Original Article

Governance indicators as determinants of operational risk

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ABSTRACT **A country-level model is presented whereby operational loss severity is explained in terms of the size of the economy and governance indicators. Estimation and simulation results show that the average severity of operational losses is positively related to the size of the economy as measured by GDP and that improvement in governance indicators leads to a reduction in the severity of losses. The effect of governance indicators on operational risk can be attributed to the fact that these indicators pertain to the provision of deterrence against crime and to corporate governance, which has implications for internal controls within firms.**
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INTRODUCTION

Operational risk is the risk of (operational) losses resulting from the failure of people, processes, systems and from external factors. Many high-profile operational loss events have materialized as a result of a combination of the failure of people and processes/systems. In plain language, they have resulted from the actions of employees who committed fraud (hence the failure of people) in the absence of strict controls and monitoring systems (hence the failure of processes/systems). The failure of Barings Bank in 1995 was caused by this combination of failures.

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Likewise, Arnold *et al* (2008) attribute the US$7.2 billion loss endured by Societe Generale in January 2008 (due to unauthorised trading) to moral hazard and the lack of internal controls. The lack of external controls (such as regulatory failure, which is an external factor) has also been a contributory factor to some high-profile loss events. For example, the failure of the US Securities and Exchange Commission to act against Bernard Madoff allowed him to run a Ponzi scheme that cost investors in his hedge fund some US$50 billion. Madoff managed to do that not only because of the lack of regulatory oversight but also because of 'fraudulent internal controls' (Chernobai *et al*, 2011).

The empirical literature on operational risk, particularly the determinants of operational losses, is rather thin – this is not surprising for at least two reasons. The first is the lack of

good-quality data, given the secrecy with which firms treat their operational losses. The second is the difficulty of modelling operational risk because the causes of operational losses are extremely heterogeneous, as they include bribes, compensation and termination issues, discrimination, forgery, theft, insider trading, incorrect client records, money laundering, terrorism, unlicensed activities and regulatory non-compliance. For these reasons, Chernobai *et al* (2011) point out that 'current academic research that sheds light on the determinants of operational risk is very limited'.

The few empirical studies of the determinants of operational risk have been done at a firm level. In these studies the frequency and/or severity of operational losses are specified in terms of firm-specific factors as well as economy-wide factors, including the state of the economy and the regulatory environment. The firm-specific factors invariably pertain to the quality of controls within a firm. As corporate governance has direct implications for risk management and the quality of internal controls, firm-specific corporate governance variables are used as explanatory variables as in Chernobai *et al* (2011).

Unlike Chernobai *et al* (2011), this is a country-level study of the relation between governance and operational risk using a cross-sectional sample of the operational losses endured by over 4000 firms operating in 53 countries that have different degrees of development, legal systems, rules, political systems and institutions. Cross-country differences with respect to these characteristics and others are likely to lead to differences in the frequency and severity of the operational losses incurred by firms operating in different countries. To extrapolate the effects of corporate governance and other factors from a firm level to a country level, we use (as explanatory variables) country-level governance indicators, specifically the worldwide governance indicators prepared by the World Bank (Kaufmann *et al*, 2010). We start by specifying the model and rationalising the specification in terms of theory, intuition and existing empirical evidence.

MODEL SPECIFICATION

The basic model is specified as follows:

$$LOSS_i = \alpha + \beta GDP_i + \sum_{j=1}^{6} \phi_{ij} GOV_{ij} + \varepsilon_i \quad (1)$$

where $LOSS_i$ is the average operational loss incurred by firms operating in country i, GDP_i is the gross domestic product of country i (a proxy for economic size) and GOV_{ij} is governance indicator j in country i. The inclusion of GDP as an explanatory variable follows from the hypothesis that big operational losses occur in countries with big economies, which may sound intuitive.[1] Research on the relation between size and operational risk has been confined to the underlying firm size, given that the basic indicators approach (BIA) to the measurement of regulatory capital against operational risk under Basel II is based on the assumption that operational losses are related to firm size. Under the BIA, regulatory capital against operational risk is calculated as 15 per cent of the average gross income over the previous 3 years.

