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DEVELOPING THE FINANCIAL BALANCE SHEET AND ACCUMULATION ACCOUNT MODEL FOR SOUTH AFRICA

IMPLEMENTING RECOMMENDATION 8 OF THE G20 DGI-2

by

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Project work report presented as partial requirement for obtaining the Master's degree in Statistics and Information Management

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DEDICATION

Firstly, I dedicate this thesis to my wife, Lisa, who has supported and encouraged me to find my true passion in macroeconomic statistics and delve ever deeper into the unknown. Throughout this project she was and still is my true inspiration – the one who has actively supported me and encouraged me to realize my full potential. Thank you for the practical and emotional support you have given me whilst I had to deal with the challenging demands of work and study. I am tremendously appreciative as we mutually engaged on this journey together and at times had to make sense of the various challenges we faced and also provide encouragement to each other at times when it seemed difficult to continue. You are my soul mate and comrade.

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ABSTRACT

The recent global financial crisis highlighted the significant degree of interconnection and integration of economies and identified several gaps in the existing suite of national and international financial statistics. From this realisation emerged the G20 Data Gaps Initiative (G20DGI) - a set of 20 recommendations on the enhancement of economic and financial statistics. These recommendations were developed in two phases – the first being G20DGI-1 and the second G20DGI-2, with the second set building on and replacing the first set. Recommendation 8 of G20DGI-2 identifies the development of the Balance Sheet Approach (BSA) for integrated sector accounts. In South Africa's case, no integrated financial balance sheet and accumulation accounts (FBSAA) exist. This study presents a proposition to a complete model for the construction of the South African FBSAA model within a positivist paradigm making use of quantitative research utilising computation techniques. This is done being mindful of international requirements and guidelines pertaining to data sourcing and output, whilst also being cognisant of the South African specificities relating to time, resource and knowledge constraints. One of the main benefits of the FBSAA model is its ability to provide a holistic view of the financial dimension of the different sectors in a national economy as well as their international linkages. In addition, it also provides the basis to analyze risks and vulnerabilities in financial systems in an integrated manner.

KEYWORDS

Balance sheet approach; integrated economic accounts; G20 Data Gaps; financial balance sheet and accumulation accounts; sector accounts

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LIST OF ABBREVIATIONS AND ACRONYMS

BFALT	Balanced Financial Asset and Liability Template
BOP	Balance of Payments
BSA	Balance Sheet Approach
CALAN	Counterparty Asset Liability Analysis
CAPFIN	Captive Financial Institutions and Money Lenders
CBSD	Central Balance Sheet Database
CB	Central Bank
CPD	Corporation for Public Deposits
CPGOV	Central and Provincial Government (sector)
CS	Closing Stock
DTC	Deposit Taking Corporations (sector)
EBI	Extra Budgetary Institution (sector)
ERSD	Economic Research and Statistics Department
ESA2010	European System of National and Regional Accounts 2010
FA	Financial Auxiliaries (sector)
FALT	Financial Asset and Liability Template
FBSAA	Financial Balance Sheet and Accumulation Accounts
FC	Financial Corporations (sector)
FCeICPF	Financial Corporations except Insurance Corporations and Pension Funds (sector)
FINCO	Financial Companies (sector)
FLFA	First Level Financial Asset and Liability Analysis
FSB	Financial Stability Board
FWTW	From-Whom-To-Whom
G20	Group of twenty (largest economies)
G20DGI	Group of Twenty Data Gap Initiative

G20DGI-2	Group of Twenty Data Gap Initiative Phase two
GDP	Gross Domestic Product
GG	General Government (sector)
HH	Household (sector)
HSM	Hierarchy of Sources Matrix
IMF	International Monetary Fund
IC	Insurance Corporations (sector)
ICPF	Insurance Corporations and Pension Funds (sector)
IEA	Integrated Economic Accounts
ISIC	International Standard Industrial Classification
JSE	Johannesburg Stock Exchange
LBS	Locational Banking Statistics
LG	Local Government (sector)
MA	Monetary Authority (sector)
MFI	Monetary Financial Institutions (sector)
MMF	Money Market Fund (sector)
NFC	Non-financial Corporations (sector)
NFW	Net Financial Worth
NG	National Government (sector)
NMMFIF	Non-Money Market Fund Investment Funds (sector)
NPISH	Non-Profit Institutions Serving Households
OFI	Other Financial Intermediaries (sector)
OMFI	Other Monetary Financial Institutions (sector)
OS	Opening Stock
OSC	Operational Steering Committee
OVC	Other Volume Change
PBS	Participation Bond Scheme (sector)

PF	Pension Funds (sector)
PG	Provincial Government (sector)
PIC	Public Investment Corporation
PUBFIN	Public Financial Intermediaries (sector)
PUBNFC	Public Non-financial Corporations (sector)
PRIVNFC	Private Non-financial Corporations (sector)
PUBPEN	Public Pension Fund (sector)
PRIVPEN	Private Pension Fund (sector)
ROW	Rest of the World
NSF	National Statistical Framework
SDR	Special Drawing Right
SNA	System of National Accounts
SNA2008	System of National Accounts 2008
SSA	Summary Statistics Analysis
SSF	Social Security Fund
Steerco	Strategic Steering Committee
UN	United Nations
UT	Unit Trust (sector)
VC	Valuation Change
WGBI	World Government Bond Index
Worco	Operational Working Committee
SARB	South African Reserve Bank

1. INTRODUCTION[1]

The level of interconnection and integration of different national economies and financial markets were highlighted by the pervasive effects of the global financial crisis that emerged in 2008. This became evident from the depth of the crisis as well as the speed with which international financial contagion spread in its wake. The crisis came largely as a surprise to many policymakers, multilateral agencies, investors and academics (Verick and Ismal, 2010). Although significant bodies of economic and financial statistics existed before the crisis, there were areas poorly covered by existing datasets. Due to the nature of and manner in which the financial crisis spread it became clear that the problem manifested not so much in the quality of existing statistics, but in the gaps that existed in certain crucial areas. "What now became crystal clear was that the global financial crisis created new demands for macroeconomic statistics" (Bamanga, 2010, p. 1). In addition, the scant availability and comparability of longitudinal data across countries compounded the problem.

One specific area of concern which emerged from the financial crisis related to the interconnectedness of economies due to strong globalisation and specifically global financialisation of national economies over the past two decades. This interconnectedness formed the global financial fault lines along which the crisis spread (IMF, 2010). These economies had positions with each other which created a possible link of contagion to their respective domestic economies depending on their national sector balance sheet structure and exposures. This was further exacerbated by the existence of complex instruments and off-balance sheet items which created serious financial stability risks (Dimsdale, 2009). The fact that data on the network of domestic and international positions were scarce or non-existent contributed significantly to the inherent risks. The set of integrated economic accounts contained in the European System of National and Regional Accounts (ESA2010) as well as the System of National Accounts (SNA2008) provide ample scope and guidance for the creation of a set of integrated and harmonised stock and accumulation accounts for an economy that could partially address some of the identified data gaps. Although the underlying statistical guidelines existed prior to the crisis there had not been sufficient focus on the following components:

- Measuring the full dimension from opening stock position, through accumulation variables to closing stock position;
- Measuring these variables for all the sectors of an economy;
- Measuring and understanding the financial dynamics of specifically non-bank financial sectors;
- Understanding the impact of credit and counterparty solvency, and
- Understanding the impact of public debt in periods of stress.

Flowing from this realisation, the Group of 20[2] (G20) advanced and large emerging market economies identified the need for comprehensive and timely economic and financial data and called

[1] The views expressed in this work project are that of the author and does not necessarily reflect that of the South African Reserve Bank

[2] In the aftermath of the Asian financial crisis the G20 emerged as a meeting between Central Bank Governors and Finance Ministers. These economies of the member countries represent approximately 90 per cent of global Gross Domestic Product (GDP)

on various international agencies "to explore gaps and provide appropriate proposals for strengthening data collection" (FSB, 2009, p.9). This resulted in the identification of the following four different but related data gap areas which required urgent attention:

- Identification of risk build-up in the financial sector;
- Identification of cross-border financial linkages;
- Determination of the extent of vulnerability to shocks (endogenous or exogenous) of domestic economies; and
- Improvement of the dissemination and communication process concerning official statistics.

From this emerged the G20 Data Gaps Initiative (G20DGI), which constitutes a set of twenty recommendations on the enhancement of economic and financial statistics by closing identified data gaps through the development of new data sourcing models and improvement of existing ones. This initiative commenced with G20DGI-1, the first set of 20 recommendations, which was subsequently replaced by G20DGI-2 – the second and updated set of recommendations. These recommendations focuses on the improvement of the availability and comparability of economic and financial data as well as the early monitoring of stress within different sectors of the economy in order to apply appropriate intervention measures. This is particularly appropriate given the fact that distressed financial markets test the macroeconomic coherence of countries and supra-national groups such as the EU, placing pressure on those countries which are considered financially fragile or partially insolvent (Dabrowski, 2009). The recent macroeconomic strains experienced by countries such as Greece, Ireland and Portugal aptly accentuated the need for integrated and continuous monitoring of their economies through advancement of the G20 DGI programme.

2. PROBLEM IDENTIFICATION

Recommendation 8 of the G20DGI-2 specifically focuses on financial and economic sector datasets and identifies the development of a strategy to promote the compilation and dissemination of the balance sheet approach, flow of funds, and sector data more generally and as a matter of priority (IMF, 2009). South Africa's membership of the G20 compels it to adhere to and implement the recommendations identified in the G20DGI-2. However, in South Africa's case, a complete and integrated set of sector balance sheets and accumulation accounts covering the main institutional sectors and instrument categories as proposed in ESA2010 and SNA2008 for financial assets and liabilities does not exist.

This problem is compounded due to the fact that the level of data availability varies among sectors, with the financial corporations (FC) sector well covered but sectors such as the Private Non-financial Corporations (PRIVNFC) and households (HH) least covered - with no directly sourced data and significant reliance upon derived and administrative data. This highlights a significant data gap in South Africa's macroeconomic financial statistics given the fact that comprehensive FBSAA datasets already exist in many countries, amongst others, Austria, Belgium, Brazil, Chile, Czech Republic, France, Germany, Indonesia, Italy, the Netherlands, Poland, Portugal, the Russian Federation, Slovakia, Spain, Turkey, United States of America, United Kingdom, etc.

Thus, the main identified problem is that there is currently no comprehensive model that provides for the sourcing, balancing, output and dissemination of the South African FBSAA. This poses a significant gap in South Africa's suite of financial statistics because reliable data on the assets and liabilities of sectors' as well as countries' aggregate balance sheets is essential for making the balance sheet approach operational (Allen, Rosenberg, Keller, Setser, & Roubini, 2002). Furthermore, it is critically important to construct a sound and robust FBSAA model that will link the "real" economy with the financial economy in one harmonized set of Integrated Economic Accounts (IEA's). Shestra, Fassler and Mink (2012) argue strongly that the relationship between economic flows in the real and the financial spheres of the economy as well as the debtor/creditor relationships should be captured and presented using an integrated statistical framework that ensures the consistency of the data between non-financial and financial transactions and between institutional units.

The fact that various approaches can be used to construct the South African FBSAA model leads to the identified research question - namely what the most appropriate model is with which to source and balance the FBSAA variables for the different sectors of the South African economy. Appropriate in this context refers to the most effective data sourcing model that can be designed according to international comparative best practice whilst being mindful of time, resource and development constraints specific to South Africa.

3. STUDY RELEVANCE

From the South African perspective, there are various reasons why the development of a comprehensive FBSAA model for the South African economy is desirable.

The well-developed and pervasive characteristic of the financial sphere of the South African economy necessitates a good understanding of the financial structure underlying the real economic activities. Furthermore, institutional units across all sectors of the economy are significant contributors to the liquidity dynamics of the South African economy and generate significant revenue through their operational activities and depending on their cost and capital structure lead to significant sector net lending/borrowing positions (SARB, 2015). These positions and the flows between periods result in sizeable financial movements throughout the full spectrum of financial instruments as delineated in SNA2008 and ESA2010. In addition, claims on debtors and cash management related to operations and short-term liquidity management can potentially form sizeable positions. The capital structuring activities by institutional units across all sectors could represent a liquidity increase or decrease on the economy in a specific period with a reversal of this in the following period or vice versa.

Due to these dynamics and their impact on the national net lending/borrowing position of the economy it is critical to understand the interlinkages and their impact. Therefore, a comprehensive and thorough FBSAA model containing granular data on the underlying financial instruments would hugely benefit the South African Reserve Bank (SARB) and country at large and would in fact constitute a national statistical asset. This would also directly benefit the IEA compilation for the South African economy by providing the financial net lending/borrowing position per sector which could be related to the net lending/borrowing position calculated from the current and capital account. Such a set of IEA's for South Africa would provide invaluable insight into the distribution of domestic savings in the economy and also cast light on the diffusion of international capital throughout the domestic economy – thereby providing elucidation into one of the key structural components of the South African economy.

The fact that there has been intense focus on financial and real sector interrelatedness since the financial crisis necessitated the development of a structure to facilitate, compile and house this information without delay. This is, in part, due to the fact that the contribution of the different sectors to economic growth as well as economic crisis can only be thoroughly comprehended if the dynamics driving the sub-components and variables within that sector are tracked and analyzed over time. Gonçalves (2011, p.1) points out that in the Portuguese case "This setting emphasizes the critical need for having detailed data on institutional sectors in order to assess their financial soundness and how they are affected by the adverse economic situations."

The following is deemed to be the main benefits of developing the FBSAA model for South Africa:

- Complete balance sheet (financial assets and liabilities) and accumulation accounts for all institutional sectors of the economy as well as the evolution in these components over time;
- Information on sector balance sheet positions could assist in the early identification of sector weaknesses before they develop into a structural constraint;

- This information could focus attention on policies that can reduce sector vulnerabilities, especially vulnerability related to changes in key financial variables;
- It could assist policymakers in the evaluation of the trade-offs among different policy objectives available after the identification/emergence of sector-specific problems;
- At an organizational level, the successful implementation of the FBSAA model will contribute towards the strategic objectives of the Economic Research and Statistics Department (ERSD) of the SARB, which houses the mandate to operationalize recommendation 8 of the G20DGI-2, and thereby congruently address the strategic objectives of the SARB, namely to:
    - Develop the FBSAA model within the larger IEA model for the South African economy; and
    - Contribute to the development of a methodology to delineate accumulation account data through the identification of valuation and other volume changes in financial instruments for the different sectors of the South African economy and thereby isolate pure transaction data and reducing data noise.
- The project further provides an opportunity to harmonize intra-departmental methodology and quality with other related statistics by integrating all sectors of the economy within one system that could benefit cross-pollination and source data harmonization efforts; and
- Additionally, basing the FBSAA model on international best practice affords South Africa the opportunity to harmonize its methodologies and quality on an international level, while being mindful of country specificities.

4. OBJECTIVES

The ultimate goal of this project is to deliver an operational blueprint for the South African FBSAA model. The different components of the FBSAA model will provide a detailed plan on how to source, integrate and disseminate the relevant financial balance sheet and accumulation account data for all the different sectors of the South African economy. In order to achieve this goal, the following intermediary objectives have been identified:

1. Develop a management structure for the FBSAA project;
2. Define the appropriate sector and financial instrument delineation based on international guidelines and requirements;
3. Develop the appropriate FBSAA data sourcing templates with which to source the required data;
4. Develop the validation model with which to estimate revaluation data and derive transactions;
5. Develop the appropriate "raw" data integration model with which to balance the input data in order to achieve harmonized FBSAA statistics for the South African economy; and
6. Develop the most appropriate statistical output system to disseminate the statistics generated by the FBSAA model.

5. LITERATURE REVIEW

It is difficult to identify literature that specifically addresses the existence of FBSAA data gaps. This is probably due to the fact that many central banks that are entrusted with the compilation of FBSAA data sets do so within the context of internal research projects and the literature set generated from this process is not necessarily made available in the public research domain. In addition, literature that address FBSAA data generating processes and dynamics is generally more readily available for developed than developing economies.

