mechanism NTIA/RUS might choose to allocate competitive grants, it will still have to address complaints and auditing.

**Conclusion**

A traditional grant application process must prove to be inadequate to the heuristic task of distributing broadband stimulus grants. It is likely to be done, cumbersome, and result in a suboptimal allocation of resources. By contrast, competitive bidding, through the use of procurement auctions, can allocate funds quickly and efficiently. While we advocate using procurement auctions to distribute all of the broadband stimulus money, allocating even a portion of the funds using procurement auctions would be useful as an experiment. At a minimum, the broadband stimulus funds represent a golden opportunity to implement rigorous evaluation techniques, which will generate knowledge that can be applied to other current and future programs. To that end it is important to include procurement auctions at least as one approach to be tested.

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**Using Procurement Auctions to Allocate Broadband Stimulus Grants**

By Paul Milgrom, Greg Rosston, and Andy Skrzypacz

The broadband component of the American Recovery and Reinvestment Act (ARRA) has dual and not entirely consistent, objectives of providing immediate economic stimulus and improving broadband service. NTIA/RUS faces a formidable challenge in determining how to spend the money quickly and efficiently in ways that meet these goals. The traditional grant application process is long, complicated, and involves subjective and arbitrary decisions regarding which projects to fund. In other words, requesting and reviewing grant applications is not an effective way to implement the plan.

Auctions allow the government to implement what economists call a second-price auction: the winning bidder pays the second-highest bid. Because bidders do not know the highest bid, this auction is simple and transparent. Since the auction is not designed to yield a single winner, it can accommodate multiple winners, and bids are not restricted to whole numbers. A sample auction can be found at http://www-siepr.stanford.edu/broadband_document.html.

The procedure is as follows. First, the government announces the auction rules and the funding available. Then, agents who meet certain goals submit bids. After reviewing every bid, the government awards broadband service to the set of bidders with the lowest cost per user. Finally, the government reimburses each bidders for the highest bid on their bid minus the cost per user. This is necessary because if a bidder wins the auction, the government will pay them the difference between the highest bid and the cost per user. This is a sort of “pricewinner” auction.

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Procurement auctions, in contrast, provide a mechanism that can allocate grant money quickly, efficiently, and, according to well-defined rules. As opposed to traditional government procurement auctions offer an alternative method of maximizing broadband improvement and while also creating some level of “temporary, timely, and targeted” stimulus. We therefore strongly recommend that NTIA and USDA adopt procurement auctions as the preferred method of distributing grants.

Procurement Auctions Are More Efficient Than Traditional Grantmaking Approaches

Traditional Approaches for Distributing Grants Are Cumbersome and Slow

Traditionally, federal agencies and state programs require firms to submit lengthy applications and the government to pick the “best” ones after reviewing all the competing applications. This approach has at least three problems for the purpose of distributing the funds from the stimulus bill. First, the traditional approach is inherently time-consuming. Firms must complete complex proposals that government officials must subsequently spend time reviewing. Such delays are inconsistent with the goal of quickly providing needed funds. Second, the qualitative nature of the evaluation process makes it difficult to compare one proposal with another. For example, it will be difficult to choose between, say, a fiber project in Texas and a wireless project in a region of similar size and deciding between large and small projects will inevitably lead to inconsistent and seemingly arbitrary decisions.

Third, it is difficult to design a public system to ensure that firms receive only the minimum subsidy necessary to achieve a goal. Procurement Agencies Can Allocate Funds Flexibly, Efficiently, and Fairly

An auction approach aims to address the specific, quantifiable criteria that must be easy to implement and more closely related to the economic outcomes than traditional, qualitative applications. Indeed, the simplest procurement or “reverse” auction process would consist of awarding the subsidy to the entity willing to provide the good or service for the smallest amount of money. Though it may sound straightforward, a procurement auction is not just a competitive bidding process. Rather, once the auction rules are in place, they eliminate the subjective element in identifying the “best” projects—the government sets forth its criteria in advance of the auction. This also enables and encourages bidders to tailor their plans to the government’s actual objectives. Clear Selection Criteria Are Critical for Any Selection Process

Clear criteria are necessary to design the procurement process and ensure that the outcome reflects the economic methodology and other mechanisms apply to determine the subsidy required to achieve any particular goal, the government does not have to estimate the subsidy actually required for each project. Bidding the subsidy for any given project fixes up money that can be used for additional projects. Finally, they enable bidders to conform to the minimum amount to increase the chances that their bid is accepted. Procurement auctions are sound and have been used successfully around the world to bring telecommunications services to areas that previously had none. Experience in other countries including Australia, Chile, India, Peru, and others demonstrates that procurement auctions can substantially bring down the subsidies required for broadband service in those countries.

