Making a Case for Investing in Pandemic Preparedness

Presentation to
Disaster Recovery Information Exchange
Toronto Chapter
September 23, 2008

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Outline

• Review of Established Facts
• Parallels to a Financial Pandemic
• Impact of Absenteeism on Corporate Profits
• Macro-Economic Cost-Benefit Analysis
• Macro vs. Micro Economic Impacts
• Risk Mitigation: Pandemic Preparedness as Insurance
• Legal Risks
• Assumptions Underlying the Investment Metrics
• Metrics for Justifying Investment for Pandemic
• Why Firms may not be Investing for a Pandemic
What is Not in Doubt

• **That a pandemic will occur**
• Different from normal seasonal influenza in its strain, intensity and duration
• It will take 90-180 days to get a vaccine produced and into the arms of people
• We will not be able to control human-to-human transmission of the influenza virus
• Influenza virus transmits in 36 hours
... What is Not in Doubt

- Canadian health care system already at capacity
- Social isolation difficult in a multicultural trading nation like Canada
- Global supply chains add to international traffic of goods and people
- Corporate reputations linked to suppliers - e.g., Mattel – a toy company with suppliers in China
- Just-in-time inventory (limited warehousing) increases risk of supply interruptions
Parallels to the Sub-Prime Mortgage Financial Pandemic

- Reliability of upstream suppliers & downstream customers is critical in all sectors
- During the recent sub-prime mortgage crisis, banks distributed risk to conduits, and ignored the credit-worthiness of downstream borrowers
- When the subprime pandemic broke, the risks ended up back on the banks’ balance sheets
- Just as banks mispriced credit risk, companies sometimes misjudge how disruptions to supply chains can be a huge strategic risk
Parallels to the Financial Pandemic

- US banks’ misjudgment transmitted to foreign banks via portfolio diversification
- For example, Swiss-based UBS wrote off $19 b in losses and shed 5,500 jobs
- Problem in the U.S. housing market damaged banks all over the world
- Influenza pandemic would be much more severe since transmission much more rapid (36 hours), and scope not restricted to just investors
What is an Influenza Pandemic?

• Different from a seasonal influenza in its strain, intensity and duration
• Rapid transmission (within 36 hours) expected to impact 25% - 33% of the population
• Adverse impact exponentially detrimental
• Largest economic impact expected to arise from:
  – Higher health care costs: “30% more patients with 30% less staff” – Mt. Sinai Hospital
  – Absenteeism among employees: 15-35% of employees (profit-drivers) may not show up at work
Employees Drive Productivity & Profits

- It is employees who are the revenue and profit drivers
- Reason why firms invest significantly to retain their employees with long-term incentive plans, seniority, etc. …
- **A 30% absenteeism rate (for example) can drive revenues and profits down by as much as 30%**
- Or even >30% if costs are largely fixed (instead of variable) and sales are largely employee-driven (rather than technology-driven)
Economic Impact of SARS

- It was absenteeism among employees, customers & suppliers (resulting in lost productivity) that led to SARS’ massive adverse economic impact of $2 billion (or 3 percentage points of GDP that quarter), even though the health impact was a more modest 44 deaths.
Global Supply Chains

- Supply chains becoming increasingly global, with lower levels of inventory and higher levels of agility
  - Thereby increasing potential for disruption
- **Less than 25% of Fortune 500 firms prepared to handle supply-chain disruption**
- GM 1996: earnings declined by $900 million due to an 18-day labour strike at brake supplier, keeping GM workers idle at 26 assembly plants
- Boeing 1997: $2.6 billion loss due to supplier delivery failure of two critical parts
Cost of Severe Absenteeism

- Labour strike at Codelco “costs $10-million a day” Globe and Mail April 28, 2008
- 25-day strike at Winnipeg-based New Flyer Industries Inc. (TSX-listed) in 2006:
  - Q2 EBITDA ↓ FROM $15.2 m to $9.0 m
  - Q2 Production ↓ by 25% in 2nd quarter
  - Q2 Margins on production significantly lower
- Metrics alarming to both internal & external stakeholders
Pandemic Preparedness

• Not about stopping an influenza pandemic, but about mitigating its adverse consequences
• World Health Organization’s (WHO) Pandemic Scale is currently at Phase 3: “none or very limited human-to-human transmission”
• Range from 1 (“low risk of human cases”) to 6 (“efficient and sustained human-to-human transmission”)
• Very rapid progression from stages 4 to 6
Macro-Economic Impact

- Most studies documenting the economic impact of a pandemic focus on the macro-economy
- *BMO Nesbitt Burns* estimates a 2 percentage point decline (or -$20 billion) in GDP growth in the Canadian economy in the event of a mild pandemic, and a 6 percentage point decline (or -$60 billion) in the event of a severe pandemic

  - **Mild:** GDP growth rate from 1.4% to -0.6%
  - **Severe:** GDP growth rate from 1.4% to -4.6%
Macro vs. Micro Economic Impact

• Individual companies can’t just rely on macro-economic studies; they must do their own micro-economic analysis.