The available literature that addresses the FBSAA model specifications can broadly be divided into three categories, namely:

- Firstly, literature by **international organizations** in the form of guidelines, recommendations and position papers that identify, analyze and comment on the impact of these data gaps and provide guidelines for closing them within the context of the overarching FBSAA construct;

- Secondly, literature on **in-house FBSAA model specifications of specific central banks**, mainly relating to European countries that deal with the scope and usefulness of financial accounts and related statistics;

- Finally, the third strand of literature relates to **individual research** - often by national central bank staff under the auspices of national central banks - that have been done on the structure and dynamics of the their in-house FBSAA models as well as the statistics generated by them.

The main body of literature that addresses the data gaps identified after the financial crisis of 2008 does so within the context of the overarching G20DGI. Since 2009 the Financial Stability Board (FSB) has produced yearly reports on the progress by G20 member countries on efforts towards closing the 20 identified data gaps. This strand of literature and the information it provides to countries about their peer-country progress is central to the motivation and design of the FBSAA model for South Africa because it provides the frame and international context within which it should be developed.

The initial report (FSB, 2009, p.4) to the G20 finance ministers and central bank governors highlighted the financial crisis and data gaps as "an inevitable consequence of the ongoing development of markets and institutions". The key focus of this research emphasizes the fact that a lack of timely and accurate information hinders the ability of policy makers and market participants to develop effective responses. The fifth progress report, released in September 2014, indicated that significant progress has been made in the implementation of the G20DGI recommendations since 2009. It however stated that although most of the conceptual work had been completed, the enhancements of datasets by all economies took place at diverse rates of progress, primarily reflecting varying levels of sophistication of national statistical systems and data sourcing structures (FSB, 2014).

The Statistical Office of the European Communities, Eurostat, also provides some elucidation regarding the impact and methodological challenges faced due to the existence of financial data gaps (Eurostat, 2010). Brites (2013) highlights the fact that harmonization in the national statistical framework can be advantageous in the endeavor to build balance sheet data and close data gaps. The author highlights that the Bank of Portugal maintains a Central Balance Sheet Database (CBSD), sourcing data on mandatory financial statements reported in fulfillment of Portuguese firms'

statutory obligations to various regulatory agencies in Portugal and that this development is the result of close cooperation among the public entities with the aim of reducing respondent reporting burden.

The second strand of literature focuses on the efforts of national FBSAA compilers. The Bank of England (2016) highlights the importance of harmonious and uniform classification schemes for the compilation of national accounts. In a similar vein the United Nations (2015) highlights the potential problems in identifying and classifying holding companies and head offices. Publications on methodological notes by the Central Bank of Russia (2015) shows that the financial accounts and financial balance sheets are also a source of data for analyzing the activities of institutional sectors for which detailed information is missing, for example, the non-financial corporations (NFC) and HH sectors.

Wen (2011) identifies the main challenges for Chinese accumulation account data as (a) time lags (b) sector classifications (c) financial instrument innovations, and (d) different supervisory and accounting standards. Kobayakawa and Okuma (2012) postulate that while the Japanese sector account data is comprehensive, it does not appear to be "user-friendly" for primary statistics users due to the complexity of its matrix structure. The authors furthermore state that against this background the Bank of Japan has enacted several measures to improve the usefulness of the Japanese data with the aim of expanding the understandability of the statistics as well as the range of users.

The third strand of literature relates to individual research, mostly by staff of international organizations, central banks and statistical authorities. Their research output primarily focuses on the existing data gaps within the FBSAA as well as the uneven development of these data sets across different countries. Shestra et al. (2011) describe the importance of using an integrated approach for the compilation of financial flows and positions on a "from-whom-to-whom" (FWTW) basis - one of the main components of recommendation 8 of the G20DGI-2. The development of the South African FBSAA model will use this approach as its anchor to contextualize the model and hence informing its design.

The authors furthermore stress that the application of this kind of analysis has been hampered by the lack of adequate data and although different countries have recently improved the development of statistical methodologies and data availability, a fully integrated approach for financial flows and positions within the macroeconomic statistics framework is yet to be achieved. The primary obstacle for achieving this is limited sets of FWTW data. Tissot (2014) emphasizes that several steps have been taken in recent years to refine aspects of national financial accounts with the ultimate aim of constructing integrated sector financial accounts which could play a pivotal role in supporting financial stability analyses. The author however also cautions that its development is presenting acute data challenges and furthermore asserts that additional progress can be achieved by drawing on the 'micro data revolution' which currently is receiving significant attention globally.

Allen et al. (2002) emphasizes the analytical framework for understanding crises in emerging markets based on examination of stock variables in the aggregate balance sheet of a country and the balance sheets of its main sectors. Heath (2013) argues that while macroeconomic policies aim to achieve price stability and economic growth, and micro-prudential policies address idiosyncratic risk of individual institutions, the experience from the global crisis has demonstrated that financial stability

cannot be assured without a macro-prudential approach. In light of this assertion the author highlights the fact that that various datasets emerging from the G20DGI recommendations support the intersection of analysis between the macro-prudential, macroeconomic, and micro-prudential and so are relevant to policy makers in these fields – one of them specifically relating to the enhanced focus on sector balance sheets.

Haim and Levy (2007) focuses on the use of balance sheet data as an important instrument in surveillance of financial stability, the formulation of other similar frameworks for analyzing financial risks, and the provision of more detailed data in the national balance sheet that would enable a deeper analysis of overall economic risks and the risks in the major sectors. In research conducted by Davies (2009) the focus turns to the identification and measurement of current omissions from balance sheets including activities from the shadow banking system such as hedge funds, structured investment vehicles and private equity. This is done with the aim of improving transparency and making it easier to analyze the transmission of financial crisis to institutional sectors and to better monitor future developments. Similarly, Rucher and Wolff (2011) emphasize analysis of vulnerabilities by stating that many recent studies have analyzed the sovereign debt as well as the financial health of Deposit Taking Corporations (DTC's) while the balance sheets of NFC's have been subject to less scrutiny.

Silva and Toledo (2015) expand on the magnitude and composition of agent's leverage and asset holdings as an important indicator for financial stability monitoring, and thus asserts that financial sector accounts have an important role to play in this regard. However, to complement gross and net measures in the sector financial accounts, timely information on FWTW holdings would improve the quality of assessments for financial stability. Rodano and Signorini (2008) emphasize future development work that can be done on the inclusion of micro enterprises in the financial sector accounts of Italy, highlighting that the nature of these small enterprises makes their measurement very difficult but necessary due to the relatively large contribution they make to employment in the NFC sector.

This project will benefit significantly from these analytical discourses which provide the context within which the FBSAA model is developed. Furthermore, this study will also fill an existing literature gap by providing a country experience on how to construct an FBSAA model from a developing country perspective.

6. METHODOLOGY

6.1 METHODOLOGICAL APPROACH

The positivist paradigm will be the overarching methodological construct within which this study will be conducted. Within this paradigm, the study will make use of a quantitative research approach which emphasises the systematic empirical investigation of social phenomena using computation techniques – both mathematical and statistical. Quantitative methods generally allow for the study of large datasets through which certain patterns and/or behaviours can be identified. This approach is also specifically appropriate when the identified subject of interest can be measured and quantified, as is the case with economic statistics. This study will furthermore avail of longitudinal data obtained from primary data sources as well secondary data sources such as public sector administrative databases. Within the above-mentioned context, the development of the FBSAA model for the sectors and financial instruments of interest will primarily be project based with research and thereafter system development being conducted on divergent but related areas.

6.2 DATA SOURCES AND CHARACTERISTICS

Within the FBSAA model, the FBSAA data sourcing template used in the project has as its underlying foundation the IMF template on minimum and encouraged data cells to be reported on by member countries. The FBSAA template was adjusted to take cognisance of the South African national requirements with regard to both sector and instrument delineation.

The data was sourced from five statistics divisions within the ERSD, and forms part of the suite of macroeconomic statistics produced by the SARB. The datasets are compiled using various census and sample survey methodologies, depending on the target population and whether full enumeration is sought. These data sets are considered to be raw datasets from the FBSAA model perspective because they have been compiled with the initial macroeconomic statistical dimension in mind. The raw data sets generate data on a varied number of financial sub-instruments and sectors. These divergent sub-instruments are then aggregated into 32 sub-instruments and 8 main instruments based on instrument guidelines obtained from the SNA2008 and ESA2010.

The underlying IT platform to be used in this project is Excel-based software. This is not the optimal technological platform but due to the fact that the ERSD is in the midst of a discontinuation of its old IT platform and development of its new platform there has been a suspension on development of new software. This has necessitated the utilisation of Excel – once the new IT platform has been developed the FBSAA model will be integrated into this platform. The utilisation of Excel has both advantages and disadvantages. The main advantage is the adaptability of the software which can be utilised to customise the FBSAA model dimensions as the project progresses. The main disadvantage is the fact that Excel is not intended to be used as a data warehouse but rather as a basic analytical tool.

7. FBSAA MODEL SET-UP

The FBSAA model has various components, each one unique with its own dimensions but also intricately interrelated with one another. For this reason it is necessary to systematically characterize each component and thereby provide a view of the foundation and structure of the model. The rest of this chapter is structured as follows – first the different phases of the project are explained. Thereafter the project monitoring, control and communication activities are described. This is followed by a discussion of the key parameters underlying the FBSAA model. Thereafter the building block component of the FBSAA model is addressed. Following this, is an exposé of how the valuation calculations are done before expanding on the balancing methodology. The chapter concludes with a discussion of the FBSAA model output and statistics dissemination strategy.

7.1 PROJECT PHASES

The inputs into the FBSAA model encompass a vast number of data sets that are merged into one harmonized data set. This entails the amalgamation of raw data from various statistical domains, which have been compiled within their own paradigms, rules and structures. In addition to this the FBSAA model represents the first effort by the SARB to construct a complete FBSAA model entailing all the different components. This has given the project an expansive and iterative nature, and therefore it was decided to implement the development in a stepwise manner. Thus, the development of the FBSAA model is divided into three distinct phases. **Phase 1** covers the following areas:

- Development of the building block component to be utilized over the full scope of the project (2010 to 2016);
- Development of the revaluation component to estimate the accumulation account data for the full scope of the project;
- Development of the balancing component to be used for the full scope of the project;
- Sourcing of unbalanced sector balance sheet data for the periods 2010 to 2011 on a quarterly basis, i.e. 8 quarters – this phase only addresses these two years to provide the model compilers the opportunity to identify and accommodate significant data gaps and also provide the sector compilers with feedback regarding their data gaps in order for them to address these in the input data from 2012 to current;
- Execution of the First Level Financial Asset and Liability Analysis (FLFA) for the period 2010 and 2011;
- Estimation of unbalanced accumulation account data for the period 2010 and 2011 on a quarterly basis, i.e. 8 quarters; and
- Generation of balanced stock data for the period 2010 to 2011 on a quarterly basis, i.e. 8 quarters.

Most of the activities in **phase 2** of the project will be dealt with in the future development section of the study and relates to:

- Sourcing of unbalanced sector balance sheet data for the periods 2012 to 2016 on a quarterly basis, i.e. 20 quarters;

- Estimation of the unbalanced accumulation account data for the period 2012 to 2016 on a quarterly basis, i.e. 20 quarters; and
- Balancing of stocks for the period 2012 to 2016 (20 quarters);
- Detail level accumulation account estimation for period 2010 to 2016 (28 quarters); and
- Population of balanced FALTS (BFALTS) for the entire project scope period.

Phase three covers the full operational integration of the FBSAA model into the suite of macroeconomic indicators that is already generated by the SARB. Figure 7.1 provides a diagrammatical view of the different components and phases.

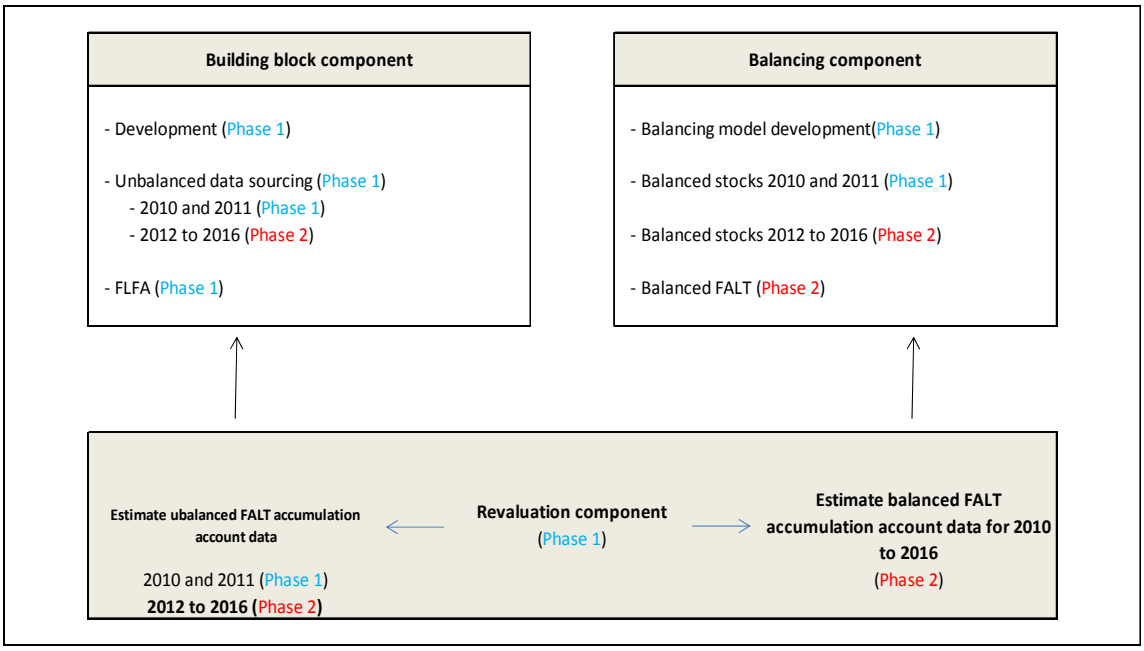

Figure 7.1 - Components of the FBSAA model

Much of the work done in phase 1 forms the foundation of the complete FBSAA model and will be utilized in phase 2. This component of the work also provides the empirical results which are analyzed in chapter eight.

7.2 MONITORING, CONTROL AND COMMUNICATION

Planning and communication are key tasks around which the execution of the FBSAA project revolves. These involve the following key pillars:

- **Strategic planning**: this pillar involves designing the strategy whereby the project is implemented as well as the overall fit of the project into the key focus areas of the SARB;
- **Operational planning**: this pillar involves planning the operational activities in the project, covering aspects such as resources, timing, work flow etc.;
- **Programming the agreed upon project activity**: this pillar entails the actioning of the specific operational plans that were designed and ensuring each action takes place according to plan;

- **Management of process and output**: this pillar entails the managerial focus which is needed to guide all participants in the project to fulfill their specific role in order to meet the stated objectives and goal; and
- **Communication of relevant information to the appropriate stakeholders**: this pillar encompasses regular clear and effective communication regarding all the relevant aspects of the project. This is done either via electronic channels or face-to-face.

Both **strategic** and **operational** planning are necessary for the efficient management of the numerous statistical operations contained within the project which entails complex processes of conceptualization, interaction with sources of information, resource management, and performance monitoring.

The ultimate objective underlying these functions in the project is to:

- Define the project direction, ultimate goal and intermediate objectives;
- Support resource management and allocation;
- Manage performance;
- Provide input for coordination; and
- Set priorities.

In line with the above-mentioned outline, the FBSAA management framework (see figure 7.2) comprises two different but related areas – **strategic** and **operational –** and for that reason, two main committees have been created – the FBSAA Steering Committee (**Steerco**) and the FBSAA Working Committee (**Worco**) – with specific characteristics and objectives as follows:

1. **Steerco** acts as the overarching strategic steering committee with which the responsibility lies to steer the project to completion and in so doing deliver on the ultimate goal. This committee convenes once per month and receives high-level feedback regarding the progression towards achieving the project milestones. Steerco is also the forum where bottlenecks and risk factors pertaining to the project are discussed and high-level risk-mitigating decisions are taken. Thus, Steerco acts as a high-level progress evaluation and think-tank with the aim of keeping the project on track as well as elevation of potential risks to the correct executive level in order to mitigate their impacts on ultimate goal delivery. Steerco's mandate takes the following into account:

    - Project management feedback from project leader and lead specialist;
    - Sector compiler inputs;
    - Reporting on and evaluation of key milestones; and
    - Horizon planning and risk mitigation.

