



ENERGY SECURITY RISK ACROSS THE GLOBE: How Does Japan Compare?

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Need for an Index of U.S. Energy Security

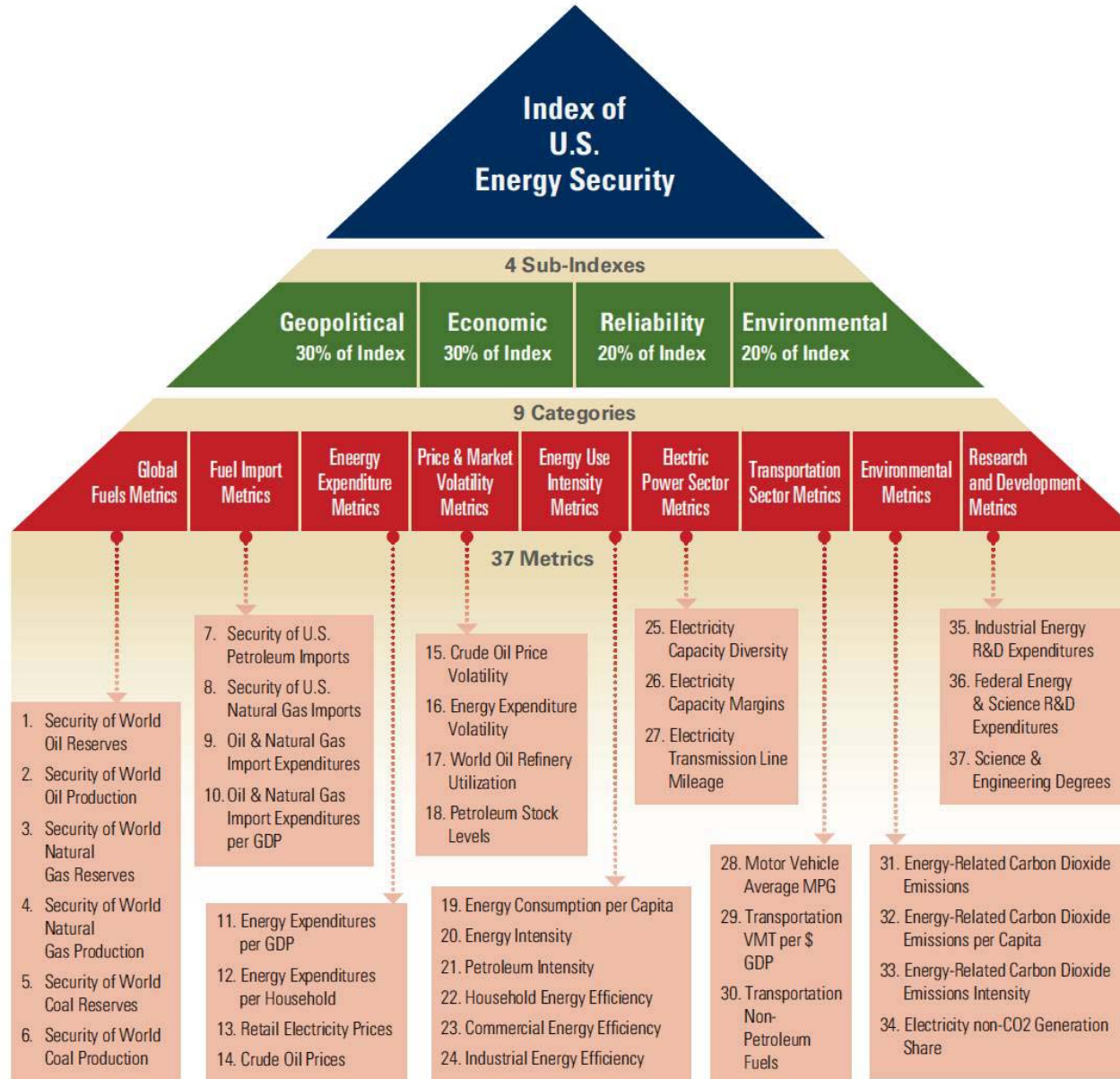


- How can we tell from if U.S. energy security is getting better or worse?
- U.S. Index provides two frames of reference:
 - Historical measures of energy security; and
 - Forecasts of U.S. energy security.
- International Index provides third frame of reference:
 - How is the U.S., or any one country, doing in comparison to other large energy using countries?