• Economic impact on a single micro-organization can be better or worse than the impact on the macro-economy.

• Just like an individual family’s susceptibility to a virus can be better or worse than the macro region’s susceptibility.
Macro vs. Micro: Differences

• Direct health costs not necessarily borne by individual employer corporations, even though they are a large component of macro-economic costs

• What may be a tolerable adverse impact to a large diversified region may be catastrophic loss to a small undiversified business

• Mitigating risks common to both approaches
Macro vs. Micro Economic Impact

- While an influenza pandemic could reduce macro-economic growth rate in the range of 2-6%, the micro-economic toll of an influenza pandemic on a mid-sized life insurance company could wipe out almost 15% of a firm’s market value (or $208 million loss for a $1.4 billion company) based on decline in revenues and increases in costs.

Micro-Economic Analysis Criteria

• Not sufficient to show that proposed case or intervention works

• Must also show that it is better than competing calls on resources
  – Benefits gained vs. benefits foregone
  – Benefits gained vs. opportunity costs

• Benefits gained ≈ Savings
• Benefits foregone ≈ Costs
• Costs avoided ≈ Benefits
Decision Context

• Successful operation, performance and long-term viability of any business depends on continuous sound decisions.

• Every decision has an economic impact.

• **Economic impact ≈ impact on cash flow**
  – Past & current cash flows achieved
  – Future cash flows expected
Markets / Analysts are Watching

- Consideration of future cash flows sometimes neglected because accounting focuses on the rear-view mirror, and only myopically into the future

- Accounting reports only capture what was done, and not on what was not done

- However, financial analysts and capital markets do monitor management’s decisions taken as well as decisions avoided to evaluate future cash flows and future risks
Stock Price Reaction to Supply-Chain Disruptions

• 10.28% decline in average stock price associated with disruption announcements causing production or shipping delays for a sample of 519 firms - Hendricks and Singhal (2003)

• 8% decline in shareholder wealth due to supply chain disruptions - Knight and Pretty (1996)
Stock Price Reaction to Corporate Disclosure

- Krishnan & Sriram (2000) find that disclosures of Y2K compliance costs were positively associated with stock prices – indicating that shareholders consider such disaster prevention expenditures value-enhancing.

- Greer et al. (1980) find that firms’ stock price declines even before the strike – indicating that shareholders can assess the economic impact of the loss of labour productivity before it occurs.
Cost-Benefit Analysis

• Every decision requires a cost-benefit analysis:
  – Are expected benefits > cost?

• Direct & indirect benefits & costs arising from a decision must be carefully identified & evaluated

• Costs & benefits may occur in different periods, & need to be aggregated using time value of money

• Financial statements focus on a single year at a time, & may not show the benefits of pandemic preparedness
Benefits from Pandemic Preparedness

• Higher revenues (due to lower absenteeism)
• Lower costs (due to stable suppliers & logistics)
• Accelerated cash flows (lower absenteeism)
• Reduced cash inflow volatility (lower risk)
• More options or flexibility to expand (expand market share if competitors experiencing downtime)
• More intangible assets – e.g., Reputation
  – As a stable supplier
  – As a responsible employer
Risk & Firm Valuation

- Firm valuation depends on net future cash flows (CF) discounted at the firm’s cost of capital (\( r \))
- Firm Value = Expected Cash Flows / cost of capital
- Firm Market Value = \( \frac{CF_1 + CF_2 + CF_3}{(1+r)^1 (1+r)^2 (1+r)^3} \)
- Businesses with higher risks face higher cost of capital (just like individuals and mortgage rates)
- Higher risk (due to a pandemic, for example) can reduce both the numerator (future sales) as well as increase the denominator (cost of capital)
- Thereby significantly erode firm value
Risk & Insurance

- Risks mitigated by insurance

- Investment in pandemic preparedness analogous to investment in insurance

- Cannot buy fire insurance after the fire

- Similarly, may not be able to invest in pandemic preparedness after a pandemic has struck
Pandemic Preparedness as Insurance

- Stockpiling & storage of antiviral drugs may be a necessary part of pandemic preparedness, since demand will definitely exceed supply once a pandemic strikes.

