

Coping with challenges in establishing security-by-security database in Thailand

Wongwatcharapaiboon Weeraya¹

Introduction

The series of abrupt global financial crisis during 1990s-2000s have spelled out demand for the more comprehensive data as to help early detect the imbalances which can potentially trigger instability in the financial system. Such data needs require the greater extension of data collection breadth and depth, and even calls for the data granularity down to the micro level.

Another aspect of data adequacy is calling upon the re-orientation of data design where greater flexibility is a key component. In this regard, data set collected should be sufficient for today needs and be flexible enough to respond to potential use in the future.

Developing Security-by-Security Database in Thailand

The Bank of Thailand decided to develop Financial Market Instrument system (FMI) by using security-by-security approach. The data requirement was focused only the benefit of the BOT internal users. The project had started off in 2006 with the limited scope to only debt securities, equity securities and derivatives trading in the equity market. In parallel, portfolio investment in Thailand data (liabilities side) which had formerly been collected via quarterly survey from custodians in aggregate format was redesigned to integrate with the new system. The new portfolio investment in Thailand data is acquired at the security-by-security and investor-by-investor level to accommodate various needs from BOT internal users.

This FMI project was scheduled to finish in December 2008 but due to the technical issues concerning system performance discovered during the user acceptance test, the delay of the project is unavoidable. Eventually, the BOT's security-by-security database was officially launched to production on September 1, 2009.

The FMI system comprises of two main components, the financial instrument reference data and the transaction and end-position data. The financial instrument reference data are pool of data acquired from various sources, namely BOT, SEC, TSD and ThaiBMA, as identified in Table 1.

¹ Statistics and Information Systems Department, Bank of Thailand, weerayaw@bot.or.th.

Sources of FMI Data

Table 1

Source of Data	Role	Financial Instrument Reference Data	Transaction and end-position data
Bank of Thailand (BOT)	Registrar	Government and state enterprises debt securities reference data (only securities BOT acts as the registrar)	New issuance and outstanding of government and state enterprises debt securities classified by holder groups -- Scrip only
Securities and Exchange Commission (SEC)	Regulator	Corporate debt securities reference data (only securities under the authority of SEC)	New Issuance of corporate debt securities (only securities under the authority of SEC)
Thailand Securities Depository (TSD)	Registrar	Equity securities reference data (only securities traded in the Stock Exchange of Thailand)	Outstanding of securities classified by Holder groups –Scripless
Thai Bond Market Association (ThaiBMA)	Information Center	All debt securities reference data (only securities registered at ThaiBMA)	Market price and debt securities trading summary
Stock Exchange of Thailand (SET)	Exchange Market	-	Market price and equity securities trading summary
Custodians	Custodian	-	Outstanding of securities classified by Holder groups Outstanding of Thai securities held by non-resident (Portfolio Investment in Thailand)

The transaction and end-position data are collected from multiple sources as indicated in Table 1. In order to ensure the coverage and accuracy of the outstanding classified by holders, consolidation among data sources are mandatory.

The position of portfolio investment in Thailand is derived from the data submitted by custodians at the investor level. Unfortunately, most of the data provided by the custodians still in the global custodian level not in the end investor level as desired.

Challenges

Challenges of S-B-S project development are the multi-fold complication. Since data are scattered among authoritative bodies holding different missions and goals which stem into the differences of data characteristics. The difficulties we faced due to these differences are as follows:

1. Data Consistency

Duplication of data and how to incorporate the data from various sources

The foundation of the security-by-security database is the financial instrument reference data. Therefore, every effort must be made to ensure the accuracy and the coverage of the integrated reference data. The problem is how we can identify the duplication of data between two sources in order to merge them correctly. The answer must rely on the unique identifier of security, ISIN code, but not in the case of Thailand. The ISIN code is not mandatory and still not widely used in Thailand.

The trading symbol is more popular and more preferable to reporting entities but is available only the securities traded in the exchange market or registered with the authorities or associated agencies.

Another reference data that always raises the issue is the Involved Party information. Lack of unique identification code of non-resident is the impediment for monitoring capital inflow, distinguishing the direct investment from portfolio investment data, and compiling comparable statistics.

2. Complex and difficult-to-maintain architecture of data acquisition and preparation system

Data quality management process is fundamental to all data management systems; however, in the security-by-security database, the issue is more complicated than others. The data quality management process must be done at the security level. The lack of security unique identification code makes this matter worse. The transaction and position data must be validated against the financial instrument reference data by using the unique identifier of the securities. However, since not all of the data has the unique identifier, other methods of validation must be introduced in order to cope with the data with no unique identifier such as short term debt securities.

