DATA ANALYSIS

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1. Introduction

Information gaps have long played a role in the unfolding of financial crises. There are arguments that the availability of better data on the unsustainable positions on banks' balance sheets in the run up to the crisis would have lead to improved monitoring of the system level risks that contributed to the crisis. This implies that the availability of good and specific (targeted) statistics could have helped mitigate the global crisis and could have contributed to improved management of it (Provopoulos, 2011). Moreover, the financial crisis has revealed that evidence based decision making and the adoption of sound policies thereof is almost impossible without consistent, reliable (accurate) and timely data or statistics.

The overarching theme for the seminar *"Towards statistics that make sense – closing the loopholes"* and this session focuses on data analysis. The reality is that the financial system and the transmission of shocks emanating from the financial sector to the real economy is (are) dynamic thus making the objective of closing loopholes and collecting informative statistics a moving target (Eichner *et.al*, 2010). Most data collection, aggregating approaches and analysis are based on the assumption that the systems that are being analysed remain fairly stable overtime, thus ignoring the fact that innovation is continuous[1]. This therefore, brings to the fore the fact that collecting more data is indeed very important but is part of developing a process of aiding the analysis so that data is used in a different way that can deliver more information to supervisors and policy makers.

The paper starts by looking at the structural changes and the key data gaps identified by the International Monetary Fund (IMF) and the Financial Stability Board (FSB). This is followed by a brief account of structural changes in the South African financial system with special attention on the residential property market. The following section discusses the identified gaps and the recommendations to close the loopholes.

2. Structural changes and key gaps identified

The financial crisis exposed the fact that the collection and analysis of data did not keep up with structural changes both in the financial system and the transmission to the real economy. Following consultation with users of economic and financial statistics[2], the IMF and the FSB identified the main structural changes and key information gaps, and came up with recommendations, action plans and timetables (IMF, 2010)

[1] To emphasise this point Eichner *et.al*, 2010 refer to the fact that many of the financial products at the core of the recent financial crisis and identified as the main causes of the near-collapse of the financial system scarcely existed prior to the crisis and have ceased to exist in the aftermath.

[2] In April 2009, the Group of Twenty (G-20) Finance Ministers and Central Bank Governors Working Group on Reinforcing International Co-operation and Promoting Integrity in Financial Markets mandated the IMF and the FSB to explore information gaps and provide appropriate proposals for strengthening data collection. In November 2009, the G-20 Finance Ministers and Central Bank Governors endorsed 20 recommendations to address the identified information gaps and requested the FSB and the IMF to draw a plan of action and the timetable to address each of the recommendations.

2.1 Structural changes

The structural changes identified by the IMF, FSB and other financial and economic statistics specialists can be summarised as below:

- Assets of major banks have roughly doubled since the start of the 2000s resulting in larger banks (financial institutions) making the spill over effects of these institutions to the financial system and the real economy intense and important;
- Interdependencies/interconnectedness among banks and non-banks has increased immensely through direct credit exposures and participation in common markets. This has also been complicated by the exponential/phenomenal growth in the numbers of the non-bank finance institutions;
- Greater complexity, in particular, through financial innovation which has allowed for the distribution of risks while creating long, interweaved chains of linkages between different participants in the financial system; and
- The globalisation of financial activity intensified by the size of financial institutions and the interconnectedness had larger cross-boarder spill over effects.

These structural changes in the financial systems exposed that larger financial institutions (banks and non-banks) had intense real economic impact and that they were highly interconnected, international and complex. Moreover, these structural changes were at the core of the breadth, speed and severity of the transmission of the shocks and the crisis (Hall, 2010).

2.2 Key information and data gaps identified

The key areas that were identified where major gaps existed were in the financial sector[3]. There was limited and in some cases lack of data on the extent of financial intermediation through non-bank financial intermediaries, such as investment banks, insurance companies, hedge funds, mortgage broking, and new instruments. This therefore, masked the interconnectedness which through the analysis of the data would have exposed (not completely, but to a larger degree) the underlying vulnerabilities and therefore the systemic crisis.

Moreover, the analysis where it was conducted or possible was not only limited by the unavailability of data but the lack of historical data as well. As a result, even most of the compiled indicators which are supposed to act as leading indicators performed badly[4].