Chernobai *et al* (2011) use size as an explanatory variable for operational risk because the accounting literature reveals that small firms tend to have weaker internal controls, which means that small firms are more likely to experience operational losses than large firms. Murphy *et al* (2004) attribute the size effect to economies of scale and reputational effects. Jobst (2007) argues that relating operational risk exposure to business volume amounts to an incomplete regulatory measure that engenders misleading conclusions about operational risk exposure and the associated capital charges. The effect of size has also been examined by Shih *et al* (2000), Aue and Kalkbrener (2007), Wei (2007), Moosa and Silvapulle (2012) and Moosa and Li (2012a, b).

The empirical evidence on the relation between operational losses and firm size is far from conclusive. The mixed results are to be expected, given that it is possible to present plausible arguments for why we should expect

bigger firms to endure more frequent and/or severe losses, and vice versa. On a country level, however, it is more plausible to envisage a positive rather than negative relation between the size of the economy and the operational losses endured by the firms operating in that economy.

Corporate governance systems are shaped by the legal system and cultural factors. La Porta *et al* (1998) explain the connection between the legal system and corporate governance by suggesting that 'legal systems matter for corporate governance' and that 'firms have to adapt to the limitations of the legal system that they operate in'. Anderson (2010) argues that 'there is an enormous array of source material when considering the strength or otherwise of any given code of Corporate Governance' and that 'local laws, customs and cultures dictate approaches to Corporate Governance and colour the manner in which it is received by boards of directors, investors and other stakeholders'.

By considering the description of corporate governance, the connection with operational risk becomes quite conspicuous. The failure of corporate governance has been suggested as an explanation for financial scandals and the global financial crisis. For example, Morrison (2005) argues that 'there is a general consensus that the accounting scandals which arose in the early years of this century in the United States were evidence of failures of US corporate governance'. Anderson (2010) points out that while corporate governance alone is not the cause of the global financial crisis, 'corporate governance could have prevented some of the worst aspects of the crisis had effective governance operated throughout the period of time during which the problems were developing and before they crystallised'. He adds that 'effective corporate governance could have helped to reduce the catastrophic impacts that the global and national economies are now suffering'.

If corporate governance is a determinant of internal controls, it must be related to operational risk. Chernobai *et al* (2011) conclude that most operational loss events can be attributed to a weak internal control environment. They draw extensively from the accounting literature in selecting firm-specific explanatory variables for operational risk because the accounting literature has revealed that several firm characteristics are associated with weak internal controls over financial reporting (for example, Ashbaugh-Skaife *et al*, 2007; Doyle *et al*, 2007; Elbannan, 2009). Another set of explanatory variables are identified by the accounting literature on earnings manipulation and accounting restatements, which highlight the role of board characteristics (for example, Dechow *et al*, 1996; Burns and Kedia, 2006; Efendi *et al*, 2007). Chernobai *et al* include, as determinants of operational risk, measures of internal and external governance 'since misreporting may indicate a lack of control', which is 'consistent with the role of senior management oversight and accountability in enforcing risk management controls'.

Chernobai *et al* (2011) distinguish between internal corporate governance (as measured by board characteristics) and external corporate governance, arguing that while the relation between internal corporate governance and internal controls is intuitive, external corporate governance could play a role. On external corporate governance, Bertrand and Mullainathan (2003) show that when shielded from an open market for corporate control, managers are reluctant to perform cognitively difficult tasks such as closing old plants, opening new plants or bargaining with suppliers and labour unions. Elbannan (2009) finds that firms with more anti-takeover provisions, as proxied by the Gompers *et al* (2003) G-index, are more likely to suffer from weakness in internal controls.[2]

Six governance indicators are considered – these are arguably the country-level equivalent of the firm-level corporate governance and internal control variables. The indicators, which are prepared by the World Bank, are the following:

1. Voice of accountability (VOA), which reflects perceptions of the extent to which a

country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and freedom of press.
2. Political stability (POS), which reflects perceptions of the likelihood that the government will be destabilised or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.
3. Government efficiency (GOE), which reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressure, the quality of policy formulation and implementation and the credibility of the government's commitment to such policies.
4. Regulatory quality (REQ), which reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
5. The rule of law (ROL), which reflects perceptions of the extent to which people have confidence in and abide by the rules of society – in particular the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence.
6. Control of corruption (COC), which reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests.

