Selected Student Economic Naturalist Essays

Introduction

All questions are from past students. All essays are based on the original essay the student submitted, but all were altered for clarity and content. For some essays, I've sometimes added explanations that the student did not, and removed explanations or background the student included, to illustrate what I think the best version of the essay looks like.

If you see any mistakes, please let me know.

PART 1

Why does Europe have more roundabouts than America instead of stop-light intersections?

Anna Cantilena (Spring 2021)

If you drive down any street in Europe, it is quite likely you will encounter a roundabout, a circular intersection of three or more streets in which vehicles move in one direction. The American driving experience is quite different which is dominated by four-ways with stoplights despite roundabouts being both safer (traffic injuries are about half that of four-ways (US Department of Transportation)) and more efficient. Why doesn't America have more roundabouts?

The U.S. was one of the first countries to make widespread use of the automobile in the early 1900s, necessitating some kind of intersection to handle the traffic. They began with roundabouts but these early roundabouts had a fatal flaw: drivers entering the circle had the right of way, leading to congestion and frustration. By the time the problem was understood and

fixed—by letting the people in the circle have the right of way—Americans had started using 'straight' intersections instead.

Although the advantages of traffic circles are now well-known, it would be too costly to switch to them. The construction costs of changing the existing intersections, including the demolition of buildings as roundabouts tend to take up more land, would be massive. American motorists would also have to relearn how to drive—the majority of the American public is unfamiliar with how to navigate roundabouts and switching would likely result in a large uptick in the number of accidents. The benefits of a safer intersection does not justify the cost of changing an already well established and engrained system, that while not perfect, is definitely functional. This is an example of path dependence—it was sensical to adopt straight intersections when the alternative was so inferior and it is now too costly to switch to a superior system.

Why didn't European countries get trapped on the same path? The mass use of cars caught on later in Europe than in America, giving time to create the modern, much safer and efficient roundabout which dominates the European roadways to this day. European countries adopted the best option immediately because they were able to benefit from the lessons learned concerning early versions of the roundabout used in the United States.

Roundabouts are a more efficient and much safer intersection and are quite popular in Europe. However the costs of changing America's current stoplight intersections do not justify the benefit of safer and more economical roadways.

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Why Montgomery County covers all the recycling services, but only take part of the trash and leave the rest to private service providers?

Jinwei Gu (Spring 2020)

Montgomery County divides solid waste collection into two subdistricts (excluding municipalities): A and B. Subdistrict A receives both trash and recycling collection from the county while Subdistrict B receives only recycling collection, leaving trash collection to private collectors. Why this distinction? Why not cover the whole county with both recycling and trash collection?

It’s notable that subdistrict B is less densely populated than subdistrict A, thus not making it cost effective for the county to cover the costs of trash collection. But recycling trucks cover both districts. If recycling trucks are worth collecting in a less dense area, why aren’t garbage trucks cost effective? There’s virtually no difference between these trucks in this regard.

Path dependence explains the difference in approach. Before the creation of the subdivisions, the County only serviced high-density areas with trash collection. When Montgomery County created the subdistricts in 1977 at the start its recycling program, the population had grown enough to make curbside recycling collection cost-effective for both subdistricts.

The county didn't introduce trash collection to subdistrict B, even though it was now worth doing due to the population growth, because there's a major political cost of changing the system. Existing companies who provide pricey curb-side trash removal services would be crowded out of existence if the county started doing it because it can charge a much lower price. (The size of the existing infrastructure the county has in place for subdistrict A allow it to charge a lower rate for trash removal.) Fighting this political battle is simply not worth the time of county decisionmakers, who disproportionately represent urban. Changing the trash collection system creates political rivals with benefits accruing only to more suburban and rural residents.[1]

Since the county did not have private recycling companies in 1977, as curbside recycling was still a new idea, pressure to keep curbside recycling out of the hands of the county did not exist.

Leaving trash collection to private contractors made sense when the county was much smaller than it is now and updating the trash collection system to reflect changing logistics costs are politically untenable. Recycling did not face this kind of resistance thus the county collects recycling all over (save municipalities) while it only collects trash in the more urban areas.

[1] In 2020, Montgomery County voted to restructure the council to better represent the county. At the time of this writing, the changes have yet to take effect but it might change the political incentives concerning trash collection.

