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JON GRUBER: We're going to continue our discussion of public goods. You remember the setup in chapter 7? We talked about general public goods theory and the general Samuelson rule for optimal public goods provision. In chapter 8, we talked about the first aspect of how you actually deal with the problems of public good provision, which is cost-benefit analysis.

In chapter 9, we talked about political economy and all the challenges of accurately creating decisions. We need to aggregate preferences and get them revealed honestly. Now in chapter 10 and 11, we're going to do two applications of public good theory.

Today, we'll talk about what we call fiscal federalism, which is this question I raised in chapter 1 of what should be done at which level of government. Why is, for example, national defense a federal priority while fixing road is a local priority? So that's the first thing we'll discuss is fiscal federalism today.

Next time, and maybe starting today, we'll start talking about education as an example of a government provided public good. But let's start with fiscal federalism.

This is particularly timely, more so than any other time I taught this class, probably, which is that in the wake of COVID, we saw an unprecedented transfer from the federal government to state governments. If look at all the bills that responded to COVID, all the fiscal relief bills, in total, they transferred $350 billion from the federal government to the state government. And that's a big amount.

And the question is why? Why is the federal government-- why didn't the federal government just spend the money? Why did they feel the need to transfer to state and local governments? And that's exactly the kind of question we'll answer today.

So to look at that, let's start with some facts. The first fact is in figure 10-1. So the first handout is for chapter 10. Figure 10-1 is the green, purple, and blue bars. This shows the division of spending across different levels of government over time.

So in 1902, more than a century ago, 122 years ago, most spending in the US, that's government spending, was done by local governments. There was a very small role for states and a fairly modest role for the federal government. Indeed, that was true through the 1920s.

So by the time we get to the Great Depression in 1927, most government activity happens at the level of local governments. That changes dramatically between 1927 and 1952, where the centralized share spending goes up dramatically and the local share shrinks. States there stays about the same.

What changed? Well, two things changed. First of all was World War II, which dramatically increased defense spending, which is done at the central government level. The second was the New Deal, which is a broad set of new federal programs to support our nation's poor and elderly.

By 1977, and especially by 2002, you see an interesting trend, which is the federal government share shrink, but much of it's made up for by the state share. So you see over this period, you see a shift. Local government stays roughly the same size. You see a shift of less federal responsibility, more state responsibility. And in particular, this period saw a large rise in what we call intergovernmental grants.

Intergovernmental grants are transfers from one level of government to the other. And so this period from '77 to 2002 and beyond or really from '52 to 2002 and beyond saw a large rise in intergovernmental grants. So the first half of the 20th century was marked by a rise in the central government.

The second half of the 20th century was marked by a rise in state government, [? inside of ?] state government, but not necessarily funded by state governments. It was a transfer of the federal government offsetting some of the spending it does to states. And this, in particular, came through things like the Medicaid program, which is a jointly funded state-federal health insurance program.

So there was more joint funding with states. At the same time, there was more-- basically, the federal government basically gives states more responsibility and sent them more money to be able to fund those responsibilities. And then things are pretty things are pretty stabilized.

Now, what do states and localities spend their money on? We talked about that in chapter 1. They spend their money on health just like the federal government does, on a modest amount of redistribution in social insurance, but a lot of things like schools and roads and police.

Now, what's interesting is if you look at across states, two main sources of spending are education and health care. And table 1 shows how much variation there is across states. There's huge variation in what states spend on things like education and health care.

There's also, by the way, huge variation in what states raise. For instance, New York collects almost $3,000 per person in income taxes, whereas seven states have no income tax.

In terms of sales taxes, Washington raised $2,500 per person per year in sales taxes, while four states literally have no sales tax. So you've got a situation where there's enormous differences-- the main takeaway from table 10-1 is that there are enormous differences across states in how they spend their money. So when the federal government devolves responsibility to the states, it's increasing the variance in how its citizens are treated.

When the federal government does something, its citizens are treated fairly, uniformly nationally. When the federal government devolves that responsibility to states and then even more to localities, that raises the variance in how citizens are treated. And that's an interesting observation want to carry with us today.

Now, interestingly, we are much more decentralized than most nations. If you look at table 10-2, this shows the share of spending and revenues that are done by subnational governments, what we call state and local governments in the US. Basically, non-centralized share spending and revenue.

So what you see is in the US, about 43% of-- it's the third from the bottom row. About 43% of our spending and 48% of our revenues are collected at the state level. That is much, much higher than the average the rest of the world.

The OECD average, developed country, they spend 31% at the subnational level, where we spend 43%. And they collect 19% at the subnational level, whereas we collect almost 50% of our revenues. So we are much more decentralized than most developed countries, not all.

You can see Denmark's even more decentralized on the spending side. But we're much more decentralized than most, although, interestingly, the trend worldwide has been towards more decentralization over time. There's still more centralized, but there's been a trend towards more decentralization.

Now, this raises the question-- the fact that there's so much variation raise the question of what is the right differentiation of responsibilities across different levels of government or what we call optimal fiscal federalism? Fiscal federalism is the term for the distribution of responsibilities across different levels of government.

Now, what we're going to start with is the workhorse economics model for optimal fiscal federalism, what's known as the Tiebout model. It looks like "tbout," but it's pronounced "tebow" like the old quarterback for the sports fans among us, the Tiebout model.

And basically, Charles Tiebout was an economist who in 1956 said, look, the Samuelson article had come out. We all knew that there was too little provision of public goods compared to private goods. And Tiebout asked the following question. He said, what is it that makes private good provision efficient, where public good provision by the private market is not? What's the key?

And he said, the key thing missing for public goods is essentially shopping and competition And the market forces that drive the private market towards efficiency. What drives the private market to efficiency? Why is the private market efficient? Because there's shopping and competition. When there's imperfect competition, remember, the private market is no longer efficient.

So what makes the private market efficient is shopping competition. And he said, look, that's just not true for public goods. You don't shop across defense systems. I mean, you could move across countries to the one we like the national defense the most, but you probably won't. It's a pretty modest compared to culture and language and family ties.

So there's not a lot of shopping across public goods at the federal level. But he said at locality level, there is. In fact, at the locality level, people very much do shop. They vote with their feet, which is by moving to localities that can be otherwise similar, but which can be more closely matched to their taste for public goods.

And indeed, he argued, that in the limit, you can actually get efficient public good provision in the private market through shopping across localities. It's a coast-like result, which is that basically you can actually solve the Samuelson public goods problem by letting people shop for public goods across localities.

So his point is, look, let's say you found that in the 1980s, we were told that the US Department of Defense was spending, on average, $110 on electric diodes that were worth $0.04 or $435 on claw hammers or $437 on tape measures. And we all got outraged and said, what a waste of money, but no one moved over it.

On the other hand, in New York City in 2014, they showed that the public library system was spending $37,000 a year to provide the library director with a sports car and raising taxes accordingly. At that point, you might say, look, I'm out of New York. It's got high taxes. I don't really care if the library director has a sports car. I'll just move to the suburbs. I can still get to my job. What do I care?

So you can vote with your feet. And to boost that on a model under which you can actually solve the Samuelson problem through competition across localities-- and the model is quite simple. Imagine that there are many people in the world, and they divide themselves into N towns with N sub i residents.

There are N towns. I'm sorry, I'm sorry. No, that's backwards. That's backwards. Scratch what I said.

There are towns denoted by i. There's towns denoted by i. Each town has N sub i residents. That's what I meant to say. They're towns denoted by i. And each town has N sub i residents. And let's say moreover that towns finance any public good they're going to provide with a flat tax G sub i, which is equal for all i. It's a flat lump sum tax.

