INFOSEC INTELLIGENCE AND REGULATORY FILINGS

AN INVESTIGATION OF THE INFORMATION SECURITY CONTENT OF MANDATORY SEC DISCLOSURES

Chris Walsh

Monday, March 4, 2013

Motivation

- We all know incidents happen to everyone, sooner or later
- Some are more important than others. Some <u>really</u> matter.
- Where impact does matter, it's nice to inform those impacted.
  - State breach laws for consumers
  - SEC regulatory disclosures for investors and the public at large
- Gives stakeholders information upon which they can act

OUR FOCUS TODAY IS ON SEC REGULATORY DISCLOSURES AND THE INFO THEY CAN PROVIDE US IN INFORMATION SECURITY

Monday, March 4, 2013

Among information security practitioners, it's a truism that incidents happen to everyone, and some are very important. Since the effects can fall on others, it's nice to let them know, thus giving them the information they need to act. This is reflected in state breach laws, where if I expose your name and SSN I need to tell you. It's also reflected in some recently-refined SEC guidance, where disclosures related to "cyber incidents and risk" are specifically called out. Today we're going to see whether this new guidance has actually led to more disclosure, what kind of disclosure it has and has not led to, and where things seem to be heading from here.

New SEC guidance: October 13, 2011

Makes disclosure recommendations in several areas:

RISK FACTORS – "Registrants should disclose the risk of cyber incidents if these issues are among the most significant factors that make an investment in the company speculative or risky."

MD&A* – "Registrants should address cybersecurity risks and cyber incidents in their MD&A if the costs or other consequences associated with one or more known incidents or the risk of potential incidents represent a material event, trend, or uncertainty that is reasonably likely to have a material effect on the registrant's results of operations, liquidity, or financial condition or would cause reported financial information not to be necessarily indicative of future operating results or financial condition."

OTHER – Description of business, legal proceedings, financial statements, disclosure controls may be impacted

This updated guidance suggests an increased concern that information security risks have increased in potential severity or have been underreported to date.

* "Management discussion and analysis"

For our purposes today, the focus is on the so-called "Risk Factors" appearing in Annual Reports.

“cyber” disclosures tend to be here

Table of Contents

EMC CORPORATION

		Page No.
	PART I	
ITEM 1.	Business	3
ITEM 1A.	Risk Factors	11
ITEM 1B.	Unresolved Staff Comments	20
ITEM 2.	Prope	
ITEM 3.	Legal	
ITEM 4.	Minc	
ITEM 5.	Mark	
ITEM 6.	Select	
ITEM 7.	Mana	
ITEM 7A.	Quant	
ITEM 8.	Finan	
ITEM 9.	Chan	
ITEM 9A.	Contr	
ITEM 9B.	Other	
ITEM 10.	Direc	
ITEM 11.	Execu	
ITEM 12.	Secur	
ITEM 13.	Certai	
ITEM 14.	Princi	
ITEM 15.	Exhib	
Signatures		

ITEM 1A. RISK FACTORS

The risk factors that appear below could materially affect our business, financial condition and results of operations. The risks and uncertainties described below are not the only risks and uncertainties facing us. Our business is also subject to general risks and uncertainties that affect many other companies.

Our business could be materially adversely affected as a result of general economic and market conditions.

We are subject to the effects of general global economic and market conditions. If these conditions remain challenging or deteriorate, our business, results of operations or financial condition could be materially adversely affected. Possible consequences from uncertainty or further deterioration due to the recent global macroeconomic downturn on our business, including insolvency of key suppliers resulting in product delays, inability of customers to obtain credit to finance purchases of our products, customer insolvencies, increased risk that customers may delay payments, fail to pay or default on credit extended to them, and counterparty failures negatively impacting our treasury operations, could have a material adverse effect on our results of operations or financial condition.

[…]

Cybersecurity breaches could expose us to liability, damage our reputation, compromise our ability to conduct business, require us to incur significant costs or otherwise adversely affect our financial results.

We retain sensitive data, including intellectual property, proprietary business information and personally identifiable information, in our secure data centers and on our networks. We face a number of threats to our data centers and networks of unauthorized access, security breaches and other system disruptions. It is critical to our business strategy that our infrastructure remains secure and is perceived by customers and partners to be secure. Despite our security measures, our infrastructure may be vulnerable to attacks by hackers or other disruptive problems, such as the sophisticated cyber attack on our RSA division that we disclosed in March 2011. Any such security breach may compromise information stored on our networks and may result in significant data losses or theft of our, our customers’, our business partners’ or our employees’ intellectual property, proprietary business information or personally identifiable information. In addition, we have outsourced a number of our business functions to third party contractors, and any breach of their security systems could adversely affect us.

