

## Research Projects

I have a file drawer full of projects that I at some point started and then abandoned. Since I am unlikely to ever get back to them I thought it would be worth describing some here in the hope that someone might be interested in reviving them, perhaps for a PhD thesis or a book. I have added some additional projects that I thought of but never worked on.

### Why do States Spend Money?

At a crude level, there are two theories of what determines government expenditure: the need for government services or the ability of the government to get money. One test of their relative importance is government finance before, during, and after a war. The end of a war leaves standing the higher taxes used to pay part of its cost. On a pure need theory, one would expect taxes and government expenditure to fall back to something close to its pre-war level. On a pure revenue theory, one would expect expenditure to remain high, perhaps not as high as during the war, when it was financed in part by borrowing and/or inflation, but at least as high as the taxes enacted during wartime would support. It is easier, politically speaking, to retain a tax than to pass one.

That is an approach to the question that others have looked at,<sup>1</sup> but I thought of another. Different U.S. states have different tax structures. Different taxes respond differently to exogenous changes such as inflation. If a state is financed by a progressive income tax, inflation pushes taxpayers into higher brackets and so raises revenue by more than it raises prices; if prices and incomes double, tax revenue should more than double. If a state is financed by property taxes not often or easily revised, inflation should reduce real revenue; if prices and incomes double, tax revenue should less than double. If expenditure is driven by the availability of revenue, we would expect the first sort of states to have real expenditure increased by inflation, the second sort decreased. One could do a similar analysis for other changes in the economic environment that affect revenue. If states whose revenues are increased by exogenous factors on average increase expenditure, that is evidence for the revenue hypothesis.

To test the need hypothesis, you would want to look at changes that affect needs for revenue. The largest expenditure of state and local governments is schooling. The cost of schooling largely depends on the number of school age children, which changes over time. On a need theory, when the school age fraction of the state's population goes up, as it did when the baby boom reached school age, state expenditures should go up. When it goes down, as it did in the years when the baby boom was coming out of the schools and onto the labor market, it should go down.

For the nation overall, we have the necessary data to see if it did. The high postwar birthrates of the baby boom ran from 1946 to 1964, so children born during it were entering the school system from 1951 to 1969, exiting from 1964 to 1982. K-12 enrollment as a percent of population peaked in 1971 at about 35% above its 1950 value. It declined thereafter, reaching about 72% of its peak value by 1990. From the early fifties to 1971, state and local expenditure as a fraction of GNP went up by about 50%, from 1971 to 1990 it increased by another 11%.<sup>2</sup>

---

<sup>1</sup> In *The Law and the Profits* C. Northcote Parkinson examined the question and found that, as a rule, taxes and expenditure remained at about their wartime level.

<sup>2</sup> I am calculating it relative to GNP on the theory that, as people get richer, one expects more money to be spent on educating their children. If we look instead at real per capita expenditure, calculated as nominal expenditure/(CPI x population), the increase from 1971 to 1990 was about 47%.

The increase happened, the decrease did not. One could interpret this as evidence against the need theory but one could also see it as an upward trend of about 15%/decade for reasons unrelated to the age distribution of the population with the rise and fall due to the changing demographics making the increase in the first period faster than that, in the second period slower.

The best evidence would be differences in what happened in different states, since that eliminates causes that affect all states equally such as changes in technology that make schooling or tax collection more or less costly. The fraction of state and local expenditure going to schooling varies by state, as does the age distribution of the population. There should be other changes that affect the need for state expenditure that vary across states as well.

The project is to calculate for each state how revenue would be expected to respond to changes in its environment. Calculate, for each state, how the demand for government services would be expected to respond to changes in its environment. See which plays how large a role in predicting what actually happened.

I have described the project from a U.S. point of view but it could be done for Canadian provinces, Indian or Australian or Brazilian states, or as an international comparison.

### **Exploiting Climate**

The [Tiebout model](#) holds that competition for residents among local governments forces each to provide the optimal level of local public goods. One limitation to the argument is that although an individual can take his labor and his capital out of a locality whose government charges him more than the value it provides, his land remains behind. A government should be able to use its control over land to collect revenue without providing services of comparable value.