- A 36-hour transmission rate of the influenza virus does not allow enough time to replenish supply.
Insurable Risks & their Probabilities

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<tr>
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<th>Probability</th>
<th>$ Impact</th>
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<tbody>
<tr>
<td>Pandemic</td>
<td>3-10%</td>
<td>high</td>
</tr>
<tr>
<td>Property Damage due to Fire</td>
<td>&lt; 1%</td>
<td>high</td>
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- Macro probabilities should not be confused with micro probabilities
- Similar to the economic impact of a fire, the economic impact of a pandemic could last several years, and lost sales (to competitors) may never be regained
- Many businesses insure against a less probable fire, but not against a more probable pandemic
Cumulative Probability of a Pandemic

• In 2008: 3% - 10%

• By 2012: 14% - 41%

• By 2017: 26% - 65%

• SOURCE: Dr. McGeer, Mt. Sinai Hospital
Viewing Pandemic Preparedness as Insurance

- We have been used to buying property insurance, whereas an influenza pandemic is a relatively new threat.
- We need someone to educate us, just like insurance companies educate us about the need to buy identity theft insurance.
- We consider insurance premium as sunk cost & normally do not try to recover value from premium paid.
Legal Risks

• Management & Board responsibility in both Canada and the U.S. require them to identify risks & ensure management of appropriate assessment and control systems to manage these risks as part of adequate corporate governance of public corporations
  » National Policy 58-201 in Canada
  » Sarbanes Oxley Act in the U.S.

• Business Continuity Planning must identify the vulnerability of business operations to failure of its suppliers, distributors and contractors, and

• Must identify industry-specific changes that may occur in the business as a result of various disasters
A Supply Chain is as Good as its Weakest Link

- Supply chain central to Business Continuity Plan
  - What if one supplier goes down?
  - What if two suppliers go down?
  - What if U.S. shuts down its borders to our exports?
- **Customers can & do ask their suppliers about their reliability in every context, including their risk management strategies**
- **Suppliers can differentiate themselves** by their Business Continuity Planning (in addition to price, quality, logistics, after-sales service…)
Market Differentiation

• Pandemic Preparedness can be incorporated into supply contracts
• **PP-certification** for key suppliers analogous to ISO-9000 certification for quality suppliers
• **Differentiation among suppliers with respect to their preparedness for a pandemic can command a market premium**
• Premium (for implementing sound BCP practices) exists even if pandemic never occurs
Metrics used for making a Case for Pandemic Preparedness

• Cost-Benefit Analysis

• Net Present Value (NPV)

• Internal Rate of Return (IRR)

• Payback
Assumptions Understate Benefits and Overstate Costs

- Absenteeism by employees, customers & suppliers can add up non-linearly- e.g., 17%+23%+20% > 60%
- Employee absenteeism often the last nail in the coffin
- Advertising Pandemic Preparedness can make firm a supplier of choice – similar to ISO 9000 certification
- Benefits in the form of Operating Income preserved last longer if pandemic lasts longer
- Reputation benefits or costs may outlast pandemic
Assumptions Understate Benefits and Overstate Costs

• Employee training and hand-washing can reduce absenteeism in general, with significant positive impact on bottom line
• Training and communication planning useful in many other emergencies such as power outage, ice storm,…
• Many other benefits realized even if pandemic does not occur
Cost-Benefit Analysis: 4 Inputs

- Net Investment for planning, training, masks, gowns, antiviral and storage \((-CF_0)\)
- Benefits realized in the form of Net Income preserved from lower absenteeism \((+CF_n)\)
- Time period before benefits realized – i.e., time period before pandemic strikes \((n)\)
- Firm’s Cost of Capital \((r)\)
Cost of Stockpiling Antiviral

• Example: Canadian public corporation with 23,900 FTE employees in 2007

• Approx 13,000 employees (or 54%) deal with the public

• **8-week antiviral dose costs $250 per employee**

• 13,000 employees @ $250 ≈ $3,250,000
Total Costs

Planning, Training & Communication $ 700,000  
Personal Protective Equipment $ 750,000  
Stockpiling Antiviral $ 3,250,000  
Storage of Antiviral $ 500,000  
TOTAL INVESTMENT $5,200,000

