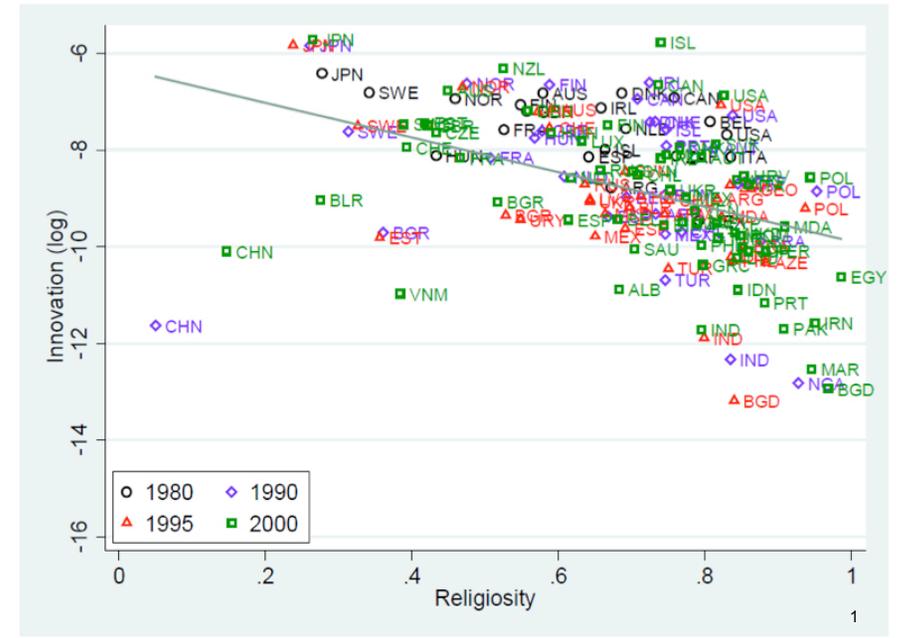# Forbidden Fruits:
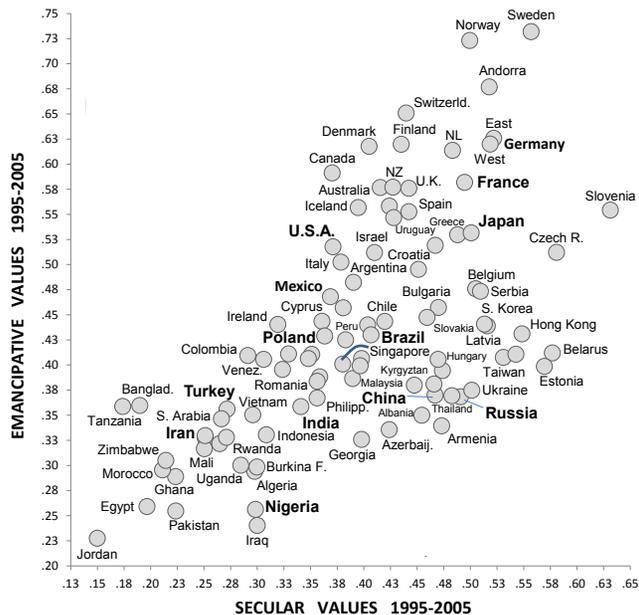## The Political Economy of Science, Religion and Growth