So each town i finances public goods with a flat, what we call a lump sum, a lump sum tax, a flat amount on everyone. Doesn't depend on anything about you. It's not individualistic. It's just a flat tax on everyone that's equal.

So there's N sub i residents in the town, and they each pay. And there's a flat tax. The total public goods version is G sub i. I'm sorry. The total public goods price G sub i. So each resident pays G sub i over N sub i in taxes. N sub i residents, G sub i is the total level of public goods.

So each resident pays a flat tax of G sub i over N sub i. That is the way the system works, i towns, N sub i people in each. G sub i is what they spend on public goods. It can be different. Each i can be different. And they charge G sub i over N sub i for public goods.

He argues that in that world we will actually get efficient public goods provision solely from voting with your feet. And the reason is because in this world, we can get back to the Lindahl equilibrium. Remember, the problem with Lindahl equilibrium is people had to tell us the truth.

Well, in this world, people reveal the truth by moving to the places that reveal their true preferences. They move to what reveals their true preferences. Therefore, we get people getting exactly the amount of public goods they want through private behavior.

Let's go to the example we talked about in chapter 7 and chapter 9. Remember Jack and Ava and the fireworks? You remember Jack wanted 75 fireworks at $0.75 each. Ava wanted 25 fireworks at $0.25 each. The Samuelson rule was we should end up providing 100 fireworks at $1. That was the Samuelson rule.

But we then talked about how Jack and Ava won't necessarily get there because Jack has an incentive to lie, understate his preferences, and by lying, he makes Ava pay more. And so he pays less but gets almost as many fireworks. Steven.

AUDIENCE: Does the example [INAUDIBLE] account for a representative system?

JON GRUBER: Right now, we're not. We're going to come back to limitations of this model. But right now, just assume everybody just kind of-- there's one. The people vote. They all decide. Well, actually, this is the point of the proof. So basically, Jack and Ava are that. We said they cheat. Now let's say Jack and Ava should have their own towns.

So in chapter 9, we said Jack had incentive to lie about his preferences. We proved that, that he would get a better deal. But now let's say Jack and Ava have their own towns. And so the only way Jack can lie is by moving to Ava's town. What happens if Jack moves to Ava's town? Well, he gets a third of the fireworks at a third of the cost. He's no better off.

Before he was better off because by voting, he could bring Ava into the pool and make her pay more. Now he can't because there's a town full of Avas, he's got to move there, he's got to do what she wants.

By voting with his feet, we reveal that Jack will stay at what's optimal for him. There'll be a set of towns of people with different fireworks preferences, and everyone will be in exactly the town that matches their fireworks preferences, paying exactly the right price.

And the reason is because there's no incentive to move. You're in a Nash equilibrium because every other town, if you get a different amount of fireworks, you pay the right amount for that different amount of fireworks.

So by differentiating these towns, when people vote with their feet, we've achieved the Lindahl equilibrium. We're not relying on honesty. We're relying on people moving. And that is essentially-- the formal proof. But that's essentially the Tiebout argument, is that basically local public goods will be provided efficiently because if they're not, people will just move.

That's the way to think about it. If you're ever in a town you don't like the public goods, you move to one where you do. And therefore, everyone will get the public goods they want. OK, yeah?

AUDIENCE: Is that what you mean by shopping with your feet [INAUDIBLE] all together in town?

JON GRUBER: Yeah, they're moving into all these towns. There's these i towns that have N people. In each town, they have G level of public goods. And you move across towns.

AUDIENCE: [INAUDIBLE]

JON GRUBER: Yeah, you move across towns until you get to the town that you like. Good question. Sorry. Yep. It's a colloquialism that's in my head. But you're right, it's not obvious until I explain it. Good question. Other questions? So that's the Tiebout proof.

And once again, like [? Cos, ?] like the other things we've talked about, it's a very interesting tuition, which is clearly not true in practice. There's clearly a number of reasons why this won't work perfectly in practice. And what are those? Basically, in subsets, there's two classes of reasons.

The first is reasons why this mechanism of competition won't actually work well. So what are some reasons why this competitive mechanism won't actually work well? Yeah?

AUDIENCE: Moving different town [INAUDIBLE].

JON GRUBER: Yeah. So basically, you've got costly moving. So you're not going to move until there's some hurdle rate in which you're really pissed off about the tax and level of public goods, and then you move.

So there's some bound over which they can deviate from your preferences. And as long as it doesn't get too far from your preferences, you'll stay. What else? What else? Yeah?

AUDIENCE: Information friction. Like for example, you might not know [INAUDIBLE].

JON GRUBER: Exactly. Information frictions is exactly right. You don't know what the public librarians pay. You know your taxes. But then they stand up and tell me, say, oh, those taxes supporting vital public goods. Bullshit, bullshit, bullshit. And you don't know. So it's hard to actually know what your town's doing if they're wasting the money or not. Yeah?

AUDIENCE: [INAUDIBLE]

JON GRUBER: Yeah. So basically, here's the thing, there's a fundamental tension in this model, which is, on the one hand, why couldn't you just have-- why do you need a limited number of towns? Why couldn't there just be each person could be a town? What's wrong with that?

AUDIENCE: There's some things that are [? too ?] [? expensive. ?]

JON GRUBER: And what do we call that?

AUDIENCE: [INAUDIBLE]

JON GRUBER: An economies of scale. Because there's economies of scale in public goods provision. It makes no sense for you to have your own school. As a result, it only makes sense to have schools over some aggregated set of people. So on the one hand, you have economies of scale.

But on the other hand, if you have economies of scale versus heterogeneity. So what Tiebout is assuming is that there are N identical people that can fit in your town, that there's enough identical people, you can afford to build a school, but they still have identical preferences. But that's never going to be true.

I mean, maybe you can find-- but I mean, actually, I don't think people could be homogeneous. You could form the skydiving town. And maybe there's enough skydivers that that's the public good they want to provide is parachutes for everyone. And maybe that would work. But the point is you need a big enough number of people versus people of similar enough tastes. And that's attention. Yeah?

AUDIENCE: [INAUDIBLE]

JON GRUBER: That's OK. No worries. Yeah, Steven?

AUDIENCE: Like a public good product that is being sold by each municipality is not like homogeneous enough across municipalities [INAUDIBLE].

JON GRUBER: Yeah, so there's in some sense imperfect competition. Some of that comes from costly moving, but some of that also comes from the fact that there's a bundle of public goods. So you need not only to have heterogeneity, heterogeneity among every single public good. So that's going to be impossible. So that's one class of problems with this model.

There's another class of problems, which is separate but very important, which is we don't pay for public goods in this way, these lump sum charges. That's not how public goods are paid for. Lump sum tax, it turns out, are incredibly unpopular.

Actually, I'll talk about this when we talk about taxation. But basically, the only modern example of a government trying to impose lump sum taxes was Margaret Thatcher, who was the most popular leader in modern history, proposed a lump sum tax in England and lost office over it because people view them as unfair, fundamentally viewed unfair that Bill Gates and you would pay the same tax.

As a result, nobody fancies anything through lump sum taxes. Typically, how our local public goods financed through property taxes. That is the way that local public goods are financed are through a tax on property, primarily housing, 90-plus percent of property tax revenues.

There's some other property taxes, but basically, it's taxes on housing. So you can think of public goods at the local level as being paid for by a tax on housing. Why does that screw up this model?

Well, here's a question for you. Let's say you're a rich person. And you know that public goods are financed-- rich people have fancy houses. You know that public goods are financed by property tax. Who else do you want to live with? Alec?

AUDIENCE: Probably a bunch of other rich people.

JON GRUBER: Probably a bunch of other people. Now, let's say you're a poor person. Alec, who do you want to live with?

