



Markets for the Environment

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Markets are increasingly being used and proposed as a way to address environmental problems and manage natural resources. Functioning markets exist for water rights and sulfur dioxide credits can even be purchased via the Internet. Markets are being developed for trading water quality credits, greenhouse gas emissions, and many other environmental services. In this paper, I examine why such markets are being widely proposed, give some background on their history, and speculate on their future. The other papers in this *Choices* theme provide an overview of what is really happening “on the ground,” discussing how well the promise of these new markets has been met in reality.

Background

Most economists are quite enthusiastic about markets; they make buyers and sellers better off and create incentives for innovation. These benefits can also be achieved when applied to the environment. Markets can help reduce the cost of achieving environmental goals and move resource usage permits to those that value them most. However, Adam Smith’s invisible hand does not magically materialize to provide clean air, protect endangered species, or even ensure the best use of fresh water. If markets are to be used to address these issues, then the rights to be transacted must be intentionally defined.

The advantages of markets have led economists to look for ways to harness market forces for the management of the environment and our natural resources. After being promoted for decades by economists, this policy tool is beginning to have some notable successes. Costs of controlling sulfur dioxide have fallen dramatically, and water quantity trading is now routine in some regions. It might even be argued that the development and implementation of environmental markets constitutes the single most valuable contribution of environmental economists to date, having saved billions of dollars in the SO₂ program alone. Today markets are being promoted as part of the solution to an ever-increasing range of environmental problems,

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including overfishing, urban sprawl, and global climate change.

What are the Economic Benefits of Environmental Markets?

The theory behind market-based approaches to deal with pollution problems arose in the late 1960s in work by Dales (1968) and Crocker (1966). In such a system, rights to emit pollutants or use natural resources would be distributed to stakeholders but could then be sold. Market negotiations between potential permit buyers and sellers would occur and result in the reallocation of these permits across the stakeholders. In the textbook version of such a program, a cap is first placed on total pollution emissions. Second, permits equal to the cap are distributed to the polluters. Finally, a market develops in which the sellers are those firms with relatively low abatement costs who end up reducing emissions by more than initially required; buyers are those with relatively high abatement costs who end up reducing emissions by less than initially required. Regardless of the aspect of the environment being considered, the market-based approach requires that transferable rights be defined and protected (typically by government), an initial allocation is set, and trade in these permits is allowed. The textbook result is an efficient market equilibrium in which a pollution target is achieved at lowest cost or a resource is used in a way that yields the most value to society.

At least, that is how it is supposed to work—the simplest theoretical models never quite work in practice. For

example, Dales' original proposal was to use transferable rights to improve water quality. Coincidentally, one of the earliest applications involved markets for water pollution on the Fox River in Wisconsin. However, significant barriers to market trades arose because the difficulty in obtaining regulatory authority for trades and the persistent concerns about "hot spots"—locally high concentrations of the pollutants. In the end, the Fox River program, established in 1981, did not give rise to a single trade during the first 14 years of its existence.

Challenges to Market Design

As the Fox River example makes clear, the design of environmental markets is not without challenges. Numerous decisions must be made when such markets are put in place. The nature of the rights must be carefully defined so that environmental goals are met but market flexibility remains. The initial allocation of rights must be established, sometimes being handed out based on historical precedents and other times being auctioned by the government. These decisions, and many others, can be politically contentious and can affect the success of the market.

Whether they are used to address pollution problems or fisheries management, all transferable rights programs require that an institution (typically the government) certify the validity and transferability of the property right. In addition to defining the rights and obligations associated with the permit, the oversight agency must monitor compliance. This is more difficult than in standard markets. When someone purchases an apple at the supermarket, they know the purchase is complete when they walk out of the store; if

the apple is rotten they can usually return it for a refund. When someone purchases a pollution permit, they know that it is legitimate when the government informs them that they are allowed to increase their pollution, but they usually have no way to know (or reason to care) if the seller of the permit actually reduced its pollution to generate the offsetting environmental benefit. Compliance must be enforced by the government. Monitoring and enforcement is also needed to create demand for the rights to be transacted. Permits will be valued only if polluters know that they are required by the government. As Dennis King puts it in his paper in this series, "the 'invisible hand' will not work without the 'visible foot' of a regulator insuring compliance."