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[3] Hall 2010, summarises these key gaps as arising from the fact that the initial shock was modest and localised (i.e. a sharp deterioration in subprime credit quality) but managed to spread rapidly and globally due to the fact that financial innovation had allowed the dispersion of risks while creating long, intertwined chains of often opaque linkages between different participant in the financial system. But information about the location of risk exposures had not kept pace, in that such innovation created new information demands that were not met. The lack of information about the location of risk exposures resulted in uncertainty which was critical in spreading the crisis as investors suddenly realised that they had little information about the credit quality underlying their exposures, their contingent funding needs and the potential problems faced by their counterparties. Under such circumstances, securitisation markets ground to a halt/ceased to function and interbank markets broke down leading to balance sheet pressures by institutions for which liquidity dried up as they sought to raise funds through the disposal assets.

[4] For example, the CAR and liquidity indicators continued to show that the financial system was sound even though financial conditions had deteriorated. Indicators of sectoral leverage did provide early warning indicators but data collection was incomplete. Risk and volatility measures also failed to highlight the underlying problems as they still indicated that risk and volatility remained at historical low levels. Macro-prudential modelling proved inadequate and did not address systemic risks, spill over effects and network effects (Towe, 2010).

The recommendations and initiatives underway for closing the identified loopholes are:

(i) Enhanced and improved disclosure (more granular and regular) to better capture the build up of risk in the financial sector. This implies the strengthening of the reporting of indicators of current financial health and soundness of financial institutions (firm's liquidity risk profiles – quantitative information about liquid asset holdings, key funding dependencies and contingent funding needs). Measures of aggregate leverage and maturity mismatches need to be developed. There is also a need to improve the coverage of risk transfer instruments.
(ii) Surveying systematically important non-bank financial institutions and exposures between institutions and across sectors to better understand financial linkages and systemic risks that might develop.
(iii) Monitor the vulnerability of domestic economies to shocks by strengthening the sectoral coverage of balance sheets (household and corporations), standardised and comparable government statistics, comparable data on asset prices, in particular real estate prices, enhance attention to flow-of-funds data (partly as response to the realisation that, end of period data provides a partial view of the institutions' position). There is also a need to have forward looking information to help understand how the system might behave in an uncertain future; and
(iv) Reprioritize financial soundness indicators and strengthen the information content of financial indicators: adapt CAR and liquidity measures for banks, include leverage and other measures for systematically important non-bank financial institutions.

3. Structural changes in the SA banking or financial system

The South African financial system and economy also exhibited similar characteristics to their international counterparts. Over the years, gradual exchange control relaxation, changes in the financial regulatory environment, the corporate tax structure, innovation and technological advancement, the implementation of BEE policies, the Financial Sector Charter and the National Credit Act are amongst the factors that have contributed to the structural changes in the financial markets and the economy in general. These factors have in turn resulted in changes in the funding strategies of the banks and the corporate sector, notably in the area of capital management where there has been an expansion in available financial instruments.

The sources of funds by banks and the corporate sector were also diversified. Nonetheless, for banks, non-bank rand dominated deposits remained the largest source of funds and asset securitisation also gained significance as an alternative source of funding. For the corporate sector, although banks remain the most important source of funding (through loans and advances) the issuance of debt securities has grown significantly. This upward trend has been dominated by the private corporate sector whose share relative to the total outstanding corporate sector debt increased markedly.

During the same period, the assets of banks increased. The asset growth coincided with the residential property boom evidenced by unprecedented rise in house prices coupled with equity markets. During this period the mortgage market advanced remarkably and has been subject to product innovation and differentiation since the 1990s[5]. The mortgage market has since the 1990s accounted for more than 40 per cent of total loans and advances to the private sector. Within the mortgage advances by banks, residential or home loans account for a larger share.

[5] Macroeconomic policies, the low level of interest rates, price stability, the introduction and implementation of the Financial Sector Charter, industry specific developments such as innovations that have allowed consumers to borrow to finance primary homes, vacant land, holiday homes, home improvements and homes for investment purposes, efficiency gains associated with the granting of pre-approval certificates, on-line and telephonic applications etc. have transformed the landscape of the mortgage market.

