

Natural Experiments

One way of testing economic ideas is to experiment on a small number of people, typically students in an artificial situation created for the purpose. Another is to analyze the results of something that has already happened, a natural experiment. Here are some examples.

Porn and Sex: Substitutes or Complements?

One argument offered for laws against pornography is the claim that it leads to violence against women. A counter argument is that it actually decreases such violence, because imaginary sex, including imaginary violent sex, is a substitute for the real thing. Economist Todd Kendall found an ingenious way of using a natural experiment to find out which was true.

Access to the internet makes pornography more readily available, not only cheaper and easier to find but more private and so less likely to lead to embarrassment and negative social consequences. Internet access increased at different rates in different states. Data on rape rates by state is available. Kendall looked at the data to see whether, controlling for other variables, increased access to the net correlated with an increase or decrease in rape. The answer was that it correlated with a decrease, about a ten percent drop in rape for a ten percentage point increase in internet access. There was no similar relation for murder, which suggests that the result is not simply picking up the effect of some third variable that happens to correlate with both internet access and violent crime

As further evidence he repeated the analysis, separating out the data according to the age of the perpetrator. His conjecture was that the men most benefitted by the availability of internet porn would be young adult men living with their parents, since they would find it difficult to consume other forms of pornography without risking discovery. The results supported the argument; the reduction in rape was concentrated in the 15-19 age group.

Readers interested in the details can read Kendall's [paper](#).

Some psychologists argue that pedophilia, sexual attraction towards children, is an innate characteristic, probably with a biological base, probably unalterable. That would imply that children are protected not by keeping people from having that characteristic but by keeping them from acting on it. One way to do so is by punishing sex with children but another might be to make substitutes more readily available. There are, after all, a lot of adolescent and young adult males who, unable to get any desirable women to go to bed with them, have to do the best they can with masturbation and pornography instead.

Kendall's research suggests the possibility that, just as online pornography appears to be a substitute for rape, child pornography might be a substitute for child sex, less desirable to a pedophile but also a lot less dangerous. If so, current laws that severely punish possession of child pornography increase rather than decrease the risk to children.¹

One argument offered for such laws is that the production of child porn involves real children, but it does not have to. Child porn could be made using adult actors made to look very much younger than their actual age, possibly with the assistance of computer graphics. It could be made using

¹ There is some evidence from research in Czechia supporting this conjecture: Milton Diamond, Eva Jozifkova and Petr Weiss, "[Pornography and Sex Crimes in the Czech Republic](#)."

images created entirely on computers. Holding such porn legal would provide pedophiles, defined by preferences not practices, a substitute for actual sex with actual children.

The Supreme Court, in a 2002 decision, held legislation that made virtual child porn illegal to be an unconstitutional infringement of free speech. Congress passed replacement legislation; its current legal status is unclear.²

Colonialism and Industrial Development

It is tempting for governments of poor countries to blame their poverty on past European colonialism. It is tempting, if currently less fashionable, for defenders of colonialism to make the opposite claim, especially after decolonialization was followed by civil wars with enormous death tolls in at least five African countries.³ A famous earlier example of the argument was Kipling's "[The White Man's Burden](#)," a poem not, despite its title, about race, but about civilized people leading the uncivilized "towards the light." The immediate subject was the U.S. rule over the Philippines, which is why the poem starts out "Take up the White Man's burden." It would be nice if someone could contrive an objective test of the effect of colonization, of whether, on average, a country that had been under colonial rule was richer or poorer, more or less developed, than an otherwise similar country that had not.

It has now been done.

Parts of British India were directly ruled by Britain, other parts, the princely states, under their local ruler with full autonomy in internal affairs, a situation that only ended with Indian independence in 1947. If one could measure which areas ended up better off one would have at least some evidence of whether the British did a better job of ruling than the locals.