2. The second, and equally important, committee is **Worco**. The function of Worco is to operationalize the strategic direction decided upon by Steerco. Worco oversees the practical day-to-day operational activities of the FBSAA project and is thus the operational arm of the project. It is the responsibility of this committee to oversee the achievement of intermediate objectives in order to achieve the ultimate goal delivery. Worco is also responsible for the maintenance and continual development of the FBSAA management system which is the operational center from where all technical aspects of the project are managed. The central premise of the management

system is the integration of the different components and levels of the FBSAA model. These relate to:

- Sector compiler areas;
- The central management area; and
- The monitoring platform – which provides a monitoring system to keep track of all the different components of the FBSAA model and take appropriate action to keep progress on track.

In order to achieve the ultimate goal of the project, the co-ordination of all activities lies with three key role players within the management structure: the **chairperson of Steerco**, the **project leader** and the **lead specialist**. Their roles can be elaborated on as follows:

1. The **chairperson of Steerco** is also the head of statistics of the ERSD and the sponsor of the FBSAA project, being responsible for aligning the ultimate goal of the project with the strategic focus areas of the SARB and also report to the Governors Executive Committee (GEC) on the project progress;

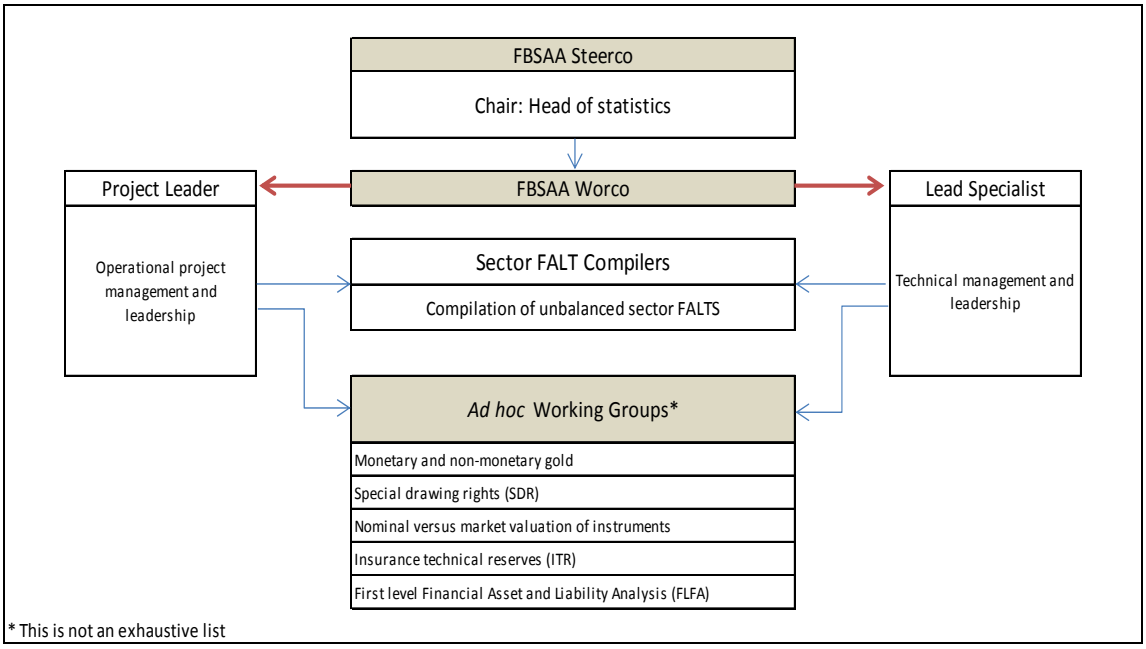

Figure 7.2 – FBSAA management framework

2. The **project leader** provides overall project leadership and operational drive and is responsible for the execution of agreed upon intermediate steps towards fulfillment of the ultimate goal; and
3. The **lead specialist** is responsible for the technical development and drive of the project and typically has more in-depth knowledge of the financial components of the South African economy, sectors and instruments.

The project leader and lead specialist also serve on various *ad hoc* committees that have been created to address specific areas of interest in the various statistical domains that feed into the FBSAA model. They furthermore have the responsibility to ensure that there is sufficient communication of relevant matters in the project. The project leader communicates matters

pertaining to the general project outline such as dates and times of meetings, minutes taken during previous meetings and formalization of action plans agreed upon to achieve specific objectives. The lead specialist has communication responsibilities with regard to technical aspects and is responsible to communicate on the technical outcomes of the *ad hoc* working groups, explaining the technical decisions made and the impact of these decisions on the FBSAA model. The project leader and lead specialist as well as one additional senior economist form the nucleus of the FBSAA model development team, solely devoted to this project. The expanded team comprises of an additional 9 economists, 4 which are division heads in ERSD. The remaining 5 members are all senior economists in the data supplying divisions which compile the raw data sets entering the FBSAA model.

7.3 THE FBSAA MODEL PARAMETERS

At this stage, it is important to define and delineate the FBSAA model parameters. These parameters are primarily derived from the mandate provided to Steerco for the development and implementation of the FBSAA model, which is to develop a full set of financial balance sheet and accumulation accounts for all the sectors of the South African economy.

From this mandate, the operational classification of the parameters can be developed. The **three main operational parameters** relate to the project scope timeframe, the sectors of the economy as well as the instruments to be covered. Lastly it is also necessary to define in more detail what type of financial information relating to the identified instruments needs to be measured.

The **first operational parameter** to be specified relates to the measurement timeframe of the project as well as the frequency within this timeframe with which the data has to be compiled. In order to track the developments in institutional sector balance sheets since relatively shortly after the financial crisis the starting period for the project is 2010. The first and second phase of the project – which is the focus of this study - will yield FBSAA statistics until 2016 on a quarterly basis – thus 32 quarters in total. Phase 3 of the project will entail the routine quarterly integration of the FBSAA production cycle into the broader statistics model of the ERSD.

The **second operational parameter** to be defined is that of the institutional sector. In order for the FBSAA model to be harmonized with the broad suite of macroeconomic statistics it considers the aggregate activities of similar institutions – grouped into institutional sectors, some of which are divided into subsectors. Each sector and subsector groups together the institutional units which have a similar type of economic behavior. The sectors to be included in the FBSAA model are obtained from a combination of the sector delineation contained in the SNA2008 and ESA2010. The complete sector breakdown is depicted in table 7.1.

Main institutional sectors	Sub-sectors		
	Sub-sector - level 1	Sub-sector - level 2	Sub-sector - level 3
Non-financial Corporations (NFC)	Public NFC (PUBNFC)		
	Private NFC (PRIVNFC)		
Financial Corporations (FC)	Monetary financial institutions (MFI)	- Monetary authority (MA)	- Central bank (CB) - Corporation for public deposits (CPD)
		- Other monetary financial institutions (OMFI)	- Deposit taking corporations (DTC) - Money market funds (MMF)
	Financial corporations except MFI and ICPF (FCeICPF)	- Non-MMF investment funds (NMMFIF)	- Money market unit trusts (UT) - Participation bond schemes (PBS) - Public Investment Commissioner (PIC)*
		- Other financial intermediaries except ICPF (OFI)	- Finance companies (FC) - Public financial intermediaries (PUBFIN)
		- Financial auxiliaries (FA) - Captive financial institutions and money lenders (CAPFIN)	
		of which: public corporations included in FCeICPF*	
	Insurance corporations and pension funds (ICPF)	- Insurance corporations (IC)	
		- Pension funds (PF)	- Public pension funds (PUBPEN) - Private pension funds (PRIVPEN)
General Government (GG)	Central and provincial government (CPGOV)	- National government (NG) - Provincial government (PG) - Extra budgetary institutions (EBI) - Social security funds (SSF)	
	Local government (LG)		
Households (HH)**			
Rest of the world (ROW)			

Table 7.1 – Sector delineation of the FBSAA model

The FBSAA model commences with the 5 main institutional sectors – four domestic as well as the Rest of the World (ROW), which is also treated as a separate "sector" – with three of them further broken down into sub-sectors as follows:

- The **Non-financial Corporations (NFC)** sector is further broken down into the Public NFC (PUBNFC) and Private NFC (PRIVNFC) sectors;

- The **Financial Corporations (FC)** sector has the most elaborate sub-sector breakdown:

  - The first sub-sector is the Monetary Financial Institutions (MFI) sector which is further broken down into the Monetary Authority (MA) and Other Monetary Financial Institutions (OMFI). In South Africa's case the MA sub-sector is further broken down into the Central Bank (CB) and the Corporation for Public Deposits (CPD). The CPD is a subsidiary of the CB and accepts call deposits from the public sector and invests the funds in short-term money-market instruments and Treasury Bills (TB's)[3]. The OMFI sub-sector is broken down into the Deposit Taking Corporation (DTC) and Money Market Fund (MMF) sub-sectors;

  - The next delineation below the main FC sector is the Financial Corporations except Insurance Corporations and Pension Funds (FCeICPF) sub-sector. This sub-sector is broken down into four additional sub-sectors as well as two memo item "sub-sectors"[4]. The four sub-sectors are the Non-Money Market Fund Investment Funds (NMMFIF), the Other Financial Intermediaries except Insurance Corporations and Pension Funds (OFI) sector, the Financial Auxiliaries (FA) sector and the Captive Financial Institutions and Money Lenders (CAPFIN)

[3] With the permission of the Minister of Finance, the CPD may also accept call deposits from other depositors

[4] Memo item sector data is already contained within the other four sub-sectors but is shown separately for national elucidation purposes

sector. The two memo item "sub-sectors" are the Public Investment Corporation (PIC) sector and an "of which public" aggregation of the public corporations in the FCeICPF sub-sector. There is a specific reason why the PIC was included explicitly - it is the only investment management company in South Africa that focuses exclusively on the public sector – investing, amongst others, the public sector pension funds. It is wholly owned by the South African government and given the magnitude of this entity in this sub-sector it is shown separately in the FBSAA model as a memo item as well as being included in the NMMFIF sub-sector. The consolidation of the public corporations data for this sub-sector has been included for analytical interest to explicitly gauge the presence of public financial intermediaries;

- The last major sub-sector in the FC sector is that of Insurance Corporations and Pension Funds (ICPF). The pension funds sub-sector is further broken down into public pension funds (PUBPEN) and private pension funds (PRIVPEN).

- The **General Government (GG)** sector is broken down into two main sub-sectors – the Central and Provincial Government (CPGOV) sub-sector and the Local Government (LG) sub-sector. The CPGOV sub-sector is further broken down into the National Government (NG), Provincial (State) Government (PG) and Extra Budgetary Institutions (EBI). An EBI is a national public entity and consists of a board, commission, company, corporation, fund or other entity which is not classified as a quasi-corporation. EBI's produce goods and services for government or sell goods and services to the public. In addition to the above-mentioned sub-sector split there is also an additional elucidation category for Social Security Funds (SSF) – a category which has seen a significant increase over the past two decades in South Africa. These SSF's provide comprehensive social security services against vulnerability and poverty within the South African constitutional and legislative framework.

- The last two sectors included in the FBSAA model are the **household (including NPISH[5])** sector with no additional disaggregation and the **ROW** "sector".

The **third operational parameter** which needs to be defined relates to the classification of financial transactions, assets and liabilities into different instrument categories. Financial transactions relate to transactions in financial assets and liabilities between the resident institutional units which have been grouped into sectors, and between these resident units and non-resident units (collectively forming the ROW "sector"). A financial transaction between institutional units is a simultaneous creation or liquidation of a financial asset and the counterpart liability, or a change in ownership of a financial asset, or an assumption of a liability (ESA2010).

Financial assets consist of all financial claims, equity as well as the gold bullion component of monetary gold, and are stores of value representing a benefit or series of benefits accruing to an economic owner by holding or using the assets over a period of time. They are a means of carrying forward values from one accounting period to another. Liabilities are established when a debtor is obliged to provide a payment or a series of payments to a creditor.

[5] NPISH's consists of non-profit institutions which are separate legal entities, which serve households and which are private non-market producers

The term instrument will thus relate to both the asset and liability component of financial transactions. In addition to the stock positions in assets and liabilities and the corresponding transactions there are two additional components that provide the complete FBSAA model – revaluations and other volume changes (OVC's). Changes between the opening balance sheet and the closing balance sheet could also be partially explained by these two additional flow categories, which are not interactions between institutional units by mutual agreement. Revaluations are recorded in the revaluation account and OVC's in the OVC account.

One of the critical considerations in the FBSAA model is to maintain a balance between too exhaustive sub-instrument breakdowns on the one hand and not having enough detail for sufficient analysis on the other. In order to address this requirement, the eight broad instrument categories detailed above are expanded to contain more detailed sub-instrument categories as depicted in Table 7.2. The expansion in the sub-instrument categories increases the depth of analysis but also addresses South African specific analysis requirements. In addition to the sub-instrument delineation in Table 7.2 the currency composition - domestic versus foreign - as well as maturity structure – short- and long-term - form two additional reporting requirements in several of the instrument categories. This allows for a richer risk analysis regarding instrument structure, foreign exchange exposure and maturity misalignment.

For purposes of the FBSAA model the following **eight high-level instrument categories** are identified:

- Monetary gold and special drawing rights;
- Currency and deposits;
- Debt securities;
- Loans;
- Equity and investment fund shares or units;
- Insurance, pension and standardized guarantee schemes;
- Financial derivatives and employee stock options; and
- Other accounts receivable/payable.

The first instrument is ***Monetary gold and special drawing rights.*** This instrument is broken down into two sub-instruments, namely monetary gold and Special Drawing Rights (SDRs). Monetary gold is gold to which monetary authorities have title to and which is held in reserve assets. This is physical gold bullion that has been monetized. SDR's are international reserve assets created by the International Monetary Fund (IMF) which are allocated to its members to supplement existing reserve assets. Both of these instruments constitute important instruments in the balance sheets of most central banks.

1	**Monetary gold and SDR's**
1.1	Monetary gold
1.2	SDRs
2	**Currency and deposits**
	(of which domestic currency)
2.1	Currency
2.2	Transferable deposits
2.2.1	Interbank positions
2.2.3	Other transferable deposits
F29	Other deposits
3	**Debt securities**
	(of which domestic currency)
3.1	Short-term securities
3.1.1	Treasury bills
3.1.2	Short-term government bonds
3.1.3	Short-term private sector bonds
3.2	Long-term securities
3.2.1	RSA-retail savings bonds
3.2.2	Long-term government bonds
3.3.3	Securities of local governments
3.3.4	Securities of public enterprises
3.3.5	Other private sector bonds and preference shares
4	**Loans**
	(of which domestic currency)
4.1	Short-term (including bank loans and advances)
4.2	Long-term
	(of which Mortgage loans)
5	**Equity and investment fund shares/units**
5.1	Equity
5.1.1	Listed shares
5.1.2	Unlisted shares
5.1.3	Other equity
5.2	Investment fund shares/units
5.2.1	Money market fund shares/units
5.2.2	Non MMF investment fund shares/units
6	**Insurance, pension and standardized guarantee schemes**
6.1	Non-life insurance technical reserves
6.2	Life insurance and annuity entitlements
6.3	Retirement entitlements (F63+F64+F65)
6.3.1	Pension entitlements
6.3.2	Claim of pension funds on pension managers
6.3.3	Entitlements to non-pension benefits
6.4	Provisions for calls under standardized guarantees
7	**Financial derivatives and employee stock options**
7.1	Financial derivatives
7.1.1	Options
7.1.2	Forwards
7.2	Employee stock options
8	**Other accounts receivable/payable**
	(of which domestic currency)
8.1	Trade credits and advances
8.9	Other accounts receivable/payable

Source: SNA2008

Table 7.2 - Detailed instrument breakdown contained in the FBSAA model

The second instrument is ***Currency and deposits*****.** This instrument has three sub-instruments, Currency, Transferrable deposits and Other deposits. Transferrable deposits are further broken down into Interbank transferable deposits and Other transferable deposits. This breakdown allows for

useful analysis of the size and activity in the interbank market in South Africa. An additional requirement is the identification of domestic currency positions for the currency and deposit category.

The third instrument is ***Debt securities*****.** Debt securities are negotiable financial instruments that serve as evidence of debt, and are divided by original maturity into two subcategories – short-term debt securities and long-term debt securities. Short-term refers to securities with an original maturity up to and including one year as well as securities payable on demand whilst long-term refers to securities with an original maturity exceeding one year, including securities where no maturity is stated. In addition to the maturity breakdown a currency breakdown, similar to the one required in the currency and deposits category, is also required. It is also useful to obtain the same data by residual maturity which provides the remaining time until the expiration or the repayment of the instrument – this could prove useful for liquidity analysis.