Building the U.S. Index

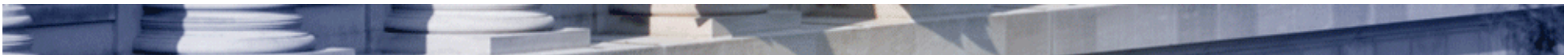




International Index of Energy Security Risk



- Extends U.S. Index methods to other countries
 - Works within limitations of data availability
- Uses 28 metrics covering imports, expenditures, efficiency, energy-use sectors, etc.
- Uses historical data from 1980 to 2010
- Focuses on 25 large energy consuming economies accounting for 80% of global energy demand
- No forecast component





International Index Measures Two Things



1. Absolute energy security risk
 - Are risks going up or down over time?
 - Measured as a risk score
2. Comparative energy security risk to an OECD average
 - Are risks going up or down over time relative to the OECD?
 - Measured as the percent difference between country score and OECD average score

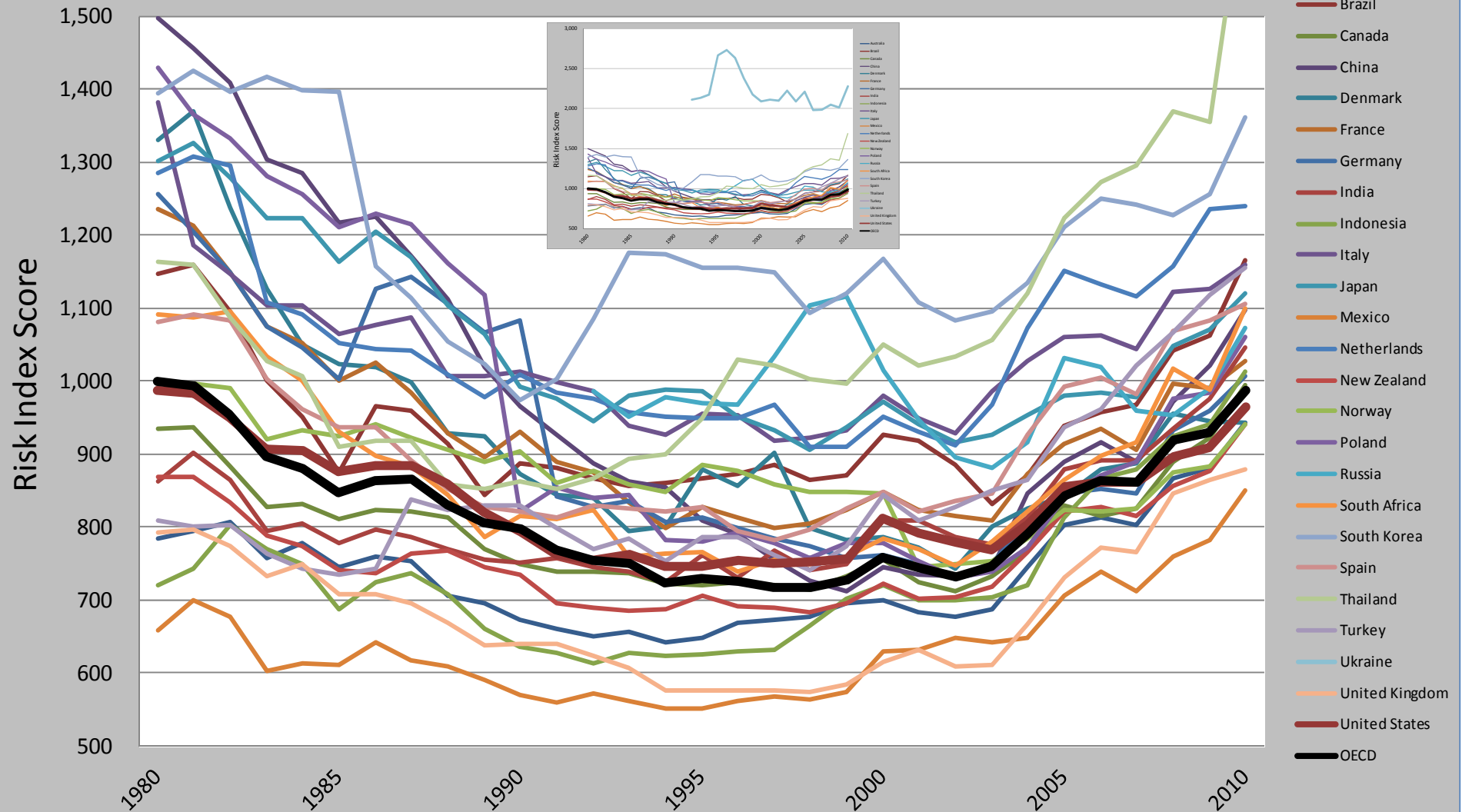




International Index Risk Scores



Figure 2. Energy Security Risk Index Scores for Large Energy User Group: 1980-2010