Monday, March 4, 2013

For those who don’t know, an Annual Report (or “10-K”) looks like this - very standardized, form

The order in which things are reported is standardized, so for Risk Factors we’d always look to Part 1, Item 1A, in which there will be a list of risks, most likely with some explanation of each one. Here, for example EMC (to which we will return later) talks about how “Cybersecurity breaches” could do various things that would adversely affect the company’s financial results.

How can we assess broad impact?

In principle

- Look at all relevant filings, before and after.
- Perform textual analysis.
- Do filings differ?

Monday, March 4, 2013

So recalling that our goal today is to see whether this new guidance has actually led to more disclosure, what kind of disclosure it has and has not led to, and where things seem to be heading from here, how do we assess broad impact? In principle we could look at every filing for a year before and after the guidance, do some text-mining or other automated analysis, and present a comprehensive before and after picture. But, there are 30,000 filings so this is hard (for reasons I would love to discuss, but don't have time for - find me in the hall).

I took a more tractable approach and looked at a subset of the 30,000.

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We'll look at Fortune 500 subset

Monday, March 4, 2013

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Data

Fortune 500 firms of 2011, 2012

Those filing 10-Ks in 2011, 2012

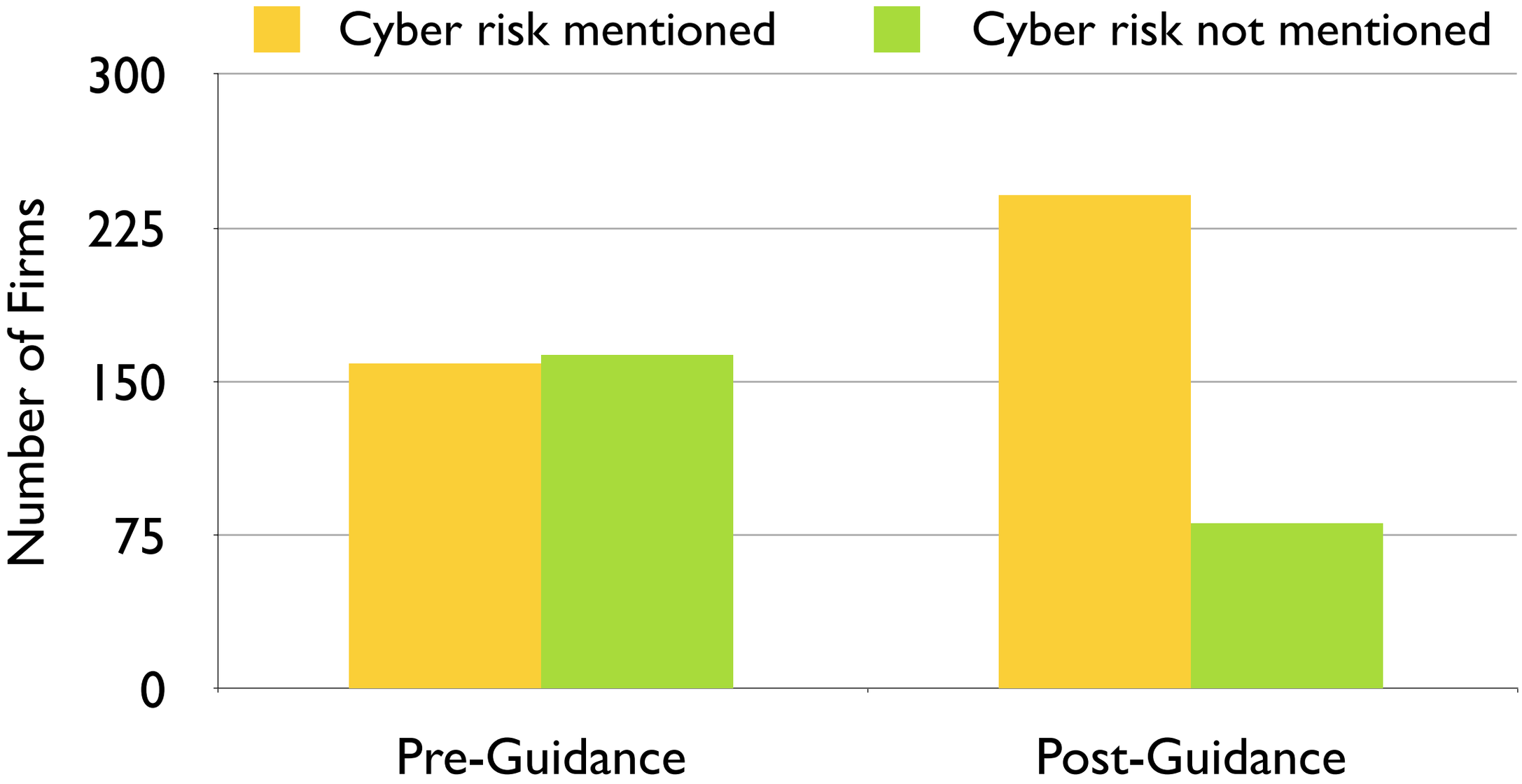
Those with “Risk Factors” in both filings