For analytical purposes a more granular breakdown of the short-term securities instrument is required, namely: TB's, short-term public sector securities (excluding TB's)[6] and short-term private sector securities. Long-term securities are also broken down into more detail for analytical usefulness. RSA retail savings bonds are debt securities that have been designed to be as accessible as possible to the general South African public to invest in. These bonds yield a safe and market related return on investment[7]. The long-term securities instrument is further broken down into long-term national government, local government and public enterprises bonds. Private sector bonds and preference shares form the last category under the long-term securities instrument. Due to the nature of the sub-instrument category breakdown certain sectors are by implication excluded from activity in certain instruments. For example, the instrument category *private sector bonds and preference shares* will never contain any general government counterpart, etc.

The fourth instrument is ***Loans***[8]**.** Loans are created when creditors loan to debtors. The loans category also provides for a domestic currency identifier as well as more detailed maturity breakdown. Short-term loans (which include bank loans and advances) are differentiated from long-term loans which include an "of which mortgage" component.

The fifth instrument - ***Equity and investment fund shares and units*** - is broken down into two separate sub-categories – firstly equity and secondly investment fund shares/units. In order to allow for richer analysis, the equity instrument is further broken down into listed, unlisted and other equity. The investment fund shares/units instrument is broken down into money market funds shares/units and non-money market fund investment fund shares/units.

The sixth instrument relates to ***Insurance, pension and standardized guarantee schemes*****.** This instrument is broken down into four main sub-instruments, namely, Non-Life Insurance Technical Reserves, Life Insurance and Annuity entitlements, Retirement Entitlements, and Provisions for Calls under Standardized Guarantees. Retirement entitlements are further broken down into Pension

[6] SARB debentures are grouped into this instrument sub-category

[7] Two different types of RSA Retail Savings Bonds are on offer: the RSA Fixed Rate Retail Savings Bond, and the RSA Inflation Linked Retail Savings Bond

[8] The distinction between transactions in loans and transactions in deposits is that a debtor offers a standardised non-negotiable contract in the case of a loan, but not in the case of a deposit

Entitlements, Claims of Pension Funds on Pension Managers, and Entitlements to Non-Pension Benefits.

The seventh instrument relates to ***Financial derivatives and employee stock options*.** This instrument is broken down into financial derivatives (differentiating between options and forwards) and employee stock options.

Finally, the eighth instrument is ***Other accounts receivable and payable*** which is broken down into trade credits and advances and other accounts receivable/payable.

Each of the eight financial asset categories noted above has a counterpart liability and vice-versa. The only exception is the gold bullion component of monetary gold held by monetary authorities as a reserve asset classified in the category monetary gold and special drawing rights. Due to the fact that monetary gold is a physical asset that has been monetized it has no liability counterpart. As mentioned earlier, the term instrument will thus relate to both the asset and liability component of financial transactions and will follow the above-mentioned instrument breakdown.

7.4 THE FBSAA MODEL COMPONENTS

Due to the expansive nature of the FBSAA model it is necessary to disaggregate it into different components in order to fully justify the description of and contribution that each component makes to the complete model. The model can broadly be disaggregated into four main components, namely:

- ***The building block component (please see section 7.4.1):*** This component encompasses all the sub-components that will be utilized to source the data which is entered into the balancing process, therefore forming the "building blocks" of the balanced stock and accumulation data;
- ***The valuation component (please see section 7.4.2):*** this component relates to the utilisation of price data to estimate valuation impacts between two stock positions and then derive transactions data;
- ***The balancing component (please see section 7.4.3):*** This component entails the balancing process – both at high and detailed instrument level - with which the unbalanced sector balance sheet and accumulation accounts are transformed into balanced sector balance sheet and accumulation accounts; and
- ***The output and dissemination component (please see section 7.4.4):*** this component details the range of outputs to be generated from the balanced sector FBSAA's and also provides the structure for the dissemination strategy of the produced statistics.

7.4.1 The building block component

The building block component forms **the first pillar of the FBSAA model** and the core activity in this component revolves around the sourcing of building block data upon which all the calculations beyond this the point are dependent. The building block component is made up of the following key sub-components: data sourcing and first level financial asset and liability analysis (FLFA).

7.4.1.1 Data sourcing

In order to source the raw stock position data per institutional sector, the FBSAA model utilizes Financial Asset and Liability Templates (FALTS). These are excel based templates which have been designed to meet national and international data requirements into which the raw source data[9] from various internal sector compilers within the ERSD are populated. Although this step forms the data entry level into the FBSAA model, this data will have gone through a previous validation process when it entered the ERSD statistical database via specific first level data channels. The FALTS have been developed taking into consideration the data requirements of the IMF, the G20DGI as well as specificities which will be beneficial for national analysis. The FALTS are comprised of the following sub-components:

***Bridging templates*:** The role of the bridging template contained within the sector FALTS is to facilitate the mapping of raw data from various first-level data areas into the required sector and instrument classification contained in the FALTS. This can be seen as the foundation step of the building block component. The data for each sector is entered manually (through static downloads) into the bridging templates in order to ensure that there is no automatic update of building block data – this is a system integrity check that ensures synchronized data revision across all contributory first-level data sets. Although the conceptual design of the bridging templates is generic each bridging template eventually assumes a unique final form. This is due to the fact that different raw datasets are used to populate each sector's bridging template. For example, the DTC bridging template might contain 10 sub-instruments that comprise the total opening stock (or closing stock) value for the instrument "Other deposits" whilst the same item for a different sector might contain less or more sub-instruments. The advantage of this is that it allows significant flexibility to the sector compiler to migrate their data from their "known" production areas into the FBSAA model. The second but equally important advantage is that it allows for the FBSAA compiler to have a road map from the FBSAA data back into the raw datasets which provides a clear audit trail in case of data anomalies. These anomalous data can then easily be traced back and in most instances resolved without having to revert back to the sector compiler.

***Counterparty templates*:** One of the most important requirements emanating from the G20DGI was the need to provide inter-sector stock and flow linkages between the different domestic sectors of the economy as well as the ROW at detailed instrument level. In order to accommodate this requirement, the FALTS have five counterparty templates – two of them capture the counterparty stock positions (opening and closing) and three capture the counterparty accumulation flows (transactions, OVC's and revaluations). These five counterparty templates are generic and enable the mapping of total stock and accumulation data for a specific sector for a specific period against all other domestic sectors (and sub-sectors) as well as the ROW. Each of these counterparty templates contains 2968 unique data cells which will be populated divergently depending on the instrument/sector configuration of each sector under review. This yields 5936 possible stock position data cells and 8904 accumulation data cells that explain the change between opening and closing stock positions for each sector for each period under review. This yields the first unbalanced FWTW stock and flow data from the perspective of the compiling sector. The advantage of this approach is that various elementary cell analysis can be done that already provides a view of the unique

[9] Raw data in this context refers to data entering the building block component of the FBSAA model

instrument/counterparty structure of a sector's stocks and flows even before values are formally analyzed. This allows the FBSAA compiler to quickly asses the number of cells containing data, blanks or zeros as well as what the dispersion of the total values are across sectors as well as an asset versus liability dispersion assessment. This provides the first details of the structural composition of a specific sector and also allows the sector compiler to provide a cell quality heat map in order to differentiate cells with lower and higher quality data.

***Revaluation split template*:** Another key requirement placed on the FBSAA model is the need to be able to differentiate between the three components of the accumulation accounts, namely, transactions, OVC's and revaluations. In South Africa's case this is a very demanding requirement because most of the available sector data only covers stock positions. Thus, in the absence of actual transaction data it is necessary to create a sub-system to estimate it.

In order to estimate transactions data, it is first necessary to isolate the revaluation component of the accumulation flows and thereafter derive transactions.

This equation for this can be written as follows:

$$CS = OS + T + R + OVC$$

where:

CS = closing stock,

OS = opening stock;

T = transactions

OVC = Other Volume Changes; and

R = Revaluations

Rewriting this equation to isolate T as the dependent variable yields:

$$T = CS - OS - OVC - R$$

In the absence of measured data on transactions and revaluations the equation can be replaced with:

$$Td = CS-OS-OVC-Re$$

where:

Td = derived transactions; and

Re = estimated revaluations

In order to estimate *Re* the sector compilers provide a currency and nationality breakdown at detailed instrument level of the opening and closing stock as well as OVC data in the revaluation split template. This information is then linked to each sector's Revaluation Template (RT) for calculation of quarterly revaluation estimates as well as derived transaction data. The discussion hereof is expanded in section 7.4.2.

Summary statistics: The final template contained in the sector FALTS is a summary output template of the unbalanced totals and counterparty sector data per sector. The summary statistics template yield the first holistic view of the unbalanced FBSAA for a specific sector for the main instrument and sector categories – OS and CS positions, OVC's, Re and Td. The intention is to provide an initial high-level – instrument and sector - assessment of the sector balance sheet and accumulation accounts for the period under review from the perspective of a sector vis-à-vis its counterpart sectors. The benefit of this is twofold – it is of analytical use to the sector compiler in the analysis done for various statistical outputs other that the FBSAA but also serves as a first level validation of the raw data entered into the FBSAA model because it affords the compiler an opportunity to identify obvious data errors in the FALTS. Item 12.1 in the appendix provides an example of this summary template.

One of the key challenges in the development and implementation of the FBSAA model relates to the treatment of sub-sectors for which data is not yet sourced, or is sourced but aggregated into categories which does not directly align with the sector breakdown contained within the model requirements. In South Africa's case this is particularly true for the OFI and CAPTIVE financial sectors. With regards to the OFI sector there are only currently two sub-sectors as delineated in the sector parameter section for which data is sourced directly, namely the Finance Companies (FINCO) and Public Financial Intermediaries (PUBFIN) sub-sectors. This poses a problem due to the fact that the counterpart sectors report asset or liability positions against all the sub-sector's contained within the OFI sector whilst the directly sourced data only relates to the two mentioned sub-sectors. This generally provides a significant asset/liability mismatch in the unbalanced FALTS. This mismatch is addressed in two different manners – firstly, the unbalanced FALTS are not adjusted but in the balancing process, after validation that the unbalanced FALT cells have been entered correctly the larger of the asset or liability position replaces the smaller position, thereby acknowledging that the two sub-sectors which are measured is only a fraction of the assets or liabilities that exists in reality. The second intervention to address this problem is the development of measurement structures for the other financial sub-sectors contained within the OFI sector – this is elaborated on in the future developments part of this study. The other sector that has a similar problem relates to the CAPTIVE sector where holding companies are allocated to. The unbalanced FALTS generally contain asset positions in listed shares against the holding companies but due to the fact that the holding companies are not yet directly measured the liability side is often missing. In this instance the liabilities in listed shares of the holding companies are imputed from the asset positions reported against them. This is also one of the future development areas discussed in section 9 of this study. In instances where sector compilers only have annual data for a specific instrument they use a business cycle proxy closely related to that instrument to infer the positions of the two middle quarters from the two annual positions. This is however very limited due to the fact that most of the data entered into the FBSAA model is already measured on a quarterly frequency, but the issue of moving towards the measurement of all required data at quarterly frequency is also addressed in the future developments section.

7.4.1.2 First Level Financial Asset and Liability Analysis

One of the key processes in the building block component of the FBSAA model is the FLFA process. The FLFA process is an internal validation protocol to which the eight quarterly sector FALTS for 2010 and 2011 for each sector is subjected. This validation step is introduced to ensure the integrity and consistency of the building block data for each sector that will be entering the balancing component.

The FLFA process is a once-off validation tool used to ensure that the building block datasets for each sector is as sound as possible.

Figure 7.3 illustrates that the FLFA process is positioned as a validation protocol between the first finalization of a specific template by the sector compiler and the acceptance of this sector FALT into the balancing component. The FLFA process analyses data generated for the eight quarters from Q1 2010 to Q4 2011. Once the FALTS for this period for a specific sector has been populated with OS, CS and OVC data and has been marked as complete (FIN1) by the sector compiler it is subjected to the FLFA process for that sector. Two sets of analysis are done within the FLFA process - both possibly yielding queries - which are then directed to the responsible sector compiler as part of the FLFA query process. The queries that are generated address the following issues:

- mapping errors;
- level anomalies; and
- classification issues (sector and/or instrument).

The first step in the FLFA process is for the sector compiler to complete all 8 FALTS for the 2010 and 2011 period. Once this is done a FIN1 status is awarded to the specific sector and the FLFA process for that sector is activated. The FLFA process then identifies areas of concern to be raised with the sector compiler in the form of queries. Once these queries have been satisfactorily dealt with and the unbalanced FALTS adjusted by the sector compiler - where applicable - the FALTS are resubmitted and marked as FIN2 – indicating that the level of integrity of the specific unbalanced FALTS are as good as possible at the sector compiler level.

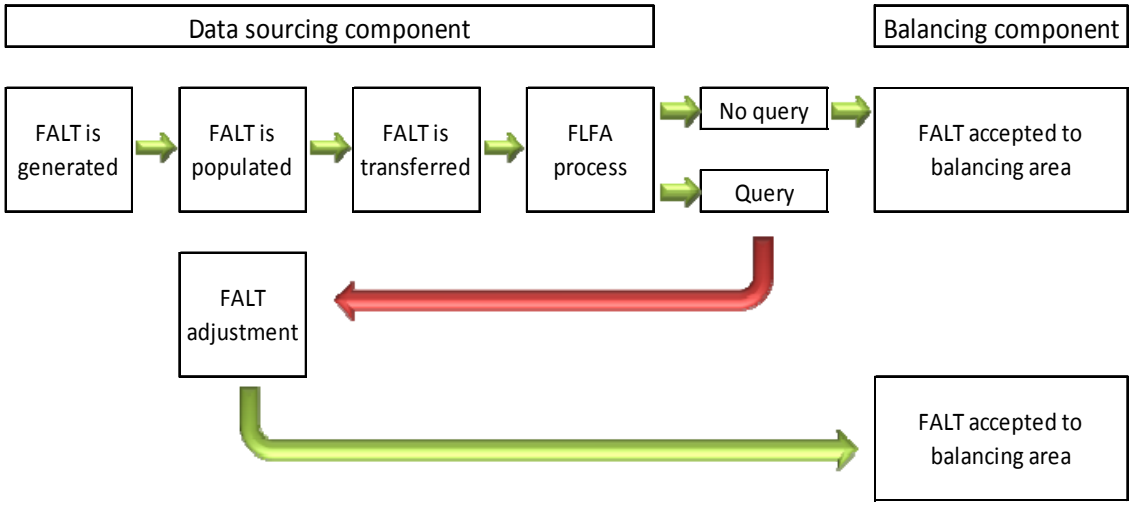

Figure 7.3 - FLFA process within the building block component

Once this marking is given to the FALTS it will be considered ready to enter the balancing component. The anchor condition supporting the FLFA process revolves around the overarching project requirement that the integrity of the balanced FBSAA output needs to be as high as possible given the time, resource and data source development boundaries within which this project is conducted.

In order to achieve the above-mentioned overarching requirement, there are three important sub-requirements that need to be satisfied, namely:

- The unbalanced FBSAA building block data needs to be as sound as possible;
- For data cells where direct data sources are not available derived data should be utilized with comparison of different derived data sources where available; and
- The ideological construct governing the balancing component needs to be as sound as possible.

On the other hand, to ensure that the unbalanced FALT data is as sound as possible the following measures need to be in place:

- FALT compilers need to employ a first level validation protocol. This will differ from sector to sector and the different sector compilers are responsible to create this for their specific FALTS;
- There needs to be a harmonized cross-sector first level analysis protocol – the FLFA process - which yields a standardized analysis and feedback model.

These two protocols provide the impetus to solidify and finalize the unbalanced FBSAA building block data. If the above-mentioned position holds then it provides one of the two critical conditions for achieving a sound balancing model construct namely, inherent sound building block data.

The FLFA process consists of two separate related but integrated components:

1) Detailed summary statistics analysis (SSA component) for each sector; and

2) Counterparty Asset/Liability Analysis (CALAN component) for each sector.

Each one of these components will now be discussed.