by Roland Benabou, Davide Ticchi,
and Andrea Vindigni

Discussion by Paul Romer
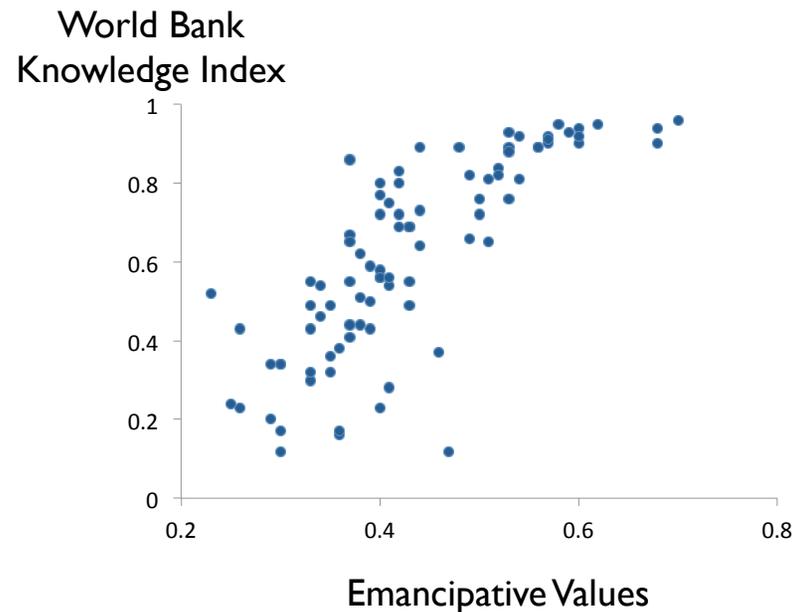NBER EFG Research Mtg
July 11, 2014

The correlation identified here with religiosity
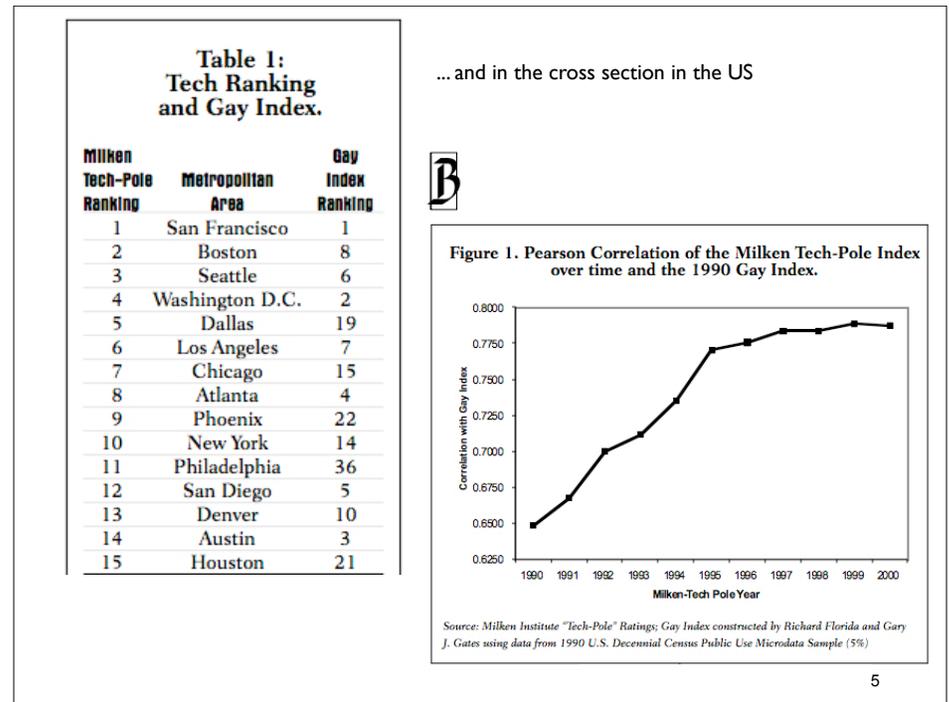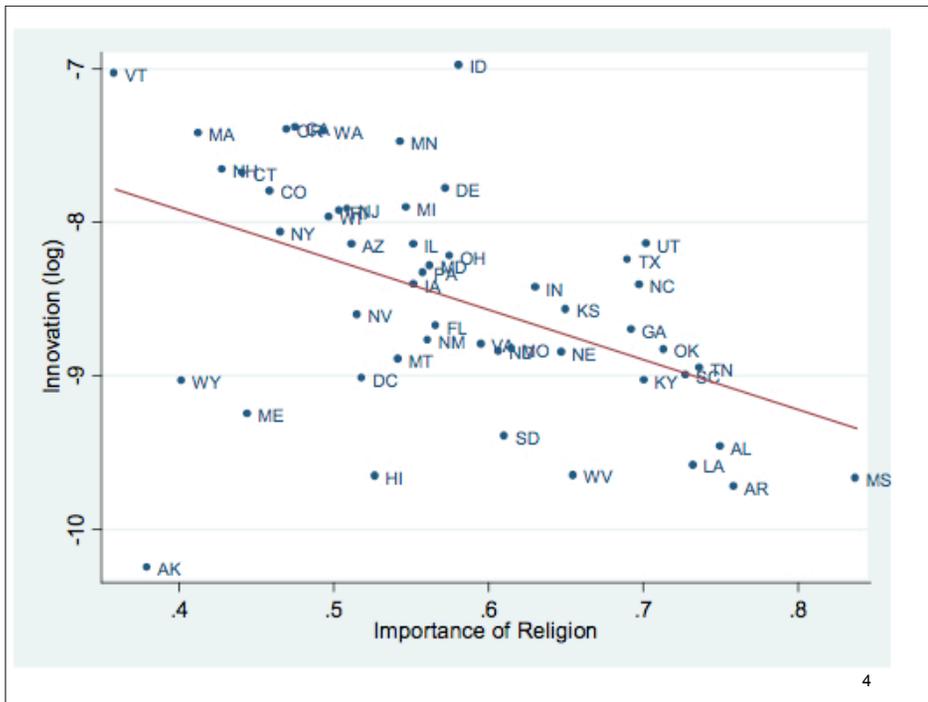