Further inhibiting the performance of environmental markets is the fact that they usually grow out of more traditional regulatory programs and often carry excess baggage as a result. As Robert Hahn (1990) noted, "In the real world, regulatory systems are rarely discarded and replaced wholesale. Rather, reform of regulatory systems proceeds in an incremental fashion." Hence, the earliest transferable rights programs in pollution are hardly identifiable as market-based systems at all. In some cases flexibility arises over time, but such evolution is not automatic. As Leonard Shabman and Paul Scodari argue in their paper in this series, the level of flexibility that has been introduced in the management of our nation's wetlands is so limited that the program can not even qualify as truly market based.

A Brief History of Environmental Markets

The development of the institutions needed to support transferable rights is more natural in some instances than in others. The buying and selling of water rights, which is centuries old, is a natural improvement over fights that inevitably arise over this scarce resource. As governments became more involved in resource management, however, they often created barriers to trades that made transactions more difficult. Government control of water, environmental regulations, and restrictions on the rights to use water often made water trading quite difficult. However, as Richard Howitt notes in his paper in this series, in recent years there have been efforts to encourage markets by modifying laws to facilitate trading. Fierce battles are still being fought, but pressed by rising scarcity, there has been substantial growth in water markets.

For pollution and environmental services, there is no natural tendency for markets to arise; the initiation had to come from the regulatory branch. In the 1970s, the US Environmental Protection Agency started down the path toward market-based instruments when it began introducing some flexibility into its air quality programs. The 1980s saw an expansion in the use of this tool: Trading was allowed as part of the rules that removed lead from refined gasoline and as part of the US approach to controlling chlorofluorocarbons. That decade also saw the development of a number of small-scale market-based programs to address water-quality: the Fox River program noted above, programs in Lake Dillon and Cherry Creek Reservoir in Colorado, and on the Tar Pamlico River in North Carolina. By the 1990s, the

number and scope of market-based programs was expanding rapidly. The national SO₂ program, started in 1990, has proven that a program can work in textbook-like fashion. California introduced an ambitious trading program in air pollutants, and water pollution programs have sprouted up around the nation.

In addition, it appears that interest in market-based mechanisms is as strong as ever. In fact, it often appears today that when environmental policy is discussed in the US, market-based approaches are assumed desirable unless proven otherwise.

Why this Issue?

Today there are many proposed markets, and we can observe a number of successful and unsuccessful efforts. It is a good time to take stock of where we are. In this collection of articles, *Choices* explores the reality of environmental markets in the United States today. In this package of papers:

- Robert Stavins reviews the market for permits to emit sulfur dioxide, which is widely viewed as an enormous success;

- Richard Howitt and Kristiana Hansen look at the emerging markets for water in the West, where markets remain quite limited despite the fact that there seems to be great potential for gains from trade;
- Leonard Shabman and Paul Scodari look at wetlands mitigation banking, which, they argue, is so restricted that it is like any other offset program and cannot legitimately be called a market-based program; and
- Dennis King looks at the problem of water quality markets and finds that the potential in this arena has yet to materialize; and it may never do so unless government plays a stronger role.

What Do the Papers Tell Us?

A constant theme repeated throughout these papers is that *details matter* and the creation of markets for natural resources and environmental services is no small task. As we look to the future, it may be prudent to avoid exuberant predictions of huge economic benefits from trading. Although it is clear that these instru-

ments will continue to be part of the policy landscape for years to come, they will also face challenges and setbacks, and markets may not be appropriate in every setting. Over time, market-based instruments may take a less prominent place in the policy mix, to be seen as one tool among many that can be used for improved management of the environment and natural resources.

For More Information

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