PART 2

Why have automakers been following California's stricter standards for vehicle emission when making cars, rather than following the federal EPA's vehicle emission standards?

Jocelyne Pizarro (Spring 2020)

California has much stricter emissions standards compared to federal requirements and these stricter requirements mean these cars are more costly to produce. Yet car makers do not have two different versions of the same car and manufacturers functionally ignore the less strict standards even though they would result in a cheaper vehicle. While other 12 other states have adopted California's standards, there's a substantial part of the country that has not. Why not make two different kinds of cars?

While these lower emission vehicles are more costly to produce, a major part of their costs was the development of the car in the first place. For example, a California-compliant car needs a more effective catalytic converter (which chemically alters the raw emissions of a vehicle to something less harmful) and such converters are more expensive to make, the upfront costs of figuring out how to make such a converter were huge and making many such converters spreads those costs out more.

There were other upfront costs as well, besides R&D. Factories had to be reconfigured to for the better emissions requirements and labor had to be trained in making these lower emissions vehicles. It's worth, then, making lots of cars to spread out those costs.

It's like a video game selling a thousand copies would have be priced much higher than a video game selling a million copies (assuming development costs are the same) because each

copy of the less-popular game would have to shoulder a larger share of the development costs. More converters mean each converter covers a small part of that upfront cost.

There would also be significant costs to maintaining two kinds of vehicles. As the catalytic converter illustrates, different standards mean different parts. A car or truck has thousands of individual parts. Maintaining two standards increases inventory and logistics costs to make sure there are sufficient parts at the factory and no mix-ups occur. Car makers would also have to spend more maintaining two different fleets, ensuring cars aren't shipped to the wrong state.

The lower standard lowers the value to consumers, as consumers often resell their car or truck. A vehicle that didn't meet Californian standards couldn't be sold in California or one of the other twelve states that have adopted its standards. This notably reduces the number of potential buyers and a consumer reselling her car or truck would get money as a result. Despite the higher costs of manufacturing, having a single standard makes business sense. Vehicle makers save money on inventory and logistics costs, spread out upfront costs more effectively, and create more value to consumers by selling them a more resalable car or truck.

Why Do Some Box-Sets With Multiple Movies Give Each Film Its Own Disc When Certain Combinations Of Two Could Feasibly Share A Disc?

Noah Clarke (Spring 2021)

There are fifteen Blu-ray discs in my fifteen film Alfred Hitchcock box set, spread out so that each movie and its varying supplemental content (interviews, deleted scenes, etc.) is housed on its own disc. The more popular movies in the set contain hours of special bonus material, while some of the lesser known entries, such as *Rope* and *The Trouble with Harry*, don't even have 45 minutes of such extras. The total length of both movies and their respective bonus

content is 261 minutes (Brown), all of which could feasibly fit onto a single 50 GB disc. (Liebman) Why do such box sets spread their content across more discs than they have to?

Movies are not only sold in box sets. The same movie that appears in a boxed set can also be sold individually. For instance, the Blu-ray box set of the first six Star Wars films saw each movie being housed on their own disc, with all visual extras going on separate discs, because the discs would later be distributed individually (Kaufman). By creating a single standard—one disc means one movie—the manufacturer reduces costs. There's lesser chance of confusion at the warehouse and packaging and the single standard creates more flexibility. If individual sales are more popular, the discs can be easily sold individually. If box sets are more popular, the discs can easily be packaged together. If individually sold movies comes out first (as often the case), unsold movies can be repurposed for the box set. Manufacturers can therefore create many discs and be mostly ready for shipping without having to know exactly how the market will play out. Tastes are hard to predict and change rapidly. Being ready to quickly adjust to shifting consumer preferences is worth the risk of having to throw away discs (which are not expensive to create).

This practice is common with popular film series but multiple films on a disc is more common with lesser-known sets. Ingmar Bergan's Cinema is a box set that houses 39 movies across 30 discs. The director's more well-known films have their own Blu-rays, which are virtually identical to their previous stand-alone releases. His lesser-known works, however, such as *The Devil's Eye* and *All These Women*, aren't in high demand, and thus had no reason to be put on Blu-ray prior to the release of this intentionally all-encompassing set. In order to minimize wasting any space in this massive box set and thus making it more expensive than it already is, both films were placed on one disc (Raup). When there's no benefit to spreading out the films, even the small savings (including shipping) in consolidating discs is worth it.

