Economic Consequences of the Tohoku Earthquake

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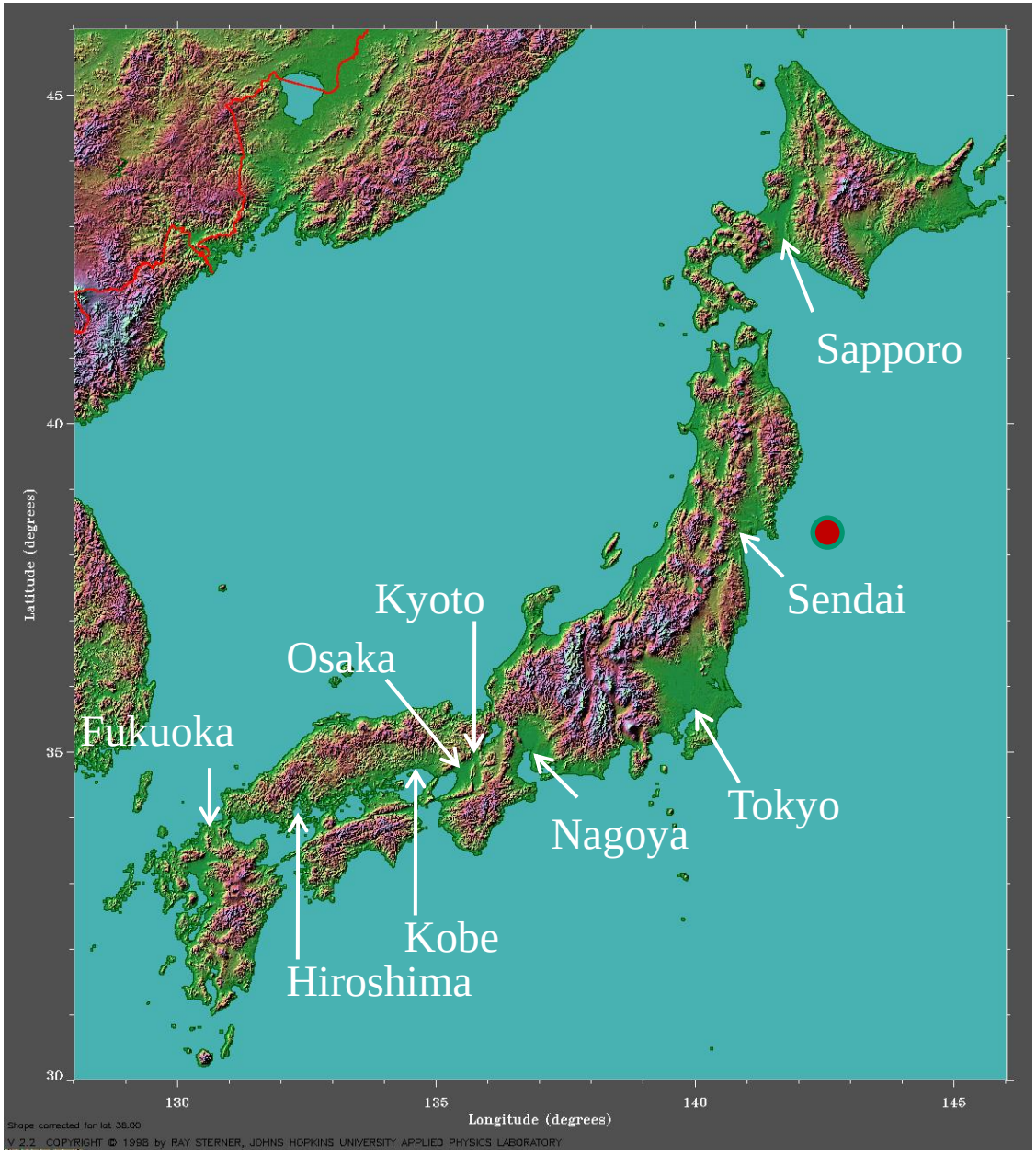
The Economics of Catastrophes

- Regional Impacts
  - How will the earthquake affect the location of production within Japan
- Aggregate Impacts on Japanese Economy
  - Comparison with Hanshin Earthquake of 1995
  - Implications for long and short-run output
- Additional Risk Factors

Japan's Cities with Population over 1 million

"Locational Fundamentals": Most *economic* geography is determined by *physical* geography

Implication: shocks that don't affect geography don't affect the location of production much in the long run



