GIRO Conference and Exhibition 2012

What lies beneath –
the unseen risk in our data

Ralph Baxter, CEO, ClusterSeven

Themes

• Data, data, data
• Corporate systems vs ‘dark matter’
• Regulatory comment
• Why internal audit will be chasing you
• Satisfying internal audit without stalling your business
• Upside benefits
No other sector manipulates historical data so extensively

The Old World

TRUST ME I'M AN ACTUARY
The Old World + Solvency II

Governance  Risk
Business/IT change  Reinsurance
Acquisition  Pricing
Investment  Products
End-to-end process understanding  Regulation / Compliance

Documentation, documentation, documentation.....

The New World (UK)

Documentation
- Transparency
- Understanding
- Control

Chartered Institute of
Internal Auditors

FSA
Regulators want to use Internal Audit to open the actuarial process

Use of spreadsheets in the actuarial profession
(2011 Survey by Actuarial Post)

- **Spreadsheet usage** (for modelling, data management and reporting)
  - 40% use spreadsheets more than any other software for these activities
  - 9% only use spreadsheets for these activities.
  - 16% either do not use spreadsheets at all or less than other applications

- **Business continuity**
  - 52% said a qualified actuary could work out what was happening in their absence but they would have to rely on experience as documentation is not sufficient.
  - 18% warned that a qualified actuary would probably have to rebuild spreadsheets in their absence.
  - 30% said that there is sufficient documentation in place in case of their absence

- **Security/integrity**
  - 46% said that between four and 10+ people could change critical spreadsheets.
  - 12% did not know how many people have access to their spreadsheets.
Leads to regulatory concerns

“Few firms provided sufficient evidence to show the data used in their internal model was accurate, complete and appropriate”

FSA’s 2011 IMAP review February 2011

“How quickly can you spot that something has gone wrong and how quickly can you locate the problem and do something about it”

Regulatory control conversation

EIOPA data quality requirements

• Embed a system of data quality management across the entity
• Compile a directory of data attributes used in the internal model, stating each attribute’s true source, characteristics and usage
• Define and monitor processes for identification, collection, transmission, processing and retention of data
• Ensure data processing from source to model is transparent and demonstrable
• Define objective metrics for completeness, accuracy and appropriateness of data
• Establish a data policy which set out the entity’s approach to managing data quality
• Perform periodic data quality assessments and implement a process for identifying and resolving data deficiencies
• Document where data quality may be compromised including implications and mitigating actions
• Provide and audit trail and rationale for data updates when applying expert judgment in lieu of reliable internal or external data
• Agree with the role of internal and external auditors in assessing data quality
• Establish a process to manage changes or data updates which materially impact model outputs
FSA Data Audit (August 2011) – Scope & Content

• Requirement
  – *A review should be performed by a suitably qualified person who is independent of model design, build and operation (e.g. Internal Audit)*

• Purpose
  – *To assist the FSA in its assessment of whether a firm’s data management complies with the standards set out in the Solvency II directive*

• Scope
  – *All data (internal and external) that could materially impact the Internal Model*

• Guidance
  – *Reviewer may make use of previous independent reviews (e.g. SOX compliance, External/Internal Audit) so long as assumptions have not changed significantly.*

Data Management – the high level (IT?) view

Data Warehouse, Data Mart, Internal Model

Policy | Claims | Loss | Risk | Finance

ETL | ETL | ETL | ETL | ETL | ETL | ETL

Metadata management, data cleansing and integration

Reporting, Data Analysis, Decision making

After Aviva, IIAG, 2011
Data Management – the reality

Policy  Claims  Loss  Risk  Finance

Data Warehouse, Data Mart, Internal Model

ETL  ETL  ETL  ETL

Metadata management, data cleansing and integration

Reporting, Data Analysis, Decision making

Full actuarial landscape

Single File feeding the Internal Model

Level 1
Level 2
Level 3

Level ???

Full actuarial landscape

LEGEND
- File has macro
- File is protected from access
- File is low risk when assessed against best practice & client-defined rules
- Files are linked
- File is high risk when assessed against best practice & client-defined rules
Management or extermination?
Two perspectives – both in agreement

Come the apocalypse two things will survive, the spreadsheet and the cockroach – they deserve each other.
Gartner analyst, 2005

Solution
• I still see audit reports or project plans that recommend replacing spreadsheets and manual processes with 'IT solution'.
• This will never happen
  – It is impractical to replace 2 or more fragmented systems with a single system.
  – Replacing the spreadsheet operations with 'IT designed' ones only compounds the problem and removes any ability of users to address problems.
• The only 'solution' is to eliminate the worst processes and to apply appropriate controls to the ones that remain.