International Index Country Rankings



Energy Security Risk Scores and Rankings for 25 Large Energy Using Countries: 2010

Country	Score	Large Energy User Group Rank
Mexico	851	1
United Kingdom	878	2
Norway	940	3
New Zealand	941	4
Denmark	942	5
Australia	942	6
United States	964	7
OECD	988	
Canada	995	8
Germany	1,006	9
Indonesia	1,013	10
France	1,028	11
India	1,045	12
Poland	1,061	13
Russia	1,072	14
China	1,098	15
South Africa	1,100	16
Spain	1,105	17
Japan	1,119	18
Turkey	1,154	19
Italy	1,159	20
Brazil	1,165	21
Netherlands	1,239	22
South Korea	1,361	23
Thailand	1,689	24
Ukraine	2,277	25

#18th of 25



Changes in Rankings Over Time



Energy Security Rankings for Large Energy User Group: 1980-2010

	1980	1985	1990	1995	2000	2005	2010
Australia	3	6	4	4	3	3	6
Brazil	13	9	15	16	18	17	21
Canada	8	8	6	6	7	7	8
China	23	22	18	12	6	14	15
Denmark	19	17	14	17	11	9	5
France	15	15	17	14	17	15	11
Germany	16	16	23	13	8	10	9
India	6	7	7	8	12	13	12
Indonesia	2	2	2	3	4	4	10
Italy	20	19	22	21	21	21	20
Japan	18	20	20	23	20	18	18
Mexico	1	1	1	1	2	1	1
Netherlands	17	18	21	20	19	22	22
New Zealand	7	5	5	5	5	5	4
Norway	10	12	16	18	15	6	3
Poland	22	21	10	10	9	8	13
Russian Federation	NA	NA	NA	22	22	20	14
South Africa	12	13	9	9	10	12	16
South Korea	21	23	19	24	24	23	23
Spain	11	14	11	15	16	19	17
Thailand	14	11	13	19	23	24	24
Turkey	5	4	12	11	14	16	19
Ukraine	NA	NA	NA	25	25	25	25
United Kingdom	4	3	3	2	1	2	2
United States	9	10	8	7	13	11	7



Lessons Learned



- In general, resource-rich countries and with efficient economies rank best

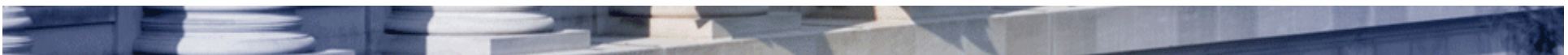
Conversely, resource-rich countries with inefficient economies do not score as well

- The disparities in risk among countries have been getting smaller since 1980 even as risks have been rising

- Policies matter

- Energy security affected by factors countries have control over and those they don't

Canada's cold climate contributes to its relatively high energy per capita and intensity metrics, increasing risks