Governance indicators are related to (or they are determinants of) operational risk because they include law and order and other measures of deterrence against crime and corruption as well as measures of regulatory quality. It is typically implied that the characteristics measured by these indices are more pronounced in developed than in developing countries. For example, developing countries are often portrayed as needing financial regulation, prudential supervision, governance, anti-corruption measures and legal reform (for example, Rodrik, 2001). It is wrong, however, to think that these indicators are always better for developed countries than for developing countries. Table 1 is a list of specific operational loss events classified under the categories suggested by the Basel Committee on Banking Supervision (BCBS, 2004; Moosa, 2007), as well as the governance indicators they are related to.

DATA AND MEASUREMENT ISSUES

Data on the operational losses endured by firms across all sectors worldwide were obtained from the Fitch (First) qualitative database, which contains long write-ups and useful information on loss events obtained from multiple sources. This database provides a comprehensive analysis of the circumstances under which loss events occur, but no supplementary data on the underlying firms are provided. The focus of the qualitative databases of operational losses is not on capturing every event that takes place but rather to examine events that are of greater relevance and interest to subscribers. The data sample comprises 4388 loss events covering the period 1975–2010 and 53 countries.[3] Data on GDP were downloaded from the website of the World Bank.

Data on governance indicators, which are prepared for over 200 countries from data on broad dimensions of governance, were obtained from the World Bank (Kaufmann *et al*, 2010).[4] The governance indicators are calculated from data on perceptions of governance from a wide variety of sources, which are organised into six clusters. For each of these clusters, the unobserved components model is used to (i) standardise the data from these very diverse sources into comparable units, (ii) construct an aggregate indicator of governance as a weighted average of the underlying source variables and (iii) construct margins of error that reflect the unavoidable imprecision in measuring governance. It is noteworthy that these governance indicators are measured in a way that corresponds to the definition of governance as

Table 1: Operational loss events and related governance indicators

Event	*BCBS category*	*Related governance indicator*
Account churning	CPBP	ROL, COC,GOE
Account takeover and impersonation	IFRD	ROL, COC,GOE
Aggressive sales	CPBP	REQ, COC
Breach of privacy	CPBP	ROL
Bribes and kickbacks	IFRD	ROL, COC, GOE
Compensation and termination issues	EPWS	ROL, VAC
Computer hacking	EFRD	ROL
Credit fraud	IFRD	ROL, COC, GOE
Discrimination	EPWS	ROL, POS, GOE
Disputes over advisory services	EPWS	ROL
Embezzlement	IFRD	ROL, COC, GOE
Extortion	IFRD	ROL, GOE
Failed mandatory reporting obligations	EDPM	REQ, GOE
Forgery	IFRD	ROL, GOE
Hardware problems	BDSF	GOE
Health and safety issues	EPWS	REQ, GOE
Insider trading (not on firm's account)	IFRD	ROL, COC, GOE
Insider trading on firm's account	CPBP	ROL, COC, GOE
Intentional mismarking of position	IFRD	COC
Malicious destruction and misappropriation of assets	IFRD	ROL
Market manipulation	CPBP	REQ
Missing and incomplete legal documents	EDPM	GOE
Money laundering	CPBP	ROL, COC, GOE
Natural disasters	DTPA	GOE, VAC
Non-client counterparty disputes	EDPM	ROL
Product defects	CPBP	ROL, REQ
Robbery	IFRD	ROL
Tax non-compliance	IFRD	REQ, ROL
Telecommunication	BDSF	GOE
Terrorism	DTPA	POS, VAC, ROL
Unapproved access to accounts	EDPM	ROL, COC
Unauthorised and unreported transactions	IFRD	ROL, COC
Unlicensed activity	CPBP	ROL, COC
Utility disruption	BDSF	GOE
Utility outage	BDSF	GOE
Vandalism	DTPA	ROL, POS, VAC
Violation of anti-monopoly rules and regulations	EPWS	REQ, POS

Notes: BCBS event types are IFRD: internal fraud, EFRD: external fraud, EPWS: employment practices and workplace safety, CPBP: clients, products and business practices, DTPA: damage to physical assets, BDSF: business disruption and system failures, EDPM: execution, delivery and process management.
Governance indicators are VAC: voice of accountability, POS: political stability, GOE: government efficiency, REQ: regulatory quality, ROL: rule of law, COC: control of corruption.

