How drivers affect bystanders

Washington DC, London, Tokyo, Atlanta, Los Angeles, and Bangkok, and indeed any of the world's great cities, are full of cars, buses, and trucks. Those vehicles seriously damage the happiness of innocent bystanders. They cause severe air pollution. Admittedly, London's current air pollution is not as severe as the "Great Stink" of the 1850s, in which tens of thousands died of cholera. But still, air pollution from traffic is not trivial: many thousands of people die because other people want to drive. Around seven thousand people a year die prematurely because of traffic pollution in Britain, a little more than one in ten thousand. In the United States, the Environmental Protection Agency estimates that fifteen thousand people die prematurely because of the particulate matter produced from sources such as diesel engines. Within urban areas like London, the cost of delays from congestion are even worse, if you consider the number of hours spent sitting in traffic as being in any way a significant loss of productive or enjoyable life. Then there is the noise, the accidents and the "barrier effect," which discourages people, and particularly children, from walking to school, the local stores, or even to meet their neighbors across the street.

People are not fools: it's almost certainly true that anyone taking a trip in a car is benefiting from driving. But they are doing so at the expense of everyone else around them—the other drivers stuck in traffic, the parents who dare not let their children walk to school, the pedestrians who risk their lives dashing across the street because they are tired of waiting for the light to change, the office workers who even in the sweltering summer cannot open their windows because of the roar of the traffic.

Because each driver who gets into his car is creating misery for other people, the free market cannot deliver a solution to the problem of traffic. The external effects of congestion and pollution are important departures from the "world of truth." In the "world of truth" every act of selfish behavior is turned to the common good. I selfishly buy underwear because I want it, but in

doing so channel resources into the hands of underwear manufacturers, and do nobody any harm. Textile workers in China, where the underwear is made, selfishly look for the best job, while manufacturers selfishly look for the most capable employees. All of this works to everyone's benefit: goods are manufactured only if people want them, and they are manufactured only by the most appropriate people to do the job. Self-centered motives are put to work for everybody.

Drivers are in a different situation. They do not offer compensation for the cost they inflict on other people. When I buy underwear, the money I spend is compensation for all of the costs incurred in making it and selling it to me. When I take the car for a drive then I do not even need to think about the costs incurred by the rest of society as I avail myself of the free roads.

Different kinds of prices: Marginal and average

It is not quite fair to say that drivers can use the roads for nothing. In the United Kingdom, it's not legal to drive a car, or even to park it on public streets, unless you have paid a sizable annual tax called "Vehicle Excise Duty." Many states in the United States have a similar tax. Gas and diesel fuel are also taxed heavily enough to cause great resentment. In the autumn of 2000, for example, a series of protests against high fuel prices prevented fuel reaching the country's gas stations, and brought Britain to a standstill. In Britain, drivers pay £20 billion in taxes on cars and fuel every year; in America, the figure is around $100 billion. To ask "have they paid enough?" is to ask the wrong question. The right question is, "are they paying for the right things?" The answer is no.

There are two different concepts of price at play here, and the distinction matters. The average price that a driver pays for a journey across a city is quite high if the driver is paying an annual license fee. But the price that the driver pays for one extra trip across the city is low: the trip doesn't burn much fuel and drivers are not charged for extra trips. Once you've paid for the right to

take the car on the street in the first place, you don't get a discount for low mileage: you might as well drive and drive, because it won't put a penny on your tax bill. That is the difference between the average price and the marginal price, which is the price for one extra trip.

To understand why the difference matters, let's turn to alcohol. When I was in college, clubs and societies used to have big parties where some people didn't drink at all and, less surprisingly, most people drank far too much. This was because there were two types of ticket. "Alcoholic" tickets allowed unlimited boozing after payment of an up-front fee of, say, ten pounds (at that time, about fifteen dollars). The other type of ticket was a lot cheaper, and you had to drink rancid orange juice instead and stand in a corner while the drinkers got more and more obnoxious. Turning up and having a couple of beers was a pretty expensive proposition, so most people preferred either to maximize the value of the unlimited drinking opportunity, or opt out of drinking alcohol completely. Of course, the result was chaos, although some people felt it made for pretty good parties.