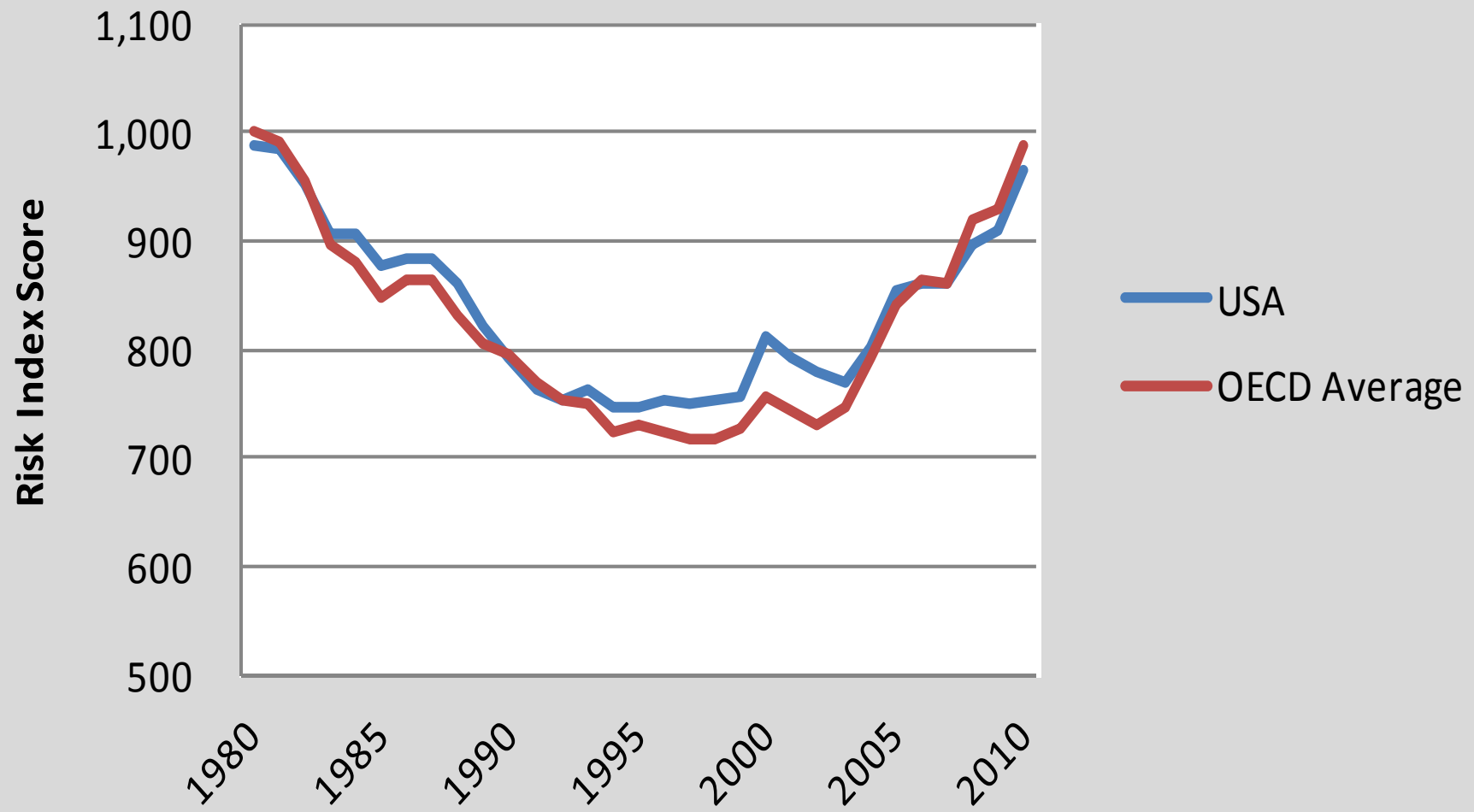
Lessons Learned



- New technology can be a disruptive & positive force
 - Hydraulic fracturing & horizontal drilling for shale gas production responsible for much of the recent improvement in U.S. compared to OECD average
- Resources are not enough without proper investment environment
 - Risk scores for resource-rich Mexico and Indonesia are getting progressively worse compared to the OECD average
- Strong economic growth in emerging economies has exposed underlying weaknesses in energy security
 - Improving energy security becoming a strategic priority
- Energy security risks are linked in a global energy market
 - Improvements anywhere causes improvements everywhere
 - A disruption anywhere can affect consumers everywhere