1

... is linked by others with related measures of free expression and individuality

2

... that are also correlated with tech/innovation across countries

World Bank
Knowledge Index

Emancipative Values

3

Slide 4 (scatter plot):

Innovation (log) vs Importance of Religion

y-axis: Innovation (log): -7, -8, -9, -10
x-axis: Importance of Religion: .4, .5, .6, .7, .8

Data labels: VT, ID, MA, OR, CA, WA, MN, NH, CT, CO, DE, NY, WI, NJ, MI, AZ, IL, OH, UT, TX, MD, PA, IA, IN, NC, KS, NV, FL, NM, VA, MO, NE, GA, OK, MT, TN, SC, WY, DC, KY, ME, SD, AL, HI, WV, LA, AR, MS, AK

Slide 5:

**Table 1:
Tech Ranking
and Gay Index.**

... and in the cross section in the US

Milken Tech-Pole Ranking	Metropolitan Area	Gay Index Ranking
1	San Francisco	1
2	Boston	8
3	Seattle	6
4	Washington D.C.	2
5	Dallas	19
6	Los Angeles	7
7	Chicago	15
8	Atlanta	4
9	Phoenix	22
10	New York	14
11	Philadelphia	36
12	San Diego	5
13	Denver	10
14	Austin	3
15	Houston	21

Figure 1. Pearson Correlation of the Milken Tech-Pole Index over time and the 1990 Gay Index.

y-axis: Correlation with Gay Index: 0.6250, 0.6500, 0.6750, 0.7000, 0.7250, 0.7500, 0.7750, 0.8000
x-axis: Milken-Tech Pole Year: 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000

Source: Milken Institute "Tech-Pole" Ratings; Gay Index constructed by Richard Florida and Gary J. Gates using data from 1990 U.S. Decennial Census Public Use Microdata Sample (5%)

Aggregate State Variables in Macro

- Capital
  - Physical, Human
- Technology
- Next? Norms
  - Becker-Murphy state variables in prefs
  - Other regarding / moralistic
  - Socially determined

Key Assumptions: Preferences

$$U(c, G \mid b_t) = c + b_t G$$

c - food

The model here uses a preference state variable as in addition models, but it does not explicitly invoke moralistic behavior on the part of the agents in the model