The integration of outstanding is not a minor issue as well. To ensure the data consistency as previously mentioned above, the data preparation module must be equipped with statistical methods or pre-defined rules in order to automate the processes as much as possible which make the data preparation more complex.

Moreover, since most of the reclassification and calculation processes are done in-house, the lack of some parts of reference data might cause the problem. The data adjustment at the security-by-security level is essential to complete the data before compiling statistics. The problem is amplified with the goal of minimizing data timeliness which is quite conflict with the amount of works burdened from security-by-security data quality management.

Even though the processes may seem complicated and troublesome, for the data quality managers, the mistakes can be effortlessly identified and investigated because every record is validated at the security-by-security level. The quality of data can be guaranteed if the data are properly passed through all of the processes.

In summary, the design of the security-by-security data acquisition and data preparation architecture should consider a trade-off between costs and benefits, i.e. the complexity of the system and the degree of accuracy of data and/or the load of data preparation processes burdened on the data quality managers.

3. Selection of Business Intelligence tool and multi-dimensional model design

The extremely large amount of transaction data combined with a great number of dimensions to form the FMI data cubes might be the reason of the poor performance of our chosen OLAP tool which was discovered during the UAT and this leads to the inevitable change of the OLAP tool and the six months delay of the project.

From BOT's S-b-S Database to TFIIC

In the year 2010, the BOT working under the umbrella of Capital Market Development Committee had initiated the separate track, called Thailand Financial Instrument Information Centre (TFIIC), which is a joint collaboration of five institutions, namely the Bank of Thailand, the Public Debt Management Office, Ministry of Finance, the Office of the Securities and Exchange Commission, the Stock Exchange of Thailand and the Thai Bond Market Association. The concerted effort among the agencies who are involving in security life cycle from issuing, trading and holding of securities is the key success factor to launch TFIIC to production in 2013.

Identical to BOT's FMI, TFIIC consists of two main components. The financial instrument reference data is managed by SEC which is the authority responsible for the approval of new issuance for both equity and debt securities of resident corporations, either in the domestic or offshore markets. The transaction and end-position data are submitted by BOT which already has the FMI system in place.

Challenges of the Thailand Financial Instrument Information Centre (TFIIC) Development

The challenges of TFIIC are somewhat similar to the BOT's FMI but there are a few issues which far more complicated.

1. Balancing between organization benefits and public benefits

TFIIC is primarily intended for the benefit of public to build the information framework for security data exchange and dissemination. Fortunately, those five agencies who aware of the significance of the TFIIC show strong commitment and allocate sufficient budget and staffs. Despite of that, some benefits should be reciprocated to those devoted organizations. In this case, TFIIC provide the information exchange in the security-by-security level for the related agencies to fulfill their missions and goals.

2. Flexibility of the TFIIC data model

Another technical challenge the working team concerns the most is the flexibility of data model. Since the expectation of stakeholders is that the data model must be designed in a way that could support all types of securities or at least less painful to add new features due to the financial innovation.

Next Step of the BOT's Security-by-Security Database

In the year 2013, to make BOT security statistics more aligned with international standard, the issues such as scrip holding and security repurchase transaction will be taken into account to make an enhancement on BOT's Financial Market Instrument system (FMI). The security statistics on "from whom to whom" basis from

FMI will then benefit the compilation of other statistics, i.e. financial account, and international investment position, to be more comprehensive.

Conclusion

Security-by-security database is an outset attempt of micro data to answer to wider range of needs from monitoring capital inflows to monetary policy formulation. Other than the flexibility to cope with the rapidly changing data requirement, the security-by-security information system can reduce the burden of reporting entities, improve the data quality despite the cumbersome data quality assurance processes shifted from reporting entities to the compilers, and move forward the compilation modality.

Despite the challenges confronted throughout the project, BOT's security-by-security database and TFIIIC are still considered to be worth investment for Thailand. The success of Thailand case is built upon the inter-agency co-operation which is the most crucial factor, the devotion of relating parties, and the endorsement of the Capital Market Development Committee.

References

Chaikhor, S. & Powattanasatien, P. (2010). "Financial Market Data Gaps Through Inter-Agency Collaboration", *BOT Stat Symposium*, August 18, 2010.

Garnjarerndee, P. "Debt securities statistics: the Bank of Thailand's experience", *IFC Bulletin No. 29*.