1. SSA component: The SSA component entails a detailed analysis of each contributing sector and is generated out of the Sector Summary Statistics for that specific sector. As mentioned earlier, the sector summary statistics is a high-level summation of the financial asset and liability data for a specific sector for the first eight quarters of the project scope period. The SSA entails the analysis of longitudinal data per sector and instrument with specific focus on the following:

- Basic coherency tests:

  Total = sum of parts, e.g.: Debt securities = short-term debt securities + long-term debt securities, etc.

- Time series analysis (structural analysis):
  - Interquartile range analysis (outlier detection);
  - Level shift analysis;
  - Trend analysis (anomaly detection);
- Net financial worth analysis;

- Currency analysis – domestic currency versus foreign currency per instrument;
- Maturity analysis – short- versus long-term;
- High-level counterparty analysis;

The output generated by the SSA component is housed in a 19X6 query matrix with the following attributes:

- 72 possible query fields;
- Instrument/sector time series view;
- Unique query number;
- Detailed FALT reference; and
- FALT compiler response area.

The following steps are employed in the SSA procedure:

1) **Visual analysis of the summary tables for each of the eight quarters under review.** Each quarter summary is reviewed covering the eight instruments and main counterparty sectors from opening stock to closing stock. The intended outcome of this first data review is to inspect the OS and CS values and also to provide a first overview of the sector being analyzed. This provides an intuitive orientation towards the:
    - magnitude of overall assets and liabilities;
    - magnitude of specific instrument contributions; and
    - counterparty composition of each instrument.
2) **Visual inspection of each instrument in time series configuration (eight main instruments as well as total assets and liabilities).** This analysis is similar to that done in point 1 but the focus now shifts to the contextualization of the data over time with the aim of identifying:
    - outliers;
    - level shifts;
    - counterparty patterns and shifts in them – here it is also important to consider what is not reported in the FALTS and to query possible data gaps and deficiencies which should be present but is not; and
    - other anomalies that are visible – here there will be a combination of the visual inspection of the data table with visual inspection of the graphs for each instrument.
3) **Analysis of net financial worth position.** In general, the net financial worth for the majority of the sectors should be negative – thus financial assets minus financial liabilities should result in a negative value – this is because the analysis only represents the financial assets and does not

include non-financial assets. For some sectors with no non-financial assets the value should be zero e.g. MMF.

4) ***Analysis of the currency and maturity construct of the specific sector.*** The sector data is analyzed according to currency and maturity split at detailed instrument level. This provides a first longitudinal view of the currency exposure that the sector has. The detailed maturity breakdown makes it possible to cross-validate the currency and maturity exposures of the specific sectors and thereby provide an early risk assessment for the sector.

2. CALAN component: The CALAN component is a detailed analysis of the first-round balancing data for each sector based on time specific cross-sectional data covering the detailed instrument and sub-component breakdowns. This analysis is aimed at:

- Determining the quarterly detail-level counterparty data composition;
- Determining mapping anomalies in the original FALT template; and
- Preparing the sector cross-link data for utilisation in the balancing component.

This analysis is done within the balancing component area which is separate from the summary statistics area. The intention with the CALAN is to analyze sector counterparty positions for both assets and liabilities and identify immediate and obvious mismatches between different sector allocations vis-à-vis all the other sectors. The CALAN is done on most detailed instrument and sub-sector level. The data used in the CALAN is obtained from the First Level Balancing Platform (FLBP). This platform contains detailed sector by sector asset and liability positions at detailed instrument level. It covers the eight main instruments that break down into a total of 52 main and sub-instruments, including currency and maturity splits. The CALAN is conducted on the first quarter 2011 opening stock data and each sector has a unique counterparty position structure vis-à-vis all the other sectors. The mismatches identified within the CALAN leads to queries that are addressed to the specific sector compiler in the FLFA. One of the most obvious examples of the CALAN mismatches is where a sector indicates a position vis-à-vis another sector where no such position is allowed to exist according to the SNA guidelines, e.g. deposits with a sector other than the DTC sector (except for the CB and CPD).

The CALAN output is contained within two query tables with 1216 (1x3) row vectors. Due to the fact that the CALAN is conducted sector per sector, it can generate 1216 possible query fields per instrument. An important requirement for the FLFA process is communication with the sector compilers and thus the CALAN also contains a FALT compiler response area where sector compilers can note their response to queries generated for that sector for each asset/liability/instrument combination. In addition, it is also required of sector compilers to indicate whether the resolution of the asset/liability/instrument mismatch will result in adjustment of the FALTS for that specific sector under review. Due to the fact that each CALAN row vector addresses the asset and or liability position of a sector against another sector it is in all likelihood required that two sector compilers will have to discuss the reason for the mismatch and thereby determine whether one of them can take some action to reduce or eliminate the mismatch – if possible. Mismatches can occur due to:

- Incorrect classification of an instrument by one (or both) of the sector compilers;

- Mapping errors from the bridging table to the FALT; or
- Insufficient sector or instrument detail breakdown by one (or both) of the sector building block data sets. – in this instance, an analysis will be done to determine whether both sector compilers have hard source data, what the source of the data is, e.g. survey, administrative data etc. After this analysis, a decision will have to be made regarding the validity of the two positions based on the evidence.

R billions

Transferable deposits	**Assets of PUBNFC vis-à-vis the liabilities of DTC**	**Liabilities of DTC vis-à-vis assets of PUBNFC**	**Difference (L – A)**
Value	236	310	75
Source data and difference explanation	Aggregated value for 3 sub-instrument entries	Aggregated value for 7 sub-instruments entries from SARB monetary survey	Incorrect mapping from PUBNFC raw data to PUBNFC bridging table

Table 7.3 – CALAN: PUBNFC assets versus DTC liabilities

Table 7.3 illustrates the CALAN row vector analysis for the transferable deposit assets of the PUBNFC sector at the DTC sector against the liabilities in this instrument reported by the DTC sector against the PUBNFC sector. In this instance, the difference of R75 billion is due to the incorrect mapping from the PUBNFC raw data to PUBNFC bridging table. It was a misclassification issue, but it could be derived from various factors or a combination of them. This information is then taken into the HSM decisions.

The result of the two above-mentioned analyses (SSA and CALAN components) is housed within the FLFA platform of that specific sector and is presented to the sector compilers as one harmonized query and confirmation template. It is then required of the sector compilers to address the resultant queries by providing clarification regarding the query, confirmation whether the query will require adjustment of the FALTS and if so, what action will be taken to resolve the query.

7.4.2 The valuation component

The valuation component forms **the second pillar of the FBSAA model.** Due to the fact that almost no direct accumulation account data is currently being sourced, it is necessary to include a revaluation component in the FBSAA model. The central premise behind this component is the estimation of revaluation data based on market price movements and thereafter the derivation of transaction data. The principle underlying the revaluation of each sectors' stock positions is a basic and fundamentally sound one. Stocks or positions in financial assets and/or liabilities refer to their levels at a specific point in time. The movement between two stock periods represents the accumulation variables. The relationship between stocks and flows can be described as:

Closing stock – Opening Stock = Flows

With flows defined as:

Flows = Transactions + OVC + revaluations

The revaluations in a specific period refer to changes between the opening and closing stocks of that period due to changes in the level of prices of financial instruments over that period. In order to populate the FALTS - unbalanced as well as balanced - with revaluation and transaction data it is necessary to compute revaluation estimates on detailed instrument level.

These calculations are done in the revaluation platform areas – one for the unbalanced and one for the balanced data - which has two major sub-components, namely, the revaluation templates for each sector for each period, and the suite of revaluation indices used to perform the revaluations on the different instruments. The same revaluation indices are utilized in both the unbalanced as well as balanced revaluation platforms, however the revaluation templates used in each one differs. They differ because for the unbalanced positions the revaluation is done generically from the perspective of the compiling sector vis-à-vis the other sectors without regard for the counterparty asset or liability position and the revaluations being conducted by the counterparty sector. However, in the balanced positions the asset of one sector now represents a matched liability of another sector and this implies that the estimation of accumulation data has to be done sector by sector – with the same revaluations estimated for the one sectors' assets also being utilized for the other sectors' liabilities, etc. Figure 7.4 provides a graphic visualization of this process.

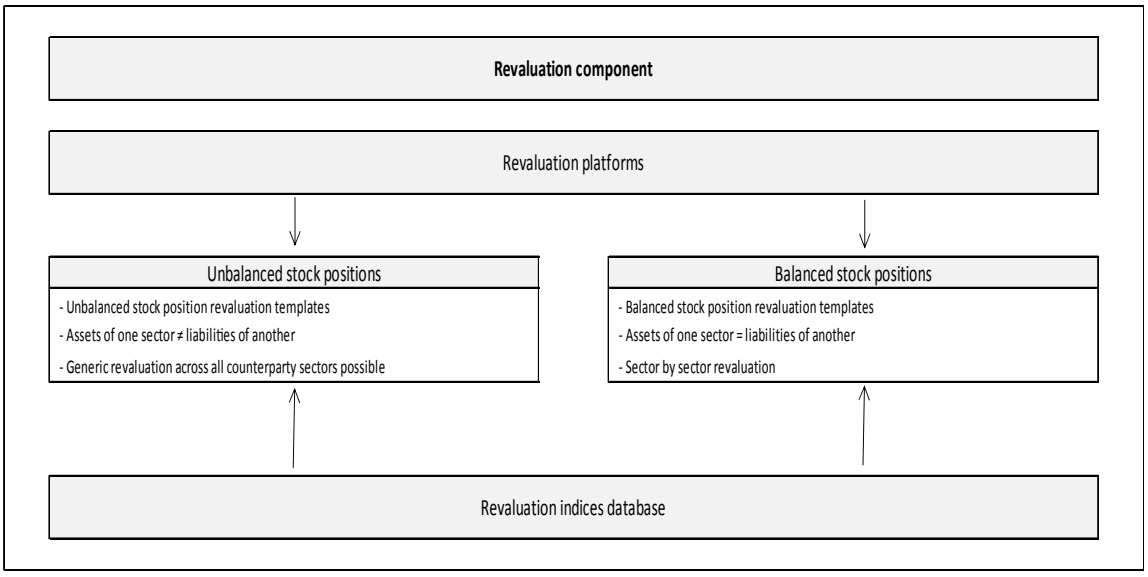

Figure 7.4 - Diagrammatic illustration of revaluation component

The revaluation template also contains OVC data where available. The revaluations that are done on detailed instrument level can involve two price components – an exchange rate adjustment and/or other price movements. Given these components there are various revaluation permutations depending on whether a sector has exposure to certain instruments and if so, what type of price exposure it involves. The possible revaluation permutations are further expanded due to the fact that it is done on both assets and liabilities, where applicable.

An important aspect of the revaluation component is the determination of the indices to be used in the revaluation process. Table 7.4 provides the price indices (stand-alone and/or aggregated)

included in the revaluation component.[10] The indices are used either as stand-alone indices or as combinations to estimate the required revaluations. Due to the transversal prevalence of exchange rates across various instruments it is worth noting that the currency revaluation is based on a basket of currencies vis-à-vis the South African rand which was determined using information obtained from the South African Locational Banking Statistics (LBS).

No	Description
1.	Basket of exchange rates against the South African rand
2.	South African government three-month TB rate (SATB)
3.	US government three-month TB rate (USTB)
4.	SA government securities with original maturity up to and including 1 year
5.	Citibank World Government Bond Index (WGBI)
6.	SA private sector bonds with original maturity up to and including 1 year
7.	Weighted International Corporate Bond Index (WICBI)
8.	SA government bonds with original maturity exceeding 1 year
9.	SA local government bonds
10.	Public corporation bonds
11.	SA private sector bonds with original maturity exceeding 1 year
12.	Johannesburg Stock Exchange (JSE) all equities (ALSI) index
13.	MSCI world equity index
14.	SA short-term fixed-interest rate index (Stefi)
15.	ALSI, ALBI[11], Stefi weighted index
16.	MSCI, WGBI, US TB rate index

Table 7.4 - Price indices used for revaluation estimation

From the LBS data the currency revaluation basket constituents were determined as follows – USA (89 per cent), Euro (7 per cent), British pound (3 per cent), and Yen (1 per cent). For the current project scope these constituents and their relative contribution to the revaluation basket were kept constant over the period – future work will involve the quarterly adjustment of the revaluation basket. The time series used to calculate the exchange rate movements is based on 10:30 mid-point average exchange rates.

[10] Please see appendix for a short description on each time series or component

[11] ALBI = South African JSE listed “All Bond Index”

The following formula is employed to estimate the revaluations at detailed instrument level:

Re = [1 – (em/e1)]CS – [1 – (em/e0)]OS – (e1 – em)OVC

with:

Re = Revaluation estimate

em = daily average price

e1 = end of period price

e0 = opening period price

OS = opening stock position

CS = closing stock position

OVC = Other Volume Changes

In this formula Re is stated in terms of the closing and opening stock of the specific instrument and also incorporates any available OVC and exchange rate information. The formula takes into consideration the movements in the opening prices (e0) and closing prices (e1) vis-à-vis the average price (em) for the period under review. Once Re has been estimated, transaction data is derived using the equation developed earlier:

Td = CS-OS-OVC-Re

For the unbalanced FALTS the next step in the process is to attribute the overall revaluation and transaction estimates to the different counterparty sectors. This is done using the relative stock composition structure approach, which involves taking an arithmetic average of the contribution that a certain sector made to the opening and closing stock position of a specific instrument and applying that ratio to the revaluation and transaction totals obtained from the above-mentioned process. This allows for the spreading of the revaluation and transaction totals across the different counterparty sectors for each period. Once the revaluation and transaction estimates are obtained and spread across the counterparty sectors it is mapped back to the original unbalanced FALTS for the specific sector for the specific period. The balanced stocks the estimation is done on a sector by sector basis and therefor eliminates the need to spread the data across counterparty sectors.

7.4.3 The balancing component

In the broader IEA, the concept of balancing can refer to both horizontal balancing of instruments across sectors in the FBSAA model as well as vertical balancing between the real and the financial components of the IEA.

The **vertical balancing** covers two areas. The first is the vertical balancing of stocks, which aims to integrate the non-financial assets (NFA) with the financial net worth (financial assets – liabilities). The second relates to the integration or balancing of the net lending/borrowing as derived from the current and capital account with the net lending/borrowing as derived from the FBSAA model. Thus, the vertical balancing addresses the more encompassing IEA, where the activities in the current and capital account are linked to that of the FBSAA. This is however beyond the scope of this project.

The horizontal balancing component forms the third component in the FBSAA model, and relates to the horizontal balancing of the individual sector accounts which represented the output of the first component of the FBSAA model. The underlying principle behind it is the fact that unbalanced sector FBSAA's depict the vantage point of a specific sector as obtained through the data sourcing channel for that specific sector. These unbalanced FBSAA's have thus not been integrated with the other sectors of the economy to form a cohesive and harmonized FBSAA for the economy as a whole. Figure 7.5 depicts the different balancing components.