'the manner in which power is exercised in the management of a country's economic and social resources for development'.

The distribution of the loss events with respect to country and year is rather skewed, with concentration in the most recent period

(when operational risk became a 'brand name') and particularly in the United States and the United Kingdom. Thus the regression Equation (1), as in a typical cross-sectional exercise, is based on averages.[5] The dependent variable is the average loss, calculated as the ratio of total loss amount in dollars to the number of loss events. This measure is used in preference to the alternatives of the maximum or total loss amount for reasons pertaining to the nature of operational risk and the loss data collection process. Unlike market risk, which is measured in terms of the standard deviation of return, operational risk is measured in terms of two parameters: frequency and severity. These parameters can be combined to come up with average severity, which is the dependent variable used in this study. Furthermore, events are distributed unevenly across countries, with more than 2000 observations for the United States and as a few as 10 for some developing countries. The use of the average loss helps smooth out the skewed distribution and gives an indication of what happens in country *X* when an 'average' loss event strikes. Using the largest loss for each country is inappropriate because this amounts to ignoring one of the two parameters, frequency. It is also likely that the results will be subject to selection bias because picking the maximum values boils down to estimating a regression equation based on outliers only.

Using the total loss amount is also inappropriate because frequency is ignored. Compare, for example, Australia, the United States and the United Kingdom. Using total loss amounts would show that the incidence of operational losses in the United States is 92 times that in Australia and 9 times as it is in the United Kingdom. This, however, is not what happens on average. It is impossible to explain cross-sectional differences in total amounts or maximum values in terms of GDP and governance indicators, notwithstanding the issue of bias and outliers.

The size variable measure is an average of annual GDP over the period 2000–2010. This is appropriate because what we need is only an indication of the relative sizes of the economies covered by the sample. Even an ordinal measure of economic size would do the job. As most of the loss events are recorded for the period since 2000, the averages match to a certain degree. Likewise, governance indicators are calculated as the average of available data. A reasonable suggestion here is that the exclusion of the observations for the period before 2000 would improve the matching of data. The problem is that this would reduce the sample (not only in terms of events but more importantly in terms of countries), particularly because a small number of loss events are recorded for some countries.

Another concern is that the loss data, given its source, is likely focussed on the developed world, and in that group there may not be that much variance in the governance indicators. While it is plausible to suggest that the governance indicators do not show as much variability within developed countries as they do between developed and developing countries, some variation within the group of developed countries can be observed. For example, it is a well-known fact that corruption is much lower in northern Europe (particularly Scandinavia) than in southern and eastern Europe. The control of corruption index, which assumes values ranging between −2.5 (weakest) and 2.5 (strongest), is as follows for a selection of European countries in 2011: Denmark (2.42), Finland (2.19), Germany (1.68), Czech Republic (0.32), Croatia (0.02), Italy (−0.01) and Greece (−0.15). These figures show significant variation in the control of corruption index. Significant variation is also found in other governance indicators, including political stability (POS). For the same countries the POS index in 2011 ranged between 1.39 for Finland and −0.06 for Greece – on a scale ranging between −2.5 (weak) and 2.5 (strong) – with a coefficient of variation of 60.9 per cent.[6] In any case, the sample lumps up developed and developing countries, hence it should exhibit significant variation in governance indicators.

EMPIRICAL RESULTS

The starting point is to present the results of estimating Equation (1), which are reported in Table 2, including the estimated values of the coefficients, their standard errors, *t*-statistics and the *P*-values. While the coefficient on GDP is significantly positive, as expected, no coefficient on any of the governance variables is significant and the associated standard errors are quite high. This is likely to be due to multicollineatrity, which can be confirmed by examining the correlation matrix in Table 3. High correlation can also be seen in Figure 1, which is a plot of the six governance indicators sorted by magnitude.

