

## Japan Earthquake and the Aftermath

Yoichi "Yo" Usui

Cross Cultural Business, Inc.

April 21, 2011

### **The Earthquake**

- March 11, 2011, 14:46 JST
- First earthquake Mag. 9.0, then 2 more within 6 min. of the first
- Occurred in the area about 500 km (N-S) x 200km (W-E) about 50 to 200km off the coast of northeast Honshu. Ibaraki, Fukushima, Miyagi and Iwate Prefectures
- Magnitude is 4<sup>th</sup> largest recorded since 1900
  - Chile 1960, 9.5
  - Alaska 1964, 9.2
  - Sumatra 2004, 9.1
  - East Japan 2011, 9.0
- Numerous aftershocks still occurring: more than a hundred, 8 in the range of Magnitude 6 - 7.5

### **Magnitude of the Tsunami Following the Main Earthquake**

- Maximum height over 15m. (49ft.)
- Reached grounds as high as 40m above sea level
- Initial estimate of the flooded area is about 500 Sq. Km (200 Sq. Mi.)

### **Direct Damage**

- Deaths: 14,000 (as of April 19)
- Serious Injuries: 5,000 (as of April 19)
- Missing: 14,000 (as of April 19)
- Home and Building Damages
  - Total Destruction: 62,000
  - Serious Damage: 25,000
  - Flooding: 7,000
  - Partial Damage: 195,000
- Ground sinking - about 75cm (190 in.) in some locations on the eastern coast
- Electricity, water, sewer, gas infrastructure wiped out
- Extensive Transportation infrastructure damage
  - Sendai airport – just opened, but still not full operation
  - Bullet Train Northeast corridor service is still disrupted
  - Railway all along the coast is still disrupted
  - Main highway opened to public at end of March, but local roads still being repaired

- Initially half a million people in over 2,000 evacuation centers in the region
  - Over 140,000 people still living in evacuation shelters
- Liquefaction of reclaimed area around the Tokyo Bay, resulting in building and infrastructure damages
- Direct damage initial estimate: Yen 16 – 25 Trillion ( US\$ 188 – 294B @ 85Yen/\$)

### Indirect Damages/Consequences

- Damages to production facilities, resulting in significant reduction of output
- Damage to logistics infrastructure, hampering movement of everything
- Significant electric power shortage due to nuclear power plant shutdown
- Destruction of communication infrastructure, hindering information flow
- Damage to the Nuclear Plant and resulting environmental impact

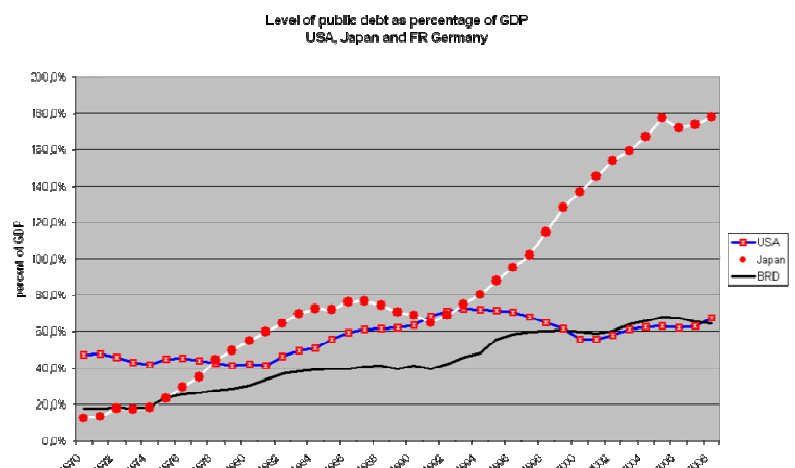
### Nuclear Plant Issue and Electricity Shortage

- Fukushima #2 Nuclear plant complex has 6 reactors
  - Reactors were shutdown, but Tsunami destroyed the back-up power system, stopping cooling process and resulting in significant problems afterwards
  - Accident rating raised to level 7, although radioactivity leak is only about one tenth of Chernobyl
  - Significant impact on environment/food chain, relocation of evacuees, loss of generation capacity
  - Huge financial burden on TEPCO and expanding popular outcry against nuclear generation
- Power shortage: The issue = Eastern Japan uses 50Hz power, while Western Japan is 60Hz
  - When electricity was introduced, East used US generators and West used German
  - As a result, not possible to connect Western grid to Eastern (only about 1TW available via converter)
  - Current East Japan generation capacity about 33TW, summer peak is expected to reach 60TW
    - ✧ East can generate maximum of about 47TW by summer, but still 20% short
  - 2011 and beyond, electric utility must;
    - ✧ Institute planned rolling outages – economic slowdown
    - ✧ Curtail demand at large factories – cause further reduction of production
    - ✧ Demand general businesses & consumers to conserve – economic slowdown

### Impact on Local and Global Economy

#### Economic Background of Japan

- Japan GDP (2010): \$5.4T (US: \$14.7)
  - Public debt (about \$13T) is at all time high (>220% of GDP as of 1Q-2011)
  - Outstanding Central Govt. Bond alone stands over \$8T
  - High “Private Savings” rate (\$16.5T, Daiwa Security estimate )



- Low external (overseas) debt ratio (<20%), i.e., most debt is domestic
- Is this the reason why Yen is strong, despite the “Public debt to GDP ratio?”