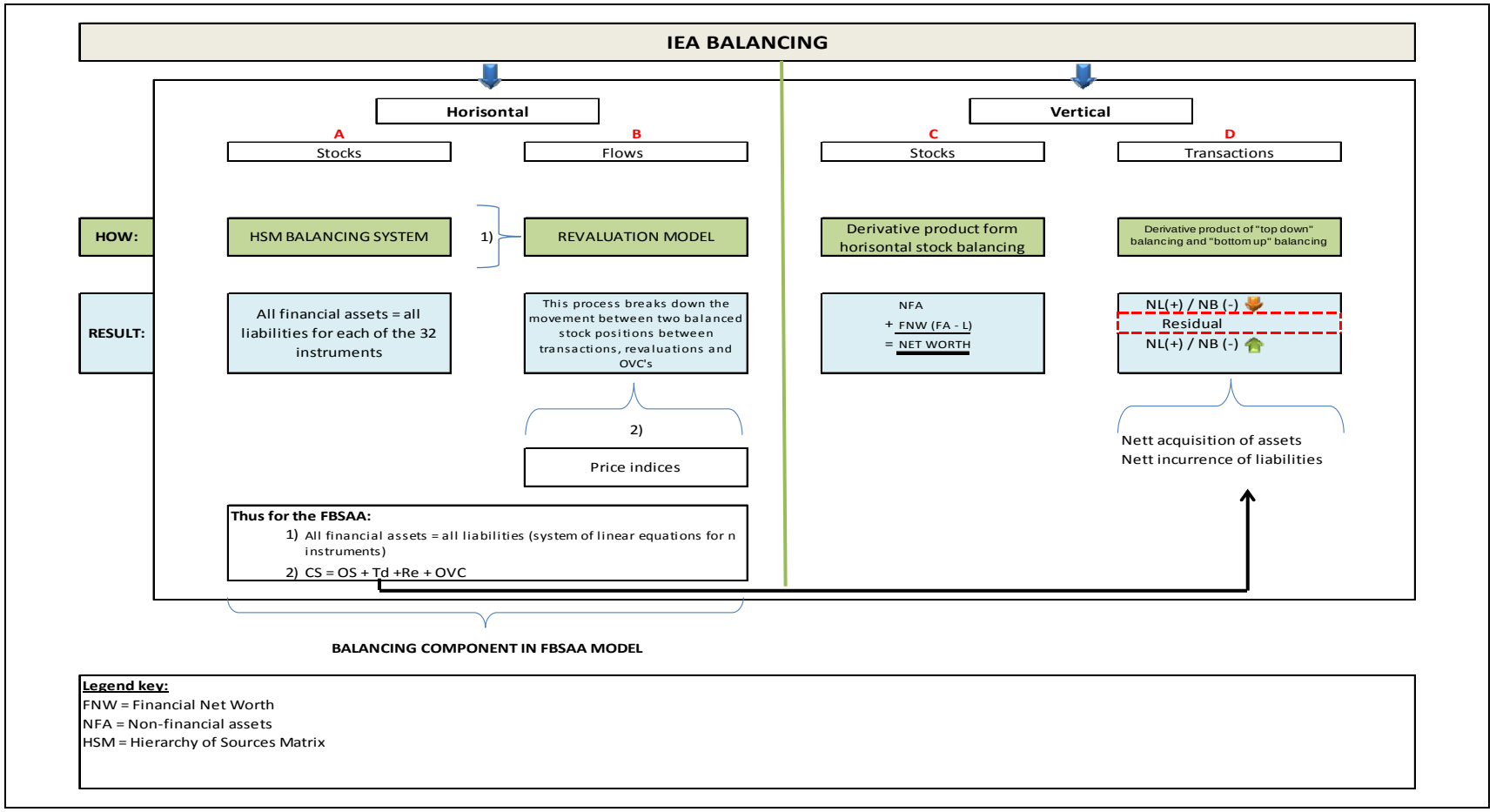

Figure 7.5 - Diagrammatic illustration of the balancing components

One of the key issues in the balancing component relates to inter-sector coherence. Inter-sector coherence relates to the principle that, in theory, the financial assets of sector A vis-à-vis sector B should equate the liabilities of sector B vis-à-vis sector A. This is the anchoring principle in balanced sector accounts and this is the main aim of the balancing component of the FBSAA model. The horizontal balancing has two different but linked components – balancing of stocks and then ensuring that the flows between two stock periods equate to the difference between OS and CS positions. The balancing of stocks will be done through the utilisation of the hierarchy of sources matrix (HSM) while the balancing of the flows will be done utilizing the revaluation model.

As indicated earlier, the inputs into the revaluation model will be the balanced stocks (1) as well as a detailed set of price indices (2). The output from the balancing and balanced stock revaluation process described above will be:

- Revaluation templates for each sector for the 28 quarters utilizing the adjusted, balanced stock positions; and
- Balanced FALT templates for each sector for the 28 quarters.

An important step in the horizontal balancing process is the construction of a repository of source hierarchies. The hierarchy of sources is based on the coverage, data quality and reliability of each sector broken down by detailed instrument. The balancing component contains the following sub-components:

- The HSM, at detailed sub-instrument level per quarter – this matrix compares sector by sector stock data for a specific instrument and utilizes equations based on the hierarchy of sources to balance sectors at detailed instrument level. Given the sector and detail instrument delineation discussed earlier this allows for 11552 unique sector by sector asset/liability combinations. One of the key outputs of the HSM is a sector by sector summary of the harmonized stock positions for the 8 main instruments and expanded 32 sub-instruments. This provides a view of the unbalanced versus the balanced stock positions of two sectors against each other as well as providing the underlying balancing assumptions across all 32 sub-instruments;

As figure 7.5 illustrate, the HSM forms the center of the balancing platform. The HSM contains row vectors for each detailed instrument which contains sector by sector asset/liability stock data. The balancing process contains the following steps:

- The Q1 2010 unbalanced sector asset/liability (A/L) OS positions are entered into the HSM;
- The equations contained in the HSM balances the Q1 2010 opening stock position data across sectors and instruments;
- The Q1 2010 unbalanced sector A/L CS positions are entered into the HSM;
- The equations contained in the HSM balances the Q1 2010 CS position data across sectors and instruments;
- The revaluation process discussed in the previous section is followed to generate revaluation estimates and derive transactions for each sector based on the balanced OS and CS positions;
- The Q1 2010 balanced CS positions becomes the Q2 2010 balanced OS positions and this process repeats until the Q4 2016 balanced FBSAA data have been calculated.

The key aspect of the above-mentioned procedure is that each sector by sector A/L position per detailed instrument is considered and based on the hierarchy of sources an equation is constructed to balance the sector by sector A/L positions. Once this is done the balanced values are mapped to the balanced sector FALTS – now becoming the Balanced FALTS (BFALTS). This process contains a 19 by 19 matrix per quarter resulting in 277 248 unique balancing options for all sectors and instruments for the whole project scope period. Due to the dynamic properties of financial instruments over time as well as improvements in data sourcing the application of the hierarchy of sources and generation of the balancing equations will be assessed before the balancing round for each quarter.

At this stage, it is necessary to highlight three very important sectors insofar the balancing equations are concerned. These sectors are the ROW, the DTC and the CB sectors. Due to the extensive development of South Africa's balance of payments (BOP) and international investment position (IIP) the FBSAA data of the ROW will be a core anchor sector in most instruments. This means that to a large extent the unbalanced and balanced FBSAA data set for the ROW will be the same. The ROW sector will also not utilize the revaluation model but contains the BOP transactions obtained from the financial account as transaction data. Revaluation data is thus derived after allowing for OVC's in a specific quarter (if applicable). The second core sector is the DTC, which is a key financial intermediary. Against all the sectors except the ROW the data on numerous instruments contained in the unbalanced FALTS for the DTC will receive a high ranking in the HSM – this is especially true for the following instruments – Currency and Deposits, Debt Securities, Loans and Financial Derivatives. The third anchor sector is the CB. Once again, in certain instruments the CB sector will receive a high ranking in the HSM – this will be the case due to the important role that this sector fulfills regarding the management of the official gold and foreign exchange reserves of the country. Figure 7.6 provides a summarized overview of the balancing workflow.

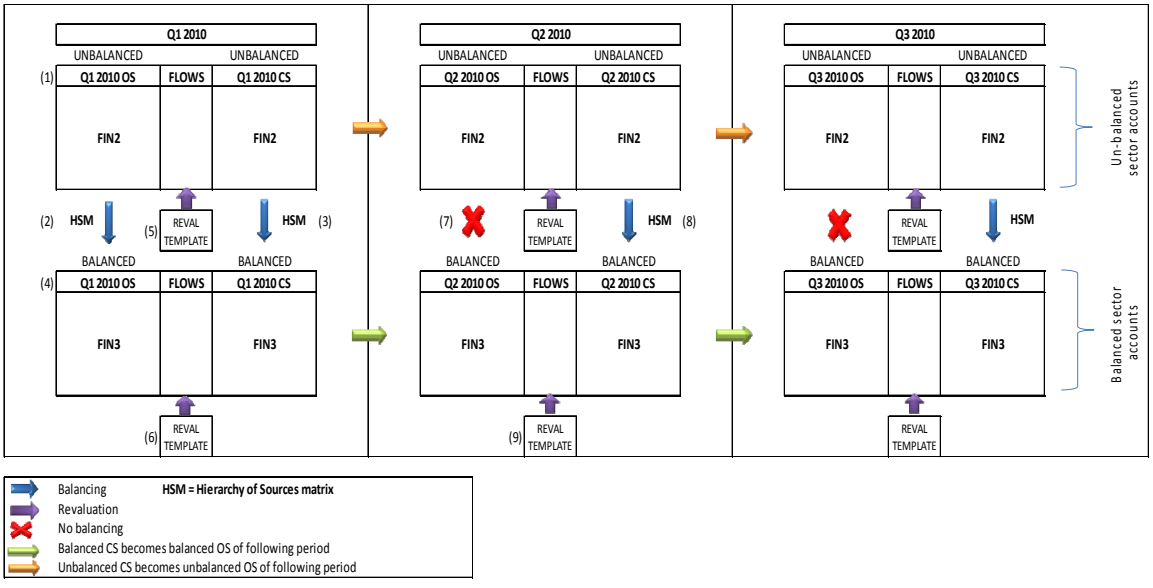

Figure 7.6 - Balancing prototype for the FBSAA model

The process commences with the unbalanced quarter 1 2010 OS positions (1). The HSM is utilized to balance each sector's opening stock positions with each other (2). Thereafter the CS positions for quarter one 2010 are balanced in the same manner using the same HSM (3). This yields a set of harmonized sector stock positions for all sectors across all instruments for quarter one 2010. These stock positions are mapped into a set of BFALTS for each sector for each quarter (4) and the FIN3 allocation is made to the BFALT indicating that it has been balanced. The next step (6) is to estimate revaluation data and derive transaction values based on the balanced stock positions. This is done using the balanced stock position revaluation technique which was described in the previous section. The core difference is that the revaluation process is now based on the balanced stock positions. Once this process is done it yields a set of balanced sector accounts for Q1 2010. Then, Q2 2010 is harmonized in a similar fashion. The revaluation of the balanced stock positions differs from that done on the unbalanced stocks (5) because for the balanced stock positions the revaluation is done sector by sector due to the fact that one sectors' asset (and the revaluation associated with it) should equate another sectors' liability (and the revaluation associated with it). From quarter two 2010 the OS positions will not be balanced again because the balanced CS positions for quarter one 2010 will become the balanced OS positions for quarter two 2010 (7). The differences that exist between sector positions for the quarter two CS positions will once again be balanced using the HSM (8) with new HSM assumptions being made if necessary. Thereafter the revaluation process will be applied again as was the case in quarter one 2010 (9). This method is utilized throughout the project till the most recent period.

7.4.4 The output and dissemination component

Finally, the output and statistics dissemination represent **the fourth component of the FBSAA model.** The output generated by the FBSAA model can be divided along two components – the introspective output component and the external output component. The introspective output is the one generated by the FBSAA process with the intent on highlighting important aspects with regard to the statistical domains that feed into the FBSAA model. The external output refers to that which is generated in the form of FBSAA statistics which is disseminated for national and international use. These components will now be discussed under the formalized concepts of Metadata and quality analysis and statistical output.

7.4.4.1 Metadata and quality analysis

For purposes of this discussion, metadata is divided into two sub-components – input metadata and FBSAA statistics metadata.

- ***Input metadata and quality analysis*.** Input metadata refers to the data regarding the building block data which is entered into the FBSAA model via the unbalanced FALTS. As mentioned earlier every set of data enters the ERSD via a data channel – with the objective of serving the dual role of providing required data for the specific statistical domain it is sourced for, e.g. monetary data, external accounts data etc. and secondly to act as building block inputs into the FBSAA model. An important role that the input metadata plays is the determination of the soundness of the first level data entering the FBSAA model. Input metadata is of key importance to understand the broader data quality of building block data. Even though a FALT might be validated and entered correctly it does not necessarily convey information of the quality of the

coverage of a specific sector or instrument. This is the gap that input metadata aims to cover. The input metadata is sourced using the input metadata template. The template is designed to cater for both the assessment of the degree of coverage of the sector of interest as well as the instruments required. The main components or levels of the input metadata template are:

- Methods used to source the building block data for a specific sector – this is broken down into the following:
  - Survey data;
  - Previously generated statistics;
  - Administrative data; and
  - Derived data - where another data set is used as a proxy for a specific instrument and a formula is used to calculate building block input values.
- Administrative data pertaining to each of the above-mentioned data sourcing methods. This refers to data such as the survey name, code, frequency, etc.;
- Qualitative data pertaining to each of the previously indicated data sourcing methods with the aim of understanding what the coverage and quality of the building block data is. Here aspects such as survey category (sample or census), target population, response rate (unit and item), survey audit procedures, survey guideline availability etc. is required;
- Quantitative data - this requires details on what type of data is provided – stocks, transactions, revaluations etc.;
- Alignment data - this refers to the alignment of the building block data to international prescribed guidelines such as the statistical manuals and international and national conventions;
- Data ownership - this aspect requires the sector compiler to indicate where the ownership of the building block data resides – both the authority presiding over the data as well as the platform where the data is housed in; and
- Mapping protocol - how raw data instruments are mapped to the instruments required in the FALTS.

The above-mentioned information is integrated into a metadata document for each sector for each data sourcing method.

- **FBSAA metadata.** The second metadata component relates to the generation of a metadata document for the FBSAA model. This metadata describes the sectors and instruments and their delineation within the model. It also provides a basic description of the souring of the data and a high-level overview of the process followed from building block data entry to balancing. The intention with the FBSAA metadata is to provide a high-level overview of the theoretical construct behind the FBSAA model and also basic information on the compilation process.

7.4.4.2 Communication and dissemination of statistical output

The last step in the FBSAA model is the communication and dissemination of the generated statistical output. Due to the expansive nature of the FBSAA model this step is crucial in order to ensure that the correct statistics reach their intended audiences. The statistics generated by the FBSAA model has two primary clients which it aims to satisfy – the national audience and the international audience. For this reason, it is critically important to define and understand the target audience and then to disseminate the FFBSAA statistical output to each client based on a specific dissemination channel developed for that client. The communication strategy of the FBSAA model is based on the following anchors:

- **Objectives**: The objective is to communicate the FBSAA model and the resultant statistical output to a very diverse client base. This implies the development of client focused communication strategies which will address their unique requirements, not subscribing to the one-size-fits-all approach;
- **Audiences**: The second anchor is the delineation of the target audiences for whom the FBSAA output will be beneficial. The following main target groups have been identified:
  - Policy makers;
  - Internal SARB users;
  - Academia;
  - Journalists;
  - Analysts;
  - Sector organisations; and
  - General public.
- **Tools, resources and activities**: This refers to the set of tools, resources and activities that is necessary to communicate the statistical output to the target audiences.

The above-mentioned anchor components of the communication and dissemination strategy are fused into a specific strategy for each of the target groups with the following characteristics:

Policy makers**:** Although one of the aims of the FBSAA model is to produce statistics that will feed into the global statistical database and contribute to efforts such as the G20DGI, the primary benefit is seen as providing useful statistical output to serve two policy domains – monetary and financial stability policy. One of the beneficial policy analysis tools could be to track the developments with the economic sectors following an interest rate adjustment for example. In general, policy makers typically focus on shorter term economic developments. For this reason, the interaction with them will take the form of sector account briefings once a quarter as soon as the data for the quarter under review has been finalized.

The presentation will follow an electronic statistical release containing high-level summarized information. This strategy is designed to allow them to digest the statistical release and prepare for deeper discussions in the presentation. Insofar as serving the financial stability policy client base the following comment is particularly relevant.

> The process of financial stability assessment typically involves identification of risks and vulnerabilities in various parts of the financial system. It also calls for identification of potential triggering events which, if crystallized, could flip the state of the financial system from stability to instability. But the events of the recent global financial turmoil have demonstrated that financial stability analysis should, perhaps first and foremost, also aim at identifying links between sectors and channels through which local shocks may propagate wider in the financial system (Castren and Kavonius, 2009).

Given this assertion by the authors it is primarily beneficial to see the national (and through the ROW, the international) financial system as a network of interlinked exposures. Viewing it as such can help analysis and financial stability policy makers to detect the transmission channels via which financial turmoil could be propagated. The usefulness of the FBSAA model from this vantage point is then that an analysis of these networks may reveal vulnerabilities in parts of the financial system that might be considered less vulnerable to a given adverse scenario and the fact that those areas could still be affected due to their close interconnection with sectors that are directly confronted by the unforeseen events (Carsten et al., 2009).

Internal SARB users: There are various users within the SARB that will benefit from the statistics generated by the FBSAA model. These range from researchers in the ERSD to analysts in other departments in the SARB. This target group has access to the internal SARB online database and special introductory sessions regarding the FBSAA statistics will be held for them.