Since the university felt that the drunkenness represented a problem, they considered dealing with it at the next party by raising the up-front fee to, say, twenty pounds (about thirty dollars). But the likelihood would be that while a few people would switch to being disgruntled orange-juice drinkers or give up on the society altogether, most of the drinkers would decide there wasn't much point in a party without drinking. Grumbling, they would empty the contents of their wallets. Later in the evening, many of them would empty the contents of their stomachs.

The university misunderstood the problem. They understood that people were drinking too much and correctly thought that the solution probably involved raising the price of drinking. The problem is that there are different ways of describing the price of drinking. There's the price of being a drinker: ten pounds. There's the average price of a drink: for the typical student who has twenty

drinks, this is fifty pence. Then there's the *marginal* price of a drink, which is zero. Once you've paid the up-front fee, you might as well keep drinking.

Question: if you were running the university, would you deal with the problem by: (a) raising the up-front fee for drinking?, (b) buying better orange juice?, or (c) scrapping the up-front fee and charging people for what they drank?

Better orange juice might be nice, but the Undercover Economist would humbly suggest that the solution to the underlying problem is *c*.

Now, back to traffic congestion. If you were advising the secretary of transportation you might suggest an analogy with student parties. Currently, potential drivers have two options: they can cough up a large up-front fee and drive as much as they like; or they can not drive at all. This second option, the "orange-juice" option, requires them to bike, use public transportation, or walk—although as with the student party, the more people who choose the first option, the less attractive the second option becomes.

You might even propose some policy options: (a) raise the up-front fee for driving; (b) supply better "orange juice" (more buses, better trains, cycle routes, pedestrian crossings); or (c) scrap the up-front fee and charge people for the trips they drive.

All of these options could be expected to reduce traffic congestion to some extent, perhaps to an important extent. But it is option (c) that attempts to deal with the cause of the problem. Drivers do not live in the "world of truth"; that is they do not pay the true cost of their actions, including the "externalities" or side effects that affect bystanders. Option (c) tries to make them pay that cost; we might call it an "externality charge."

Currently, every potential driver is being offered the same kind of deal as partygoing students: put up a wad of cash in exchange for an unlimited binge, or pay nothing and receive nothing in return. There are no half measures.

Student parties were not livened up excessively by the fact that drinks worked out at fifty pence (less than one dollar) on average: they were livened up excessively by the fact that the next drink was always free. Similarly, congestion is not caused by the fact that the tax on a car trip is fifty cents on average: it is caused by the fact that the next trip is always free.

We must not get obsessed with the question of how much drivers pay on average. Certainly, how much tax any type of person pays on average is an important question of distribution. While distribution is important, however, it doesn't have a big impact on whether our streets are clogged up and our cities are polluted.

What matters much more for congestion is the price drivers pay at the margin; or, to put it another way, the price drivers pay to make one extra trip. Cars don't cause much pollution or congestion, after all: car *trips* are the problem. Universities would encourage appropriate levels of drinking by charging students per drink. Similarly, the Department of Transportation would encourage appropriate levels of driving by making drivers pay for each trip.

Pricing should reflect the damage

I've been oversimplifying, as usual. In most European countries, drivers do pay a tax per mile in the form of a high tax on fuel. But the tax on fuel doesn't closely match the costs that drivers inflict on each other and on nondrivers. People in rural areas pay the taxes (typically they spend between a quarter and a third as much again on gasoline as those in urban areas), but it is the commuters in the London, New York, or Paris rush hours who are causing the most serious congestion, severe air pollution, and noise. The same trips made in the small hours of the morning do not cause congestion, although pollution and noise are still a problem. Make a similar trip between two houses in Alaska and you do not cause congestion. The noise is likely to be heard only by the occasional stray caribou. The damage caused by pollutants is much reduced, because many of them will disperse harmlessly. If

the idea of a charge on driving is that each driver faces the costs of his actions, the rush-hour New York driver should pay more because he is causing more harm to others. Whatever level of externality charge turns out to be appropriate, if it is to reflect the truth, it should vary according to time and place.