#### Short-Term Economic Impact of the Disaster - 4 Significant Areas Impacted

- Cost to rebuild infrastructure
- Cost to rebuild housing
- Relocating population
- Loss of productivity
  - ✧ 0.5 – 1% loss of GDP

#### Loss of Short-Term Productivity and Potential Impact on Global Supply Chain

- Northeastern Japan is home to many high-tech components & material manufacturing
  - Examples:
    - Automobile parts:
      - ✧ Renassas provides Toyota Prius engine control LSI; its factory is at 25%
        - Toyota is operating at 50% output:
      - ✧ JIT process may be good but will cause immediate impact if supply chain disrupted
      - ✧ Nissan and Honda operating at reduced schedule, due to lack of parts
    - iPhone parts:
      - ✧ Asahi glass, the sole supplier of LCD glass panel, operating at 50% output
      - ✧ LCD: Suppliers are Toshiba and Samsung, but Toshiba still not in production
      - ✧ Silicon wafer: Shinetsu Semicon is still shutdown (supplies 20% global market)
      - ✧ Many other high-tech material and components come from Japan
    - High-tech Supply Chain will be disrupted on a global scale
  - Electric Power Shortage
    - Large manufacturing enterprises are being asked to curtail power usage this summer
    - Companies are already planning long summer shutdown, reduced operating schedule etc.
      - ✧ Cause further stress on material/parts inventory around the world
    - Many offices will close for long vacation this summer – disruption of logistics flow

#### Cost of Rebuilding

- Must finance the rebuilding cost, but how?
  - Initial estimate of damage (\$200 to \$300B) is about 4 - 5% of 2010 GDP - Huge
  - Unlikely that Government can pay 100% of cost, as it adds to already high level of public debt
  - Possible sources: Disaster Relief tax, special bonds, instruments to tap private savings and others
    - ✧ Key maybe Private Savings market: just 1% of savings can yield over \$100B

#### Short Term and Long term Impact

- Short term downturn is inevitable
  - Cost of rebuilding infrastructure and relief efforts will be high
  - Reduction in production will result in reduction of export
  - Increased non-working population leads to reduced productivity

- Therefore, GDP in the first half of 2011 will take a hit
- However, longer-term outlook is not too bad
  - Public investment will create job and demand
  - Japan can probably finance its own recovery
  - Inflation fears?
  - In just 2-3 years after the large Kobe earthquake of 1995, GDP turned significantly positive
- Japan will be forced to re-evaluate Energy Policies
  - General fear and outcry against Nuclear generation
  - In the past, investment in Smart-Grid technology and alternative energy sources were slow
    - ✧ Electric companies stifled such initiatives, lest they may lose monopoly
    - ✧ Power grid in Japan was stable (significantly lower power outage rate compared to the US)
  - Japan will be forced to investigate alternative power sources
    - ✧ Distributed generation, biogas, wind, solar, ground heat etc.
    - ✧ Business enterprises will consider installing own generation equipment
  - Japan may be forced to consider energy deregulation
  - Can provide positive economic stimuli and present investment opportunities

#### Impact on Other Economies

- Many Asian nations depend on Japanese high tech parts – Short term impact on local economy
  - China about 10% of auto parts from Japan
  - Korea: About 25% of basic high-tech material and components from Japan
  - Slowdown in manufacturing inevitable.
  - Companies that outsource manufacturing to Asia will be impacted
- High-tech companies around the world will be pressed to find alternatives outside of Japan
  - Reduced production, reduced sales, product schedule impact, impact on financials
  - Short-term impact on such company operation
  - Maybe good for other manufacturing economies and bad for Japan, unless Japan off-shores
- Japan may consider more offshore manufacturing diversification – Good for global economy
  - Asian countries lobbying to bring more manufacturing locally
  - Nissan just announced manufacture of Infiniti SUV in the US (April 2011)
- Foreign firms may consider moving Asian operation center out of Japan – Bad for Japan
  - Many US companies already have Asian operation centers in Singapore and Hong Kong
  - This trend is likely to accelerate
- Energy and construction related businesses may find lucrative investment opportunities in Japan
  - Electric grid planning, infrastructure building, nuclear plant risk management etc.
- Radioactivity impact on environment and food-chain in areas around Japan - Still unknown
- I am sure there are much more.....