Simple Prediction: Bigger bays and more flat land yield bigger cities

People Return to Same Cities within 15 Years

Effects of Bombing on Cities with More than 30000 Inhabitants

Kobe is a Case-in-Point

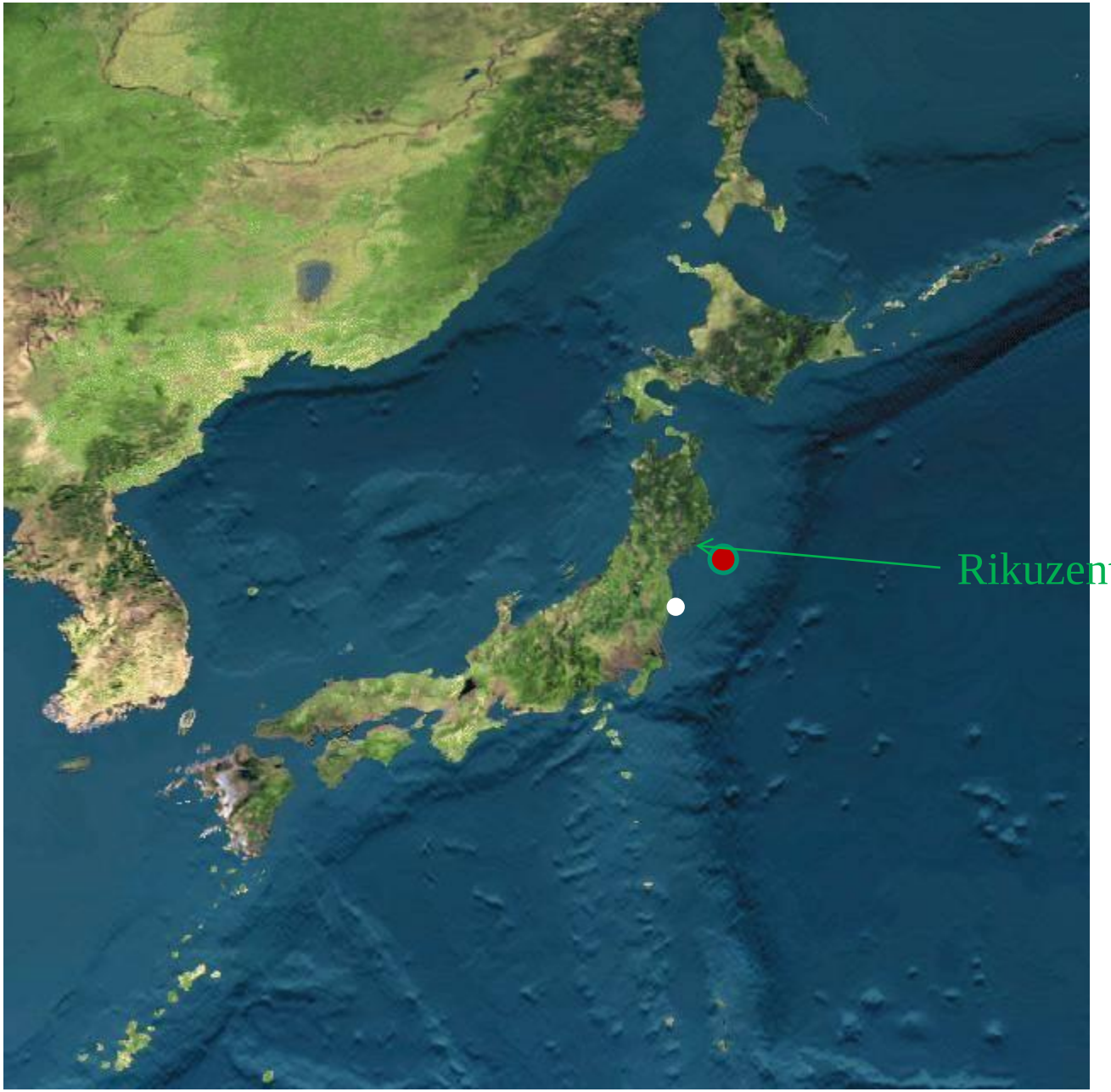
Kobe's Population in millions

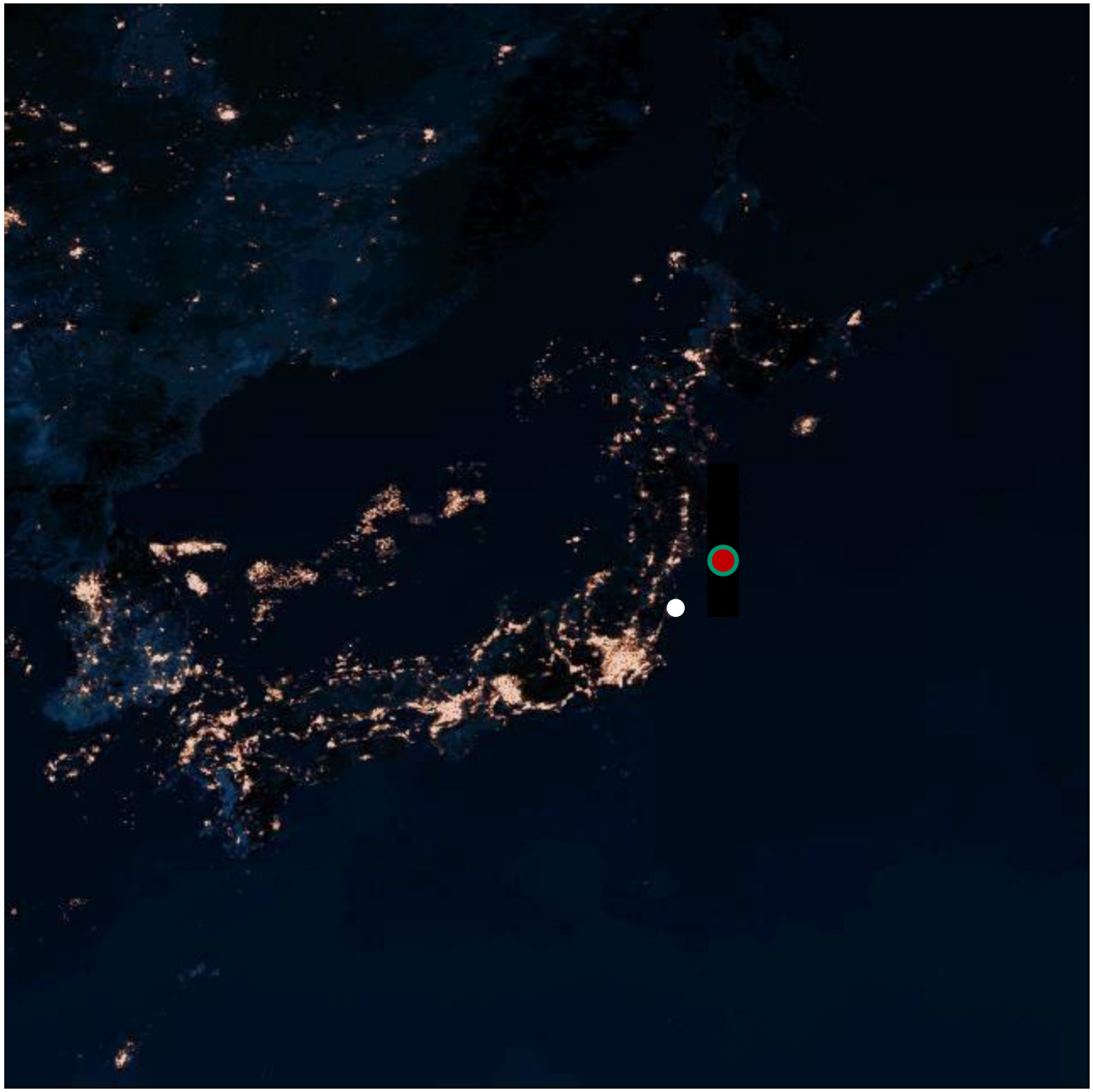
1990	1.48
1995	1.42
2000	1.49
2005	1.53

Lessons and Questions

- Lessons
  - Location of production tends not to be altered by shocks that do not change physical geography
  - Shocks that change physical geography (e.g. nuclear fallout making land uninhabitable as in Chernobyl) will have permanent impacts

- Questions
  - Were there shocks that changed Japan physically?
    - Probably occurred through two channels: reassessments of danger of living near Fukushima's nuclear power plants and land loss
  - What will the damage be and how long will it take to recover?


Rikuzentakata



Rikuzentakata: March 1, 2011

Rikuzentakata: March 14, 2011

Hanshin vs. Tohoku Earthquakes

	Hanshin	Tohoku
Dead and Missing	6,400	22,985
Partial/Total Collapsed Homes	240,956	23,854
Damaged Homes	NA	128,507
GDP Share of Impact Area (Narrow)	4%	4%
GDP Share of Impact Area (Broad)	11%	6%
Number homes w/o Electricity	2.6m	0.26m
Number homes w/o Gas	0.8m	NA
Number homes w/o Water	1.3m	NA
Total Cost	¥9,900 bil	NA
Gov't Reconstruction Exp	¥5,020 bil	NA

(Tohoku data as of 9PM 3/22 Japan time, rolling blackouts not included)

Impact of Hanshin Earthquake

- Industrial Production fell 2.6% in first month after but bounced back 2.2% and 1.0 percent in next two months
  - We are likely to see similar pattern this time

- Almost impossible to detect an impact of Hanshin Earthquake on annual growth (source: Jerram)
  - Consensus GDP growth forecasts in early January 1995: 1.9% for1995 and 3.1% for1996
  - Actual GDP growth in 1995 was 1.9% and 2.6% in 1996

- International evidence suggests no impact of disaster casualties on GDP growth and impacts around 0.6% for loss of capital stock of around 1%

Why such small impacts?