Resulting dataset has 322 firms, with reports before and after SEC revised guidance was issued

Monday, March 4, 2013

My subset is a group of 322 firms, each of which filed a 10-K with risk factors in 2011 and in 2012 (so, before and after the revised guidance), and was in the Fortune 500 each of those years. Some firms dropped out because they were only in the F500 for one year, or were not publicly traded US firms, but the notion here is that the F500 can teach us something.

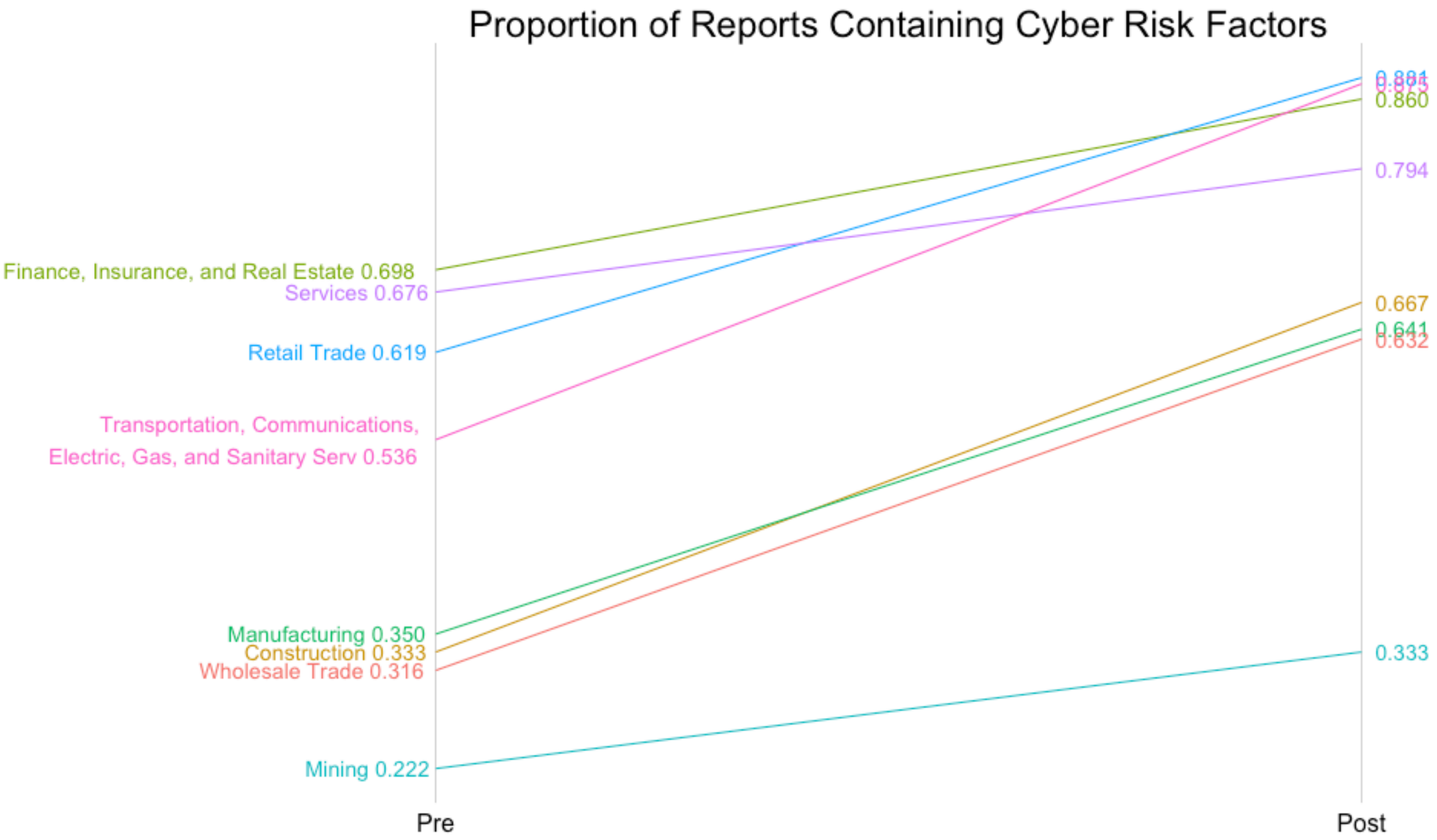
A Quick Graphical Summary



Guidance seems to have made a difference!