Also reported in Table 2 are the results of Ramsey's (1969) *RESET* test for specification and three non-nested model selection tests for the linear versus non-linear specifications. The *RESET* test is based on a regression of the of the error term of Equation (1) on the explanatory variables and the squared estimated values of the dependent variable. Since the test statistic has a $\chi^2(1)$ distribution, it is insignificant at the 5 per cent level, which means that the linear specification cannot be rejected against the alternative of a non-linear specification. For the same purpose, three non-nested model selection tests are used to choose between the liner specification in Equation (1) and a semi-logarithmic non-linear specification. These are the Cox *N*-test, the adjusted Cox *NT*-test, Wald-type *W*-test suggested by Pesaran (1974) and Godfrey and Pesaran (1983). All of the test statistics have a *t* distribution. Two numbers are reported for each test statistic: if the first number is significant, it means that the linear specification is rejected in favour of the non-linear specification; if the number in parentheses is significant, the non-linear specification is rejected in favour of the linear specification. The three tests show that the linear specification cannot be rejected in favour of the non-linear specification, but not the other way round. Hence, the remaining tests and the simulation exercise will be based on the linear specification.

Table 2: Estimation results of Equation (1)

	Estimated value	*Standard error*	*t-statistic*	*P-value*
α	12.589	4.481	2.81	0.007
GDP	0.678	0.296	2.28	0.027
VAC	−0.400	0.587	−0.68	0.500
POS	−0.425	0.639	−0.66	0.510
GOE	−1.0304	1.798	−0.57	0.569
REQ	−0.831	1.303	−0.63	0.527
ROL	−0.635	1.502	−0.42	0.674
COC	1.747	1.433	1.22	0.229
R^2	0.26	—	—	—
$\overline{R}^2$	0.14	—	—	—
F(7,45)	2.24	—	—	0.229
RESET[a]	2.25	—	—	—
N[b]	−1.72 (−15.78)	—	—	—
NT[c]	−1.58 (−18.89)	—	—	—
W[d]	−1.50 (−17.40)	—	—	—

[a]*RESET* is Ramsey's (1969) test for functional form. The test statistic is distributed as χ^2 with 1 degree of freedom.
[b]*N* is the Cox non-nested model selection test derived in Pesaran (1974). The test statistic has a *t* distribution.
[c]*NT* is the adjusted Cox non-nested model selection test derived in Godfrey and Pesaran (1983). The test statistic has a *t* distribution.
[d]*W* is the Wald-type test proposed by Godfrey and Pesaran (1983). The test statistic has a *t* distribution.

Table 3: Correlation matrix of governance indicators

	VAC	*POS*	*GOE*	*REQ*	*ROL*	*COC*
VAC	1.00	—	—	—	—	—
POS	0.77	1.00	—	—	—	—
GOE	0.84	0.87	1.00	—	—	—
REQ	0.83	0.85	0.96	1.00	—	—
ROL	0.83	0.89	0.97	0.95	1.00	—
COC	0.82	0.88	0.97	0.95	0.97	1.00