USA vs. OECD: Risk Index Scores

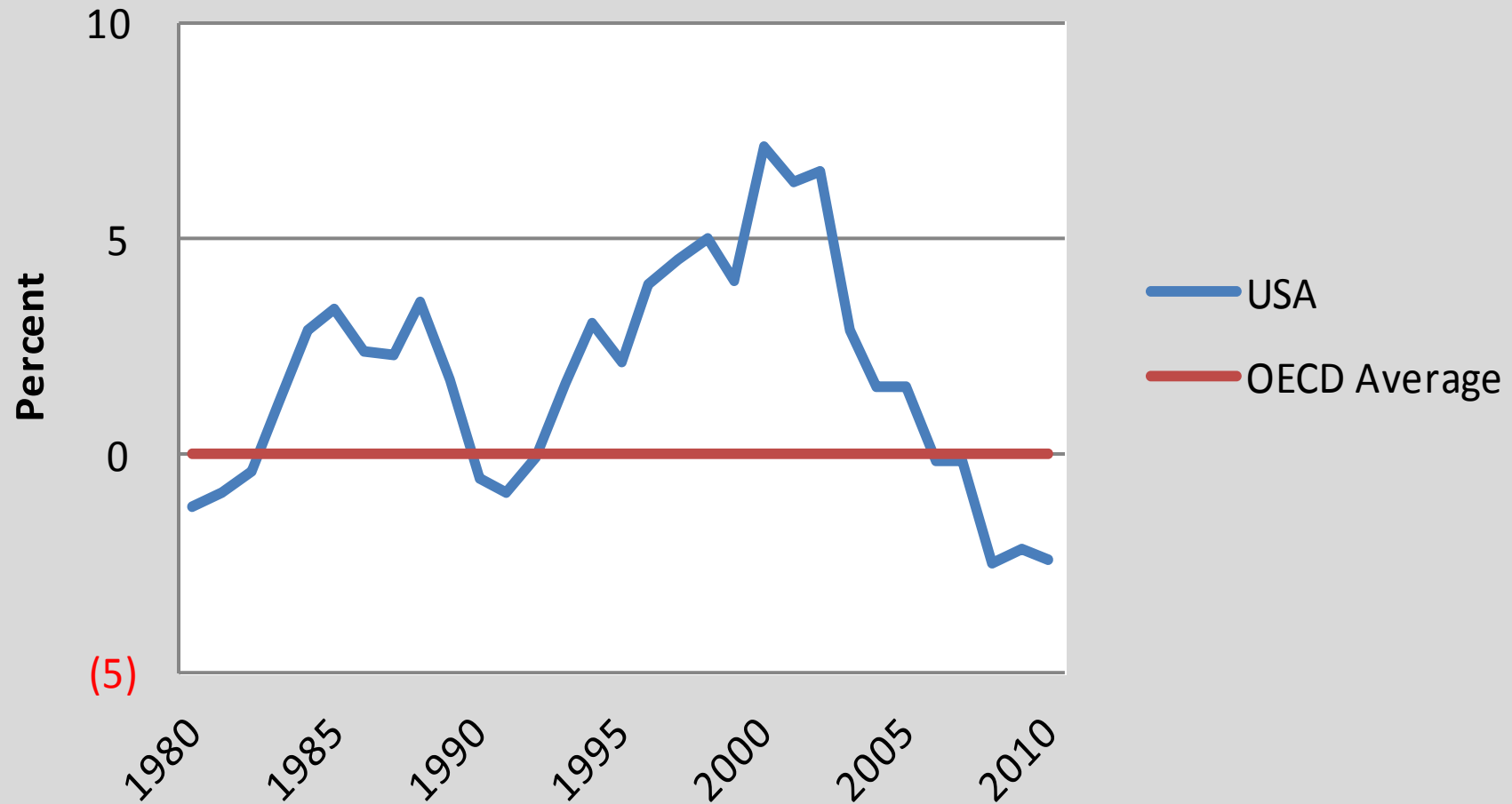




U.S. Gap is Erratic



USA: Risk Variance from OECD