Academia**:** Academia typically has a more academic research focus and thus their interest lies in longitudinal cross-sectional data. For this reason, a special web-based "Academia interface" will allow them to access a rich time-series database covering several thousand-time series at detailed instrument and sector levels. This will be augmented with a special bi-annual sector account research workshop.

Journalists**:** Journalists often look for information that conveys messages of change, adjustment and risk. It is their focus to scour a data release and in a very short time span report the key finding out of a vast statistical data set. In this sense, a special journalist statistical debriefing of the key findings from the FBSAA model for the latest quarter will be held just after the briefing presentation to the policy makers. Due to the fact that journalists play a key role in spreading the information generated out of the FBSAA model and in such a manner creating awareness thereof it was decided to also provide a focused journalist communication hub where they can post questions and comments. This hub takes the form of dedicated electronic and telephonic communication around the time of the quarterly FBSAA statistics release.

Analysts**:** Various types of analysts - either within the central bank or in private financial and non-financial corporations - make use of the sector accounts to analyze movements in the network of the national and international economy. Their focus typically combines that of the academia and journalists – often focusing on key recent developments to inform strategy but also doing longer-

span research from time to time. Thus, a special topic statistical release will be compiled which provides the normal FBSAA data set but also highlights certain special topics that would be of interest to them – for example currency exposure risk heightening or reduction, etc. This allows them to rely on the detailed knowledge of the statisticians compiling the FBSAA model but also to further develop research and analysis on the identified topics for which the FBSAA compilers do not always have time;

***Sector organizations*:** This is a particularly important grouping of clients for the FBSAA model. The reason for this is the fact that these organizations and bodies represent the organizations that generate the raw input data for the building block component of the FBSAA model. It is critical to convey to them the importance of the generated statistics and thereby use moral suasion to encourage them to assist in continually enhancing the feedback to individual organizations and in so doing enhance the source data feeding into the FBSAA model. Therefore, special sector workshops are arranged to discuss sector nuanced themes based on the FBSAA statistical dataset. These workshops will include high-ranking executives from the key corporations in the sectors delineated in the FBSAA model.

***General public*:** One of the important mandates of any statistical organization is to serve the public at large and this is the same for the FBSAA dataset. The household sector is a crucial sector in the FBSAA model and it is the sector that the general public associates with and therefore special focus articles on the state of the household balance sheet is prepared in conjunction with the research wing of the ERSD and distributed annually to households. The intention is to communicate the output from the FBSAA model in basic layman terms and linking it to the economic reality prevalent on ground level.

Finally, an important aspect to be mentioned relates to the policy of data revision. On this topic, it is expected that the FBSAA data is revised once per annum for the 8 most recent quarters. This revision will coincide with the release of the fourth quarter FBSAA statistics for the most recent year available. Each targeted client group will be informed of the revised statistics via their unique communication and dissemination channel as discussed above.

8. RESULT ANALYSIS

The results discussed in this section relate to the 2010 and 2011 balanced stock data generated in phase one of the project. The methodology with which the FBSAA measurement system has been developed provides for rich and multi-faceted analyses to be performed from various vantage points.

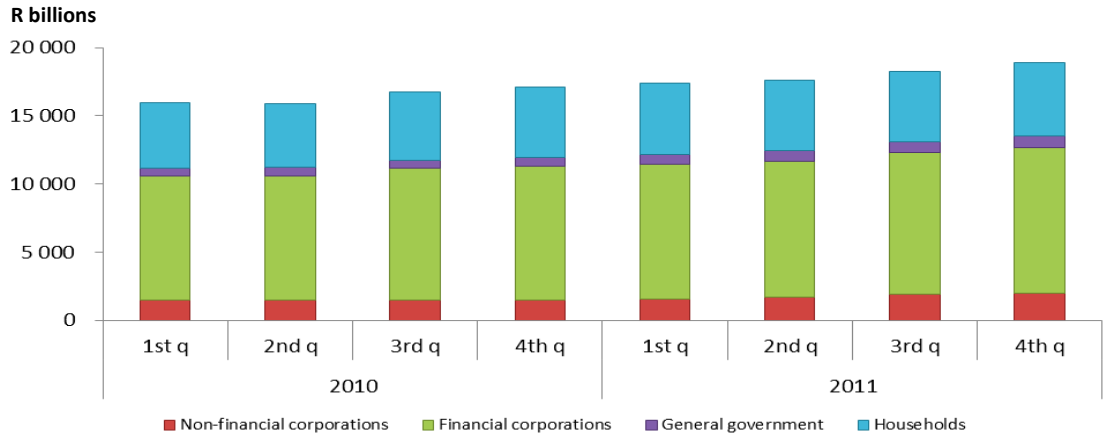

Figure 8.1 - Total financial assets per institutional sector

The first inclination is to gauge the overall value of the stock of financial assets in the South African economy. Total financial assets amounted to R18,9 trillion in the fourth quarter of 2011, or approximately 7 times gross domestic product. Figure 8.1 shows the distribution by value of financial assets per institutional sector. At the end of 2011 the bulk of financial assets were held by the financial corporations and household sectors, at 49 per cent and 24 per cent respectively. The financial asset holdings and the share of these two sectors remained fairly stable over the eight quarters. Another interesting vantage point is to scale the contribution of the financial instruments to total financial asset holdings. Figure 8.2 illustrates that equity and investment fund shares is the largest contributory instrument, representing 33 per cent of the total.

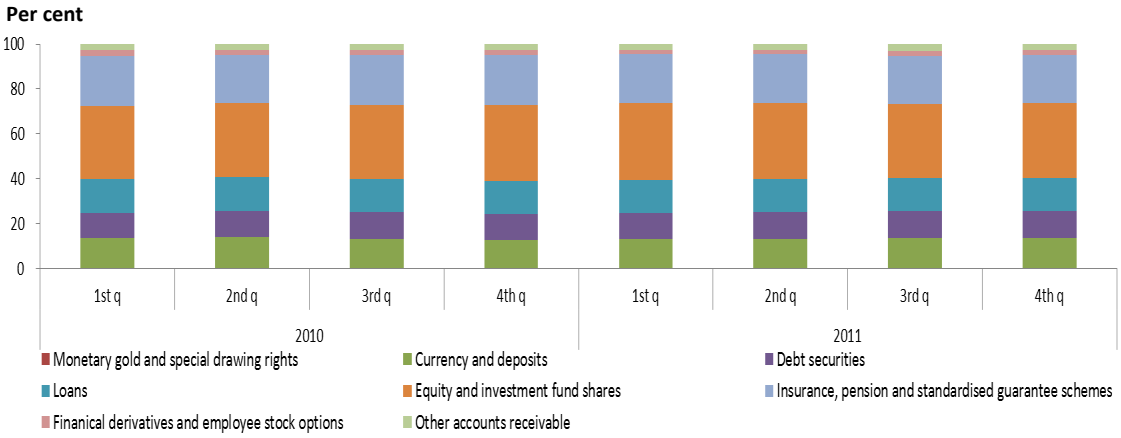

Figure 8.2 - Total financial assets per instrument

This is followed by insurance, pension and standardized guarantee schemes at approximately 22 per cent. Loans, currency and deposits and debt securities contribute 15 per cent, 13 per cent and 12 per cent, respectively. The contributions per instrument remain stable over the eight quarters under review. Due to the balanced nature of assets and liabilities this analysis also holds for liabilities.[12]

The data discussed above highlights the relative positioning of institutional sectors and financial instruments for financial assets in the South African economy. However, to see the complete picture it is also necessary to view the financial liability side for the same dimensions. Figure 8.3 depicts total liabilities per sector.

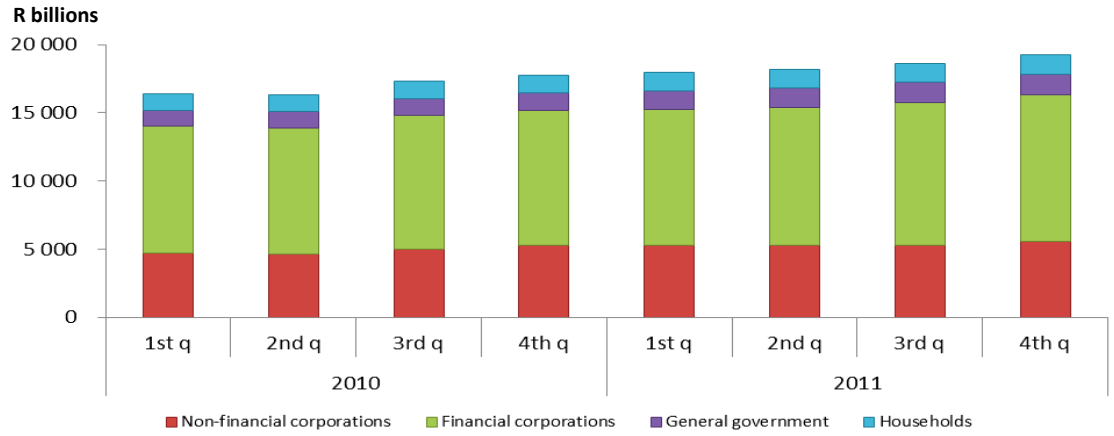

Figure 8.3 - Total liabilities per institutional sector

Three important observations emerge when viewing the financial asset and liability data sets together as at the end of December 2011. The first is that the relative size of the financial assets and financial liabilities of the financial corporations sector is fairly similar. The second is that the household sectors' financial liabilities are significantly less than its financial asset position. Thirdly, the financial liability position of the non-financial corporations sector is markedly more than its financial asset position.

Additional insight into the financial instrument specific make-up of the assets and liabilities of the institutional sectors as at 31 December 2011 is conveyed in figure 8.4. From this analysis, it is clear that the majority of the financial liabilities of the non-financial corporations sector are vested in equity and investment fund shares – approximately 64 per cent. This is to be expected as this instrument provides the majority of the funding for private non-financial corporations. The second largest liability instrument for non-financial corporations is loans – at 22 per cent. On the asset side equity and investment funds shares and currency and deposits account for 39 per cent and 37 per cent of the asset position, respectively. For the financial corporations sector equity and investment fund shares and then loans represent the largest asset categories – 30 per cent and 23 per cent respectively. The high exposure to equity and investment fund shares represents investment by financial intermediaries, such as unit trusts, in equity while loans represent a significant asset for deposit taking corporations.

[12] With the exception of the monetary gold assets of the central bank which does not have a counterparty liability

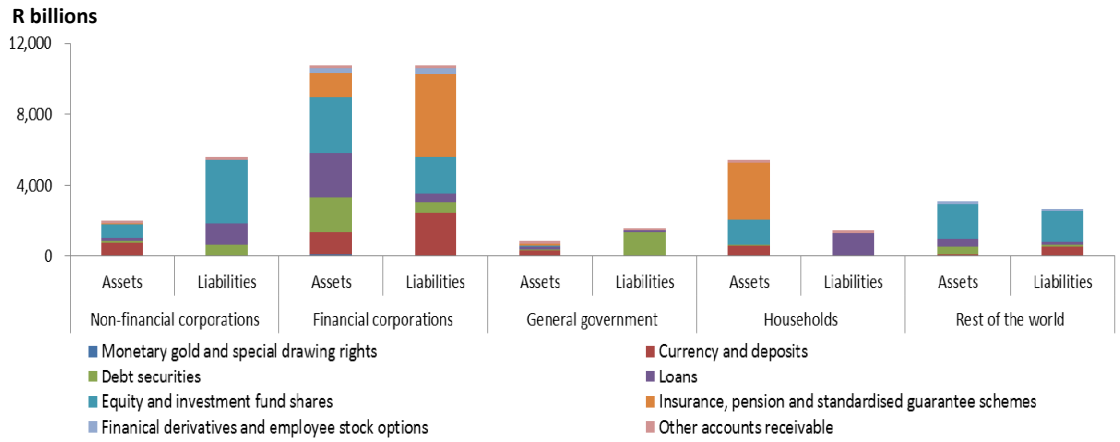

Figure 8.4 - Total financial assets/liabilities per sector, 31 Dec. 2011

On the liability side the majority of the value is comprised of insurance, pension and standardized guarantee schemes and currency and deposits – 44 per cent and 23 per cent, respectively. Of the 44 per cent allocated to insurance, pension and standardized guarantee schemes a significant amount relates to pensions due to households. The 23 per cent related to currency and deposits to a large extent reflect the deposits by various institutional sectors at deposit taking corporations. On the liability side of general government, debt securities represent 84 per cent of the total value. This is to be expected as national government has an extensive debt security issuance programme to finance its activities. The majority of the household assets are in the form of pension claims on the financial sector which represent about 60 per cent of the total household asset position. As is to be expected, 90 per cent of the household liability position is made up of loans.

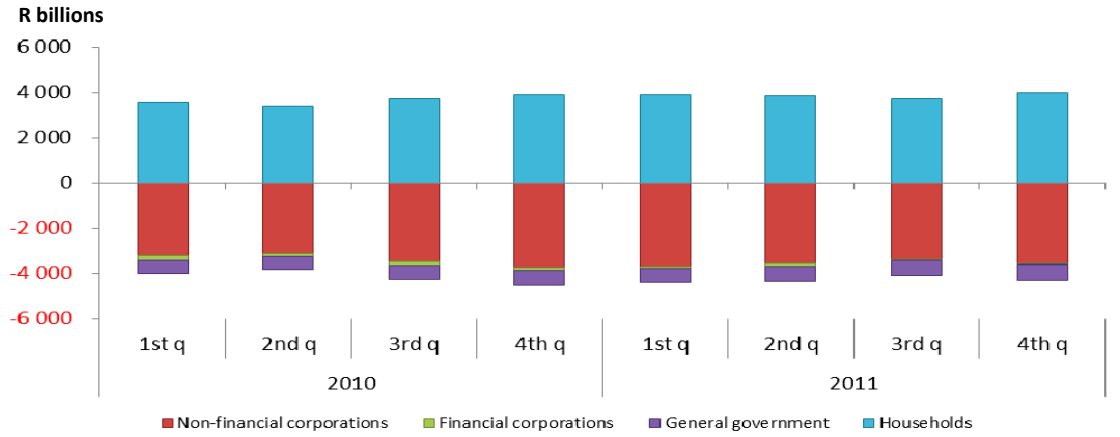

Figure 8.5 - Net financial worth per institutional sector

This structural make-up of the overall financial position of the different institutional sectors of the South African economy is captured succinctly by the concept of net financial worth (NFW). The net financial worth of an institutional sector indicates to what extent financial assets cover liabilities and also whether an institutional sector is a net lender or borrower. Figure 8.5 show that only the household sector had a positive net financial worth position (net lender) during the review period. By

contrast, the non-financial corporations, financial corporations and general government sectors all had negative net financial worth positions (net borrowers). The ratio of liabilities to financial assets reflects the net financial worth position of institutional sectors over time. The ratio of liabilities to financial assets of the financial corporations sector is just larger than 100 per cent – indicating that almost all of its liabilities are covered by its financial assets (almost neutral). This is to be expected given its financial intermediary function. In contrast, the liabilities to financial assets ratio of the non-financial corporations sector are 283 per cent and indicate a significant divergence between liabilities and financial assets. This is also to be expected given this sectors' large investment in non-financial assets. The lowest financial liabilities to financial assets ratio is that of the household sector at 26 per cent which indicates that the household sector is a significant net lender in the South African economy. The financial liabilities to financial assets ratio per institutional sector is a key vulnerability indicator. Table 8.1 provides the financial asset (A) and liability (L) as well as net financial worth positions (NFW) per institutional sector.