AUDIENCE: [INAUDIBLE] people.

JON GRUBER: A bunch of other rich people. The problem is, in a world with property taxes, you have a bit of a free rider problem because basically, the rich pay more, but everyone gets the public good. And if they're not all homogeneous, that screws it up. So heterogeneity in income with a property tax means this doesn't work.

But the rich have found a solution to this. And what's that called? How do the rich solve the free rider problem inherent in this system? They claim it's for something else. What is it really? Yeah?

AUDIENCE: I mean, they provide private goods.

JON GRUBER: Well, private goods, but what else? Yeah?

AUDIENCE: [INAUDIBLE]

JON GRUBER: [INAUDIBLE] what?

AUDIENCE: [INAUDIBLE] you can exclude people [INAUDIBLE].

JON GRUBER: That's typically illegal to do that, not always. What else do towns do-- what do towns do to try to fight the fact that both the rich and the poor want to live with the rich? Yeah?

AUDIENCE: [INAUDIBLE]

JON GRUBER: Zoning laws. So Western Massachusetts will tell you that it restricts everyone to have at least two acres because it wants to preserve green space, but that's bullshit. They want more than two two acres because that keeps the poor people out. Poor people can't afford two acres.

So zoning laws are how towns have reacted to the incentives to free ride on property taxes. When you have a property tax where the rich pay more, if you don't keep the poor out, then they're going to free ride on the taxes the rich pay. So that's why towns have zoning laws.

These zoning laws are incredibly pernicious. They're, first of all, incredibly prevalent, but also incredibly pernicious, because what they do is they massively restrict the amount of housing available.

Because basically, the way you do zoning, you can't say a house in our town has to cost at least $1 million. That's illegal. But you can say it has to at least have amenities such that no one would build such a house for less than $1 million. And those amenities mean that you don't get many houses in your town. Yeah?

AUDIENCE: [INAUDIBLE]

JON GRUBER: Yeah, well, we have two things like that in the US. We have within buildings, what we call co-op buildings, which are essentially cooperatives where the other owners have to prove you. And if you want to make a renovation in your apartment, the whole co-op has to approve.

We also have some communities-- there's a community behind me, which was set up as a community with what's called a covenant. And basically, what that means is not anyone can buy in, but you can't, for example, change your house without approval of everyone in the neighborhood. But you can't stop someone from buying in, certainly not for any reason like they're poor. You get sued for that. But zoning, totally fine.

The effects of zoning are enormous. The best estimates-- there's an excellent urban economist named Ed Glaeser at Harvard. They said that land in zoned areas costs about 10 times more than the land in the unzoned areas, just roughly speaking, to try to compare them.

Zoning is a huge, huge effect on the cost of housing, availability of housing. But it's a natural reaction to the Tiebout mechanism.

So in other words, competition-- think of it like we did in 14.01. Competition only delivers the efficient outcome if there's no barriers. some mentioned barriers to entry. Well, here's a barrier that makes competition not deliver the efficient outcome. Yeah?

AUDIENCE: Would the zoning thing be different than the [INAUDIBLE]

JON GRUBER: That's about getting your voters. This is about literally who can live there.

AUDIENCE: Districting [INAUDIBLE] like school districts [INAUDIBLE]

JON GRUBER: Oh, I see. Yes, sometimes they have school districts that don't follow town boundaries. And that's another thing. But that's more about economies of scale. Now there's a third problem. So there's three problems with Tiebout. One is market imperfections. Two is the financing. And then this third problem with Tiebout, which is it assumes no spillovers.

But that's not true. Anytime a town builds public goods, it affects other towns. If I paved my road, then people who drive through on their way home benefit. If I have better police, then there's less crime. Maybe that hurts the other town because it pushes the criminals to the other town.

If I have better education, there's better educated workers that maybe want to come work in my town. Once there's spillovers, that leads to the same market failure we get with positive externalities or negative externalities in our standard market, which is competition doesn't work if there's externalities.

Well, with spillovers in public goods, there's externalities. Therefore, we won't get the optimal level. But even if we don't worry with these other conditions, Tiebout model will not deliver optimality because we will not get the optimal level of public goods because the spillovers are externalities. OK, questions about the Tiebout model?

Now, much like Coase or the median voter theorem, the Tiebout model is not true in extreme, but has a lot of power to explain phenomena we see in the real world. So what are some evidence that the Tiebout model actually works in the real world. Well, for example, let's imagine-- let's imagine two cities, one of which has three big suburbs, one of which has 20 little suburbs.

What does the Tiebout model predict should be different about the suburbs in those two cities? What things-- not one thing. What things should be different? Going to try some other folks involved now. Let's see. Come on. Let's get some other folks involved.

Let's get more participation up. What other things should be different? They want a place with a few or even one to make it extreme, one big suburb versus 20 little suburbs. What should be different in the nature of the suburbs in those two places? Actually, one doesn't work, got to be at least three. Yeah?

AUDIENCE: In larger cases, there would more specialization in public goods or more [INAUDIBLE]

JON GRUBER: With more towns, there'd be more specialization. Absolutely. You predict there'd be more specialization, there'd be more diversity across towns. Yeah?

AUDIENCE: People in towns would be more similar to one another.

JON GRUBER: Exactly. You'd expect more-- those are the two predictions. You'd expect more diversity in public goods provision as the number of towns goes up and more homogeneity within a town the number of towns go up. And both are true. It is true.

But if you think about 15 versus 20, as the number gets bigger, you get more specialization and more homogeneity. Never all the way to what Tiebout would want. But you go in that direction as predicted by that model.

You also get a higher level of satisfaction with public goods as the number of towns get bigger because people are moving towards that Tiebout equilibrium. So the more choice they have, the happier people are because they can move to a place that really matches their preferences. So that's one prediction.

The second prediction is really important and interesting because another problem with Tiebout model is that-- and someone mentioned this in the first thing. Moving is a big deal. It's really costly to move. I mean, you guys move your dorm rooms every year and you don't care.

But believe me, like selling a house, buying a new house, it's a nightmare. It's really costly. And so one problem you might have with the gee, Tiebout model, gee, all these people have to move. That's a very weak mechanism.

But here's the thing. They don't have to move. You don't need that many people to move. In fact, in theory, you don't need anyone to move or certainly a very small number of people to move.

And why is that? Why would the Tiebout force operate in theory even if no one moves, but as long as you don't need many people to move? What else is going to change is to make the Tiebout force operate?

You're the mayor of a town. You've screwed up. How are you going to get a signal without everyone leaving town? How are you going to signal that you screwed up? What's going to tell you you screwed up? Yeah? What?

AUDIENCE: [INAUDIBLE]

JON GRUBER: What?

AUDIENCE: Get voted out.

JON GRUBER: But there's no vote for three years. Yeah?

AUDIENCE: [INAUDIBLE]

JON GRUBER: But let's imagine you throw them in jail. OK, what else? What else can you observe in economic indicators about that town? Yeah?

AUDIENCE: [INAUDIBLE]

JON GRUBER: Well, that's what she said. But then you throw them in jail. What else? Think about how public goods are financed. Think about markets and towns. What's going to change? Yeah?

AUDIENCE: You'll see more private good provision.

JON GRUBER: Private good provision is one thing. What else? What about the fundamental nature of prices in the economy will change?

AUDIENCE: [INAUDIBLE]

JON GRUBER: What's that?

AUDIENCE: The cost of the [INAUDIBLE]

JON GRUBER: House prices will drop because people don't want to live there anymore. And asset prices can react much quicker than people can move. So in theory, you don't even need anyone to move. If it gets in the news that this town sucks, all of a sudden, no one wants to live there, and house prices drop.