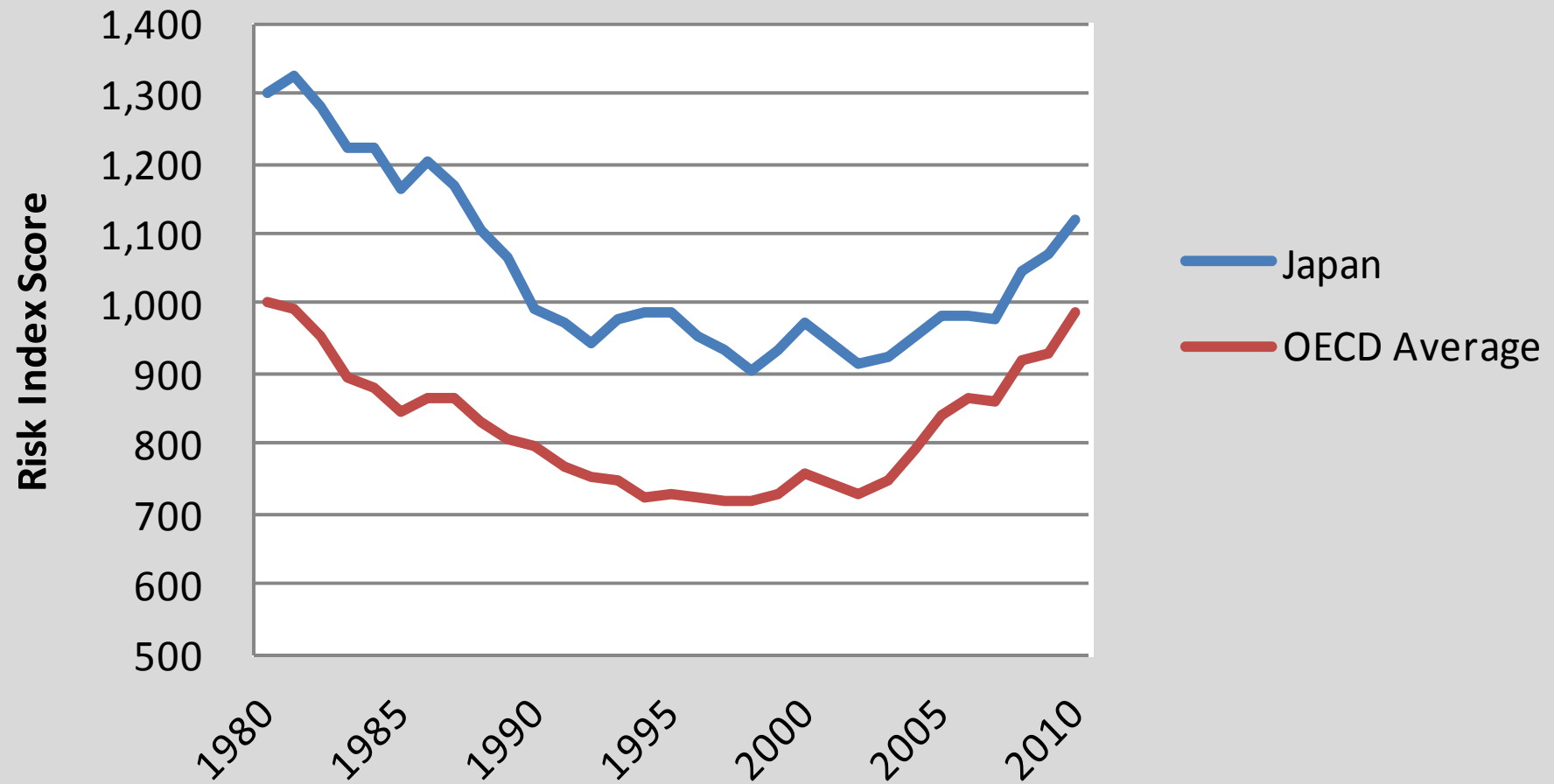
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Japan vs. Peers