PART 3

Why do High School Physical Education Teachers Get Paid the Same as Chemistry Teachers in Montgomery County Public Schools (MCPS)?

Evan Wellek (Fall 2021)

As a recent MCPS graduate, I remember vividly my P.E. teacher claiming he was the smartest teacher in the school. His reasoning was that he earned the same salary as an AP Chemistry teacher but does not know anything about challenging chemistry concepts like stoichiometry, thermodynamics, or intermolecular forces. One would think that someone with much more practical knowledge would make more, not the same, as a P.E. teacher. Why do high school P.E. teachers get paid the same as chemistry teachers?

Compensating differentials predicts that reduced difficulty leads to a decrease in salary to balance for the high degree of interest in that job relative to others. When applying this to P.E. teachers and AP chemistry teachers, there is a perception that AP chemistry teachers have a harder job solely because of the subject they teach. However, the difference in content rigor may suggest a more difficult or less desired job, but it fails to take into consideration all aspects of the job.

While P.E. teachers do not have to create and grade exams, they have different duties that create a less desirable work condition compared to chemistry teachers. For example, class sizes tend to be larger for P.E. teachers and P.E. teachers must be engaged physically to ensure student participation daily whereas an academic teacher can get away with sharing an educational video to replace a lecture or lesson plan. P.E. teachers often work as coaches, requiring they stay at

school longer, and comes with more stress—the mistakes of a coach are more easily observable than that of a chemistry teacher.

While this explains why P.E. and chemistry teachers are paid similar amounts, it doesn't explain why they are paid the same amount. That the P.E. and chemistry teachers are paid the same amount is not a funny coincidence—MCPS structures salaries so only experience and degree level, but not subject matter, is important. This is because compensating differentials render the natural salaries to be *roughly* similar and a single salary schedule is easier to administer. It lowers the negotiation costs by avoiding meetings and arguments concerning individual teacher salaries. While the school might overpay one group and underpay another, the savings on administration costs are worth it.

Why Is Wild Boar Meat More Expensive Than Regular Pork?

Nimesh Mahamalage (Fall 2022)

When I go to the meat store, I see that there is a huge price difference between regular pork and wild boar meat. Wild boar meat is more than three times as much as regular pork. Even though wild boar meat is frozen, the shop owner does not reduce the price. One pound of pork is almost $5.00, but one pound of wild boar meat is $10.00. Also, the shop owner claimed to me that he has less profit from wild boar meat as well. Why wild boar meat is more expensive than regular pork?

Compensating differentials predict that reduced difficulty leads to lower earnings, and increasing difficulty leads to higher earnings. Pork is much cheaper because it's much easier to get. Pig farmers only have to feed their pigs and clean the cages before selling them to slaughterhouse. Thus, pig farmers make reality little money.

Wild boars are not so easy to obtain. Hunters have to track and locate them by looking at their marks in the forest, a specialized skill. Sometimes, hunters have to spend the night in the forest to catch wild boars because they are most active at night or early in the morning. Staying overnight is dangerous—hunters can be attacked by wild boars or other animals. The hunt can also fail, resulting in wasted time roaming through the forest. The work is always unpleasant, sometimes unsuccessful, occasionally dangerous, and requires specialized skills—all of which mean that it's hard to get people to do this work, thus compensation must be high or it would not be done.

It's worth noting that many people are willing to pay a premium for wild boar meat because it has a strong, nutty, rich flavor and is much leaner than pork. While hunters provide a good amount for meat shop owners, they cannot meet the demand. For example, when my father tried to buy wild boar meat from a meat shop, it already had a list of people who wanted to buy wild boar meat. As soon as the shop owner gets the meat, he calls the people on the list. My father had to be on the list for two weeks to get the meat, indicating a strong demand for the meat which also increases its price.

This explains why wild boar meat is more expensive than regular pork. Most people think that it is not that hard to kill a boar. Then, why it is so expensive? I thought the same way after seeing some YouTube videos, but the videos do not show how much time hunters spend to find them, and how hard it is to shoot them. People’s demand and difficulty in catching wild boars increase the price of wild boar meat.