Economist Lakshmi Iyer looked at the question and concluded that the areas under direct British rule had lower levels of investment in public goods such as health, education, canals, and roads, higher levels of poverty, inequality, and infant mortality, similar levels of literacy.⁴

Iyer was unable to look at per capita income or similar measures of development because that data was available only at the state level and current Indian states do not correspond to the past princely states. Priyaranan Jha and Karan Talathi solved that problem by using satellite night light data, which have been widely accepted in the development literature as a proxy for economic

² In [Ashcroft v. Free Speech Coalition](#), 535 U.S. 234 (2002) the Supreme Court held that "The boundaries between actual and virtual child pornography remain sufficiently distinct that the latter, lawful form of speech does not need to be suppressed to prevent the circulation of the former, unlawful form of speech." The court found the Child Pornography Prevention Act of 1996 overly broad and inconsistent with the constitutional protection for free speech. The only reference to the issue raised in this chapter was "The argument that virtual child pornography whets pedophiles' appetites and encourages them to engage in illegal conduct is unavailing because the mere tendency of speech to encourage unlawful acts is not a sufficient reason for banning it ..." For a summary of the ambiguous legal situation since, see Paula Bird, "[Virtual Child Pornography Laws and the Constraints Imposed by the First Amendment](#)."

³ The Nigerian Civil War and the Rwandan Civil War are each estimated to have killed over a million people, the several Sudanese Civil Wars several million. The Burundi Civil War killed about 300,000, the [Ugandan Bush War](#) between 100,000 and 500,00. There were a variety of other civil wars in Africa after decolonization with smaller death counts.

⁴ Iyer, L. 2010. "[Direct versus Indirect Colonial Rule in India: Long-Term Consequences](#)." The Review of Economics and Statistics, 92 (4): 693-713.

development.⁵ They found that modern districts that were historically under direct British rule had about 39 percent fewer night lights per capita in 1993 relative to modern districts that were historically under indirect British rule.⁶

The determination of which states were directly ruled was not made at random. If the more prosperous states were allowed self-rule, as might have been suggested by Kipling's argument — it was the more backwards that would have been most in need of a firm British hand to lead them — the fact that they started out more developed could explain why they ended that way. If, on the other hand, the British chose to directly rule the more prosperous states, perhaps because rule over them was more profitable, the night lights data would understate the negative effect of British rule.

Under the [Doctrine of Lapse](#), if the ruler of a princely state died without a direct male heir the state came under the direct rule of the East India Company, later the British Viceroy. That meant that some states were under direct rule because of a random process. Iyer, followed by Jha and Talathi, used that fact by rerunning their analysis based on the comparison between those states and the states under indirect rule. They found that doing it that way gave an even stronger result.

Compulsory Licensing of Drugs

(Done, but ...)

One solution sometimes proposed for the problem of making medical drugs available in poor countries is compulsory licensing: The government of the poor country sets the price at which the patent owner must license others to produce the drug. The obvious argument against is that while it might reduce the cost of present drugs it would also reduce the supply of future drugs.

I once heard a talk by someone who tried to test that prediction by looking at U.S. drug companies that had been required to accept compulsory licensing, usually as one of the conditions of a merger. She had a total of six cases. In only one did there seem to be a visible decrease in future patent applications. She viewed that as at least weak evidence against the idea that compulsory licensing would reduce innovation.

Her sample size was tiny and the data very noisy, making a conclusion in either direction difficult. But that was not the interesting problem with her project. In four of her six cases, the requirement was for compulsory licensing of a patent that already existed. When I pointed out that there was no reason to expect that to have any effect on future research by that particular drug company, she replied that that wasn't what the drug companies, arguing against compulsory licensing, claimed.

I believe I know what was going on; there are two arguments for the same conclusion which look similar enough to be confused. One is the argument that I, or any economist, would make. The other is the argument she was rebutting.

Her argument takes the form "If the drug companies don't have enough money from their past research, they can't afford to finance future research to produce new drugs." That sounds plausible and explains why compulsory licensing of an existing drug might reduce future research, but it is wrong. If future research looks to be profitable, drug companies do not need to finance it from past

⁵ Priyaranan Jha and Karan Talathi, [Impact of Colonial Institutions on Economic Growth and Development in India: Evidence from Night Lights Data](#)

⁶ The result was from a regression that controlled for a variety of geographical and other variables, but the raw numbers gave a similar result (personal communication).

profits; that is what capital markets are for. If future research looks unprofitable then, however much money drug companies have from past research, they can find somewhere else to put it. That too is what capital markets are for.