The two fundamental outcomes of the process would need to include the same identification task to avoid arbitrary and inconsistent decisions. In addition to these very general considerations, NTIA must design in a way that the subsidy required for broadband service is newly available. That is, the government does not need to provide one technology over another; it must benefit one technology over many. Organizations, could, therefore, bid to upgrade copper services in order to make existing copper cable into fiber, or upgrade and install wireless and satellite bandwidth equipment. With a bid or June, for example, advance bidders could know how they would be awarded to those bidders that maximize broadband expansion with the lowest subsidy amount. Through the auction process, bidders would be able to bid down the subsidy for any given project.

Both auction rules and define unserved and underserved areas. The detailed rules of the auction will be crucial, as they will affect the outcome. It would be useful to subject the rules to experiments in advance of bidding the auctions. No matter what the rules for Distributing Grants Are


Efficiently, and Fairly

Auction Plan for Allocating NTIA/RUS Broadband Subsidies

Auction Design

We now briefly describe the economic methodology and other considerations for designing an auction program. First, the traditional approach is inherently time-consuming. Firms must complete complex proposals that government officials must subsequently spend time reviewing. Such delays are inconsistent with the goal of quickly providing needed funds. Second, the qualitative nature of the evaluation process makes it difficult to compare one proposal with another. For example, it will be difficult to choose between, say, a fiber project in Texas and a wireless project in a region of similar size and deciding between large and small projects will inevitably lead to inconsistent and seemingly arbitrary decisions.

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Both auction rules and define unserved and underserved areas. The detailed rules of the auction will be crucial, as they will affect the outcome. It would be useful to subject the rules to experiments in advance of bidding the auctions. No matter what the rules
Procurement auctions, in contrast, provide a mechanism that can allocate grant money quickly, efficiently, and, according to well-defined rules. An effective procurement auction offers NTIA/RUS the most promising method of maximizing broadband improvement while also creating some level of “temporary, timely, and targeted” stimulus.

We therefore strongly recommend that NTIA/RUS adopt procurement auctions as the preferred method of distributing grants.

Procurement Auctions Are More Efficient Than TraditionalGrantmaking Approaches

Traditional Approaches

Traditionally, subsidy programs require firms to submit lengthy applications and the government to pick the “best ones” after a lengthy and deciding between large bodies of applicants, each of which will inevitably lead to inconsistent and seemingly arbitrary decisions.

Procurement Auctions Can Allocate Funds Flexibly, Equitably, and Fairly

An objective, mechanism-driven approach that specifies, quantitatively, precisely, a competitive landscape is easier to implement and more amenable to objective, outcome-oriented policies than traditional approaches, which often compare against each other by subjective, qualitative judgments or need to offer service. The firm must provide detailed information on how much the firm would bid to cover the costs of infrastructure deployment, operation, maintenance, and administration expenses. The government must be clear about the rules of the auction and the criteria on which firms will be scored. The best bid may not be the lowest, but there must be clear rules and a well-defined process. Firms must therefore have a clear understanding of the rules and be able to “bid down” the price. The procurement auction concept, combined with the auction plan for allocating NTIA/RUS Broadband Subsidies, can help NTIA/RUS identify the “best” contractors, allocate funds according to the service plan, and respect a wide range of policy concerns.

Auctions can be used to secure the total effective supply, subject to the government’s spending and other constraints (for example, the need to aggregate to a minimum amount on new access points per state).

Auction Design

Auction Design is crucial to ensuring an efficient outcome. It is particularly problematic to introduce subjective comparisons required by an effective auction.

Procurement auctions have several advantages over traditional methods of distributing grants:

1. Firms that commit to providing a service or infrastructure are likely to be better equipped to do so than firms who are not.
2. Procurement auctions use competition among providers to determine who gets the subsidy, which undermines arbitrary and seemingly arbitrary decisions.
3. Second, because procurement auctions use well-defined rules, they consistently lead to more efficient and equitable results.
4. Procurement auctions can identify the firm that submits the best bid. The firm that submits the lowest bid for the government’s objective wins the auction, and the government picks the firm that submits the best bid. The firm may or may not be the lowest.

1. Note that the need to aggregate to a minimum amount on new access points per state.

In a well-structured auction, the winning bidders maximize the total effective supply, subject to the government’s spending and other constraints (for example, the need to aggregate to a minimum amount on new access points per state).
Procurement auctions, in contrast, provide a mechanism that can allocate grant money quickly, efficiently, and, according to well-defined rules. As a result, procurement auctions often STS’s most promising outcomes compared to any grant program and are used as a negative selection tool to determine which firms would fail to benefit any one technology over another. Organizations could, therefore, bid on one technology or another, enabling and encouraging a technology for the success of any plan, not just procurement auctions. First, there is a competitive bidding process. Second, because procurement auctions use competition among providers to determine the subsidy required to maximize the good or service for the smallest amount of money. In contrast, it is difficult to do this on a computer system because firms need only the minimum subsidy necessary to achieve a goal.