You don't actually even need mobility. That's what's great about this. This is what we call capitalization. There's something called capitalization, which is the notion that a house price embeds a stream of services that come with that house.

Why is one house expensive, one house not expensive? Well, it embeds how many bedrooms there are and how nice it is in the yard. But it also embeds how good the schools are and how high the property taxes are. Those are all embedded in one stream of things that determine the price of a house.

So for a given level of property taxes, if I suddenly start keeping all the money for my public librarian sports car and don't spend it on things that are good for people, they'll say, don't live here, this town sucks. And house prices will drop. So you don't need everyone to move to have the market show that you've screwed up.

So what this says-- what's really cool about this is it says that even in a world where people don't move much, we can use house prices as an indicator for how good a job a government is doing on meeting the tastes of its citizens.

So in other words, if you cut taxes, if you cut property taxes-- let's say you have a town, and you cut property taxes. Should house prices go down or up? And for what reasons? If you cut property taxes in your town, should the price of the house go down or even up? And why? Yeah?

AUDIENCE: I think they'll go up because that makes it a more desirable town.

JON GRUBER: You pay less taxes, but does it make a more desirable town?

AUDIENCE: [INAUDIBLE] people want more public goods. [INAUDIBLE]

JON GRUBER: Yeah. In fact, if you're at the Tiebout equilibrium, it'll make prices go down. Why? Because at the Tiebout equilibrium, everybody's perfectly happy. So if I cut property taxes in Tiebout equilibrium, prices will go down.

But if I'm overspending on public goods, prices will go up. If I'm underspending on public goods, price will go down. So what happens to prices can tell us about where we are relative to Tiebout equilibrium, assuming people are informed and stuff. Yeah?

AUDIENCE: [INAUDIBLE] like a positive loop?

JON GRUBER: No, not necessarily. Explain what you mean by that.

AUDIENCE: Like if tax go up, price goes [INAUDIBLE].

JON GRUBER: No, no, no. No, because as the tax goes up-- so let's say you were underproviding public goods. So your tax goes up, price goes up. But now public goods go up too. Now let's say you've hit the optimal point. Well, tax goes up again, price will go down.

Think of it as climbing a hill. The hill is the net of taxes versus benefits. The hill is the net of tax versus benefits. And Tiebout is saying you want to settle at the top where the next dollar in tax is worth it in terms of the next dollar of benefits it pays for. Indeed, what's the key lesson from Tiebout is that we want to think about tax benefit linkages.

It's a totally new way of thinking about taxes. We're going to think about taxes, things like are they efficient? Do they help poor people? There's a different way to think about it, which is think of a tax as a price.

In Tiebout's world, a local tax is a price at which you purchase a public good. And when you think of it that way, it makes sense. If the price is too high, you buy less. Price is too low, you buy more. So that sets the net of the tax versus the benefit you're getting on the margin determines the value of the house and your desirable to live in there. Yeah?

AUDIENCE: This model [INAUDIBLE] for example. Are we selling this good primarily to the people who are already [INAUDIBLE]

JON GRUBER: I'm leaving all the-- once again, we're leaving chapter 9 behind. We're assuming a social planner who's vote maximized or something like that. And we're just doing an easy case. But you're right. There'd be a lot of subtleties about pleasing maybe certain residents of town who hold the power versus not, et cetera, as we talked about in chapter 9. Yeah?

AUDIENCE: [INAUDIBLE] capitalization. Are there any other salient examples besides like housing prices?

JON GRUBER: Oh, it's in everything. I mean. So yeah, the stock market. What determines the price of a stock? Well, in theory, it's the underlying future profits of that company determine the value of a stock. Now, in practice, it's kind of how day traders are feeling that day.

But in theory-- so, yes, capitalization is fundamental. All assets are capitalized something. Every asset you hold is a capitalized value of its future utilization or future utility or future value. Yeah, question?

AUDIENCE: Yeah. So for a person that moved from Georgia to Florida, for example, because there's no state income tax in Florida, then for those people, they weren't in this equilibrium in Georgia, right? [INAUDIBLE]

JON GRUBER: I mean, if that's the reason they moved. Once again, they might have moved for other reasons. But if they're voting with their feet and saying, look, Georgia's got all these taxes-- why do people move to Florida when they're retired? No state income tax because it's warm, but also no state income tax.

So why should I pay taxes to support schools? Screw that. I'm a selfish old person. I'm moving to Florida, and I won't pay taxes. And the schools suck in Florida. No offense, but they do. And so that's a Tiebout outcome. People who don't care about schools move to Florida. People who do care about schools move to places where schools are good.

So that says that basically-- well, let me go back to one thing. What is the actual evidence that capitalization exists? And here, we have a wonderful example from one of the most important events in our nation's history of fiscal federalism, which was California's Proposition 13.

Proposition 13 was a law passed by California in 1978 that limited local towns ability to raise property taxes. Before this law, all over the country, towns could do whatever they wanted. California was the first state to say, wait a second, we are not going to let towns set their own property tax. We're going to limit them.

In particular, what the law said is that you could not have a property tax that was more than 1% of a home's assessed value. So every year people could not pay more than 1%. Just to fix ideas, property tax in the US are typically between 1 and 2.5% or between half a percent, 2.5%. But we'll cover property taxes in chapter 23. So that's a pretty strict limit.

Moreover, it could not be more than 1% of the home's value at that point in time. And it could only increase at 2% per year no matter what happened to the value of the house. So think about what that means.

So a great study in 1982 looked at the effect of Proposition 13. And he said, look, let's compare towns that before this law already had low property taxes to ones that had high property taxes. Those high property taxes had to reduce their property taxes a ton. The ones that low property taxes didn't.

So let's ask what happened to house values. And what he found was an enormous increase in house values, an enormous increase in house values. Indeed, what he found was that basically, for every $1 in property tax reduction, for every $1 per year in property tax reduction, the value of homes in California went up by $7.

Now your reaction is, wait a second, how can that be so big? But why does that make sense? Why does it make sense that you'd get $1 per year leading to $7 in house value? Yeah?

AUDIENCE: Because you hold the house for a long time.

JON GRUBER: Because You hold the house for a long time. Indeed if we think you hold the house forever, what is $7 worth in [? PD? ?] Basically, what is $7? What should it compare to? Well, you're paying $1 a year. You've been paying it forever. You put it over the interest rate.

When this law passed, interest rates were very, very high. Interest rates were typically about 12%. So this equals $8.33. So, actually, the capitalization was pretty close to 100%, pretty close to if you look at the PDV of what people are going to owe in property taxes. When you lower taxes, house prices went up just about dollar for dollar.

So what does this imply? This implies that people thought we were massively overproviding public goods, or they thought the state would bail them out. And maybe people thought, yeah, we'll do this, and the state will realize our schools are going to fall apart and they'll send us money. So this is just the way we squeeze money out of the state.

OK, well, it turned out they were wrong. California went from having top 10 school system in the nation to bottom 10 school system in the nation. California public schools went to shit. Everybody left and went to private school. And basically, the California public school system has suffered massively.

So basically, we have a system where essentially people-- now, maybe that's what people wanted. Maybe people wanted crappy public schools at low price. Nothing wrong with that.

The question is is it really what they wanted? Did they really understand that that was a consequence? Or do they think maybe, nah, they'll figure some other way to pay for the schools? Maybe they were misinformed. Maybe they thought the state would bail them out.

Indeed, more recent work suggests that on average in the US, more spending on schools would actually raise house values. More spending on schools financed by property tax would raise house values. There's a cool study which looked at what happens when towns hold special elections to raise certain supplemental funds to fund capital improvements in schools.