In the aggregate, it seems clear that a large proportion of firms chose to add “cyber” risk factors following the release of the guidance.

Reporting Change by Industry



Monday, March 4, 2013

Here, the leftmost vertical line represents the “pre-guidance” reports, and the rightmost, the “post-guidance” reports, with each industry represented by a colored line showing the proportion of reports from that industry containing cyber risk factors both before and after the guidance was issued. The Y-intercept of each line shows where that industry began and ended, with of course the slope indicating the rate of change.

As an example, prior to the guidance, 35% of the “Manufacturing” firms in the sample reported cyber risk factors, while after the guidance this had increased to 64%.

Interestingly, the industry with the greatest rate of change, and the second greatest (by a slim margin) proportion reporting cyber risks, is Transportation, Communications, Electric, Gas, and Sanitary Services (the categories, I should mention, are those of the Bureau of Labor Statistics). Also interesting is Retail Trade eclipsing Finance, Insurance, and Real Estate, despite the “head start” had by the former.

How many firms added which terms?

Word	Count		
cyber	97	reputation	34
attack	66	march	34
sovereign	62	intend	34
confidenti	62	cybersecur	33
european	54	critic	33
data	53	corrupt	33
unauthor	50	theft	32
europ	41	proprietari	32
breaches	41	measur	32
breach	39	august	32
information	37	viruses	31
comput	37		
network	36		
crisi	35		

15 of 25 terms added most often are ‘cyber’ related.

Monday, March 4, 2013

This table shows a count of terms newly appearing in post-guidance risk disclosures, and the number of firms which added them. The terms have been “stemmed” by an algorithm used in text mining, so in some cases the ending portion of a word is cut off. The idea is that terms that are the same analytically are grouped together.

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europ	41	proprietari	32
breaches	41	measur	32
breach	39	august	32
information	37	viruses	31
comput	37		
network	36		
crisi	35		

15 of 25 terms added most often are ‘cyber’ related.

Arguably, 18 of 25 are.

Monday, March 4, 2013

If you actually dig into these reports, as opposed to just summarizing them algorithmically, 3 additional terms are arguably “cyber” related.

Of the top 25 such terms, 15 (shown in black) are cyber related, with an additional three very likely to be. Parenthetically, four of the top 15 seem related to the European debt situation, which may account for the more rapid rise in Finance, Insurance, and Real Estate disclosure length we saw on the previous slide -- all industries care, and now need to report, about cyber, but they do so with varying degrees of verbosity. Finance, Insurance, and Real Estate as an industry may be more exposed to the situation in Europe, so they need to report about it, too.

What is/is not in these disclosures?

Three chosen at random: these show the typical case

One chosen deliberately: this shows an emerging trend

Legend:

Green: the threats

Red: the threat actors

Blue: what is threatened

Purple: possible consequences

Orange: Have attempts occurred?

Magenta: Were they successful?

Example – General Dynamics

"**Our business could be negatively impacted by cyber security events and other disruptions.** As a defense contractor, we face various cyber security threats, including threats to our information technology infrastructure and attempts to gain access to our proprietary or classified information, as well as threats to physical security. We also design and manage information technology systems for various customers. We generally face the same security threats for these systems as for our own. Accordingly, we maintain information security policies and procedures for managing all systems. If any of these threats materialize, the event could cause serious harm to our business, damage our reputation and prevent us from being eligible for future work on sensitive or classified systems for U.S. government customers and could have an adverse effect on our results of operations."

Monday, March 4, 2013

Green: the threats
Red: the threat actors NONE
Blue: what is threatened
Purple: possible consequences
Orange: Have attempts occurred? NONE
Magenta: Were they successful? NONE

This risk factor is entirely new for 2012, and quoted in full. They had no "cyber" disclosure in 2011.

Words in red are those from the "top 25" list. It is, as these things go, of medium length: providing a high-level description of threats, what is threatened, and possible consequences. There is no mention of threat actors, and no mention of whether any actual attempts (successful or otherwise) have been made.

General Dynamics is classified as a "Manufacturing" firm. The average disclosure for Manufacturing firms increased by 5 sentences as we saw earlier. This is a 6-sentence additional risk factor.

Example – Deere & Co.

Security breaches and other disruptions to the Company's information technology infrastructure could interfere with the Company's operations, and could compromise the Company's and its customers' and suppliers' information, exposing the Company to liability which would cause the Company's business and reputation to suffer.