3.1 The impact of mortgage originators

Mortgage originators entered the South African home loans market in 1999. Bond originators offer consumers a service by liaising directly with banks on their behalf and shop around among the banks for competitive interest rates for buyers. The entrance of mortgage originators has seen the relationship between estate agents and banks taking second place, nevertheless, all mortgage originators work closely with estate agents. It is reported that, prior to the activities of originators in the mortgage market, the average interest rate concession offered to consumers was 0,5 per cent off the base mortgage loan rate. This has changed since consumers get on average 1,0 per cent to 1,5 per cent, even 2,5 per cent in some instances below the base home loan rate. As a result, mortgage originators are reported to have added value to consumers since entering the market.

Research in this market indicates that mortgage originators account for 60 to 70 per cent of new business with the remainder processed by banks through direct distribution channels to estate agents and developers. Originators are praised for enabling banks to increase the volume of home loans without the need to increase their capacity. Mortgage originators are seen as having contributed to the increase in the residential (the area impacted the most by mortgage originators) market share of the banks that embraced them in their strategy to increase business volumes[6].

At the height of the residential property boom, bond aggregators entered the market and act as intermediaries between homebuyers and banks offering home loans. Bond aggregators sell bonds to prospective home buyers i.e. their primary job is to sell home loans. They make their proposals attractive by offering incentives such as cash rewards or pay some or all of the bond transfer fees if the consumer uses their services. Some home loan originators act as aggregators while some contract bond aggregators and do not deal directly with the home buyer (i.e. they allow other originators to use their technology or submit applications to the banks under their contracts).

3.2 The impact of non-bank mortgage finance companies

Currently South Africa has three major non-bank providers of home loans namely South Africa Home Loans (SAHL), Sanlam Home Loans (SHL) and Old Mutual bank[7]. SA Home Loans was launched in 1999 and is also the only institution that provides a 20 year term fixed mortgage loan. Sanlam Home Loans is a joint venture with Absa and both parties are 50 per cent shareholders. The unit was established in May 2004 and the administration of SHL is outsourced to Absa.

The common thread among these institutions (i.e. SAHL and SHL) is that they dominantly use securitization through the issue of both short- and long term instruments to fund their business. It is this securitization funding model at lower rates coupled with reliance on Sanlam's distribution network of financial intermediaries (in the case of SHL) and a direct distribution system centered on a call centre and other efficient technologies (in the case of SAHL) that is said to give these institutions the ability to offer competitive rates to prospective customers.

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[6] In the past banks carried the cost of paying sales teams to market their home loans. Mortgage originators save banks the cost of having to employ their own distribution channel of home loan consultants and their electronic loan application channel is reported to save banks from the processing costs although it is reported that there is an element of duplication in this area since banks also have their own distribution channels.

[7] Old Mutual bank is a Nedbank subsidiary and its business is consolidated into Nedbank's books and therefore becomes part of mortgage advances by the banking sector.

SAHL was the first South African mortgage originator to tap the public residential mortgage securitization market in November 2001. As at November 2002, SAHL accounted for 100 per cent of securitization issues in this market, until banks and other non-bank financial institutions such as SHL, South African Quantum Home Loans, NBC Home Loans, Homeplan Financial Solutions[8] etc. entered the market. Banks account for 41 per cent with the remainder accounted for by NBC Home Loans.

3.3 Home-loan products

Over the years home-loan products available in the market have increased and range from:

- The access bond facility which was introduced by banks a decade ago and is now automatically included with all home loans offered by banks. This product effectively offers mortgage bond holders an effective money management tool. The facility allows the consumer to deposit into and withdraw or access any surplus funds in the home loan account. Because interest on a home loan is calculated on a daily basis, by depositing some extra money into the account, the consumer is able to reduce the amount of interest charged on the mortgage bond;
- First time home owners' loan which allows new buyers to borrow more than 100 per cent of the property value, as it allows registration and transfer costs to be included in the total purchase price. Even though one home loan is granted, the account is set up in such a way that the costs portion is separate from the purchase component and the option to repay costs over a short period is available. In some instances new home owners are given a grace period during which they do not make any repayments. There is also no deposit required. A higher value of up to 50 per cent more than the value of the property can be registered. The loan term can be increased or decreased at any time;
- Pension backed loan which is a mortgage loan secured against the pension funs benefit;
- Building loan which can be used to finance the purchase of vacant land/stand with the specific intent to build a residential property. The repayment only starts when the loan has been paid out in full;
- Re-advances which can give the home owner access to the capital amount already paid off up to the original loan amount and does not require the registration of a new mortgage bond;
- A further loan which is equivalent to tapping into the equity accumulated in the home and is secured by a second bond registered over the property;
- Equity release mortgage or reverse mortgage is a product that enables retired homeowners (mortgage free properties), regardless of their income to access equity in their properties without having to pay it back in monthly instalments and selling the property so as to down scale to a cheaper property or move to a rented one. Previously the only option available to them was to sell their properties. This product is offered in either a lump sum payment minimum R25 000 and between 10 and 45 per cent of the value of the property, in monthly instalments or both; and
- The interest-only mortgage which gives the home owner with a mortgage loan a choice of shifting between paying the interest only, or the full mortgage bond instalment, or another amount they choose.