To explore the non-political constraints faced by a local government, model it as a dictatorship. All citizens are identical. The optimal level of local public goods costs \$10,000 per capita to produce. An adjacent polity currently produces that level of services at that price in taxes, as per Tiebout.

The dictator sets taxes at \$11,000 per capita, spends \$10,000 producing the optimal level of local public goods, pockets the rest. Citizens start to leave. As they leave, the value of fixed resources, land and houses, goes down. They continue leaving until the cost of selling house and land at a low price and replacing them at a higher price in the adjacent polity just balances the advantage of paying a thousand dollars less a year in taxes. There is now a new equilibrium with a smaller population and higher taxes. A local dictator who is selfish and rational will adjust the tax rate to maximize his revenue while still providing the optimal level of local public goods, since providing more or less would, once population had adjusted, leave him poorer.

This model implies that the greater the value of living in the territory of a local government, taxes and services aside, the higher the level of exploitative taxation we should expect. If living in California instead of Nevada is worth \$10,000 a year, California can afford to charge \$10,000 more in taxes net of the value of services before citizens start to leave for Nevada. This looks like an explanation for why California, with a notoriously attractive climate, also has notoriously high taxes.

California, of course, is not a dictatorship. To fit the model more closely to reality, assume special interests within the polity, such as organized public employees, have effectively captured control of revenue. The threat of teacher strikes or police strikes or sanitation strikes can be used to push

wages and pensions above the market level, transferring the excess tax revenue to the public employees. From an accounting standpoint there is no exploitative taxation, since the cost of the services provided, including the cost of those wages and pensions, absorbs all of the tax revenue.

This line of argument was suggested to me by an [online discussion](#) of what the disadvantages were of living in a low tax state. One participant wrote:

Whenever I've fished the stats on such things all I've been able to see is that it is much worse to be a public employee in states without income tax. Schools don't seem to be worse, but being a teacher is worse, as an example.

The model implies a correlation between the level of taxes in a state or local government and the natural advantages of its location. To test that implication, find or calculate an estimate of the natural advantages of different locations, taxes and services aside, and see if it correlates with level of taxes.

### **Genetic Testing and Adverse Selection: Measuring the Size of the Problem**

Reductions in the cost of genetic testing and improvements in genetic knowledge produce obvious benefits; if you know you are likely to have some particular medical problem, you may be able to take precautions against it. They also have at least one potential downside: The more that can be known about the chance of bad things happening to us, the less able we will be to insure against them.<sup>3</sup>

A solution sometimes proposed is to permit individuals to have their genes tested but forbid insurance companies to use the information. The problem is adverse selection. If the insurance company cannot distinguish between high risk and low risk customers it must charge them the same price. Since the customers know which they are, insurance is a better deal for higher risk customers, so more of them buy it. Insurance companies, finding that those who choose to buy their insurance are likely to be bad risks, charge accordingly, driving more of the lower risk customers out of the market. In the limiting case insurance is bought only by high-risk customers at a high-risk price. A well known description of the problem is Akerlof's article "[The Market for Lemons](#)," where the lemons are not fruit but used cars.

If we allow both companies and their customers to make use of genetic information, both high risk and low risk customers will be able to buy insurance but at different prices. The risk of having genetic variants that make you more likely to suffer some expensive medical problem is then uninsurable, although you can still insure against the risk that, given those genes, the problem will actually appear.

The theoretical analysis of the problem is straightforward; interested readers can find one version in [Chapter 6](#) of my *Law's Order*. How large the problem is depends on how much the information provided by genetic testing affects the expected cost of insuring someone. If the effect is small, neither adverse selection due to rules prohibiting insurance companies from using genetic information nor, absent such rules, the inability to insure against genetic risks, is likely to be much of a problem. If it is large, either is.

---

<sup>3</sup> Another possible downside is mentioned in Chapter XXX (Utility); there may be some things we would prefer not to know. The issue of adverse selection is also discussed in chapters XXX (applications of economics).