The idea of an externality charge is not to discourage everyone from doing anything that might inconvenience anyone else; it is to get them to take into account the inconvenience they cause to others. To take an extreme example: if I go walking in Virginia's Blue Ridge mountains, it is nice to be able to take in the natural beauty of the place in relative solitude, and so it's mildly annoying to find the trails cluttered with other people. They may be inconveniencing me, but it would not be efficient to forbid their trip because it gives them so much pleasure and me so little trouble.

Externality charging needs to strike the right balance between pleasure and trouble; it must reflect the cost of the externality . . . but no more. We should aim to make ours a world where people feel free to do things they enjoy, even if others are mildly inconvenienced, but also one where we all refrain from harming other people if the effort involved to avoid harming them is small. We discovered in chapter 3 that perfect markets deliver this world, at least within the sphere that markets operate. Perfect markets cannot make us smile at passersby or love our families, but they can make sure that we get a cappuccino if and only if we are willing to pay more than the true cost—which includes the cost in time and trouble of the baristas, the bean pickers, the entrepreneurs, the machine manufacturers, and the rest. In other words, perfect markets allow us to feel free to do things that we enjoy only if our enjoyment outweighs the trouble caused to make it all possible.

This is why economists are fairly relaxed when markets seem to be working well. But we are also vigilant for the many market failures. So how do we make sure that when deciding whether to drive across town, I can be sure that the benefit to me outweighs the cost to everybody else? There's no need to worry about costs and benefits that are part of an efficient market transaction. So, if

oil refining and gasoline retailing are perfect markets (contrary to popular belief, they are not far off), then the trouble it took to refine and distribute the gasoline is fully represented in the price. I will not buy gasoline unless the benefit I get from it is greater than the trouble it took to refine and distribute.

Instead, we should worry about costs and benefits missing from the market transaction. The pollution from the gasoline causes local poisoning and global warming, and the majority of the pollution damage when I burn a tank of gasoline is not caused to me or to the oil company. The trick is to mimic perfect markets by getting drivers to pay all of the costs of their actions: since they have already paid the market costs to the oil company, they also need to pay, on top of that, the externality costs. These externality costs are the costs inflicted on others but not borne by the driver or the oil company.

We now have all the elements in place to design an externality charge. We know that there may be costs and benefits that spill over from an individual choice or a market exchange, and if so, this will be inefficient (translation: we could do better, making at least one person better off and nobody worse off). We also know that if we want to change behavior to correct the inefficiency, we need to address prices at the margin, not average prices. Third, we do not need to worry about costs, which have been incorporated into a well-functioning market transaction, only externality costs, which have been left out. Fourth, our marginal pricing should reflect those externality costs accurately. It's not enough simply to ban any behavior we don't like. Instead, we should be focusing on cases where the active person gains small benefits but causes large costs for others.

The attractive thing about externality pricing is that it attacks the problem but makes no assumption about the solution. The congestion charge gives drivers a signal: by bringing your car into town in rush hour, you are imposing a cost on everybody else. The drivers then have a choice: pay compensation, or find a way to avoid imposing the cost. There are many, many ways to avoid that cost, and markets can produce the ingenuity needed to uncover them. When no externalities are present, markets automatically take account of costs and provide incentives for producers to reduce them. When externalities are present, those costs are invisible to the market, but systems such as externality charging provide the missing signal that the cost exists.