Japan vs. OECD: Risk Index Scores

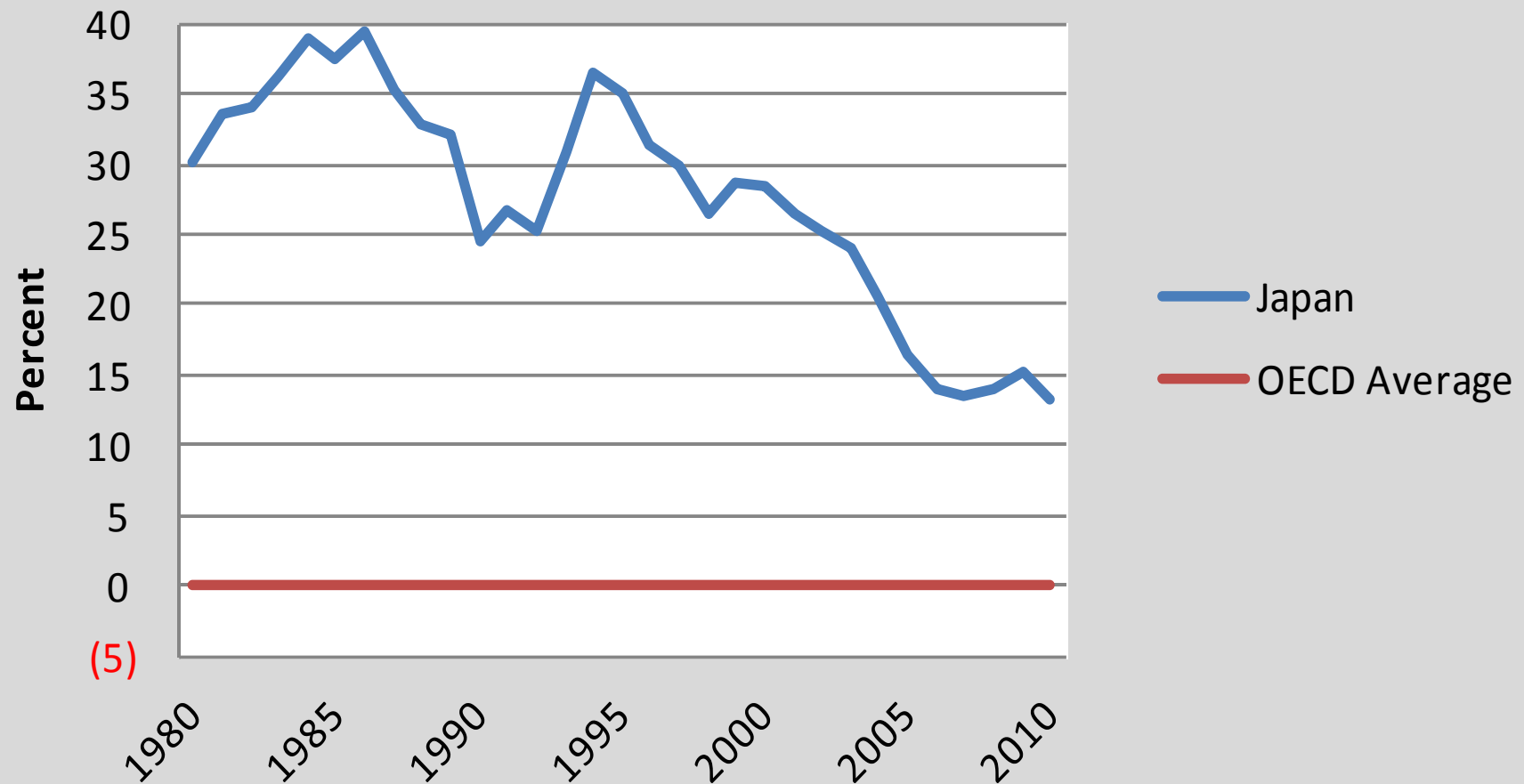




Japan's Gap Was Closing



Japan: Risk Variance from OECD



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Japan's Major Energy Security Risks



- Energy Imports

 - High Fossil Fuel Exposure

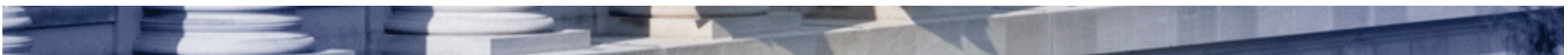
 - High Overall Import Exposure

 - Second only to ROK in 2010...likely highest in 2011-12

- Highest retail electricity prices outside of EU

- For non-energy producing country, lowest fossil fuel expenditures...due to large nuclear fleet