In the ordinary course of business, the Company relies upon information technology networks and systems, some of which are managed by third parties, to process, transmit and store electronic information, and to manage or support a variety of business processes and activities, including supply chain, manufacturing, distribution, invoicing, and collection of payments from dealers or other purchasers of John Deere equipment and from customers of the Company's financial services operations. The Company uses information technology systems to record, process and summarize financial information and results of operations for internal reporting purposes and to comply with regulatory financial reporting, legal and tax requirements. Additionally, the Company collects and stores sensitive data, including intellectual property, proprietary business information, the propriety business information of our customers and suppliers, as well as personally identifiable information of the Company's customers and employees, in data centers and on information technology networks. The secure operation of these information technology networks, and the processing and maintenance of this information is critical to the Company's business operations and strategy. Despite security measures and business continuity plans, the Company's information technology networks and infrastructure may be vulnerable to damage, disruptions or shutdowns due to attacks by hackers or breaches due to employee error or malfeasance, or other disruptions during the process of upgrading or replacing computer software or hardware, power outages, computer viruses, telecommunication or utility failures or natural disasters or other catastrophic events. The occurrence of any of these events could compromise the Company's networks and the information stored there could be accessed, publicly disclosed, lost or stolen. Any such access, disclosure or other loss of information could result in legal claims or proceedings, liability or regulatory penalties under laws protecting the privacy of personal information, disrupt operations, and damage the Company's reputation, which could adversely affect the Company's business.

http://www.sec.gov/Archives/edgar/data/27673/000110465912084562/a12-24291_110k.htm

Monday, March 4, 2013

Green: the threats
Red: the threat actors
Blue: what is threatened
Purple: possible consequence
Orange: Have attempts occurred? NONE
Magenta: Were they successful? NONE

This is a somewhat longer, more detailed, additional disclosure, also from a Manufacturer, describing potential consequences in a more fine-grained manner. In addition to mentioning threats, what is threatened, and possible consequences, in this case there is mention of threat actors, but still no mention of whether any actual attempts (successful or otherwise) have been made.

Example – Waste Management, Inc.

***A cybersecurity incident* could negatively impact our *business and our relationships with customers*.** We use computers in substantially all aspects of our business operations. We also use mobile devices, social networking and other online activities to connect with our employees and our customers. Such uses give rise to cybersecurity risks, including security breach, espionage, system disruption, theft and inadvertent release of information. Our business involves the storage and transmission of numerous classes of sensitive and/or confidential information and intellectual property, including customers' personal information, private information about employees, and financial and strategic information about the Company and its business partners. We also rely on a Payment Card Industry compliant third party to protect our customers' credit card information. Further, as the Company pursues its strategy to grow through acquisitions and to pursue new initiatives that improve our operations and cost structure, the Company is also expanding and improving its information technologies, resulting in a larger technological presence and corresponding exposure to cybersecurity risk. If we fail to assess and identify cybersecurity risks associated with acquisitions and new initiatives, we may become increasingly vulnerable to such risks. Additionally, while we have implemented measures to prevent security breaches and cyber incidents, our preventative measures and incident response efforts may not be entirely effective. The theft, destruction, loss, misappropriation, or release of sensitive and/or confidential information or intellectual property, or interference with our information technology systems or the technology systems of third parties on which we rely, could result in business disruption, negative publicity, brand damage, violation of privacy laws, loss of customers, potential liability and competitive disadvantage.

http://www.sec.gov/Archives/edgar/data/823768/000119312512065370/d260235d10k.htm

Monday, March 4, 2013

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While each of the examples shown so far does contain information tailored to the circumstances of the firm making the disclosure, the language is in all cases somewhat generic and would seem to apply to almost any similar firm. I suppose no firm wants to stand out for disclosing risks others in its industry do not. As has probably become clear, the language in these new disclosures tends to be somewhat stylized, yet still somewhat tailored to the circumstances of each firm.

Notably absent from each of these examples is any information on whether the disclosing firm has ever actually been subject to the threat actions the consequences of which they describe. This is certainly not limited to these examples -- quite the contrary. From the 322-firm sample used here, few acknowledged actual incidents (even though we now from external sources that such incidents had occurred).

Example – Intel 2011

We may be subject to intellectual property theft or misuse, which could result in third-party claims and harm our business and results of operations.

We regularly face attempts by others to gain unauthorized access through the Internet to our information technology systems, such as when they masquerade as authorized users or surreptitiously introduce software. These attempts, which might be the result of industrial or other espionage, or actions by hackers seeking to harm the company, its products, or end users, are sometimes successful. We seek to detect and investigate these security incidents and to prevent their recurrence, but in some cases we might be unaware of an incident or its magnitude and effects.

http://www.sec.gov/Archives/edgar/data/50863/000095012311015783/f56033e10vk.htm

Monday, March 4, 2013

Green: the threats
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In contrast, I'd like to now move to a deliberately-selected example -- a *pre-guidance* disclosure by Intel, which mentions actual historical facts: they get attacked frequently, using various methods, and sometimes it works. The disclosure (in a portion not shown here) goes on to note that should IP theft take place, it could harm the business in various ways, similar to what we saw described in our earlier examples (reputational harm, increased costs, possible legal claims, etc.)