G - sanctuaries

Aside: Sanctuaries are not a public good, even if they provided by the state
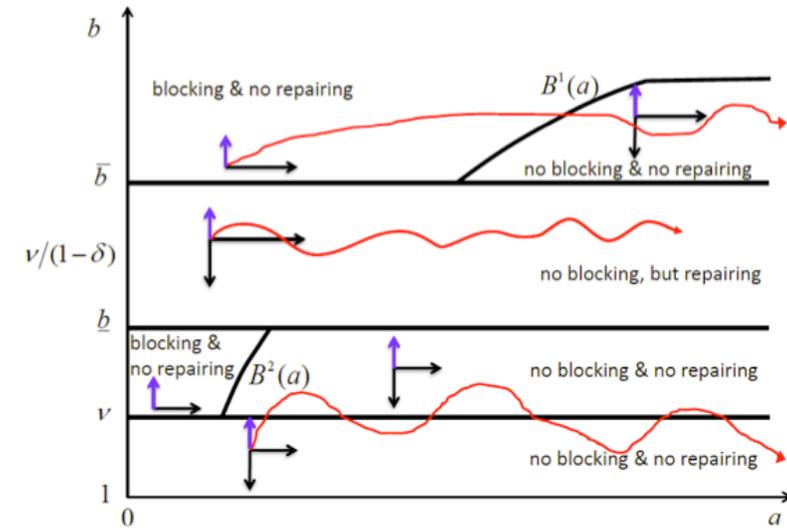
b_t - religiosity state variable

Key Assumptions: Dynamics

$$c + G + I = a_t$$

$$a_t = (1+\gamma)^s \text{ for some } s \le t$$

$$\Delta b = F(\overset{-}{\Delta a}, \overset{+}{I})$$

8

Dynamics with BE shocks

9

Augmented Dynamics

$$a_t = a_s^{BR} a_t^{BN}$$

$$= (1+\gamma)^s (1+g)^t \text{ for } s \le t$$

$$\Delta b = F(\overset{-}{\Delta a^{BR}}, \overset{+}{I}; b_t) + \varepsilon$$

10

Payoff from I needed to get "repair" in middle region

11

Slide 12
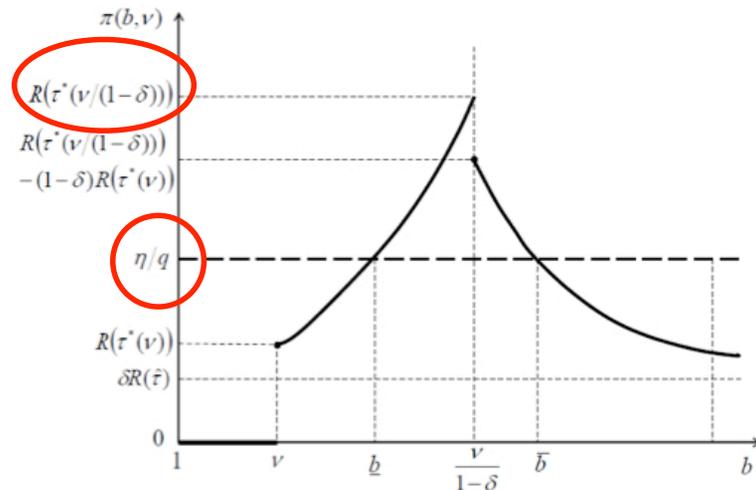
Secular Publicly Provided Good T