- One of lowest in Energy Intensity; overall and transport

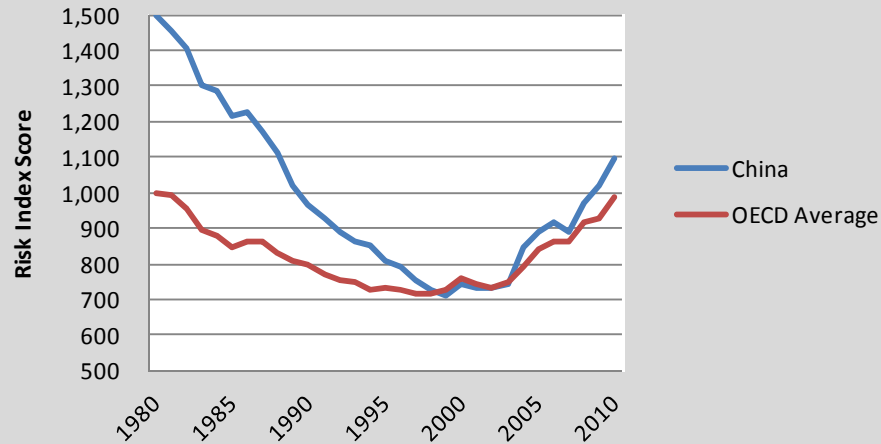




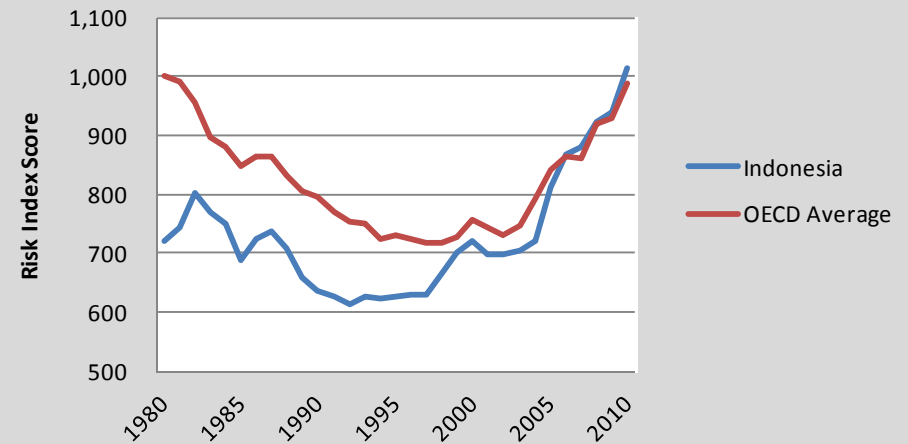
Energy Security Risk Comparison in Asia



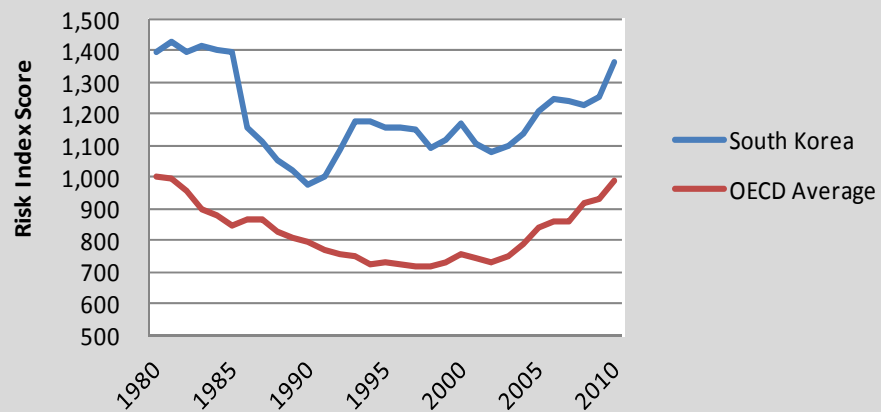
China vs. OECD: Risk Index Scores



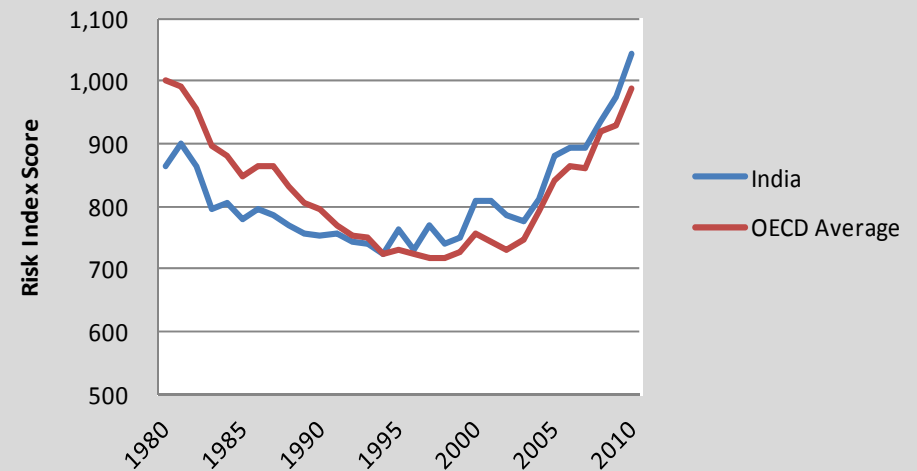
Indonesia vs. OECD: Risk Index Scores



South Korea vs. OECD: Risk Index Scores



India vs. OECD: Risk Index Scores





Conclusion



- Energy Security Risk isn't only factor policy makers should consider, but an important and overlooked factor
- Without continued use of Japan's nuclear fleet, its energy security risk will continue to grow precipitously
- The risk index isn't an abstract number...capital investment follows lower risk
- Higher energy security risk also increases geo-political risks