While almost no information security practitioner would be surprised that user impersonation and trojans are used in unauthorized access attempts, this type of disclosure is -- in the reports I examined - rare. (I will discuss in a moment SEC processes and trends that are changing this)

Example – Intel 2012

***Third parties** may attempt to **breach our network security**, which could **damage our reputation and financial results**.*
We regularly face attempts by others to gain unauthorized access through the Internet or introduce malicious software to our IT systems. These attempts—which might be the result of industrial or other espionage, or actions by hackers seeking to harm the company, its products, or end users—are sometimes successful. In part because of the high profile of our McAfee subsidiary in the network and system protection business, we might become a target of computer hackers who create viruses to sabotage or otherwise attack our products and services. Hackers might attempt to penetrate our network security and gain access to our network and our data centers, steal proprietary information, including personally identifiable information, or interrupt our internal systems and services. We seek to detect and investigate these security incidents and to prevent their recurrence, but in some cases we might be unaware of an incident or its magnitude and effects.

http://www.sec.gov/Archives/edgar/data/50863/000119312512075534/d302695d10k.htm

Monday, March 4, 2013

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This is a post-guidance disclosure by Intel, which again mentions actual historical facts: they get attacked frequently, using various methods, and sometimes it works. The disclosure is not as focused on IP theft, and describes other possible targets -- such as PII. Again, the acknowledgment of *actual incident experience* is notable.

SEC reviews filings, leading to change

"[The Corporate Finance Division] selectively reviews filings of new issuers and public companies...to both monitor and enhance compliance with disclosure and accounting requirements.

[...]

The staff members engaged in filing reviews have accounting and disclosure expertise aligned with the industries in their respective review groups. ***Approximately 80 percent of the staff of the Division is assigned to the disclosure review program***

[....]

In the course of a review, the staff will issue comments to a company to elicit better compliance with applicable disclosure requirements. In response to those comments, a company may need to amend its financial statements or other disclosures to provide additional or enhanced information, or may undertake to improve its disclosures in future filings."

http://www.sec.gov/news/testimony/2011/ts1116rk.htm

Monday, March 4, 2013

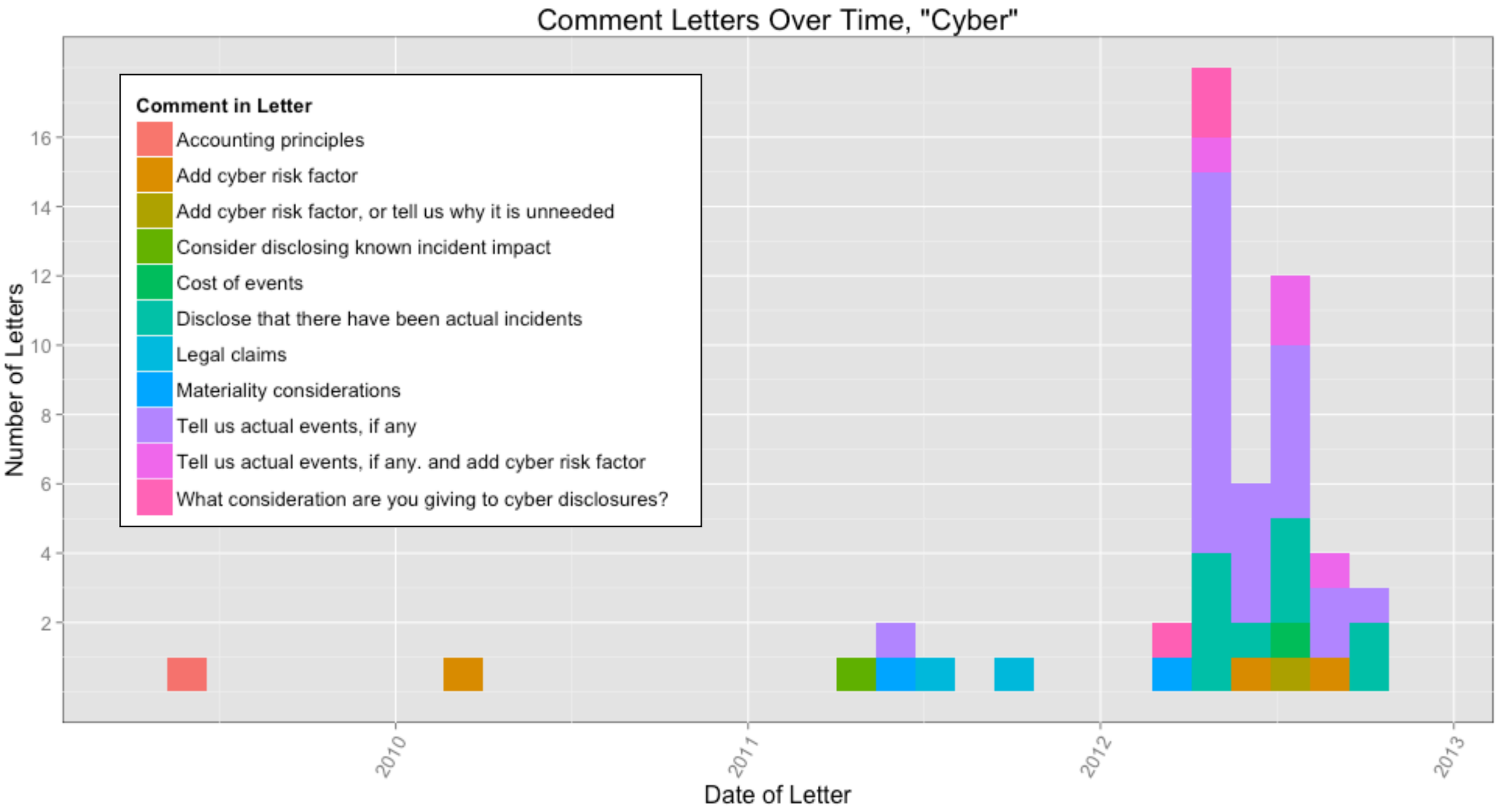
Materials submitted are systematically reviewed.