I happened to come across a datum relevant to that issue as a result of having my own genes tested by [23andMe](#). It turned out that I had a genetic variant that implied a moderately increased risk of meningioma, the second most common type of brain tumor.<sup>4</sup>

The information came a little late. A year or so earlier, one of the other players in a group on *World of Warcraft* noticed that I had stopped responding. He called the house. My son took the call, came into my office and found me half conscious on the floor. The diagnosis at the local hospital was meningioma, benign (i.e. non-cancerous) tumor inside my skull but fortunately outside my brain. It was large enough to put pressure on my brain, so required surgery. I got the surgery, all went well, and I now seem to be fully recovered.

According to 23andMe, 35,000 Americans a year are diagnosed with meningioma; in most cases the tumor is small enough not to require surgery. Assume that 10,000 of those do require it, making the annual probability for a random American 1/30,000. Further assume that the average cost is \$100,000. That is the right order of magnitude, judging by the figures I saw for what it cost my insurance company. The average cost to the insurance company of that particular risk is then about \$3.

Finally, assume that my "moderately increased risk" means twice the average risk.<sup>5</sup> It follows that in a world where insurance companies had and used that data, my medical insurance would cost three dollars a year more than in a world where the data was not available.

This is, of course, only one example of a risk affected by observable genetic differences, one for which I happened to have enough data to make a very rough estimate of its size. Another that occurs to me, also from my own genetics, is the effect of APOE4, a genetic variant that increases the risk of getting Alzheimer's. Someone with no copies of the gene has about a 10% chance of eventually developing Alzheimer's, someone with one copy about a 30% chance, someone with two copies something over 50%. About 15-25% of the population carries one copy, 2-3% carry two. By combining these facts with figures on the medical costs of Alzheimer's, it should be possible to do the same sort of calculation I have done for Meningioma.

The research project would be to do similar calculations for, as nearly as possible, all such risks in order to produce an estimate of how much their combined effect could be expected to vary from one individual to another. That would be of no immediate relevance for current U.S. policy, since Obamacare already creates adverse selection by forbidding insurance companies from basing their rates on information they have about a customer's health, much of it more relevant — that is why the legislation included a requirement that everyone be insured. But it might be relevant for decisions elsewhere or for arguments here on future changes.

## The Patent Puzzle

Consider a country deciding whether to create laws protecting intellectual property. The benefit is the creation of more writings and inventions. The cost is the deadweight loss due to the temporary

---

<sup>4</sup> Strictly speaking not a tumor in the brain but a tumor in the membrane that contains the brain, separates it from the skull.

<sup>5</sup> According to my archived report from 23andMe, my probability was increased by a factor of about 1.93. According to [information I found online](#), one copy of a particular allele results in 1.61 times the normal risk, two copies in 2.33 times. I do not know if this is the genetic issue I had.

monopoly. Royalties paid by inhabitants to inhabitants are a wash, a benefit to one and a cost to the other. If net benefit is larger than net cost, it pays to create the laws.<sup>6</sup>

There is, however, a problem. Protection within one country against infringement by its citizens provides benefits to all other countries, since they can take advantage of the innovation without paying for it. Intellectual property protection is, viewed from an international standpoint, a public good, something valuable whose producer cannot control its consumption by others.

One way of producing a public good is by a privileged minority, a subset of the public small enough to coordinate, in the limiting case a subset of one, and getting enough benefit from the good to be willing to pay all of the cost. When I have my house repainted or mow my lawn I am producing a public good, a more attractive neighborhood, for my neighbors, while paying all of the cost myself. Similarly, a country that gets sufficient benefits from enforcing patent and copyright law within its boundaries might be willing to do so in spite of its inability to charge foreign consumers for using its IP.

Another solution to the problem is a contract by which potential consumers get the public good produced by agreeing in advance to pay for it. If the public consists of one person, that reduces to the ordinary mechanism for producing private goods — you only get them if you pay for them. As the number increases, the problem becomes more difficult. In principle the producer can offer a contract by which each member of the public agrees to pay his share if and only if all the others agree, but with large numbers a single holdout, a consumer who values the good at less than he is being asked to pay for it or one who believes that a new round of negotiation with him not included will let him get the good for free, blocks the contract. A third alternative, with elements of both of those, is a unanimous contract not among all consumers of the public good but among enough to fund the good.