So a town will have a special election. Everybody needs to pay $500 more or another 0.1% in the property tax. And we're going to rebuild all the schools. They found when they do that, house values go up, not down as a California example would suggest. So higher taxes, funding better schools make it go up.

So what might be going on in California too was just, OK, we don't think the schools suffer. We think politicians are wasting a lot of money on other stuff, and that will all go away, and our schools won't suffer. And folks were just wrong. And now California has crappy public schools.

So it's an interesting example of capitalization in practice. The capitalization really worked. The question is is it really a test of Tiebout? That depends on this, information friction. Did people really understand what they were voting for?

Because at least later evidence suggests they didn't. Because when people have the choice to just vote about what I pay more for better schools, typically, when they do so, that's better for their housing value. Questions about that?

Where does this leave us in the question we started with, which is optimal fiscal federalism? Optimal fiscal federalism. Where does this leave us in optimal fiscal federalism?

Where it leaves us is-- basically, the Tiebout model says that government spending is most efficient where the tax benefit linkages are the largest, that where the tax benefit linkages are the largest, you have the least inefficiency because people can vote with their feet and get the level of public goods they want.

So basically, that says-- so what the Tiebout model says is optimal fiscal federalism is determined by three things. One is tax-benefit links.

Two, the second thing is determined by is the level of spillovers because the more spillovers, the more that it'll be inefficient to do it locally. And the third thing is going to be determined by is economies of scale. Because basically, something which has to be huge to succeed shouldn't be provided locally.

So in other words, if we go back to chapter 1 and that mystery of some stuff was done federally, some stuff was done locally, we can ask, do these three factors explain it? And the answer is they do. What does the federal government do? Defense, huge economies of scale. Very hard to make a tax-benefit linkage on defense.

OK, what do local economies do? Fix the roads. Not that big a economy of scale. You just need a guy in a machine. OK, but a lot of tax-benefit linkage. I can see that my road got better when I pay higher taxes. Schools, some economies of scale, but a lot of linkages. Police, same thing.

So, actually the division of responsibilities makes sense. The main thing you have from the Tiebout framework is stuff's kind of divided the way it should be. Think about redistribution, especially social insurance programs. They're done at the state and mostly federal level. Why? Why don't we have local redistribution?

AUDIENCE: Because people tend to locally be separated by socioeconomic status.

JON GRUBER: Well, that's right. But why else? I mean, they do, but it's still not fully-- why don't we just-- in Lexington, why don't we say just get rid of federal income tax, have a big Lexington income tax and distribute to the poor people of Lexington? Why won't that work? What does that violate here? Yeah?

AUDIENCE: Spillover.

JON GRUBER: No. Yeah?

AUDIENCE: [INAUDIBLE]

JON GRUBER: Yeah. Basically, if Lexington starts taxing all the rich people to give to the poor people, they'll leave. If America does, they're not going to leave. I mean, some will, they'll go to Macao or whatever, or no Monaco or whatever. But basically, the point is the tax-benefit linkages are sufficiently weak that if a town tries to do it, they'll get killed.

So basically, that's why redistribution is mostly done at higher levels of government is for tax-benefit linkages. Things like defense are at a higher level of government because of economies of scale. Things like roads and police are done at lower levels of government because the economy of scale is large and the tax-benefit linkages are tight. Yeah?

AUDIENCE: What's an example of spillovers?

JON GRUBER: OK, well, let's come to the one category-- I would argue I'm pretty much every category we have, the US gets it right, except for one, where we differ from the rest of the world and we probably get it somewhat wrong, which is education. Education, as we'll talk about next chapter, is about 50% locally financed.

It's about 45% locally financed, 45% state financed, 10% federally financed or probably even less. The US federal government does very little education. Why could that be wrong? And why do other countries actually have the central government play a much larger role in education?

And the example is spillovers, that basically when I educate someone in my town, that benefits the whole country. They pay higher federal taxes. They might start a company in some other place which hires lots of people.

Now, it does benefit a lot-- most people don't move. I love a great line, I had. Everybody talks about-- I like to think I married the love of my life. Everybody says they married the love of their life. They said it is interesting that most people happen to have the love of their life living within 10 miles of where they were born because most people don't move.

So it is true that most of the benefits accrue to states and localities, but it's hard to argue less than 10% of the benefits accrue to the country of having a better educated population.

So for that, that's a spillover argument. And that's example of why most other countries actually finance education much more to central level than we do. And we probably should. Questions about that? Yeah?

AUDIENCE: Would health care be another area with big spillover effects?

JON GRUBER: Health care could. Yes, absolutely. Health care would be another. And that's once again not really state, but that one we get right. That's federally and state financed, not really locally financed.

Once again, these theories are kind of wacky. But, actually, they explain a lot of central patterns pretty well. Like these three factors explain a lot of why stuff is done at different levels of government pretty well. Other questions or comments? Yeah?

AUDIENCE: At what level-- I'm thinking like a township might want to do something versus the state versus the United States. Like I agree that people aren't going to move. Most of them aren't going to leave America.

It's like America starts like doing redistribution. I guess this is more politically oriented, but maybe not. I guess the question would be, at what scale does the tax-benefit links outweigh the--

JON GRUBER: I mean, it's a trade off. We don't know. I mean, obviously, like for example, one of the main things that localities do is roads. There are spillovers with roads because you drive through. There are economies of scale with roads. It's more the forces in each direction, the forces that push in each direction. Yeah?

AUDIENCE: OK, so [INAUDIBLE]. Like on a local level it would be like [INAUDIBLE]

JON GRUBER: Which public good?

AUDIENCE: [INAUDIBLE]

JON GRUBER: Like if you do redistribution at the local level, that would be underprovided because the problem is if you try to distribute too much, everybody leaves your town. So you end up in equilibrium where you can't do redistribution.

AUDIENCE: Well, my question is more related to [INAUDIBLE] if this should be done at a federal level?

JON GRUBER: Yes.

AUDIENCE: [INAUDIBLE] provision of a public good that [INAUDIBLE]

JON GRUBER: So basically, here's another way to put it. It's a great way to put it. More tax benefit linkages means more local. More spillovers means less local. More economies of scale means less local. That's the way to think about it. Those are the forces pushing. That's a good way to answer the question, too. Yeah?

AUDIENCE: How relevant is this [INAUDIBLE] immigration or migration into [INAUDIBLE] country?

JON GRUBER: Excellent. I mean, look, we will talk-- it's not that there's no mobility across countries. There's obviously mobility across countries. But I think there is not a lot of evidence that mobility for most people responds to local public goods or taxes. It's more about not getting killed.

That is not true, however, totally. There's a lot of cool studies we'll talk about when we get to chapter 25 about very rich people moving across countries in response to the top marginal tax rate, particularly athletes. But it's generally not really true. OK, other questions or comments?

All right, now that's all optimal fiscal federalism. Now having done that, we now come to the part that we really care about, which is, OK, we know what should be optimal, but what should we do to try to encourage the optimal level of fiscal federalism, the optimal level of public provision?

And now we get to the last topic, which is the role of intergovernmental grants and thinking about how government should behave to get at that optimal level.

So the first thing is let's step back and just talk about the general topic of redistribution across communities. Just think about the general topic of redistributing across communities.

So let me ask you a general question. Given all you've learned, should we or should we not redistribute from, say, rich communities to poor communities? I'm not talking about rich people to poor people, rich communities to poor communities.

Should we, in general, take money from rich places and give it to poor places? Should we or should we not do that? The answer's, of course, ambiguous. What are the factors pushing each direction? Yeah?

AUDIENCE: [INAUDIBLE]

JON GRUBER: What's that?