When there is a question, or an area the SEC wants to see handled differently, etc, they will send the registrant a so-called "Comment Letter", specifying their concerns, and asking for more information, a change in firm behavior w.r.t. reporting, etc. Registrants will either reply or will make changes in their subsequent filings.

By looking at the 10-K filings themselves, and the comment letters issued to registrants, we can see the contours of a new normative equilibrium being established. As indicated previously, that new normative equilibrium will include additional acknowledgement that incidents may happen, that they have indeed happened, and that they sometimes are successful.

The argument will shift to what constitutes materiality, and how it may be assessed. This is where information security practitioners, legal, and finance people will need to develop a shared vocabulary!!

SEC “Comment Letters” as catalyst



Monday, March 4, 2013

In the last 12 months, we’ve seem an increasing number of SEC letters to firms asking them to disclose incidents, and to add “cyber” risk factors, and so on. This includes letters to Amazon, Google, EMC, Wynn Vegas, Wal-Mart, Southwest Airlines, and more. What is happening is that as the SEC reviews, they ask for the firms to provide this information.

When I first looked into this in mid-October 2012, the SEC had made 35 cyber-related comment letters public. As of January 28, 2013 that number had increased to 53 - a 50% increase in 3.5 months.

The vast majority of the newly-available letters:

1. ask registrants to tell the SEC whether they have experienced cyber attacks/incidents,
2 ask them to add a “cyber” risk factor it one isn’t already present in the registrant’s disclosures, and
3. to disclose that actual incidents have occurred (rather than that they “may” occur).

Firms within an industry are aware, I am sure, of each others filings, so will likely engage in herd behavior, leading to much greater disclosure that actual incidents/attacks have occurred. Interestingly, and where I believe the action will be in the future, is over the *materiality* of these incidents. Today, firms such as Wal-Mart and SWA have told the SEC that they have not made certain disclosures because they are not material, with the SEC in effect saying “disclose anyway”. This highlights an interesting tension, and a key point for infosec practitioners -- what some of us think is important isn’t always thought to matter from a business or investor standpoint.

Examples showing this future direction

SEC to Southwest Airlines, April 2, 2012

Risk Factors, page 23
Any failure of the Company to maintain the security, page 27

3. We note that you derive a significant percentage of revenues from internet bookings and rely on third party technology and systems for many of your technology initiatives. We also note that you disclose that customer information is subject to the risk of intrusion, tampering, and theft and that system disruptions could occur. Please tell us whether you have experienced attacks, disruptions, intrusions, tampering or theft in the past and, if so, whether disclosure of that fact would provide the proper context for your risk factor disclosures. Please refer to the Division of Corporation Finance's Disclosure Guidance Topic No. 2 at http://www.sec.gov/divisions/corpfin/guidance/cfguidance-topic2.htm for additional information.