In the case of two similar countries, the simple solution is a bilateral contract: We enforce your IP on our citizens, you enforce ours on yours. But a country that expects to pay much more in licensing fees to foreigners than it receives in licensing fees from foreigners has an incentive to remain a free rider. In the case of a small country and a large one the difference in amount of intellectual property produced should be balanced by the difference in the amount consumed, since what the larger country consumes is used by many more people, hence pays more per work. But there will be other cases where one country is a net gainer and one a net loser by a bilateral contract, such as a situation where a technologically advanced country produces innovation that can be used by a less advanced country. One solution would be for the net gainer to agree to compensate the net loser in exchange for the latter agreeing to enforce the former's patents.<sup>7</sup> Failing that, the less advanced country might choose not to enforce patents for the relevant technologies. An example is India; its law provides very limited protection to medical patents, letting Indian firms produce drugs patented abroad for domestic use without paying licensing fees. Some other countries may use the threat of non-enforcement of drug laws to get drugs on favorable terms.

Both patent and copyright law originated within single countries, eventually spreading through bilateral and multilateral agreements. The U.S. provided no protection to foreign copyrights until

---

<sup>6</sup> For simplicity I am ignoring public choice issues. Readers unhappy with this may interpret everything in terms of political costs and benefits to the government. They presumably depend on costs and benefits to citizens, although not necessarily with everything and everyone having the same weighting in the political calculus.

<sup>7</sup> In the case of U.S. negotiations, the compensation largely consists of offering more favorable tariff treatment to countries that enforce U.S. patent and copyright law.

the Chace act of 1891 and very limited protection well into the Twentieth Century; Taiwan permitted large scale violation of foreign copyrights until almost the century's end.<sup>8</sup>

Inventions made in one country are likely to be used in many others, so the development of international patent law occurred, in effect, in a single world, giving us only one sample of how it could happen. Most consumption of books is by native speakers of the language they are written in, so each language is in effect its own world, allowing us to observe the development of copyright law in different worlds containing different numbers of countries. Theory suggests that it should be easier to get copyright agreement in a two country world, such as Portuguese — Portugal and Brazil — than in a many language world, such as Spanish or English.

It would be interesting to see if it happened that way. More generally, it would be interesting to see how the development of IP law occurred, given the public good problem associated with it.

### **Russo-Finnish Trade: A Research Proposal**

The facts almost everyone agrees on are:

After the end of the Second World War, Finland paid Russia a large sum in "reparations." Thereafter trade was conducted as barter, with an accounting system to keep track of which country owed how much to which. Russians provided Finns with raw materials, especially oil, at a price said to be somewhat below the current world price. Finns provided Russians with a variety of manufactured items; it is not clear how the prices were determined. No money was supposed to change hands. At the end of the period, when the Soviet Union collapsed, it turned out that the Soviets owed quite a lot to the Finns; Russia has now paid off the debt.

The obvious conjecture, given the reparations, the relative strength of the two countries and their previous history, is that the trade was a form of disguised tribute, that the Finns were paying off the Russians not to attack them. Many Finns, however, claim that it was the other way around, that the Russians provided the Finns oil at below market prices and accepted low quality manufactured goods from the Finns at prices higher than they could have sold them for elsewhere. I have seen three different explanations for why that might have happened:

1. The Russians were bribing the Finns to provide them political support. Finland was the one democratic and capitalist country that was in some sense an ally of the Soviet Union; the relation could be used by the Soviets as evidence of their interest in peaceful coexistence.
2. The Russians were constrained by their own ideology in ways that either made them relatively indifferent to the real terms of the exchange or made it hard for them to trade with other capitalist countries and so forced them to accept the terms they could get from the Finns.
3. The Finns were smarter than the Russians, at least understood trade better, and so tricked the Russians into trading on terms favorable to the Finns.