AUDIENCE: There are a lot of [INAUDIBLE] things that you can achieve in a higher level if you redistribute that [INAUDIBLE]

JON GRUBER: So in some sense a reason-- so let me just shortcut this a little bit because we're getting a little late on time. The reason not to distribute is Tiebout. The bottom line is if Tiebout holds, you don't want to redistribute. You might want distribute from rich to poor people, but there's no reason to take from one community to give to another if everybody's happy.

In a Tiebout world, everybody's happy. It can't be welfare improving to redistribute across communities in a Tiebout world because everyone's chosen their optimal level of taxes and public goods.

I'm not saying you shouldn't have a federal income tax when you switch from rich to poor. But there's no reason to actually take from one town and give-- just because my town has rich people with good schools and another town has poor people with bad schools, Tiebout would say, that's the choice they made. There's no reason to distribute. If you care about income distribution, you do have a federal income tax. There's no reason to take from my town and give it to the other town.

Why is Tiebout wrong? Where he wrong? He's wrong if people can't freely move. In other words, if redistribution does matter, then Tiebout doesn't hold. So essentially it's a simple equation, which is the more Tiebout holds, the less you want to be doing community-level redistribution. The less Tiebout holds, the more you just want to be considering.

I'm not saying it's optimal, but at least you want to open that. Just like we talked about, only in market failure should the government intervene. A Tiebout equilibrium is equilibrium with no market failures. So the government should intervene. Everybody's in the right town for them. The government should leave it alone.

But if people are stuck and can't move to get to the Tiebout equilibrium-- so if, for example, someone has a family that really wants a good education for their kids, but they're stuck in a town with a shitty educational system, and they can't move to another town because zoning laws keep them out, then we should redistribute. Steven?

AUDIENCE: I guess [INAUDIBLE], but I was going to ask like the difference between a poor town and a rich town in a Tiebout situation, could that [INAUDIBLE] be driven by someone in the poor town might actually want to live in the rich town, but they can't actually [INAUDIBLE].

JON GRUBER: Right. Right. So that would be a breakdown of the [? table. ?] So essentially, what's pretty cool about this is essentially if someone asks you, as people often come walk up and ask you, they'll say, hey, should we be redistributing from rich to poor communities? How do I think about that? And your answer is, it all depends on how efficiently we think how people are sorted across those communities. If we think we're in a purely Tiebout equilibrium, the answer is no. Given that we're not, the answer is probably a little bit yes and how much depends.

So now let's say-- so let's say-- so let's say we've decided we do want to redistribute. So now the question is, how we do that? And the way we do it is through intergovernmental grants. So I want to talk about the analysis of intergovernmental grants. This is a fun example. It shows you how you have fun with budget constraints.

So let's imagine that there's the town of Lexington, and we're in a simple world with a private good and a public good. There are private goods and a public good. The public good is education. So people can either spend the spend their money on private goods, or they can spend their money on schooling. And to make life easy, a unit of each is $1. We always do this numerator thing so we can talk about units of dollars interoperably without worrying about each.

So let's assume people can-- the town of Lexington has a representative democracy, and it's choosing for its people-- and it's a true median voter theorem representative democracy. It's choosing for its people how much spend in education. So it's essentially representing its voters in thinking about that trade-off.

Let's further assume that more education spending delivers a better outcome. Let's assume people want more. I'm going to come back to that next chapter. Let's just assume that every dollar of education spending is that much better outcome. So we want more education spending, but they also want other stuff.

So what that means is that essentially you get something like figure 10-2 shows the trade-off facing Lexington. This is below table 10-2 that we looked at a few minutes ago-- shows the trade-off facing Lexington. People, let's say, can spend their money on private goods or education.

Let's say the town of Lexington has $1,000 as an entity. And it can decide as a town whether they want to spend that $1,000 on private goods or education. And once again, we're ignoring the whole voting difficulties here. Let's assume it's a representative. It's representing people's preferences. You can assume everybody's identical to make this easy.

So let's assume the town, as a set of identical individuals, has some indifference curve between private goods and education. And that indifference curve is tangent with their budget constraint at the point x. So let's say that the voters of Lexington decide they want to spend half their money on education, and half their money on everything else. And that's the equilibrium.

Now, let's say the federal government says, you know what? We think you are not spending enough on education. [INAUDIBLE]. We want you to spend more. And to entice you to spend more, we are going to give you a grant to try to entice you.

There are three forms that grant can take. The first form is what we call a matching grant. A matching grant says, hey, Lexington, I'm going to pass a state law that says for every dollar you spend in education, I'm going to give you $1. So I'm going to match one-for-one your education spending.

What does that do to the budget constraint? See that in figure 10-3. In figure 10-3, you see the new in red is the new budget constraint. This budget is such that if people in Lexington decide to spend all their money on private goods, they still only have $1,000 worth of private goods. But if they decide to spend all their money on public goods, they now get $2,000 worth of public goods. Why? Because the state has announced they're matching it one-for-one.

So the budget curve has shifted outwards. In other words, the price of education has fallen to half the price of private goods. Education used to cost the same as private goods. Education now costs the town half as much.

What will that do to the level of education? Well, we know from 14.01 that depends on income and substitution effects. On the one hand, the price has fallen. So substitution effects unambiguously lead you to say they want more of it. On the other hand, they're richer. So if education is a normal good, which we'll assume, that would say that they want more of it. The income effect would work the same way. They're now richer, so they have more of it as well.

So the substitution effects would both say they want more education. Both the price has fallen, and they're richer. So for both reasons, they want more education. So education shifts out, and you end up spending $750 on education instead of $500.

Note also, you also spend more money on private goods. Why? Because you're richer. And as long as private goods are normal, you're going to take that windfall and spread it across both. So you're going to spend $750 on education now, and $625 on private goods. So even though private goods price hasn't fallen since you're richer you want more private goods as well. So you are going to end up at a point like Y. Questions about that?

Now, imagine the state said, well, wait a second. Let's try a different kind of grant. Let's give them what we call a block grant. A block grant is saying, look, we know that basically-- we know that that point you choose with the matching grant, if we gave you a block grant of $1,375, you could get to that exact point. Why? Because look at what you're spending. You're spending $750 plus $625 is $1,325.

So if I literally just gave you $1,325, you would literally get to the same point. But is that what you do? It's not. Take a look at figure 10-4.

Figure 10-4-- now in blue, we have the original budget constraint and the matching grant budget constraint. But we also have a third budget constraint, which is the block grant budget constraint now in red. That is just a shift out of the budget constraint of $1,375.

Why does that cause a smaller increase in education spending than does the matching grant? Why does the block grant cause a smaller increase? Yeah?

AUDIENCE: Would we only have the income effect?

JON GRUBER: We only have the income effect. Relative prices haven't changed. This is like our old proof, remember, of income substitution effects. We only have the income effect. As education spending rises less, and private spending goes up more.

Does that mean that the town is worse off? Is the town worse off or better off, and how do you know? Is the town worse off or better off, and how do you know under the block or of the matching grant? Yeah?

AUDIENCE: [INAUDIBLE].

JON GRUBER: How do you know?

AUDIENCE: [INAUDIBLE].

JON GRUBER: Yeah. By definition, it's better off because it could have chosen the exact same outcome as before, but it didn't. Or in other words, you can see the indifference curve tangent at Z will be higher than the indifference curve tangent at Y. That's the kind of reveal preference proof we like in economics. Just keep that in mind, is that if someone has a choice they made before and they choose not to make it, then they clearly like the new outcome better.