http://www.sec.gov/Archives/edgar/data/92380/000000000012016774/filename1.pdf

Future direction – cont'd

Southwest Airlines response, April 16, 2012

The Company has not experienced cyber incidents that are individually, or in the aggregate, material. In addition, **the Company is sensitive to the Commission's guidance that it should not present risks that could apply to any issuer**. Nevertheless, the Company recognizes that cyber risks and vulnerabilities continue to evolve and that developing and maintaining adequate security measures may present significant challenges not only for the Company, but also for third parties with which the Company does business. Therefore, the Company's risk factor provides examples of (i) the significant *types* of cybersecurity risks that the Company monitors and seeks to address on an ongoing basis, (ii) the aspects of the Company's operations that give rise to such risks, and (iii) potential consequences to the Company should it not be able to adequately address these risks. In accordance with the Division of Corporation Finance's Disclosure Guidance Topic No. 2, **the Company does not believe additional detail is necessary to provide the proper context for the risk factor**

http://www.sec.gov/Archives/edgar/data/92380/000009238012000012/filename1.htm

Future direction – cont'd

SEC, April 27, 2012

In response to prior comment 3, you disclose that you recognize that cyber risks and vulnerabilities continue to evolve and that developing and maintaining adequate security measures may present significant challenges not only for you, but also for third parties with which you do business. Accordingly, **it appears that your business has been subject to cyber risks. If you have experienced attacks in the past, please expand your risk factor to state that.**

http://www.sec.gov/Archives/edgar/data/92380/000000000012021869/filename1.pdf

Southwest, April 27, 2012

Although the Company has not experienced cyber incidents that are individually, or in the aggregate, material, **the Company will comply with the Staff's request and will expand its risk factor disclosure in future filings to state that it has experienced cyber attacks in the past, which have thus far been mitigated by preventive and detective measures put in place by the Company**.

http://www.sec.gov/Archives/edgar/data/92380/000009238012000022/filename1.htm

Monday, March 4, 2013

Despite company insistence that attacks have been, even in the aggregate, immaterial, SEC requires disclosure, but allows firm to add info that attacks have been mitigated. So, while 2011 10-K showed no cyber risks, 2012 had hypothetical "may face" language, 2013 will seemingly contain disclosure that firm has been attacked in the past.

How many firms have not faced immaterial attacks?

Example 2: Wal-Mart

SEC, June 8, 2012

We note your disclosure that you "may be vulnerable to security breaches" through cyber attacks. **Please tell us whether any such breaches or attacks have occurred in the past. In order to place the risks described in this risk factor in an appropriate context, in future filings please expand your risk factor to disclose this information.**

http://www.sec.gov/Archives/edgar/data/104169/000000000012029999/filename1.pdf

Wal-Mart, June 22, 2012

[...] in the future the Company will modify its risk factor disclosure relating to the risk discussed in the Subject Risk Factor to read substantially as follows: [...]

Each year, computer hackers make numerous attempts to access the information stored in our information systems. We maintain substantial security measures to protect, and to prevent unauthorized access to, such information. As a result of those measures, the **past attempts by computer hackers to gain access to the information stored on our information systems have been unsuccessful.**

http://www.sec.gov/Archives/edgar/data/104169/000144530512002043/filename1.htm

A similar example.

It seems clear that the SEC views disclosure of prior attacks/incidents as useful in establishing a proper context for "cyber" risk disclosures, whether the attacks were successful or not, and whether the impact was material or not.

This position, as revealed through the comment letters we've looked at briefly here, as well as others which have been issued since October 2011, will have interesting ramifications.

What will future disclosures look like?

- More firms from all industries mentioning cyber risks
- More firms disclosing that they have actually been subject to these threats
- More firms acknowledging that sometimes attacks have worked

Monday, March 4, 2013

The first is simply an extrapolation of what we have already seen. Additionally, as the SEC reviews filings, they have been, and will continue to, ask firms that have not added a “cyber risk factor” to do so, *and* to state whether they have suffered attacks/incidents, *and* to state this. This means that all three bulleted predictions will be motivated at least in part by comments made by the SEC as part of its ongoing reviews. We simply are at the leading edge of this at the moment.

Implications

Disclosure of immaterial incidents

- Need to track and speak of small incidents in boardroom-ready terms
- Need to understand concept of materiality
  - Why an incident matters, and to whom

Need to see where your industry is

- SEC's requests to your peers likely pertain to you as well

Last, but not least

“Stuff happens”

Increased disclosure, and events outside the disclosure realm, show more firms are acknowledging incidents.

More information -> better decisions, less fear/shame.

Acknowledgments

My interest in this topic was inspired by

- Various blog postings made by Adam Shostack and Richard Bejtlich
- Discussion on the Security Metrics mailing list
- The example set by the OSF's Primary Sources Archive, and by
- The recent reporting of Joseph Menn and Linda Sandler.

Questions?