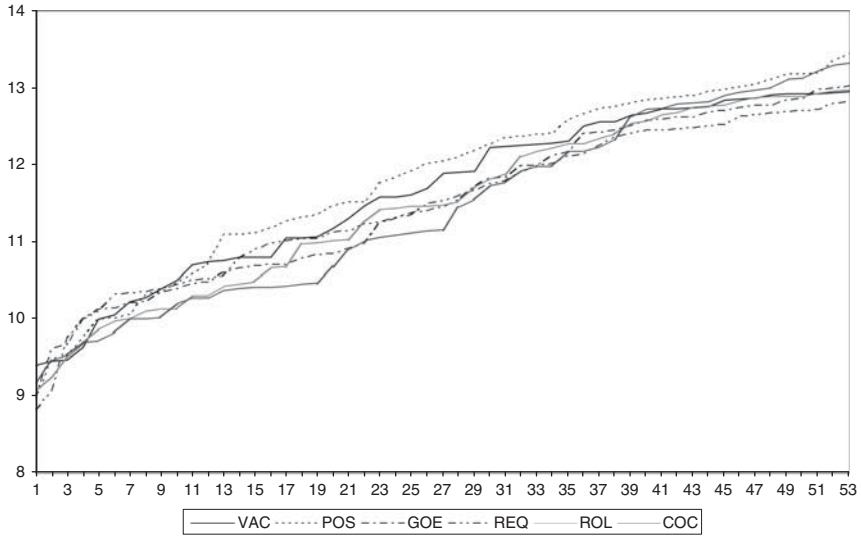

Figure 1: Sorted values of governance indicators.

Table 4: Results of estimating Equation (2)

	VAC	*POS*	*GOE*	*REQ*	*ROL*	*COC*
α	8.991	8.953	8.999	10.119	8.207	7.142
	(2.37)	(2.39)	(2.43)	(2.59)	(2.30)	(2.02)
GDP	0.507	0.407	0.576	0.565	0.536	0.451
	(2.02)	(1.98)	(2.21)	(2.19)	(2.09)	(2.17)
GOV	−1.115	−1.005	−1.194	−1.284	−1.089	−0.923
	(−3.43)	(−3.47)	(−3.56)	(−3.60)	(−3.52)	(−3.21)
R^2	0.20	0.20	0.21	0.21	0.21	0.18
$\overline{R}^2$	0.16	0.17	0.17	0.18	0.17	0.15
$F(2,50)$	6.19	6.34	6.66	6.79	6.50	0.14

Instead of Equation (1) that includes the six governance indicators, a model is specified that contains one indicator at a time. This model is written as

$$LOSS_i = \alpha + \beta GDP_i + \phi_i GOV_i + \varepsilon_i \quad (2)$$

Apart from the benefit of circumventing multicollinearity, Equation (2) allows us to find out which of the six governance indicators has the biggest effect on the severity of operational losses. The results of estimating Equation (2) are presented in Table 4. They show that the coefficient on GDP is significantly positive in all cases, thus confirming the size effect. The coefficients on the individual governance indicators are significantly negative, implying (as expected) that improvement in governance reduces loss severity.

In order to find out which of the six governance indicators is the most important for operational risk, we conduct some simulation exercises. Starting from a value of 10 for loss severity, we should expect it to rise or fall depending on whether the positive size (GDP) effect is bigger or smaller than the negative governance effect. In the first exercise, we allow GDP to grow at 2 per cent (per period) while all of the governance indicators improve at the

rate of 1.5 per cent and simulate loss severity over 53 periods. The results of this simulation exercise are presented in Figure 2, showing that improvement in political stability (POS) is more powerful in reducing the severity of losses than any of the other indicators.

Figure 3 shows the results of the second simulation exercise where it is assumed that we start with a big improvement in governance indicators (as each of them rises by 6.25 per cent over one period), subsequently they improve steadily at the rate of 0.7 per cent per period.