3.4 Interest rate options and repayment term options

Home loans are normally repaid over a period of 20, 25 or 30 years, with 20 years being the most common term (the repayment for vacant land is over a maximum of 15 years). Consumers have a choice of increasing or decreasing the loan term at any time. The interest on most home loans in South Africa is flexible or variable and traditionally linked to the prime

[8] The latter three institutions are involved in the securitisation of originated pension backed home loans.

rate. Nevertheless, there has been a shift of base home loan rates from the traditional linkage to the prime lending rate plus some margin. Banks are gradually shifting to linking home loan rates to the Johannesburg Interbank Lending rate (Jibar) plus some margin depending on the risk profile or qualifying criteria of the client.

The fixed interest rate option became popular in 1998 when home loan rates reached a peak of 23,5 per cent and the prime lending rate peaked at 25,5 per cent. Currently consumers have a choice of fixing their mortgage rates in terms of 12, 18, 24, 36, 60 months and 20[9]. Generally or across banks, fixed interest rates on mortgage loans depend on three risks categories namely aggregate risk, loans to value risk and credit risk and the overall outcome will also differ per client amount of loans, therefore it will differ per client. Some banks review their fixed rates on a weekly or fortnightly basis. On expiry of the fixed rate contract, the home loan interest rate automatically reverts to the prevailing variable rate.

Capped home loan rates are also offered and in this case the capped rate is like the variable rate loan except that there is a maximum interest rate defined. The consumer still benefits from the decline in interest rates but will never pay more than the capped rate. There is also a step down or reducing loan which is a contract in which regardless of whether the base mortgage loan increases or decreases, the loan facility guarantees that the consumer's rate will decrease by an agreed amount over the set period.

The SmartBond option linked to the three month bankers' acceptance (BA) rate is offered to low risk clients i.e. those who have already paid off 30 per cent of their mortgage debt or those who are able to put down a 30 per cent deposit when buying a home. The rate resets or is reviewed on a quarterly basis.

3.5 Refinancing or switching of mortgage loans

The majority of the home loans that are refinanced or switched[10] would be those that are fixed and the borrower wishes to get out of the contract when the interest rate cycle goes up or they wish to release the equity accumulated in their house or both. In many instances a refinancing or re-mortgaging option is considered so as to make cheaper interest repayments and shorten or lengthen the duration of the mortgage loan, withdraw extra finance on the back of increased equity in the property for renovations, to make huge purchase, or lump sum investments, and etc., to consolidate outstanding short-term and unsecured debts by increasing the size of the mortgage loan or bank accounts (through a one account) into one monthly repayment so as to make savings on interest payments, fees and etc.

4. Filling data gaps and analysis: the case for expanding data on mortgage advances to achieve targeted analysis

The structural changes presented in the previous section highlight to a large degree the fact that mortgage financing has changed over the years. Using the developments in the residential property market and the consensus view that the financial crisis exposed that aggregate financial statistics failed to convey or capture fundamental transformation in the market.

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[9] SA Home Loans (SAHL) VariFix is a repayment option that allows the consumer to cap the interest rate on a home loan for 20 years. The consumer can choose to cap part or all of the repayment. The Varifix rate moves in line with the prime rate, yield curve pricing and the SAHL margin. The funding rate is reviewed every six months after the loan or the fixed portion is first fixed. The variable funding component of the loan is reviewed on a quarterly basis and is linked to the Jibar.

[10] The refinancing or switching of a home loan involves cancelling a mortgage bond with one institution and taking a new bond with another. There maybe penalty charges involved with such transactions.