For accounting purposes, investment may be amortized over the lower of time before pandemic occurs or 5-year life
Cost-Benefit Analysis

• Economic impact on the company’s operating income *conservatively* estimated to be the same as the impact of SARS in 2003 (well documented in its 2004 MD&A)

• **In the absence of preparedness, income expected to decline by 17% (the same as SARS) or by $73 million**

• **Investment in pandemic preparedness assumed to avoid entire decline in profits**

• Probability of a pandemic *over the next 5 years*: 14% - 41%
Net Present Value (NPV)

• Most commonly used metric
• Investment outlays (-CF₀) and future benefits (CFₙ) considered in equivalent present value terms
• Congruent with shareholder value
  – Maximizing NPV = Maximizing Share Price
• Appropriate for evaluating preparation for a disaster, evaluation of a strategic market opportunity, advertising campaign, or any other investment

• \[ NPV = -CF₀ + \frac{CF₁}{(1+r)^1} + \frac{CF₂}{(1+r)^2} + \ldots \]

• **Decision Rule:** Invest only if NPV > 0
NPV Calculations

• NPV = -5.2 million + $73 million = $44.5 million
  \[
  (1.08)^5
  \]

• Assume cost of capital = 8%

• Assume pandemic occurs in 5 years from today

• NPV > 0, therefore invest in Pandemic Preparedness
Internal Rate of Return (IRR)

- NPV = -CF₀ + \frac{CF₁}{(1+r)¹} + \frac{CF₂}{(1+r)²} + …
- IRR = the rate of return at which NPV = 0
- The breakeven rate
- Higher IRR better in the sense that even if the cost of capital is high, the investment project breaks even
- If the IRR exceeds the firm’s cost of capital, the investment project will yield surpluses
- **Decision Rule**: Invest if IRR > Firm’s Cost of Capital
IRR Calculation

• NPV = -CF₀ + \( \frac{CF₁}{(1+i)^1} + \frac{CF₂}{(1+i)^2} + \ldots \)

• 0 = -5.2 million + \( \frac{73 \text{ million}}{(1 + IRR)^5} \)

• \$73 \text{ m} / \$5.2 \text{ m} = (1 + IRR)^5

• 14 = (1 + IRR)^5

• \((14)^{1/5} = 1.70 = (1 + IRR)\)

• **IRR = 70% - therefore invest in Pandemic Preparedness**
Payback

• How soon can the original investment be recouped from net annual cash flow savings
• Payback = Net Investment / Annual Cash Flows
• Ignores time value of money
• Higher quality investments have shorter payback
• In the case of Influenza Pandemic, payback occurs when the pandemic strikes
• **If pandemic first occurs in 2 or 5 years, then investment payback will be 2 or 5 years**
• Investments with payback ≤ 5 years are generally considered acceptable
Why Firms may not be Investing in Pandemic Preparedness (PP)

- Pandemic preparedness may seem to be overwhelming: legal, regulatory, ethical, logistical, & economic issues in ordering, storing, securing & dispensing prescription medications
- Senior Management underestimating the probability and bottom line impact of a pandemic
- Ignorant of what competitors are doing for PP, and therefore ignorant of the danger to their firm’s competitive advantage
- Liquidity concern in current recessionary climate
Why Firms may not be Investing in Pandemic Preparedness (PP)

- Lack of awareness of legal exposure
  - By both Senior Management and Boards of Directors
- BCP Directors more likely to have logistical, HR or technical backgrounds & not financial backgrounds
- Accounting & accountability models failing to compel
- Lack of education & guidance on assessing impact
- Lack of standards for Pandemic Preparedness
- Shortage of employees skilled in pandemic planning
Pandemic Preparedness as Competitive Advantage

• Cannot afford to miss being prepared if competitors are getting prepared
• Competitors will have unique window during pandemic to steal market share, as well as make strategic moves that may be hard to reverse later
• Pandemic Prepared certified suppliers may enjoy comparative advantage even if a pandemic *never* occurs
• If all competitors getting prepared, then courts may consider it to be a “reasonable norm” within industry
  – The unprepared may be found negligent & liable
Economics of Pandemic Preparedness

- Pandemic Preparedness can be evaluated and justified using micro-economic analysis at a firm-specific level, even if not all factors are quantifiable.
- Lack of experience with a pandemic may make some quantitative estimates difficult.
- However, planning for a pandemic and justifying investment for it does not have to be overwhelming.
Questions / Comments?

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* This research was funded by an unrestricted research grant from Roche Canada.