal expenses
	Net foreign exchange exposure to equity
	Number of applications for protection from creditors
Households	Household debt to GDP
	Household debt service and principal payments to income
Market liquidity	Average bid-ask spread in the securities market
	Average daily turnover ratio in the securities market
Real estate markets	Real estate prices
	Residential real estate loans to total loans
	Commercial real estate loans to total loans