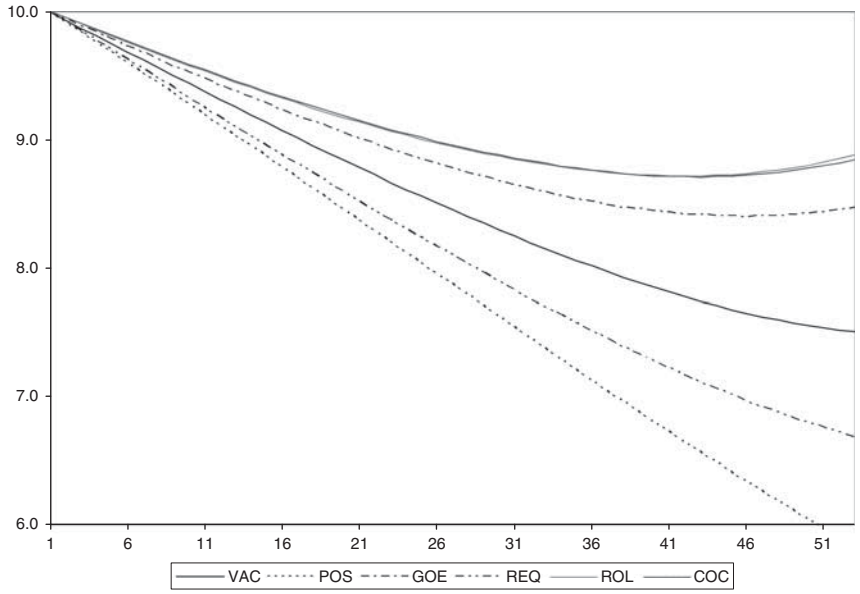

Figure 2: Simulated loss severity over time (Simulation 1).

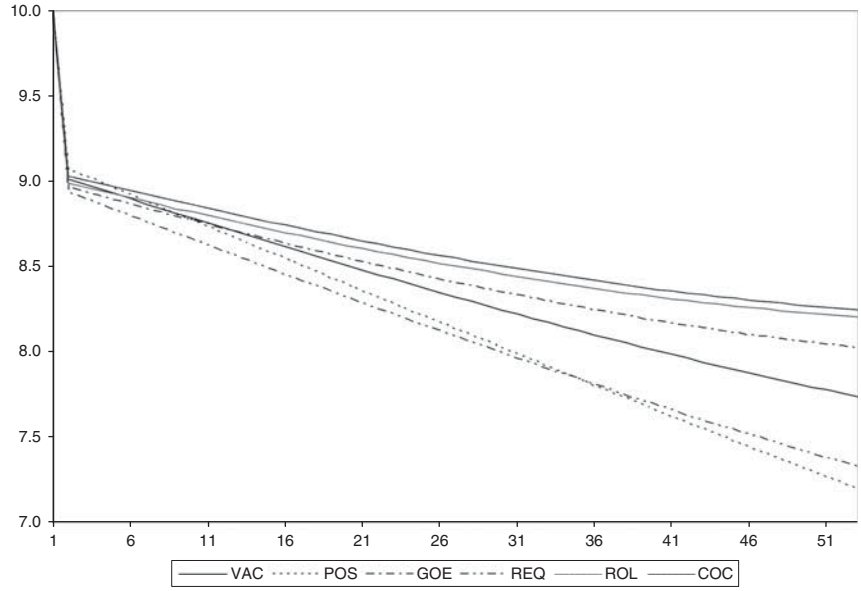

Figure 3: Simulated loss severity over time (Simulation 2).

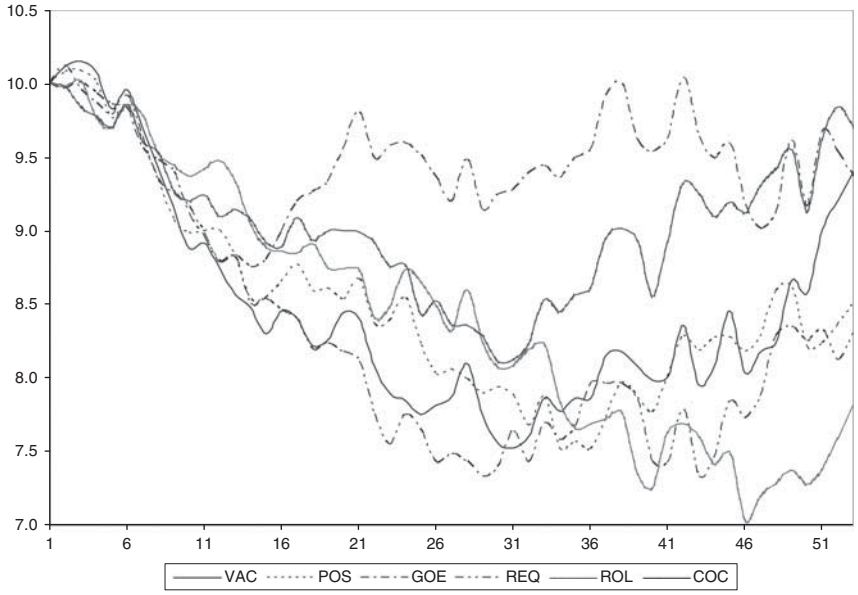

Figure 4: Simulated loss severity over time (Simulation 3).