- Trade-off between negative affect on supply due to destruction of capital and positive effect on demand as 120,000 households have to rebuild their homes and the government rebuilds infrastructure

- Given Japanese capital utilization rates were already low, supply is probably not constrained by capacity constraints
  - Leads demand effect to offset the supply side

Is this time different?

- Radiation issues could cause problems
  - But probability of large amounts of fallout rendering large areas of *economically* valuable land uninhabitable is low
- Electrical power issues remain for eastern Japan
  - Not clear how long this will take to resolve
- Japan's net debt is 114%, will reconstruction costs cause a fiscal crisis?
  - Government reconstruction costs are likely to be small relative to net debt (probably less than 2 percent of GDP) unlikely to alter fiscal sustainability

Conclusion

- One-time catastrophic events may have big very short term impacts, but their long-run impacts tend to be quite small

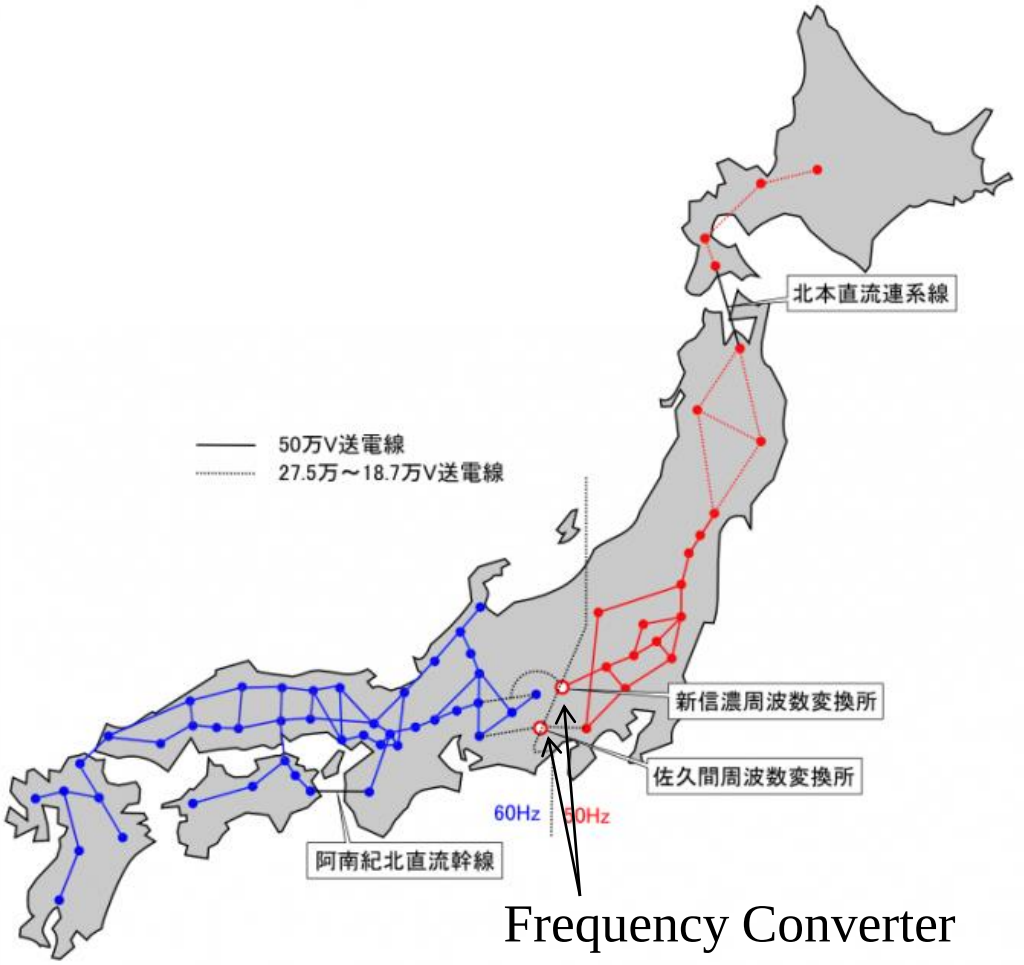
- Nevertheless, Japan and its trade partners are likely to suffer from many short-run supply and demand shocks due to supply chain issues

- While human toll is horrible, fortunately the aggregate economic impacts are likely to be much less severe

Japan's Power Grid

The existence of two different electrical frequencies in Japan means that eastern Japan faces rolling blackouts but western Japan is largely unaffected

Even so, eastern rolling blackouts are short in duration



Frequency Converter Facilities