The Economics of Water

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Moderator: *Welcome to* Research Insights*, an occasional podcast from the Federal Reserve Bank of Atlanta. We're talking today with Sheila Olmstead, associate professor of environmental economics at the Yale School of Forestry and Environmental Studies. Our topic is the economics of water. Sheila's visiting the Atlanta Fed to discuss a working paper and speak at the bank's Public Affairs Forum in June 2009. Sheila, thanks for joining us for this podcast; glad to have you here.*

Sheila Olmstead: Thanks for having me, Bill.

Moderator: *Sure. Now, water has become an increasingly important public policy issue, not just in the Southeast but around the world. Why is this issue getting more attention in public discourse?*

Olmstead: Well, I think in the United States it's in large part a result of the fact that lots and lots of people have moved to the cities in the South and the West in recent years, and so we see a lot of places in the United States that don't typically get a lot of rainfall, or where the water supply is somewhat constrained, having increasing demand by both households and firms in various types of industry. At one time, those places could sustain that kind of demand, and we're reaching the point in a lot of those places where that just can't be so. In other parts of the world, we could talk about climate change and changing availability of water resources and water supply that may play a role as well, and certainly population growth in other parts of the world matters to that extent as well.

Moderator: *Interesting. Well, much of your research focuses on the importance of prices in water conservation policies. Can you explain why, and how prices are an effective way to address water shortages?*

Olmstead: Well, we could also take a step back for a minute and think about why we don't typically manage water through price. And it's sort of a notable contrast to other types of natural resources, for which most natural resources are treated in markets. So if you think about something like oil, or those sort of end products—electricity, timber, those kinds of resources—those are also scarce resources, but they're priced, and prices in markets provide very important information to consumers, whether they be households or firms, about the scarcity of a resource and other aspects of its value.

For water resources, we tend to have a lot intervention by public sector organizations and institutions, and managing those resources could be done actually very well by the public sector. But historically, for a variety of reasons, we haven't seen prices used as one of those main mechanisms to manage the water demand, at least not so much in the United States. The reason is, economists think markets are a pretty good allocation mechanism for a lot of things, and so it's often the case that I'm having to make the case that perhaps water is not one of the areas where we could have unregulated, laissez-faire, free markets for water. But we could certainly inject more of that information that comes from the price signal into people's consumption of this valuable resource.

Moderator: *Instead of markets, are you seeing command-and-control mechanisms?*

Olmstead: Very much so; so I guess I would say that conversation over urban water pricing in particular is about where the conversation over pollution control policy was in the late 1980s, when there was a very raucous debate over the appropriateness of methods like cap-and-trade and environmental taxes shifting over from the more typical, traditional, prescriptive approaches, such as technology standards and uniform performance standards and so on. And at first when those ideas were introduced, they were extremely controversial—and they still are, in many corners—but we have increasingly seen the cost savings and the impressive pollution reductions that can be achieved with those kinds of instruments. And from my perspective as a researcher and a teacher, I think that a similar conversation in the area of urban water demand is long overdue.

Moderator: *Well, in addition to market forces, what are some other lessons learned for encouraging water conservation, some other techniques that are out there?*

Olmstead: Well, we see a lot of water policies following along the technology standard, or water rationing, actually. So it's a little bit different from pollution control, where cities and towns often will restrict the different ways that households or firms can use water, or restrict the amount that they can use. And what we can see is that, while those can be effective in many cases, we see that there are a variety of problems with them. One is sort of like the pollution control stories; they're not really a cost effective way of reducing consumption. But there are other problems as well. For example, with technology standards, we see things like a rebound effect, where if you require that households install technology that perhaps they wouldn't have chosen themselves, like a low-flow fixture, they may replace that fixture, they may alter the way that it's used, they

may take longer showers if they're dissatisfied with the way the fixture works. So one thing we have to do with those kinds of standards is make sure that we're very careful about how we measure the effectiveness of those and not just think of multiplying the manufacturer specification for the water savings achievable with such a technology by the number that households actually install.

With the rationing approaches, again, there's empirical evidence for the effectiveness for those kinds of policies. It's just that we think about the cost, and that's been a focus of my research of late. When we think the economic costs of that approach, it doesn't really compare favorably with the price-based approach, and in addition it doesn't compare favorably along the lines of monitoring and enforcement. We can certainly have a conversation about political feasibility and equity and some other important factors. But, in general, the policies are not going to stack up very well from an economic perspective against the price-based approach.

Moderator: *So measurement's important?*

Olmstead: Measurement's very important, and we lack that. Actually, I would say with the price-based approaches, there are literally hundreds of water-demand studies that have been published in economics since 1960, and we have a handful of studies of the effectiveness of nonprice policies that have been published at least in the academic literature. Certainly there are more in cities that have assessed the benefits of those kinds of policies on their own, once they've been implemented.

Moderator: *OK. Well, here in the Southeast, it's a hot day today in June, but we've had some easing of drought conditions here, yet water remains a contentious issue. Are there any closing thoughts you have that you could share with us about communities in this region as we adjust to conservation and water shortage?*

Olmstead: Absolutely. I mean I think it's an important point that the most recent drought has eased somewhat here. So the question of how to conserve water during a drought is perhaps less relevant, at least in the near term here. But one thing to keep in mind is that the price sends the signal to firms and households about how valuable the resource is, and if you have low water prices, the signal is that water is plentiful and cheap and should be used as much as one wants. Raising prices, and having the price incorporate the actual value of the resource, is going to affect these long-run decisions made by firms and households, like what kinds of appliances to adopt, what to plant in your yard—on the firm side, what production technology to adopt, what their output decision is going to look like. If we're looking at rural areas you're talking about farms, perhaps choosing crops and choosing irrigation technologies. And it is precisely those decisions that will determine how flexible those firms, households, and farms will be in response to the next water shortage. Which may be two years, may be five years, may be 10 years—it's hard to know how long it will be before the region is challenged again as it was over the past three years, but one can be sure that given the population growth increasing and competing demands, it will happen again.

Moderator: *OK, well thanks, Sheila. Again, we've been speaking with Sheila Olmstead, associate professor of environmental economics at the Yale School of Forestry and Environmental Studies. This concludes our* Research Insights *podcast on the economics of water. Thanks for listening, and please return for more podcasts.*