The project is to figure out, on net, whether the exchange was profitable for Finland at the expense of Russia, profitable for Russia at the expense of Finland, profitable for both or a loss for both. Finns I have discussed the question with online seemed sure that it was in the economic interest of

---

<sup>8</sup> "After years of negotiation, a copyright protection agreement between the U.S. and Taiwan was finalized in July 1989." Jean Lin, [\*The U.S.-Taiwan Copyright Agreement: Cooperation or Coercion?\*](#)

Finland, perhaps in the political interest of Russia, but they did not offer a lot of evidence. The trade and the terms were arranged government to government, providing lots of opportunities to fudge the figures. In particular, it was possible for the Soviets to accumulate a substantial interest free debt, as they eventually did. It is claimed that that happened only late in the relationship. It is also claimed that the people concerned were surprised when they discovered how much the Soviets, on net, owed, which suggests that nobody had been keeping very careful track of it.

The hardest part of the project, supposing one could get data on what each side delivered to the other when, would be pricing the goods, figuring out what they would have sold for elsewhere.<sup>9</sup>

### **How are Criminals Different?**

People become criminals because that is a more attractive profession for them than the alternatives available to them. That leaves open one important question: Is the reason a difference in the available options, such that anyone facing the same opportunities as the criminal would make the same choice, or is it a difference in the person? If it is a difference in opportunities, the obvious ways to reduce crime are to make it less attractive or make alternatives more attractive. If it is a difference in the person there might be other options, depending on what the differences are.

How would one find out? The straightforward approach is to collect information on a large number of people, some of whom are criminals, some not. See what characteristics are more or less common in criminals than in other people.

One problem is that the same characteristic may fit both explanations. Poor people have less attractive legal opportunities than rich people, which might make them more likely to be criminals. If it turns out that criminals have a lower IQ or less education than non-criminals that might mean that those characteristic make one more inclined to crime but might equally well mean that people with low intelligence and little education are likely to be poor and poor people likely to commit crimes. To distinguish between those alternatives one would want to control for income, see whether poor people with lower IQ's are more or less likely to be criminals than equally poor people with higher IQ's, and similarly across a wide range of characteristics.

A second problem is that you only know people are criminals if they have been caught. If it turned out that criminals had, on average, low IQ's, that might be only a characteristic of unsuccessful criminals.

A first step might be to draw up a list of characteristics that might plausibly make someone more inclined to crime, characteristics that make crime more attractive but not alternative occupations.

Here is a tentative first try:

A thief gets an immediate benefit from stealing at the cost of criminal punishment at some time in the indefinite future, so someone with a *high discount rate*, someone who gives much less weight to future than to present costs and benefits, might find theft an attractive profession.

Both the returns of crime and the punishment, especially the latter, are uncertain. So an *optimist*, someone who expects to win bets, might find it an attractive profession.

---

<sup>9</sup> For a detailed account of the mechanisms of Finnish/Soviet trade, see Juhani Laurila, [\*Finnish-Soviet Clearing Trade and Payment System: History and Lessons\*](#).

A criminal, unless he functions entirely within a criminal subculture, must keep his activities secret from most of those he deals with. That would be easier for someone who is by nature a loner.

Many, perhaps most, criminals function not as employees of criminal firms but as free lancers.<sup>10</sup> That would make many sorts of crime, such as theft or mugging, attractive to people who like to be their own boss.

Suppose we discovered that one or more of these characteristics correlated with being a criminal. How could we use the information?

Identifying criminals in order to arrest them is not likely to work very well, since what we want to know is who committed a particular crime, not who is more likely than average to be a criminal. A sufficiently illiberal society could perhaps identify potential criminals and restrict them in some way, but that is not likely to be an acceptable policy in a modern democracy.

A better answer is to use the information to make substitutes for crime more available. I mentioned in another chapter evidence that internet availability correlates with reductions in rape, implying that online pornography is a substitute for violent sex. If criminals like risk, legalized gambling might provide them a safer way of getting it. Legal rules that favored the gig economy would make self-employment an option for more people, substituting for crime for people attracted to being their own boss. Other examples of the approach could apply to other characteristics.

But the first step would be to identify the characteristics, if they exist, that make a criminal career attractive.

---

<sup>10</sup> I discuss reasons why this is true in [Chapter 20](#) of my *Price Theory*.