When London introduced a congestion-charging zone in early 2003 (charging £5 or about $9 per day to drive into the city center) people responded far more quickly than many critics had expected. After a year, car rides fell by nearly a third. Trips that were exempt from the charge became more popular: there were 15 percent more bus rides, 20 percent more motorcycle rides, and 30 percent more trips by bicycle. Drivers who no longer enter the charging zone have chosen a variety of responses: one quarter drive around it, 55 percent have switched to public transportation, and 20 percent use alternatives like bicycles, car pools, or working from home on some days While the number of trips by car fell, the total delays caused by congestion fell by much more, which suggests that the congestion charge allowed the

streets to be much more efficiently used. And as people have more and more time to adjust to the congestion charge, the cost of dealing efficiently with this externality will fall further.

Battling pollution on the cheap

In the 1990s the Environmental Protection Agency (EPA) in the United States discovered how cost-effectively an externality charge could fight pollution when it decided to attack acid rain. The EPA wanted to reduce sulfur pollution from power stations. It seemed likely that some reduction would be efficient, but reducing pollution has costs as well as benefits. So the regulators were unsure by how much they should demand that pollution be reduced.

The trouble is that polluters will lie to regulators about what the cost of abatement really is. After all, even breathing emits a pollutant, carbon dioxide. But regulators could hardly demand that we all stop breathing to prevent pollution. So which pollution should be reduced? And how? By switching to different methods of power generation? Or reducing power consumption? Or something else? Ask the polluters and they will all tell you that reducing their pollution is like stopping breathing—it would be very expensive to stop, and so somebody else should make the changes.

But it's not really hard to find out the truth. Regulators can find out how much it costs to reduce pollution by telling people either to change their ways or pay a charge. Watch which decision they make. Judge them by their actions.

The EPA tried this in the case of sulfur emissions. They set up an auction for the right to emit sulfur dioxide, which causes acid rain. Polluters were given a quota of emission permits and could either buy more permits in the auction or reduce their emissions by shutting down, installing sulfur scrubbers, or buying cleaner coal. When the EPA simply tried to tell them to install sulfur scrubbers, the power generators argued that it would be very expensive to do so, and they lobbied hard to stop the mandatory

regulation. Even the EPA estimated that the cost of reducing sulfur dioxide emissions by one ton would probably be in the range of $250 to $700 and might be as high as $1,500. But when the EPA conducted the auction in 1993, very few polluters made high bids. The companies had been exaggerating their costs. By 1996 permit prices had fallen to $70 a ton, and even at that price many polluters were buying cleaner coal or installing scrubbers rather than buying permits to continue polluting.

The regulators discovered that getting rid of sulfur dioxide was so cheap that few people were willing to pay much for the right to keep producing it. In the end, the only people willing to pay high prices for permits were student environmental groups buying single permits in an attempt to win fifteen minutes of fame. The clever thing about the auction was not that the sulfur emissions were reduced—that could have been required by law—but that legislators all over the world found out how much sulfur scrubbers *really* cost. It created a basis for further legislation: not making rules in the dark but in full knowledge of the (modest) cost. And it has set an example to the world; for instance, Taiyuan in North-East China is putting a similar plan into place.

Now economists are designing the same kind of auction for carbon dioxide emissions in the hope of reducing the effects of climate change. There is massive controversy about how much emission reduction will cost, but an auction of permits to extract oil, coal, and gas would soon start to tell us. An auction could start gently: in 2007, auctioning permits to extract the same number of tons of carbon as were extracted in 2006. This would require that economic growth take place without any growth in carbon emissions. If many environmentalists are to be believed, the auction wouldn't even sell all the permits, because basic energy efficiency measures cost nothing. We'd soon find out.

Then over the next few years, we would auction fewer and fewer permits. Carbon emissions would probably fall faster than the number of permits, because carbon speculators would be buying the permits and hoarding them. This would cause no problems: the same emissions take place in the end but are delayed. If

it turned out that the permits were expensive, then we would have the information for an informed debate. We could ask if the costs of climate change were worse than the cost of emission reduction. But many economists believe that, like sulfur permits in California, the carbon permits would quickly reveal that decarbonization is cheaper than we expected, and we will wonder why we took so long to start.