Therefore treat spreadsheets like IT

In summary
• Spreadsheets are a form of IT system
• All business-critical IT systems must have adequate controls
• Firms must recognise that spreadsheet control should be part of their IT strategy
Initial thoughts

FSA, Spreadsheets & the Regulator, 2007

Controls we expect to see

- Audit trail
  - 'Tamper proof' record of changes
- Version control + backup
- Segregation of duties
- Code checking / code reading
- Testing
- Maintainability

Recent thoughts – model integrity

FSA, Data Controls & End User Computing, 2011

Possible controls

- Peer (non-independent) review
- Independent expert review
- Segregation of 'production' from 'test' version
- Version control over production version
- The list is long – think in terms of what controls would be applicable to 'corporate IT' application. A user-developed application, if business critical, should be no different.
Solvency II – Focus on data quality

FSA, Spreadsheets and Solvency II, 2010

Data operations
Data operation: Any point in the system where you ‘do something’ with data:

- Interpretation, formatting, alteration
- Joining, restructuring
- Aggregation, extraction, derivation
- Merging, translation

Examples:
- String = contract ID
- 3.1.2010 to 1/3/2010
- Data cleaning
- Data sorting
- Contract data plus mortality data
- Matrix multiplication
- SQL based CSV extract
- Cut & paste
- M = male
- SUMIF
- Data sorting
- Contract data plus mortality data
- Matrix multiplication
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- SUMIF

Possible controls
- Peer (non-independent) review
- Independent audit review
- Version control over production application
- The list is long – think it would be applicable to your user-developed applications should be no different.

Audit trail
- Tamper proof record of changes
- Version control + backup
- Segregation of duties
- Code checking / code reading
- Testing
- Maintainability

Logic/Risk checking
- Any ‘firms books and records’ e.g. those involving legal or contractual records
- These typically require access control and an audit trail of changes
- Any application where changes would have a significant economic impact
- These require monitoring, access control, frequent independent checking

Access/role control

Version control

Data comparison

Controls over accuracy
- Recognised check over accuracy is to compare the data received with the original source
- Reasonable checks, or random checks against the primary (i.e. objectively verifiable) data may often be sufficient
- Internal coherency/consistency checks based on known properties of the data (e.g. its expected distribution) can also be effective
- Think about possible worst case and place appropriate controls

Audit trail

Business alerts

Reconciliation

Controls over completeness
- Reconciliation is a recognised check on completeness
- ‘Reconciliation’ means a check on records that were received against the records that were expected to be received
- This can be difficult to achieve, as it requires transparency about what records were requested, e.g. by a complex SQL query
- Reconciliation can also be more difficult with end-user applications

FSA, Data Controls and End User Computing, 2011

FSA, Data Controls and End User Computing, 2011
IMAP 2011 Review findings

• 6.9 In many firms, spreadsheets provide a key area of risk, because they are typically not owned by IT, but by other business or control areas, such as the actuarial function. They may not be subject to the same general IT controls as the firms’ formal IT systems (i.e. Change controls, disaster recovery planning, security etc) and firms need to develop a control system around this.

Meeting requirements

What’s out there, what’s in your spreadsheets, what do they do?

How do you maintain integrity in the application and the data?

Data comparison
Reconciliation
Business alerts
Audit trail
Access/role control
Version control
Logic/risk checking

2. Control
Application

1. Discovery

Data
Data Focus Increasing for Banking and Insurance Regulation

Risk-Based Capital Reporting for Institutions Subject to the Advanced Capital Adequacy Framework—FFIEC 101 Data Attestation

1. Discovery

2. Control Application

Board of Governors of the Federal Reserve System
Office of the Comptroller of the Currency
SUPERVISORY GUIDANCE ON MODEL RISK MANAGEMENT

OCC 2011-12

NAIC Model Audit
OCC 2000–16
OCC BULLETIN

FSA Data Audit: Scope and Content (2011)
FSA IMAP Thematic Review (2011)

