The Actuarial Profession
making financial sense of the future

The Value of ERM
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ERM: does it add value?

The perspective of academic research

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Plan

- What is Enterprise Risk Management? It must be good!
- Risk management – does it add value for firms?
  - Or does it add value for managers?
- Enterprise Risk Management – does it add or subtract value?
- Which firms use ERM?
- What are the elements of ERM?
- ERM is difficult!
- Reflections.

What is ERM?

- COSO: “A process, effected by an entity’s board of directors, management and other personnel, applied in a strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives”
- Or: a firm operates ERM if it has the amount and type of risks that best contribute to achieving its objectives
- “I have an appetite for all risks that are positive for shareholder value” – but need to understand the link between risk and shareholder value

So ERM must be good!

Survey of US firms that had, in 2005, operated ERM (Gordon, 2009)

AIG

Lehman Brothers

(though Equitable Life in UK didn’t in the 1990s)

Does risk management add value?

- No in a CAPM world, but could be yes in practice, e.g. reduce financial distress, reduce taxes, secure cash for growth
- Some studies find that financial risk management by industrial firms is related to lower FX sensitivity
- A number of studies show that use of derivatives to manage FX, interest risk is linked to higher share values
- *Smithson & Simkins (2005)*
- Look at individual cases, e.g. Equitable Life post-closure; though also cases where risk management has gone wrong

Do the 'right' insurers reinsure?

		US general	UK life
Size	-ve	True	True
Surplus	-ve	No effect	True
Profitability	-ve	True	No effect
Proprietary	-ve	True	No effect
Diversified geographically	-ve	True	Not tested
Diversified lines of business	-ve	True	True
Member of group	+ve	True	Not tested

Or does risk management create value for managers?

Hedge gold prices in N American gold mining industry if:

Financial distress	High leverage	(True)
Disrupts investment	Substantial exploration	No effect
	High no. of acquisitions	No effect
Ext financing costs	Low market value	No effect
	Low reserves	No effect
Managerial risk aversion	High D&O shares	True
	Low D&O options	True

And insurance managers may be a problem, too!

- US life insurers 1987-93: more shares held by officers and directors is associated with higher risk (4 measures including share return volatility) - *Chen et al (2001)*
- US insurers 1992-2007: higher use of share options leads to higher default risk; where shares are used as the incentive the link with default risk disappears - *Milidonis & Stathopoulos (2011)*

What good is the E in ERM?

- Understand total risks better
- Helps identify interdependences between risks
- Avoid risk management duplication of silos
- Meet rating agency requirements
- Keep others informed about risks
- Leading to better decisions; reduced volatility in profits, share price; lower capital costs; better capital efficiency
- *Hoyt & Liebenberg (2011)*

Does announcing a CRO appointment affect share prices? (1)

- US firms 1992-2003: 120 firms identified with senior risk mgt appointment (after exclusions, e.g. private firms), not new name
- Sample is concentrated in financial services (39.2%), insurance (12.5%), energy (20.0%)
- Measure cumulative abnormal return (CAR) over day of announcement and following day
- Average CAR was -0.0001, not sig different from 0
- Multiple regression analysis: high ratio of cash/liabilities assoc with -ve effect on CAR (for firms that can buffer risk with cash, ERM may be wealth-destroying) [if ERM is done wrongly]

Does announcing a CRO appointment affect share prices? (2)

- **Financial services firms** (47)
- CAR: -ve assoc with cash ratio
- +ve assoc with leverage
- **Non-financial services firms** [including insurance] (73):
- CAR: -ve assoc with cash ratio; leverage (surprise: possibly as ERM reduces value of default put option) [if it leads to less risk]
- +ve assoc with firm size, previous earnings volatility
- Possibly, financial services firms' appointments reflect regulatory or rating agency demands
- *Beasley, Pagach & Warr (2008)*

Does ERM increase value (US insurers)? (1)

- Survey of 117 US publicly traded insurers 1998-2005
- Evidence of ERM from accounts, newswires, etc, using terms such as 'integrated risk management' etc
- Value taken as Tobin's Q = (market value of equity + book liabilities)/book assets
- Several suggested determinants of ERM, Q
- Model used to jointly estimate equations for ERM and Q

Does ERM increase value (US insurers)? (2)

- Firms using ERM tend to be large (1% sig), have low leverage, high institutional share ownership, use less reinsurance (all 5% sig)
- Q: ERM presence is highly significant: insurers engaged in ERM are valued 20% higher than others, after controlling for other factors and potential bias
- Limitations: can’t measure intensity of ERM usage
  - [and small sample size: 23 ERM firms in 2005; is the result plausible?]
- *Hoyt & Liebenberg (2011)*

When firms use ERM, do they become less risky?