So herein, we have the fundamental trade-off of grant-making. If your goal is just to increase education spending, then a better way to set that up is with a matching grant. If your goal is to make the town better off while also increasing education spending, then it's better to do the block grant. And that comes right back to why we're redistributing.

If we feel like we really care about poor towns, and we also want education to increase, we may want a block grant. We may want to say, look, we realize education won't increase as much, but at least we'll give more to the poor towns. A matching grant gives more to rich towns because rich towns spend more on education. So a matching grant gives more to rich towns. A block grant gives the same to everyone.

So if your goal is purely, we want to increase education spending. We don't care about redistribution, then a matching grant dominates. If your goal is both to increase educational spending and to redistribute across towns, a block grant's better.

Now, you're probably thinking, well, Jon, can't we have our cake and eat it too? Can't we do a conditional block grant-- a conditional block grant? What would a conditional block grant look like?

Well, it would say, look-- conditional block grant would say, look, we are going to say we're going to give you, Lexington three-- I shouldn't-- this is-- I didn't say-- don't give them that grant. They give them this grant. My bad. Wasn't $1,000. They give them $375 in that example [INAUDIBLE]. So in that example, they gave them $375, not $1,375. Because it increased their spending by $375 is the delta they gave them.

Well, now imagine that they gave them-- they said to Lexington, you can have $375, but you have to spend it on education. In that case, can we have our cake and eat it too? If we say to Lexington, $375, but you have to spend it on education. Will that both give a block grant, which is fair across communities, and enforce more education spending? And the answer is in economics, you never get to have your cake and eat it too. And to see, that let's go to figure 10-5, which should look familiar from our old figures about food stamps.

Figure 10-5, we have the regular budget constraint B, the first budget constraint. We have the upper blue line is the matching grant. The line that goes DFE is the block grant. The new budget constraint goes AFE. Why? Why is the new budget constraint AFE, as opposed to the old DFE? Explain why you draw the new budget constraint that way. Yeah?

AUDIENCE: [INAUDIBLE].

JON GRUBER: Yeah, the first $375 you have to spend on education. You don't have a choice. So that segment that goes from F to D is not available to you. You can't do-- that's not available to you. You have to spend at least $375 on education. Once you spend at least $375 on education, then you're back on the block grant.

So what this means is, in many ways, you end up with the same outcome as a block grant, but not fully. And why is that? Why is it different than block grant? For what kind of towns will you not get the same outcome as the block grant? Yeah?

AUDIENCE: Towns that have super high private goods spending [INAUDIBLE].

JON GRUBER: Yeah. You can see towns which might-- any town which would choose a point between D and F will now be forced to spend more on education and be on a lower indifference curve. If your tangency was a D and F and I forced-- between D and F, and I forced you to F, you'd be in a lower indifference curve. And that's probably the poorest towns. It's probably the poorest towns that spend the least on education.

So in some sense, this is not as good for redistribution as the block grant. It's better for getting more education spending because it forces the towns that weren't spending on education to spend. But it's not as good for distribution. So it's sort of a halfway between example.

So matching grant gets the maximum increase in education spending. Block grant gets the maximum increase in town utility. Conditional block grant is halfway in between, part way in between. Questions about that? Yeah?

AUDIENCE: So like much like food stamps, poor towns would still be unhappy because their indifference curve gets lower, even though they're getting more money?

JON GRUBER: Exactly. Exactly. Well, no. Lower-- they're not getting more money. The people between D and F are getting the same--

AUDIENCE: They're being forced to-- yeah.

JON GRUBER: They're being forced to spend their money differently. Yeah, Steven?

AUDIENCE: Does matching always strictly outperform the conditional block grant in terms of education [INAUDIBLE]?

JON GRUBER: At the same budget level it will-- at the same budget level because you get the income and substitution effect, unless substitute effects are zero. So it's strictly as good or better in terms of education spending because you get substitution effect you don't get with any block grant.

So basically, what you have is a situation-- let me just check that. At the same budget, yes. At the same budget, it will strictly outperform it. Now, matching grant at less money won't necessarily outperform it, but the same budget will strictly outperform it.

So basically, what you have is a situation where there's this inherent trade-off, and it all comes full circle. What I like about this chapter, it's very circular, in the sense it all comes full circle, which is it all comes back to Tiebout, which is if Tiebout is holding perfectly, we just say, isn't it wonderful local public goods are efficient? That's wonderful.

But whether that's going to be true depends on a lot of things. What you should do at which level is going to depend on how much Tiebout holds. And whether you want to redistribute across communities and which kind of grant you use is going to depend on how much Tiebout holds. So it's a nice way to think about optimal fiscal federalism. Now, questions about that?

We're going to do-- next time-- we're not stopping yet. But next time, we're going to come back to one last cool coda to all this, which is actually-- actually, no, I'm going to do it now.

So basically, let's talk about two more things. The first other thing I want to talk about in chapter 10 is an important public policy called school finance equalization. Many states have felt that-- first of all, there's enormous discrepancy across districts and what they spend in education. So within Texas, for example, there's a five-fold discrepancy across towns and what they spend on education per student. That's true all over the place. Huge discrepancy.

So What happened was people started suing under state constitutions, saying that the state Constitution guaranteed equal rights for everyone, and different-- such vast disparities in educational spending violated their equal rights. And the first such case was won, once again, in California in 1976.

In California, in 1976, there was a lawsuit. And the state ruled that the state-- the Supreme Court of the state ruled that the state had to equalize financing across districts. And indeed, there's been subsequent lawsuits in almost every state in the country, and that's led to a massive shift towards school finance equalization. I haven't gotten to education yet, but this is how education is paid for.

Now, these plans differ a lot. For example, in California, what California says is, look, every district should spend the same. You can exceed that by $350 per student, which is tiny. But beyond that, you don't get to have any more. So in California, basically, it doesn't matter how much you collect in property taxes, your education spending can only be $350 above the statewide average.

New Jersey, on the other hand, does a different system where they say, look, if you are below the 85th percentile of property values in the state, we're going to send you money. And above, we're not. So a different system-- both redistribution but done in very different ways.

What are the effects of this redistribution? It's quite interesting. There's been a number of studies. They found the following. First of all, all these schemes equalize school financing. All these schemes worked. The spending across districts got much more equal, but how they worked was very different.

States like New Jersey, they work by bringing the bottom up. States like California, they work by bringing the top down. Why? Because think about the California system. It's essentially 100% tax. Once you're spending $350 above the average, all the rest of the tax revenues you raise just go to pay for other towns' education. So people are like, forget it. We're not going to invest in education.

Whereas, in New Jersey, the rich towns get taxed, but they still-- it's like a typical tax. Some of what they spend they have to give to the government, but the rest they get to keep. So they might spend less on education than they otherwise would. But they redistribute it to the bottom, which spends a lot more.

So there's equalization, but the way it happens is very different depending how the system is set up. So this is-- it's not quite pedantic. It's a technical detail, but it matters enormously.

And this matters more than that because studies have shown this matters for educational outcomes. And we'll talk about money and education next time. But studies have shown which not only does equalization lead to equalization of spending, at least equalization of student outcomes. This stuff matters. So that's an example of how equalization works.

Now, this leads to one of my favorite examples in this course, which is someone wrote an article-- this guy wrote this article in the 1980s about why did Proposition 13 happen? Proposition 13 was this incredible event that changed the whole nature of public finance in the country. But people have bitched about property taxes since the first century. Why 1978? Why did Proposition 13 not happen until 1978?

And he said, well, the answer is, what happened in California in 1976? School finance equalization? What does school finance equalization do? It fundamentally breaks the tax benefit linkage between the taxes you collect and what you get from them.