PWC: “OCC 2011-12 Program features that were previously considered "industry leading practices" are now minimum regulatory expectations”

New Basel consultation document on Risk Data Aggregation in Banks

….and other institutions at local regulator discretion

- Principle 1.23 “A bank’s board and senior management should be fully aware of any limitations that prevent full risk data aggregation in terms of…..reliance on manual processes.”
- Principle 3.28(b) “Where a bank relies on manual processes and desktop applications (e.g. spreadsheets, databases) and has specific risk units that use these applications for software development, it should have effective mitigants in place (e.g. end-user computing policies and procedures) and other effective controls that are consistently applied across the bank’s processes.
- Principle 3.31 “…banks to document and explain all of their risk data aggregation processes, whether automated or manual. Documentation should include an explanation of the appropriateness of any manual workarounds”
The Data Supply Chain

What has gone wrong?

• It could be a real business issue
• It could be a spreadsheet model
• Or it could be the data
  • Data source
  • Data extract
  • Data update

And how do you even know there is a problem?

The Data Supply Chain (Monitored)

Database:
- File version history
- Cell/data history
- Validation history

Scheduled processing of files enabling automatic transformation and detection of exceptions

Scheduled processing of files enabling automatic transformation and detection of exceptions

Dashboards, Alerting & Reporting on:
- Models
- Data
- Processes

Enables rapid location of problem

Looking odd
The Data Supply Chain (Automated)

Internal model / data warehouse

Scheduled processing of files enabling automatic transformation and detection of exceptions

Validated extracts replace direct extracts from input files

Database:
- File version history
- Cell/data history
- Validation history

Dashboard, alerting & reporting on:
- Models
- Data
- Processes

Enables rapid location of problem

How do you know something unexpected has happened?
- MI for historic spreadsheet data
Controls over completeness

• Reconciliation is a recognised check on completeness
  • ‘Reconciliation’ means a check on records that were received against the records that were expected to be received.
  • This can be difficult to achieve, as it requires transparency about what records were requested. E.g. By a complex SQL query
  • Reconciliation can also be more difficult with end-user applications
Solvency II – data detail (2)

FSA, Data Controls & End User Computing, 2011

Controls over accuracy
  • A recognised check over accuracy is to compare the data received with the original source
  • Reasonable checks, or random checks against the primary (i.e. objectively verifiable) data may often be sufficient
  • Internal coherency/consistency checks based on known properties of the data (e.g. its expected distribution) can also be effective.
  • Think about possible worst/bad cases and place appropriate controls.

Checks on accuracy – e.g. Heat Map
(e.g. shows values that have moved by more than 100%)
Control and evidence/documentation options

- **Manual**
  - time consuming (=expensive)
  - difficult to make reliable/repeatable

- **Desktop utilities**
  - inconsistent usage = no assurance
  - one file at a time - no enterprise perspective
  - no data analysis

- **Centralised solution**
  - can be done non-invasively to avoid disrupting users
  - ensures central tracking/reporting of all user activity and control processes for consistent, repeatable, accurate analysis
  - new data insight

**How does it work?**

Spreadsheet Users in One or Multiple Locations

- One installation

Multiple Beneficiaries

- Spreadsheet Users
- Risk & Control
- Audit & Compliance
- Business Intelligence & MI
- IT

Multiple forms of output

- xlsx
- .pdf
- web
- ESM
Reassurance

- You don’t change the user experience of Excel at all (performance, functionality)
- You won’t impact your ability to get to your spreadsheets
- You won’t get buried in useless information
- You don’t have to move files to any new location
- You don’t have to install multiple components or any file server agents

New World Operations

- Increased transparency
- Automated documentation
- Automated data tolerances/validation
- Reduced operational risk
- Regulatory confidence
- Informed decision process
Opening the box can deliver more than just compliance

- Reduced actuarial 'checking'
- Rapid insight into previously nearly inaccessible data
- Business agility with control
- Improved alignment between IT road map and business requirements
Thank You

“Ensuring good quality data management is a fundamental requirement to support the continued success of Canopius. The real power of the software is its ability to embed appropriate data- and function-checks as part of our normal business practices. It is difficult to know how this could be done effectively without using this type of technology.”

Mark Allen, Head of Business Information, Canopius, Lloyds Managing Agent

Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.

The views expressed in this presentation are those of the presenter.

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FSA Data Audit White Paper  
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