The argument that makes sense to an economist is about incentives, not resources. Anything that makes future research less profitable, such as a policy of compulsory licensing expected to apply to future drugs, means that some projects go from just worth doing to not quite worth doing, reducing the amount of future research. Seen from that standpoint, four of her six cases are irrelevant, since they involved compulsory licensing of patents that already existed. In only two cases did the requirement apply to future patents. So her sample size was not six but two, and one of the two was the one case where she concluded that the result of the requirement was to eliminate research in the area it covered. Insofar as any conclusion could be drawn from her results, it was the opposite of the conclusion she drew.

The argument she was responding to got the economics wrong but was, rhetorically speaking, the right argument for the drug companies to make. With her argument, the drug companies are claiming that they would like to develop new drugs to save lives but can't do it if compulsory licensing deprives them of the needed resources. That sounds a lot more attractive than saying that, while they could develop new drugs to save lives, they won't unless it is profitable.

The Supply Function for Marriage

(Still to be done)

Federal tax law bases its definition of what income belongs to which taxpayer on state law. In a community property state, back before the invention of the joint return, half of a couple's income was attributed to the husband, half to the wife. In states that did not recognize community property, on the other hand, the husband was taxed on his income, the wife on hers.

The result, after tax rates become significantly graduated in response to the need to pay for WWI, was that high income single-earner couples paid substantially lower taxes in community property states. One possible response was for a couple not in a community property state to move to one. Another was for a high-income bachelor living in a community property state to get married, shifting half his income to his wife's lower rate.

That situation lasted for twenty years or so, long enough for individuals to observe it and respond. Was one response an increase in the fraction of high-income men living in community property states who were married relative to the fraction in non-community property states? If so, the size of the effect would give us a measure of how the number of people who get married responds to financial incentives to do so.

It should be a good project for a PhD thesis, assuming the necessary data, marriage rates by income group and by state, or at least good proxies for them, exist.

Mortgage Defaults

(Still to be done)

You buy a \$400,000 house with \$40,000 down and a mortgage for the rest. The housing market slumps, as it sometimes does; the value of your house drops to \$320,000. You now have a \$360,000 debt secured by a \$320,000 asset; defaulting on the mortgage and forfeiting the house gives you a

\$40,000 gain at the cost of the lender. It may be in your interest to default even if you do not have to.

This only works in a state where the lender's claim against you is limited to the house, as it is in some (non-recourse) states,⁷ or if you have no other assets that a lender would find worth going after. That suggests a simple research project to provide a rough estimate of the fraction of defaults that are voluntary. Compare default rates in states where the lender can go after other assets to default rates in states where he cannot. The researcher would want to try to control, by the usual statistical measures, for other differences among states that might affect the chance of default.

When I made this suggestion on my blog, two commenters, one of whom had an aunt who ran a title office, responded that even in non-recourse states lenders usually swallowed the loss instead of trying to go after other assets. On the other hand, a commenter from Sweden described the Swedish situation as an extreme form of non-recourse, including the possibility of collecting from the defaulting debtor's salary, with the result that people almost never defaulted. I do not know what the legal situation is in Denmark or Norway, adjacent countries in some ways similar. If it corresponds to that in U.S. non-recourse states my project could perhaps be done by looking at data for adjacent regions separated by a national border but otherwise similar.

The Value of an Alphabet

(Still to be done)

Until the 15th century, Koreans wrote using Chinese characters. During that century they invented an alphabet, Hangul, which a linguist of my acquaintance described as the best alphabet ever created. Learning to read and write in Chinese characters took a lengthy education. Learning to read Hangul took only a few days, long enough to memorize the sounds of the letters. The introduction of Hangul converted Korea from a society where only the elite were literate to a society where almost everyone was.

China retained the traditional writing system, so the history of the two countries ought to provide information on the effect of widespread literacy. In what ways in which the societies were similar before Hangul did they diverge thereafter?

I do not have an answer, but someone much more expert in the history of both countries might.

⁷ Alaska, Arizona, California, Connecticut, Idaho, Minnesota, North Carolina, North Dakota, Oregon, Texas, Utah and Washington, as of 2020, according to [Forbes](#).