$$U(c,G,T \mid b) = c + bG + vT$$

$$c = (1-\tau)a_t$$

$$G + T = R(\tau)a_t$$

Slide 13

Like many economic models, this limits scope for policy to change culture/norms

1. Vertical transmission of culture / state variables - parent to child

2. Given, unchanging types

$$U(c,G \mid b_t) = c + \beta^i b_t G$$

$$\beta^i \in \{0,1\}$$

Slide 14

Crime is an application where assuming adults never change norms (or type) has huge policy implications - can be used to justify a moralistic policy of "lock em up and throw away the key" instead of getting back to 1950s equilibrium
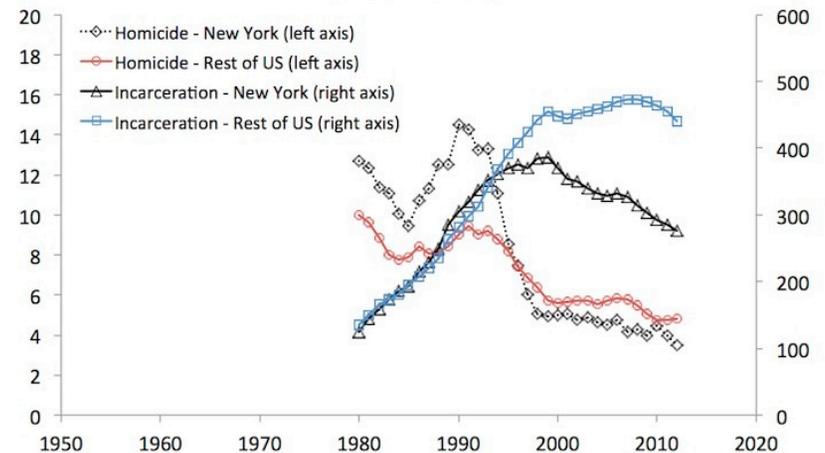

Homicide and Total Incarceration Rate for the United States
(Per 100,000 Residents)

Slide 15
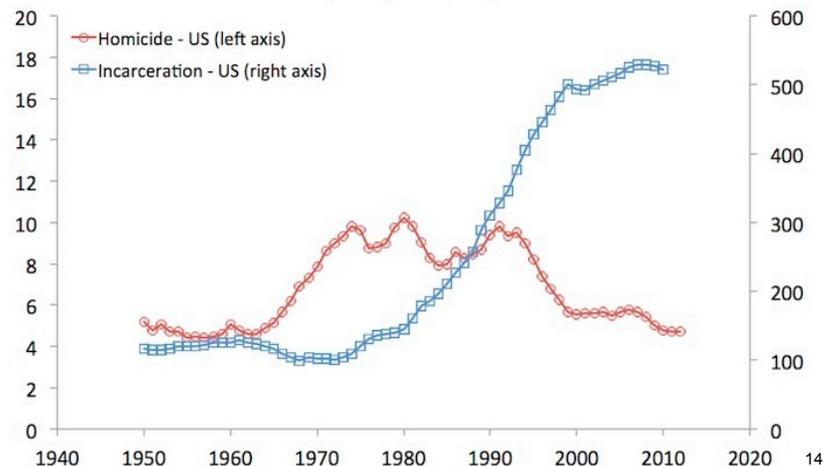
Data from NY show that the right incentives can change behavior, in this case by deterring crime. Changes in norms may be part of this dynamic

Homicide and State Level Incarceration, NY and Other States
(Per 100,000 Residents)

- Related literatures

  - Psychology - Nisbett, Haidt

  - Cultural Evolution - Boyd, Richerson, Henrich

  - Biology - Sloan-Wilson

- Much evidence that norms do change over a person's life and are strongly influenced by interactions with others

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Words and Math

• Math is good because it keeps us from invoking emotions (particularly anger) in our scholarly discourse. Doing so will help us work toward agreement on the science

• When we use words, it would be better if we used them precisely, in parallel with the math; hence, don't use "public good" to refer to a building like a sanctuary that rival and excludable

• More generally, we should avoid words that activate moralistic norms in our colleagues, even as we consider the logic and evidence concerning how norms affect behavior

• So avoid quotes like ...

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The United States

- Rep. Paul Broun (R-Ga.) also an M.D., June 2012

"All that stuff I was taught about evolution and embryology and the big bang theory, all that is lies straight from the pit of Hell...

It's lies to try to keep me and all the folks who were taught that from understanding that they need a savior...

You see, there are a lot of scientific data that I've found out as a scientist that actually show that this is really a young Earth. I don't believe that the earth's but about 9,000 years old. I believe it was created in six days as we know them. That's what the Bible says."

- Rep. Broun sits on U.S. House Committee on Science, Space & Technology

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