PART 4

Why does Brazil prioritize public awareness campaigns on the importance of economizing water when the agribusiness sector is responsible for most of its consumption?

Luisa Buckup (Fall 2021)

For the past few decades SABESP, the state-owned company responsible for water management, have taken over the media and billboards with ads about the necessity of decreasing water consumption in everyday activities like shorter showers. Their fear is understandable—since 2015 the reservoirs in Sao Paulo state have been operating with dangerously low levels, so low that the water pressure decreases in the afternoon, leaving millions of households without water for sometimes days at a time. While the population is told repeatedly about the necessity of economizing, they were only responsible for 11.4 percent of the water consumed in the country in 2019 (ANA 32), in contrast with the agricultural sector uses more than 70 percent of the water in the country (Barbosa). If agribusiness is responsible for most of the water usage in the country, why are millions of reais spent on awareness campaigns directed to the general population?

Public choice explains this strange situation. Due to the current economic crisis, with inflation rising severely and wages not fully adjusting, leading to starvation, the demands for short showers are a small concern—one not worth second-guessing. Brazilians think of their home as "the country of impunity" and that all politicians are corrupt, thus they do not expect anything to change. When it comes to water utilization, the population is rationally ignorant and the politicians have no incentives to favor the population over agribusiness even during water shortages since they will probably get re-elected anyway.

Thus the benefits of water allocation go to a small subset of the population—those involved in agribusiness—and the costs are borne by the general public, with each person a little poorer, water-wise. It's a clear example of concentrated benefits and dispersed costs. Though politicians are aware of this unbalanced allocation they are incentivized to maintain the status quo because of the loyal support they get from the farmers and ranchers, such as those who support President Bolsonaro.

Though awareness campaigns cost money, they are important to maintain the concentrated benefits of the agribusiness. Since Brazil is a massive exporter of agricultural and animal commodities, farmers and ranchers gain much money from exportation, which incentivizes them to support politicians that ensure they are allocated the water needed for production. Possessing a loyal interest group, politicians have no incentives to change things since people are rationally ignorant.

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PART 5

Why are the houses/buildings in Level 1-2 countries are more stable than the buildings in the Level 4 countries?

Gebremeskel, Wagaye (Gigi) (Spring 2021)

When you see reports after natural disaster or other accidents on buildings/ houses, the damage from the incident differs from place to place. After accidents like fire, storm, earthquake, hurricane, or flooding, the main structure of the buildings in underdeveloped countries are still noticeable. In Level 4 countries, houses/buildings disappear without any trace or very small restorable remains buildings of same standard. Why do rich countries' buildings less durable than those of poor countries? The expectation and the reality seem the absolute opposite.

Building using durable materials is relatively straightforward, if done roughly. Cement can be used as mortar for bricks or rocks and cement can simply be poured in makeshift molds. The end result might not look nice, but even a haphazard cement wall can be pretty strong and requires relatively little skill to make. Because of the low cost of human labor in Level 1 and 2 countries, building with durable materials happens to also be very cheap, even if it is rather time consuming (to wait for the cement to dry as well as building molds).

Homes made of wood and drywall require more skill and technology, thus more expensive labor. Wood must be precisely measured, cut, and fitted to even function as a supporting wall. But because it requires no drying or mold-making time, it can go up fast. Moreover, its lack of durability is itself an advantage: wooden homes can more easily be upgraded and remodeled, something people in lower-income countries rarely have the resources to do.

Insurance also plays a role in explaining this difference. Level 4 countries tend to have well-developed home insurance markets which covers the cost of rebuilding in the case of fire or flooding. People in Level 4 countries have less incentive to make durable homes, especially since durable homes might be less pleasant to live in (for example, they are more likely to have fewer and smaller windows). People in countries without wide-spread insurance must shoulder the entire cost of rebuilding on their own. They will thus build to protect against disaster, even if they must sacrifice day-to-day livability. In other words, they have to provide their own insurance, but their insurance manifest as cement walls rather than an insurance policy.

The income difference leads the two worlds to utilize their advantages in building houses. The developing countries cannot afford technology, insurance, and fancy designs, so they build strong houses in a very slow phase than developed countries. Level 4 countries have the wealth and institutional systems (like insurance) to allow people to build the upgradeable nicer-looking buildings, even though these buildings are less durable and more skill-intensive.