We can see the immediate big reduction in loss severity, then the reduction becomes gradual as the effect of improvement in governance indicators overwhelms the GDP effect. In Figure 4, the simulation exercise is conducted by assuming that GDP and governance indicators change at random rates. Specifically, it is assumed that GDP grows at rates ranging between 1 per cent and 3 per cent per period while governance indicators improve by 1–2 per cent per period. We can see that while there is a reduction in loss severity over time, the reduction is reversed more substantially for some indicators than others. We have to remember, by going back to the results of estimating Equation (2), that governance indicators have quantitatively more significant effect on loss severity than GDP, which makes sense.

Table 5 summarises the results of the three simulation exercises, showing by how much loss severity is reduced for each of the governance indicators. When governance indicators improve at the same rate, as in Simulation 1 and Simulation 2, improvement in POS brings about the biggest reduction in operational loss severity. But when they improve at different rates, this is not necessarily the case. In Simulation 3, the biggest reduction in the severity of operational losses results from improvement in the rule of law (ROL). The relative importance of POS may sound strange because it is not directly related to many of the operational loss events listed in Table 1. However, improvement in POS is conducive to improvement in everything else – after all political stability is a necessary condition for good scores on the other indicators.

Table 5: Change in loss severity in three simulation exercises

Indicator	*1*	*2*	*3*
VAC	−24.9	−22.6	−6.0
POS	−47.7	−28.1	−15.0
GOE	−15.3	−19.8	−6.3
REQ	−33.1	−26.8	−16.9
ROL	−11.2	−18.0	−21.9
COC	−11.6	−17.5	−3.0

CONCLUSION

In this study, we conduct a country-level analysis of a total of 4388 operational loss events of

various types recorded over three decades in 53 countries. Estimation and simulation results show that the severity of operational losses is positively related to the size of the economy as measured by GDP. The underlying rationale for this result is that big losses are incurred by firms operating in big economies because bigger transaction amounts are involved. The results also show that improvement in governance indicators lead to a reduction in the severity of operational losses because these indicators pertain to law and order and corporate governance with all of their implications for operational risk.

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NOTES

1 Otherwise GDP may be portrayed as a control variable that is needed to examine the effect of governance indicators.
2 A higher G-index means that the firm has a larger number of anti-takeover provisions. This is typically taken to be an indicator of weaker external governance, which is positively related to operational risk.
3 The countries covered by the sample are Algeria, Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Denmark, Finland, France, Germany, Greece, Guatemala, Hong Kong, India, Indonesia, Iraq, Israel, Italy, Japan, Jordan, Korea, Kuwait, Luxembourg, Malaysia, Mexico, Netherlands, New Zealand, Nigeria, Norway, Pakistan, Panama, Peru, Poland, Portugal, Russia, Saudi Arabia, Senegal, Singapore, South Africa, Spain, Sweden, Switzerland, Tanzania, Thailand, UAE, the United Kingdom, Uruguay, the United States and Zimbabwe.
4 The update data for the six indicators, together with the underlying source of data are available on www.govindicators.org.
5 Of course there is the alternative of using panel estimation but this is not possible because there is no regular time series on operational losses in the sense of having observations at regular intervals that can be matched to observations on GDP and governance indicators.
6 It may be surprising to find so much variation in the POS among European countries, given the description of POS as 'the likelihood that the government will be destabilised or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism'. One may tend to think that the only European country where there was any likelihood of a violent change in government was Spain immediately after Franco's death. This means that the likelihood of something like this happening is rather low, implying that European countries (and developed countries in general) should have high POS scores with low cross-country variation. But this is not what the figures tell us. If, however, we identify the components from which the POS index is measured, we will not be surprised to find such variation. These components include orderly transfers, armed conflict, violent demonstrations, social unrest, international tensions, terrorist threat, frequency of political killings, frequency of disappearances, frequency of tortures, political terror scale, security risk rating, violent actions by underground political organisations, violent social conflicts, external public security and government stability. No wonder that Greece has a low score of −0.06.

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