For instance the statistics released by the Research Department on mortgage advances have the following gaps:

- Aggregate advances by banks and do not cover non-bank institution;
- There is no identification of new-advances, re-advances, further advances, refinancing or switching;
- In the cases of re-advances, further advances, refinancing or switching the underlying motives for such transactions is unknown (i.e. are the transactions motivated by the withdrawal of equity, lengthening the repayment period, etc);
- There is no identification of what underpins the transactions i.e is it owner-occupier, buy-to-let, second home and other;
- There is no identification of movements in the mortgage book as a result of external channels nor the direct surveying of mortgage originators; and
- Non-banks are not fully surveyed as a result their size, activities and interconnectedness to the banks are not completely known.

In filling the gaps, below are some of the recommendations:

- Disaggregate mortgage advances by banks;
- Survey the non-bank mortgage lenders to identify their size, activities, funding dependencies, interconnectedness to banks, etc; and
- Surveying non-banks can be complemented by collecting data directly from the deeds office (and mortgage originators), which will be more granular and have more information content; and
- These can be supported by qualitative data such as telephonic surveys of what for example the funds obtained through the withdrawal of equity were used for (data which would have been vital in partly closing the gap identified at the height of the previous credit boom when there was a disconnect between the acceleration in mortgage advances and instalment sale and leasing finance was decelerating at the time when consumption expenditure on durable goods including new car sales was increasing).

The data will serve for good analysis in both crisis and non crisis times (periods). For example, the fact that at the height of the recent interest rate tightening cycle and the financial crisis, indicators such as non-performing loans (impaired loans) did not perform nearly as badly as in the late 1990s remains unexplainable empirically (quantitatively) and are left to speculation[11] and what is reported in the media (anecdotal information) due to lack of official data. Nonetheless, the slowdown in credit extension in this cycle was the most severe on record, of which the explanatory factors remain unquantifiable due to lack of data. It may be inferred from these observations that banks learned from the previous financial crisis and credit busts,

[11] Official data confirms that non-performing loans/ impaired advances almost peaked at same levels in all cycles (1997-1999, 2001-2003 and the 2007-2010) whereas debt levels, interest rate increases and the implied debt servicing costs were dissimilar. Possible explanatory factors are that banks may have learned from the destruction of value in previous painful busts of the credit cycles and were creative in this cycle. For instances, as the tightening cycle gathered momentum and it became clear that South Africa was not going to escape the second-round effects of the global financial crisis, banks pre-empted defaults and became creative in trying to minimize the damage.

Examples in this instance are that, banks (including other financial intermediaries such as insurance companies) went on a public campaign, encouraging customers in tight financial circumstances to communicate and come forth to reschedule and consolidate debt and renegotiate terms to lessen the burden. These measures ranged from banks extending mortgage contracts to a maximum of 30 years, granting payment holidays until the customers' financial circumstances improved (for example, six months of paying only half the amount or 3 months of no payments). Over and above the measures taken by banks, other options available to consumers during this cycle came with the introduction of the National Credit Act (NCA) which became effective in June 2007. The Act makes available to consumers the option of debt counseling, during which time they are protected from their creditors. They can negotiate with the banks for longer periods to re-pay their debt and no repossessions of their houses and cars can be effected during this time.

to the extent that measures were taken to minimize default levels as well as the introduction of the NCA and consumer protection under the Act. These measures helped to artificially maintain growth in credit extension at high levels and prolonged the lag with which credit extension would have normally responded to monetary policy tightening and real economy slowdown. Those who claimed that a credit crunch was at play during this period could not be dismissed nor could they prove that they were right – they could not make their case convincingly.

5. Conclusion

Monetary and financial stability require good policies, good policies require good analysis, and good analysis requires good statistics (ECB, 2010). But good statistics require a constant flow of reliable reporting and this should also take into account the dynamic nature of the financial system and the real sector that are being measured. This implies that the data set to be collected and analysed a moving target as the systems being analysed do not remain stable. The main lessons to be learned from the crisis are that the data collection and analysis approaches used currently are not consistent with the continuous/dynamic shift in the systems we are trying to measure and analyse. It is therefore clear that better and not simply more disclosure coupled with targeted analysis is necessary to be better prepared for future incipient crisis. Also, that there is a need to improve capacity on both respondents and analysts.

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