- Survey of US publicly traded insurers 1992-2007
- ERM adoption from accounts etc; 69 ERM adopters
- Risk measured as annualised standard deviation of daily stock market returns
- ERM adopters reduce risk by 13.9% (lagged effect: 12.3% in year 1, and grows stronger over time); results hold for 2008
- Profits per unit of risk (ROA/annualised standard deviation of stock returns) increases by 2%
- *Eckles, Hoyt & Miller (2011)*

Does ERM increase value (US general insurers)?

- Survey of 85 US publicly traded general insurers 2000-2007
- ERM (from accounts etc) more likely if firm is large; has a high credit rating; uses large amount of reinsurance; geographically diversified
- After adopting ERM, firms reinsured less and hedged more
- ERM reduces Q by 5%; also similar effect when include reinsurance, derivatives, geographical and product diversification and asset return volatility as explanatory variables (i.e. ERM without individual RM)
- *Lin et al (2012)*

Is a firm's S&P rating for ERM associated with higher value (US insurers)?

- Survey of 82 US publicly traded insurers 2007
- ERM rating from 1 to 5
- Regression with control variables, e.g. size, leverage: shows ERM rating has +ve effect on Q but peaks at ERM3 ("adequate with a positive trend")
- ERM4,5 show that firm has moved beyond traditional RM but no apparent increase in value for such insurers
- *McShane, Nair & Rustambekov (2011)*
- *Lin et al (2012)* found no effect of S&P rating on Q (though weak ERM assoc with lower RoA than no-ERM firms)

Summary of 'Value' results

ERM measure	Scope	Value measure	Result
Appointing CRO	US firms 1992-2003	CAR	No effect
Using ERM	US insurers 1998-2005	Q	+20% on value
Using ERM	US insurers 1992-2007	Stock volatility Profit per risk	Reduces by 12.3% Increases by 2%
Using ERM, control IRM	US gen ins 2000-07	Q	Reduces by 5%
S&P ERM rating	US insurers 2007	Q	Positive to ERM3 only or no effect

Some issues with statistical analysis

- How define whether ERM takes place or stage of ERM?
- How measure effect?
- Analysis covers only publicly listed firms
- Some low sample sizes
- All analyses in US
- Results vary
- What about failures or would-be failures?
- Results not convincing; but effects not obviously apparent

Which firms adopt ERM?

- Which firms appoint CROs? Financial services or energy, high leverage (US 1997-2001)
- What positively affects CRO appointment? Size, cash flow volatility, high % of shares held by institutions, if CEO had incentives from share options (board control?); banks if they had low tier 1 capital (US 1992-2005)
- Which firms use ERM? Energy firms (Canada, 2001)
- What positively affects stage of ERM? CRO; CEO/CFO encouragement, high % independent board members, big 4 auditor, banking or insurance, not US-based firm (US 2004)

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There are different aspects to ERM

15 international banks, 2006-07

Compliance champion

Modelling expert

Strategic adviser
Calculative sceptic

Strategic controller
Calculative enthusiast

Mikes (2009)

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And probabilistic modelling is difficult!

- Banks' VaR models are too conservative but understate volatility *(Berkowitz & O'Brien, 2001)*
- Still too conservative and (if using historical simulation) little help in predicting volatility of future trading revenue *(Perignon & Smith, 2009)*
- Goldman Sachs 2007: 25-standard deviation moves, several days in a row: see *Dowd et al (2008)*
- Turner (2009): misplaced reliance on sophisticated maths
- Haldane (2012): remove internal models from capital setting?

Graham (2011): "The great 99.5th percentile swindle" (GIRO)

While modelling firm value is even more difficult than the balance sheet

- Need to include value of goodwill – and 'demand' risk is difficult to manage
- And put option to default
- Include elasticity of demand for premium level compared to market *(Daykin & Hey, 1990)*
- US general insurers who are less risky charge higher prices *(Sommer, 1996)*
- How easy is to model shareholder value as distinct from solvency, profit or embedded value?

Some evidence from UK insurers

- Survey of UK life insurers 2004: top reasons for ERM were:
  - Good business practice, FSA compliance
  - And, for mutuals, FSA compliance came top
- Walker suggested board risk committees (BRCs) for forward-looking risk perspective, based on main prudential risks
- In practice, BRCs look at all risks: consistent with ERM
- Compliance element always present, sometimes dominant
- 21 listed insurers: 17 CROs – 7 actuaries, 5 accountants
- *O'Brien (2011)*

Some reflections

- ERM looks very ambitious
- Non-financial firms often have a different structure of risk management
- ERM is based on firm value but the impetus may come from regulators, who are interested in solvency, easier to model
- Link between ERM and value not firmly established
- Firms can learn from ERM but not a panacea