R trillions

Period		Non-financial corporations			Financial corporations			General government			Households			Total domestic economy		
		A	L	NFW	A	L	NFW	A	L	NFW	A	L	NFW	A	L	NFW
2010	1st q	1.5	4.7	-3.2	9.1	9.3	-0.2	0.6	1.2	-0.5	4.8	1.2	3.6	16.0	16.4	-0.5
	2nd q	1.5	4.6	-3.2	9.1	9.2	-0.1	0.7	1.2	-0.6	4.6	1.3	3.4	15.9	16.3	-0.5
	3rd q	1.5	5.0	-3.5	9.7	9.8	-0.2	0.6	1.3	-0.6	5.0	1.3	3.7	16.8	17.3	-0.6
	4th q	1.5	5.3	-3.8	9.8	9.9	-0.1	0.6	1.3	-0.7	5.2	1.3	3.9	17.1	17.8	-0.7
2011	1st q	1.6	5.3	-3.7	9.9	10.0	-0.1	0.7	1.3	-0.6	5.2	1.3	3.9	17.4	17.9	-0.5
	2nd q	1.7	5.3	-3.6	10.0	10.1	-0.1	0.7	1.4	-0.7	5.2	1.4	3.9	17.6	18.2	-0.5
	3rd q	1.9	5.3	-3.4	10.4	10.5	-0.1	0.8	1.5	-0.7	5.1	1.4	3.7	18.2	18.6	-0.4
	4th q	2.0	5.6	-3.6	10.6	10.7	-0.1	0.9	1.6	-0.7	5.4	1.4	4.0	18.8	19.2	-0.4

Table 8.1 - Financial asset and liability positions per institutional sector

The analysis done thus far is necessary but not sufficient as it provides only an assessment of the absolute size of institutional sectors in the economy and their positions as net lenders or borrowers. This analysis does not reveal any information on institutional sector by sector linkages or the extent of linkages. As alluded to earlier, it is precisely these linkages that are of importance to understand the possible implications for financial stability. Thus, what is needed is thorough FWTW information. Due to the application of the underlying principles of the SNA2008 and ESA2010 to the development of the FBSAA model it could be extended to incorporate FWTW analysis[13].

Table 8.2 shows the FBSAA model on a FWTW basis by domestic institutional sectors and the ROW in matrix format. Following future development this matrix analysis will similarly be constructed to show transactions, revaluations and OVC's at detailed instrument level. For the resident institutional sectors, aggregated data (i.e. non-consolidated data) is presented. This means that intra-sector

[13] Apart from the analytical value obtainable from the construction and depiction of the financial balance sheets and accumulation accounts on a FWTW basis it is also an important compilation tool for enhancing the quality and consistency of the data. The advantage of this approach is that it allows for cross validation of information from both debtors and creditors sides and as such enhances the consistency of reported data

positions, transactions, revaluations and OVC's are not eliminated. The current data shows the balanced financial asset and liability stock positions of the five institutional sectors as at 31 December 2011. The total financial assets amounted to just more than R22 trillion with total liabilities amounting to just less than R22 trillion. The difference of R51 billion, relates to the monetary gold assets of the central bank which does not have a counterparty liability. The horisontal view of the table provides total financial assets of each institutional sector vis-à-vis the institutional sector against which these claims are held. For example, of the R10,6 trillion financial assets of the financial corporations sector – R2,5 trillion represents claims against the non-financial corporations sector and R4,0 trillion claims against the financial corporations sector itself. Similarly, the vertical view of the table 8.2 provides an institutional sector counterparty breakdown of an institutional sector's liabilities.

R billions

Institutional sectors		Liabilities by resident institutional sector and residency					Total	
		Non-financial corporations	Financial corporations	General government	Households	Rest of the world		
Assets by resident institutional sector and residency	Non-financial corporations	60	966	15	77	848	**1 965**	**21 968**
	Financial corporations	2 525	4 024	1 002	1 270	1 773	**10 594**	
	General government	162	537	89	74	1	**863**	
	Households	1 070	4 149	102	0	73	**5 394**	
	Rest of the world	1 738	1 007	355	0	0	**3 101**	
Total		**5 555**	**10 683**	**1 563**	**1 421**	**2 696**	**-405**	
		21 917						**51**

Table 8.2 - FWTW positions: total financial assets and liabilities, 31 Dec. 2011

Important to note is that the ROW is compiled from the perspectives of foreign economies – which basically results in the inverse of South Africa's IIP. The financial assets of the ROW issued by the ROW are not covered and will thus always be zero due to the fact that this data is not relevant from South Africa's perspective. Holdings of financial instruments by non-residents (vis-à-vis resident sectors as debtors) are shown as South African liability positions in the ROW balance sheet, whilst acquisitions and disposals by non-residents of financial instruments issued by residents is shown as financial transactions in the ROW financial account. Similarly, holdings of financial instruments by residents' vis-à-vis non-residents are shown as South African asset positions in the ROW balance sheet. The ROW financial asset position of R3,1 trillion and liability position of R2,7 trillion in table 8.2 reflect South Africa's IIP and the positive difference of R0,4 trillion South Africa's net financial worth. In the case of countries where the role of global financial markets is very important, information regarding the ROW in terms of counterparty countries and non-resident institutional sectors is desired. This is not within the current scope of the FBSAA model.

9. LIMITATIONS AND RECOMMENDATIONS FOR FUTURE WORK

Although the development of the FBSAA model has already contributed in various ways to the quality and integrity of South African macroeconomic statistics, there are however significant areas where future work needs to be undertaken, namely:

- Operationalization of the FBSAA model with the quarterly statistical production cycle of the ERSD: the FBSAA model should be expanded from the current project environment into a quarterly production environment – this is envisaged in phase three of the project;
- Expansion of sectors for which direct measurement is currently not undertaken. These include:
  - **Private NFC**: currently there is no authoritative measurement of financial balance sheets and accumulation data for private NFC's. This represents a significant gap in the suite of financial statistics in the modern era which needs to be addressed as a matter of urgency;
  - **Various OFI sub-sectors**: this sector is currently not well represented in the measurement paradigm of the ERSD – future developments needs to focus on the improvement of the range and depth of data pertaining to the sub-sectors of this sector;
  - **Financial auxiliaries**: the function of brokers have increased significantly in the modern era and this needs to be measured;
  - **Holding companies**: the characteristics of what constitutes a holding company should be clearly defined and this should be applied to the South African business register, in consultation with the national statistical office, to develop a separate holding company database;
  - **Investment banks**: although DTC's are thoroughly measured the additional activities within banking groups are not. These activities have expanded significantly over the past decade and there could be sizeable positions with significant flows which are currently not captured. Of specific interest here is the role that investment banks play in the facilitation of large scale development projects, etc.; and
  - **Households**: the measurement of household balance sheets and accumulation variables needs to be addressed – currently a significant portion of the household data is derived and the endeavour towards obtaining more directly sourced household data from which estimates could be made and which could act as cross-check to the derived data should be advanced.
- Refinement of data for sectors that is already being measured: for the sectors which are currently measured there should be development work done to refine their data sets, expand where there are deficiencies in terms of counterparty and sub-instrument data and also with regards to the statistical methodology applied to the sourced data;
- Development of depth regarding instruments which are currently poorly measured: in addition to the expansion of activities to cover poorly measured sectors it is also important to expand the measurement basis pertaining to the following instruments:

- Listed shares: market value on asset and liability side of balance sheets;
- Unlisted shares: especially differentiating between participatory and non-participatory preference shares;
- Insurance Technical Reserves (ITR): expansion of the knowledge base regarding the sub constituents of ITR;
- Other accounts receivable/payable: development work needs to be undertaken to provide a more robust data sourcing framework for other accounts receivable/payable; and
- Market versus nominal values: throughout various instrument categories there needs to be a more refined measurement of nominal and market values.

- Further development of the revaluation model to refine estimation of revaluations based on the most appropriate price indices as well as harmonisation across all instrument categories;
- Investigation regarding the usefulness of employing an iterative proportional allocation algorithm as part of the horizontal balancing process;
- Development and harmonisation of inter-agency protocols. This specifically pertains to:
  - Reframing of South Africa's National Statistical Framework;
  - MOU's between the statistical authorities and the revenue service; and
  - Advancing the case for the utilisation of one unified business register.
- Advancing the training of staff on the FBSAA model and its requirements. In this respect, the following future development work is identified:
  - **Management training regarding requirements of modern statistical systems*:*** The senior staff and management of the ERSD should be the forbearers of the thinking regarding the compilation and management of the FBSAA model. The requirements, insights and demands that a modern statistical outfit makes is quite different from that of only a few years ago. Managers within these outfits should understand the pillars that form the basis for the FBSAA model, have a sound technical knowledge of the underlying concepts and also be able to manage human and other resources in order to address the future development work on the FBSAA model;
  - **In-depth knowledge of institutional units' landscape:** It has become critical for macroeconomic statisticians to have a working and evolutionary knowledge of the landscape they are measuring. To a degree this has always been true, but due to the speed of innovation and development of industries this knowledge is indispensable in the modern era. The integrated nature of the FBSAA model has brought the additional requirement for macroeconomic statisticians to contextualise their measurement area within the holistic FBSAA model framework;

- **Survey methodology:** The raw input data obtained from the various divisions within the ERSD forms the basis of the FBSAA model. The manner in which data is sourced from respondents and the application of sound methodology is extremely important in order to make valid inferences. Sampling and estimation is a key tool in the hands of statisticians because populations are too expansive to measure. Yet, this tool places a significant responsibility on the statistician to understand its benefits, limitations and mechanisms. Better utilisation of these tools will ultimately contribute to the soundness of the FBSAA model output; and

- **Knowledge of and application of international guidelines:** The proliferation and expansion of the guidelines underlying macroeconomic statistics compilation, and specifically the FBSAA model has made it increasingly important for macroeconomic statisticians to have a grounded knowledge of the requirements contained within international manuals. While the harmonisation of cross-cutting manuals (SNA2008, ESA2010, BPM6, and MFSMCG) has helped, the depth and coverage of these manuals have also increased and future work needs to focus on the entrenchment of this knowledge within the macroeconomic statistician.

10.FINAL REMARKS

The impact of the financial crisis and its long-lasting effects on economies has highlighted the need to re-think and re-prioritize the conventional approach to macroeconomic statistics. The interlinkages between different sectors of an economy have emerged to be of paramount importance. In addition, it has become increasingly useful to understand the micro structure of these interlinkages through the systematic recording of sub-instrument data. While regular and detailed analysis of the main sectors of the financial system is necessary for identification of developments that may threaten financial stability, it is clearly not sufficient. Therefore, the modeling of interlinkages between the sectors is equally important as this aims to reveal the channels through which local shocks can propagate wider in financial systems. It has furthermore become important to focus on the whole progression from opening stocks, through accumulation accounts to closing stocks, taking account of the reasons for the shifts in stock positions for each instrument. Due to the development of the dimensions of the financial markets and the increased volatility in price movements is has also become important to more accurately differentiate between the three different components of the accumulation accounts – namely transactions, revaluations and OVC's. Another dimension that has required the development of new data sources and structures has been the requirement to understand the FWTW context of financial stocks and flows due to the fact that counterparty risk has become significantly more important. The expansion of international statistical manuals and guidelines like SNA2008 and ESA2010 have largely provided the theoretical underpinnings in order to cater for the above-mentioned statistical requirements in the FBSAA model. Although the framework provided the base before the advent of the financial crisis it was only in the wake of the crisis that serious intent was added to the existing theory and applied to statistical measurement domains of central banks and statistical offices.

The FBSAA model provides the tools to view the national economy and its international linkages holistically. It furthermore provides the basis to analyze risks and vulnerabilities in financial systems in an integrated manner. This analysis can potentially provide rich information for both monetary as well as financial stability policy. It can additionally serve as a rich foundation for various types of research – from academic research to analyst's analysis. The data requirements for the FBSAA model have however also added to the statistics compilation burden of central banks and national statistical offices. There is a much higher degree of integration and this has posed several questions to the compilers of more conventional, one-dimensional, statistics. The advent of the FBSAA model has challenged the conventional thoughts regarding sector roles and instrument classifications. In addition, it has also challenged the project leaders and sector compilers to critically re-think the statistics within their normal statistical domains by requiring the sector compilers to be imaginative and cast an introspective view on their "normal" way of compiling statistics. This has been difficult but also rewarding and overall, the advantages offered by this project outweigh the disadvantages by far. It is also important to note that work done thus far only sets the landscape for future work and development for the further expansion of the South African FBSAA model. The current model has identified various data limitations pertaining to sectors which are currently not measured and this calls for action plans to be implemented to bring the measurement of these sectors into the main stream statistical domains being measured by the ERSD.

Apart from this future challenge the operationalization of the FBSAA model into a unit or division to produce ongoing quarterly statistics is also a key priority to be addressed. The FBSAA model is a national statistical asset for South Africa and future development work will only improve its strength and prominence in the suite of statistical domains of the SARB and country as a whole.

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12.APPENDIX

12.1 SUMMARY TEMPLATE FOR DTC SECTOR FALT: OPENING STOCKS[14]

Main template:	FBSAA
Sub template:	Summary tables : counterpary
Sector:	DTC sector
Sector code:	S122
Period:	Q12011
Currency:	Rand millions

DTC sector

Opening stocks

Code	Instrument classification	Assets							Liabilities						
		Total	ROW	Total economy	HH	GG	FC	NFC	NFC	FC	GG	HH	Total economy	ROW	Total
					S14 + S15	S13	S12	S11	S11	S12	S13	S14 + S15			
F1	Monetary gold and SDR's	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F2	Currency and deposits	126 804	19 479	107 324	0	0	107 324	0	537 090	605 877	108 513	533 049	1 784 529	62 948	1 847 477
F3	Debt securities	421 564	9 268	412 296	0	266 975	101 959	43 363	53 710	489 214	2 732	338	545 993	12 109	558 102
F4	Loans	2 160 270	186 737	1 973 532	1 057 817	22 167	148 432	745 116	10 009	94 479	0	0	104 488	78 597	183 085
F5	Equity and investment fund shares	70 715	21 714	49 001	0	0	28 733	20 268	15 483	200 804	0	0	216 287	9 431	225 719
F6	Insurance, pension and standardised guarantee schemes	5 488	0	5 488	5 488	0	0	0	0	0	0	0	0	0	0
F7	Financial derivatives and employee stock options	283 774	142 157	141 617	0	0	98 109	43 508	11 260	101 510	0	0	112 769	155 797	268 566
F8	Other accounts receivable/payable	29 270	1 434	27 836	0	2 435	0	25 400	41 638	5 729	9 267	1 163	57 797	1 205	59 002
	Sub totals	3 097 885	380 790	2 717 095	1 063 306	291 577	484 558	877 655	669 190	1 497 612	120 512	534 550	2 821 864	320 087	3 141 952
	Balancing								208 465	-1 013 055	171 065	528 755	-104 769	60 702	-44 067

[14] Each sector has a summary template for opening stock positions, transactions, revaluations, OVC's and closing stock positions for each quarterly sector FALT

12.2 DESCRIPTION OF PRICE INDICES CONTAINED IN THE REVALUATION MODEL

No	Index	Description
1.	Basket of exchange rates against the South African rand	Index of the top 5 foreign currencies in which assets and liabilities of the DTC sector are denominated. This index is compiled using the quarterly LBS data set
2.	South African government three-month TB rate (SATB)	Index of the yield on the three month South African government Treasury Bill
3.	US government three-month TB rate (USTB)	Index of the yield on the three month USA government Treasury Bill
4.	SA government securities with original maturity up to and including 1 year	Index of the yield on South African government securities up to and including one year
5.	Citibank World Government Bond Index (WGBI)	The WGBI measures the performance of fixed-rate, local currency, investment grade sovereign bonds
6.	SA private sector bonds with original maturity up to and including 1 year	Index of major South African private sector short-term bonds with original maturity up to and including one year
7.	Weighted International Corporate Bond Index (WICBI)	Index of major traded international corporate bonds
8.	SA government bonds with original maturity exceeding 1 year	Index of yields on South African long-term government bonds with original maturity exceeding one year
9.	SA local government bonds	Index on yields on South African local government bonds with maturity exceeding one year
10.	Public corporation bonds	Index of yields on South African public corporation bonds with maturity exceeding one year

No	Index	Description
11.	SA private sector bonds with original maturity exceeding 1 year	Index of yields on major South African private sector long-term bonds with original maturity exceeding one year
12.	Johannesburg Stock Exchange (JSE) all equities (ALSI) index	Index of top 150 JSE-listed corporate share price movements
13.	MSCI world equity index	Index of top 150 international listed corporate share price movements
14.	SA short-term fixed-interest rate index (Stefi)	Index of the South African short-term fixed interest rate movements
15.	ALSI, ALBI, Stefi weighted index	Composite index comprised of index movements of the ALSI, ALBI[15] and Stefi indices
16.	MSCI, WGBI, US TB rate index	Composite index comprised of index movements of the MSCI, WGBI and USTB indices

[15] ALBI = South African JSE listed "All Bond Index"