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International evidence on medical spending

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Outline

- Differences and similarities in medical spending across countries
- Modeling spending and data challenges
- Implications for long tailed lines of insurance

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Differences and similarities across countries

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The U.S. is different in some ways

- High spending
  - Absolute spending
  - Percent of GDP
- No universal health insurance
  - Significant uninsured minority
  - Most developed countries have univeral or near universal coverage
- Large private sector
  - Relative to other countries
  - Public companies concentrated in pharmaceuticals
  - Some countries have physician private practice

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Other countries face similar challenges

- Unsustainable rates of spending growth
- Multiple rounds of health reform
- Battling stakeholders
- Defining the role of insurance

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OECD data allows comparison across countries

- Medical spending in aggregate
  - In national currency unit of each country
  - On several dollar bases and PPP
- Breakdown of spending
  - Public versus private
- Other aggregates
  - GDP
  - Aging and demography
- Spending data taken as given
  - No standards across countries

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Modeling spending and modeling challenges

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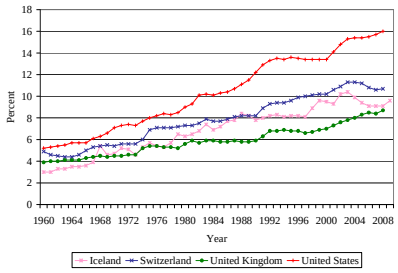
U.S. spending is high



Medical spending as a share of GDP in four OECD countries

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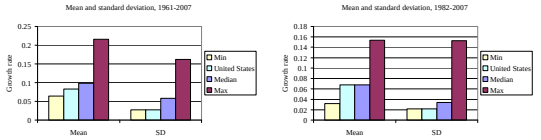
U.S. spending growth is moderate



Per capita spending growth rates in 11 OECD countries

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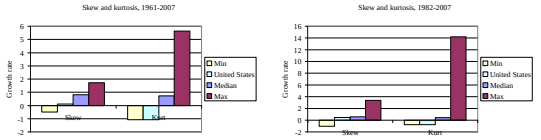
U.S. spending volatility is low



Per capita spending growth rates in 11 OECD countries

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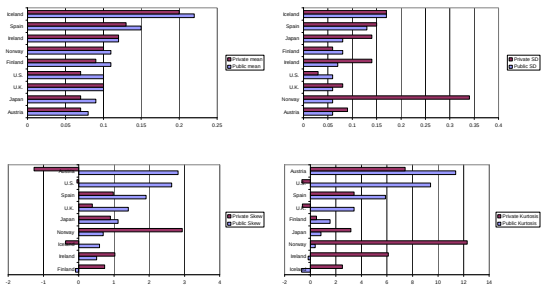
Public spending growth is higher



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Better models require a lot more data

- Each country has approximately 50 data points
- Many moving parts
  - Multiple policy changes
  - Demography
  - Macroeconomic shocks
- Strong unit roots
  - In overall spending
  - In the growth in spending in many countries
- High autoregressivity?
  - It's hard to tell
  - Possible spuriously low standard errors
- Forecast effects
  - 1-2 years is ok
  - 5-10 or more is a problem

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Implications for long tailed lines of insurance

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Many lines of business have long tails

- Guaranteed renewability
  - Given medical trend for computing premiums
  - Guarantee can run 10 years of more
  - Early mistakes can be costly
- Workers' compensation
  - Insurer may be paying many years into the future
  - Standard of care improves
  - Social inflation—insurers must forecast spending growth (not just inflation)
- Excess casualty reinsurance
  - "Leveraged effect of limits on severity trend"
  - Claims below the limit are unobserved
  - Losses jump from zero to positive
  - Hard to see the trend rate
  - Excess trend can be above or below true trend rate

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Numerical example

- Base case scenario
  - $10,005 of expected claims
  - $12,000 upfront premium
  - Payments spread over 10 years
  - 7% expected trend
  - 3% discount rate, 3% return on reserves
- Gross load = 20%
  - Initial expected gross surplus of $1,995
  - Final expected gross surplus of $2,681 (nominal)

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3 alternative scenarios

- Mean reversion in claims
  - 9% trend in year 1 followed by return to base case nominal premiums
- Mean reversion in trend
  - 9% trend in year 1 followed by 7% trend thereafter
- Autoregressive trend
  - 9% trend in year 1 followed by 7.5% trend thereafter

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Persistent trend growth can cause variation from expectations for a 10 year insurance contract

Scenario	Naive premium	Total discounted claims	Final gross surplus	Time 0 gross surplus	Time 0 gross load
Base case	12000	10005	2681	1995	20%
Mean reverting claims	12000	10021	2659	1979	20%
Mean reverting trend	12000	10215	2400	1785	17%
Autoregressive trend	12000	10436	2101	1564	15%

Full insurance case

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Persistent trend growth can cause losses for a 10 year reinsurance contract

Scenario	Naive premium	Total discounted claims	Final gross surplus	Time 0 gross surplus	Time 0 gross load
Base case	2400	2001	536	399	20%
Mean reverting claims	2400	2014	519	386	19%
Mean reverting trend	2400	2193	278	207	9%
Autoregressive trend	2400	2403	-3	-3	0%

20% excess reinsurance case

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There are some solutions to forecast errors in medical spending

- Prediction markets
  - Bet on aggregates
  - Bet on political outcomes
  - Hard to connect to different future trend outcomes
- TIPS
  - Inflation hedging bonds
  - Could be “sliced” to be medical only
  - Doesn’t hedge against quantity changes (most of trend growth)
- Macromarkets
  - Buy shares in GDP, medical spending growth
  - Health insurance futures haven’t worked
- Government reinsurance for health insurance
  - Could exacerbate problems in other lines linked to medical care

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Many problems with medical spending are out of our hands

- Medical spending is linked to overall economic growth
- Medical trend is not outrageous in the U.S.
  - Trend = GDP growth + Rate of aging
  - Fits prior trend well
- GDP growth, demography even less controllable
- PPACA
  - May fix some problems
  - Some problems may spill over from health insurance to other medical claims linked lines

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The best solutions involve humility

- PPACA—new business opportunities
  - ACOs will need risk management services
  - Chances to profitably manage new populations?
- Challenges involve an uncertain future
  - Will we get more volatility like other countries with publicly funded health care?
  - Significant trend volatility to deal with here and abroad
  - Trend breaks and implications for long tailed lines
- Public policy implication—exercise caution
  - In making public policy
  - In writing long tailed insurance and reinsurance tied to medical claims

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Next steps

- Paper is available in the CAS E-Forum
  - http://www.casact.org/pubs/forum/11spforum/
- I continue to work on this problem
- I have a grant proposal in to The Commonwealth Fund to extend this work
  - Look at financial and non financial similarities of international health care systems
  - Convergence of systems over time

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