Why are manual transmission cars far more popular in Central and South America than in the United States?

Phillip Oganesyan (Spring 2020)

In 2020, a mere 2.4 percent of all vehicles sold in the United States came with a manual transmission.[2] To many, this form of driving is outdated, tedious, and downright annoying. In Central and South American countries like Brazil, however, over 80 percent of all cars sold boasted a manual transmission.[3] If automatics are easier to drive, then why are manual transmission cars far more popular in Central and South America than in the United States?

[2] https://www.carmax.com/articles/stick-shift-index
[3] https://theicct.org/sites/default/files/publications/Brazil%20PV%20Market%20Statistics%20Report.pdf

The essence of the answer lies in the different income levels in Central and South America versus the much richer United States. A manual transmission vehicle is more economical to own than an automatic. Manual transmission cars are lighter and cheaper to make, thus saving two to five mpg on gas and between $800 and $1,200 on the purchase price.[4]

If the savings are so significant, why don't Americans use manual transmission? Because incomes are affected by diminishing marginal utility. When incomes are high, even large savings can have a relatively small impact on a person's life. An American saving $1,000 on a car results in being able to buy something nice, but not critical. In contrast, saving $1,000 in lower income controls could mean a significant improvement in well-being. The opportunity cost of that $1,000 is high.

Incomes vary widely within the United States so it still seems puzzling that so few Americans would be interested in saving $1,000. But people have a wide variety of concerns about their vehicle beyond price and fuel economy. All consumers, regardless of where they live, think about safety record, space (especially in the case of pick-up or not), handling, and so on. If an American car dealership wanted to reliably sell manual transmission cars, they'd have to buy up a large variety of them lest an otherwise interested customer opt for an automatic. You need a critical volume of people who want to drive a manual to justify the inventory costs, which the United States doesn't have.

The lack of manual transmission cars reinforces itself. With so few manuals to practice on, it's particularly costly for Americans to learn how to drive manual transmissions. The opportunity cost of learning is higher—Americans have to spend more time finding a manual to practice on and, because they will thus likely learn later in life, it takes longer to learn. This is

[4] https://www.consumerreports.org/cro/2012/01/save-gas-and-money-with-a-manual-transmission/index.htm

time that could've been spent earning income, which is much, much higher than in Central and South American. Thus, in important ways, an automatic transmission ends up being cheaper in the U.S. even if its price tag is a bit higher.

PART 6

Why does it hurt my credit score if I use more than 30 percent of my credit, yet consistently pay it off on time?

Cyrus Safiran (Spring 2021)

A credit score attempts to measure how reliable someone is about paying back a loan. So it makes intuitive sense that a large amount of unpaid loans or missed loan or utility payments lowers a credit score. But using more than 30 percent of my credit limit also lowers my credit score. Why allow that much credit at all if I should only use 30% of it? Why do I still get docked on my credit even if I have a consistent history of timely payments? Wouldn't credit card companies want me to spend as much as I can while consistently using their card?

Signaling explains this apparent paradox. Signaling is witnessing certain behaviors to determine if an individual has undesirable traits. For example, let's say Joe and Sarah both have college degrees in the same field of study. Sarah finished her degree in four years, while Joe took eight. Employers would question Joe on what caused him to take so long and questioning his competence, intelligence, diligence etc.

So what undesirable trait am I forecasting when I spend more than 30 percent of my credit limit? *Fiscal risk*. Yes, I am responsibly paying my credit debt on time, but I *also* need to be utilizing a low amount in tandem. This is due because a time might come when I don't have enough funds to pay off the debt, therefore turning what could be a little problem into a big one. People are cautious about their spending—who are the kind of people banks want to lend to—are the kind of people who naturally spend well below their credit limit, just in case.

In contrast, people who have a hard time paying off loans typically spend near their limit. It might be because of self-control issues, or poor planning, or low-income, or unusually high

expenses. Regardless of the reason, they tend to use large hunks of their credit limit. Thus institutions see people who spend a large portion of their limit as likely people who would have trouble paying off a loan.

Low spending signals restraint and reliability. The kind of person who's given a lot of credit but doesn't use it is typically the kind of person who can reliably pay back a loan. The kind of person who uses a large part of their credit limit is typically the kind of person who has trouble paying back a loan.