Before 1976, if you raised more tax, you got better schools. After 1976, you raised more taxes, you don't get better schools. So why pay higher taxes? So his argument-- this is more of a curiosity argument. It's not really strongly proven. His argument is that basically, Proposition 13 was a natural consequence of causing--

Essentially, what the school finance equalization in 1976 was impose 100% tax on your property taxes, giving it back to the state, breaking the tax benefit linkage and causing towns say, well, forget it. We don't want property taxes anymore. That led to all the property taxes falling, which led to the entire educational system cratering.

Somebody mentioned a cycle. This is a real cycle, you see. You break the linkage. People vote for lower taxes, and the whole bottom falls out of the school system. And that's happened in California. Really fascinating set of events in the late 1970s. Yeah?

AUDIENCE: Can I ask if the law in California is causing overall spending to drop, why is it still the same way [INAUDIBLE]?

JON GRUBER: It is very hard. It turns out to be very-- it's a great question. It turns to be very hard to make the argument that you should raise taxes, fundamentally. It's just very hard. I mean, you can go in and say, look, look what's happened to our schools.

And the problem is, while you say that, people say, well, raising taxes wouldn't solve it with this corrupt politicians, da, da, da, da da. It's hard to change the status quo is the bottom line. So Massachusetts has a law like this called Proposition 2 1/2, which limits property taxes to growing at 2.5% a year.

By the way, these limits are binding. In California-- here's a fascinating case. California, starting 1978, your property tax bill could only grow at 2% a year. California property values have gone up 50-fold since 1978. So you have houses that are worth gazillions of dollars paying almost nothing in property tax.

Here's the fascinating thing-- until you sell the house. When you sell the house, the property tax gets reset at 1% of the new value. So that leads to this thing called housing lock, where you have people who don't want to sell their houses. Because basically, once they do it, there's a huge property tax hit the next owner. It's like a good deal.

It's like, remember we talked about the old pollution, the old plants. And we had these new standards which said, only new plants have to put in scrubbers. Well, the new thing which says only new houses pay a higher property tax, people don't sell their houses. Another example of unanticipated distortion that comes from systems like this. But it turns out to be hard.

So in Massachusetts, we have Proposition 2 1/2. But in the law, there's the ability of towns to have override votes. So towns can have specific votes to say, this year we're going to raise our property taxes extra to fund x. Why does that work? Those pass more than they fail.

So even though Massachusetts kept Proposition 2 1/2, because they make it at every vote about a specific tax benefit linkage. So if California, I would argue, could prove that we promise every dollar of higher tax will go to better education, they probably could change their system. But it's hard to prove that.

In Lexington, what we do is we have relatively modest increases for specific projects, like to fix this high school, to fix this building. So you maximize tax benefit linkages, and that's how you get around the law. It's hard to get around. But just vaguely, we should increase tax to make education better. It's hard to prove and hard for people to accept.

AUDIENCE: Thank you.

JON GRUBER: All right. That's a good question. Other questions? I like chapter 10 a lot because, once again, like chapter 8, on cost-benefit analysis, seems like it's getting kind of boring going in. It actually ends up being pretty interesting.

Chapter 11 has a lot in it, so I want to get started on chapter 11 for five minutes. So let's take your chapter 11 handout, which is the other handout you have, and let's talk a little bit about education in the US.

Education is the single largest expenditure for state and local governments. One third of all of our state and local budgets go to education. Yet, our education system is not very good.

If you look at figure 11-2, this shows education spending and test scores on an internationally comparable eighth grade math test. What you'll notice is, first of all, the US spends the most and does the worst. Second of all, there's a remarkably low correlation between the blue bars and the orange bars-- a remarkably low correlation between who spends the most and who does the best.

So this is-- I said we'd assume in the example a few minutes ago that more education spending meant better outcomes. This one doesn't look like it. It certainly doesn't look like more education spending is delivering better outcomes. There's no correlation between the blue bars and the orange bars. And that's why we raised this question of, is the government getting it wrong with education, and so education spending.

So what I want to start with the last five minutes, I want to ask-- let's step back and ask the first question in public finance. Why is the government even in education? Why don't we just have a system where everybody pays for their own education? You could take out a loan from the bank, and pay for your own education. Why don't we just have private schools, everybody paying for their own education? Why not? What are the market failures in that system?

So the private market system would be literally-- there's no public involvement in education. Literally, we just have everyone financing their own private education. What would be wrong with that? Nick?

AUDIENCE: Externalities.

JON GRUBER: Externalities of what type?

AUDIENCE: Probably both, but positive externalities in the sense that-- yeah, positive externalities because it benefits everyone to have an [? educated population. ?]

JON GRUBER: Yeah. So basically, there's two types of externalities. One is fiscal externalities, which is you pay higher taxes, and that benefits all of us if you have better education. But more generally, we think that citizenship, the basic tenets of what it means to be a citizen in the US, what it means to be a resident in the US are things we fundamentally want people to know.

Remember, your vote affects me. I want you to know enough to cast a vote that's informed. There's a basic set of things that we want citizens to know. Now, so that's one benefit. Another externality benefit is things like reduced crime. We don't want people to be committing crimes. That affects all of us.

The problem with those arguments is those are pretty compelling arguments for elementary school, middle school, maybe even high school. It's a little hard to justify AP classes. Like, I'd be a criminal if I hadn't taken AP chemistry. It's a little hard to justify a lot of what we spend money on education with those alone. So what else? Yeah?

AUDIENCE: Jobs, entrepreneurship.

JON GRUBER: Productivity writ large. But under what condition should we care? Under what condition should that cause us to want to publicly finance education? Or in which case, should it not want us to? Are you going to answer that, or a different question, different comment?

AUDIENCE: [INAUDIBLE].

JON GRUBER: Well, no. I want to answer this question right now. Why might she be wrong? Why might the fact-- yeah?

AUDIENCE: If I can fully capture my--

JON GRUBER: Yeah. Remember, it has to be an externality. Now, obviously you can't because you pay taxes. But beyond that, the question is, if I literally-- does Elon Musk generate more utility for the world than he captures himself in his private wealth, despite it-- maybe now not so much anymore. But five years ago, I would say yes.

Elon Musk is worth $100 billion. The world is more than $100 billion better off because of Tesla and SpaceX and stuff. So basically, the extent that we create benefits above and beyond the wages we get, that's another argument.

Other arguments? Let me just-- actually, we're out of time. So let me just hit the other two, and then we can go. The first argument is I said that high-level high school and college can't be justified by the stuff [Enoch mentioned.

But what about the fact that folks need to-- who want to go to that might not have the money to? Now, the classic answer is, well, they'll just borrow from a bank. The problem is they can't because you can't borrow money from a bank without collateral.

When I buy a house, I take a mortgage. The bank gives me a mortgage because they know they can take my house if I don't pay. If I take a loan from my education and don't pay, they can't take me. They can harass me on the phone. But ultimately, there's no collateral.

So banks are not willing to loan for things like education because they're not sure they can get their money back, or they'll charge very high interest rates. These types of credit market failures are reasons why we might care about education.

So even absent all the other things, people just can't carry out their plans. We don't want to screw-- and more generally, failures to maximize family utility. Do you really want to screw the ambitious kid with loser parents who's not willing to invest in them? No, we want what's best for society. And so once again, that's another reason why the private market might not deliver.

And then finally, we have redistribution, that a great way to distribute in society is to actually bring-- is to give everyone a basic set of skills. Remember in 14.01, we talked about arguments for redistribution. And even conservatives agreed that we should at least give everyone an equal playing field, and then we should let the dice roll. But we at least want everyone have an equal playing field. That's an argument for public education's redistribution, is making sure everybody has a level playing field to start.