Procurement auctions are more efficient than traditional grantmaking approaches

Traditional Approaches

For Distributing Grants Are Cumbersome and Slow

Typically,薄弱补足 programs require firms to submit lengthy applications and the government to pick the “best ones” after reviewing all the competing applications. This approach is fraught with at least three problems for both firms and the government. First, the traditional approach is inherently time-consuming. Firms must complete complex proposals that government officials must subsequently spend time reviewing. Such delays are inconsistent with the goal of speeding applications. Second, the qualitative nature of applications makes it difficult to compare one proposal with another. For example, it will be difficult to choose between, say, a fiber project in Texas and a wireless project in South Dakota: both operating in similar markets and deciding between large and small companies. Moreover, the evaluation process will inevitably lead to increasingly more subjective and arbitrarily decisions.

Third, it is difficult to do this on a computer system because firms need only the minimum subsidy necessary to achieve a goal.

Procurement Auctions Can Allocate Funds Flexibly, Efficiently, and Fairly

An auction, an approach that applies specific, quantitative guidelines that is easier to implement and more likely to produce equitable outcomes than traditional grant applications. The simplest procurement or “reverse” auction, bids consist of just the price. The government would set forth its criteria in advance and ask firms to bid for the right to meet that objective. For example, a rural area with limited broadband access. The government can ask firms to bid for a subsidy that would make it profitable for the firm to provide service. Firms and other applicants would compete against each other by bidding below the government minimum amount they need to offer service. The firm that commits to provide broadband for that area for the smallest subsidy would win the grant.

Procurement auctions have several advantages over traditional methods of distributing grants: grants. First, once the auction rules are in place, they eliminate the subjective element in identifying the “best” projects—the government sets forth its criteria and allows the market to decide. This also enables and encourages bidders to tailor their proposals to the government’s actual objectives. Second, because procurement auctions use competition among providers to determine the subsidy required to maximize the good or service for the smallest amount of money, it is easier to implement an auction that a wireless project in Texas would not work well due to latency, mobility, and price. In a sealed-bid auction, the outcome. It would be critical for the success of any plan, not just procurement auctions.

Auction Design

We now briefly describe the economic methodology and other considerations for designing a procurement auction program for NTIA/RUS Broadband Subsidies.

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One way to use auctions for a portion of the first wave of stimulus funds would be to divide the country into large geographical regions that are roughly similar in terms of population size and urban/rural mix. Then, in the first wave of stimulus disbursement, part of the U.S. population would be served through procurement auction of stimulus funds and part through a conventional grant review process. The NTIA/RUS should then compare the results of the two programs to make an informed decision whether to use procurement auctions in subsequent rounds.

Should NTIA/RUS decide to continue or expand the use of procurement auctions, the mechanisms can be tweaked to incorporate lessons learned from the first wave. However, even if NTIA/RUS decide to proceed through entirely conventional means, the procurement auction will undoubtedly provide important lessons (e.g., bidder receptiveness to quantitative targets that will inform refinements to the conventional approach. Finally, once similar procurement auction designs can be used in other public projects, the lessons are likely to be valuable for broader policymaking.

Conclusion

A traditional grant application process must prove to be inadequate to the herculean task of distributing broadband stimulus grants. It is likely to be slow, cumbersome, and result in a substantial under-allocation of resources. By contrast, competitive bidding, through the use of procurement auctions, can allocate the funds quickly and efficiently. While we advocate using procurement auctions to distribute all stimulus funds, it may be useful as an experiment. At a minimum, the broadband stimulus funds present a golden opportunity to inform and summarize important research on the issues involved.

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About The Authors

Paul Milgrom is a Nobel Prize Laureate in Economics. He is also a Senior Fellow at SIEPR and Professor at Stanford. He has been working at the Stanford Graduate School of Business since 1980, where he teaches microeconomics, industrial organization, and game theory. He is the author of several books and many articles on microeconomics, industrial organization, and game theory. His work has been recognized by the American Economic Association, the National Academy of Sciences, the American Law Review Association, and a number of other leading organizations. He is a member of the American Academy of Arts and Sciences, a fellow of the National Academy of Engineering, and an Honor Member of the Institute of Electrical and Electronic Engineers. He was also the 2008 Nemmers Prize in Economics laureate. He is Associate Professor of Economics and Gary S. Becker Research Professor at the Graduate School of Business. His research has focused on industrial organization, game theory, and economics, market design, bargaining theory, and game theory/strategy. His research has been published in leading journals in economics, and regulation. He has been instrumental in developing and implementing auctions in a variety of sectors, including auctions and spectrum policy. He served on the Obama transition team. Prior to joining SIEPR, Milgrom was a research associate at the National Bureau of Economic Research, and Deputy Director of SIEPR.

Greg Rosston is the Shirley M. Mineta Research Professor at Stanford and Co-Director of SIEPR. He has served as an associate editor for the American Economic Review and the Journal of the European Economic Association. He has written numerous articles on the economics of broadband, telecommunications, and the regulation of telecommunications. He has written and edited a book on auctions and spectrum policy. His current research interests include the competitive implications of the FCC’s recent national wireless auction, broadband access, and the economics of competition in local telephone and Internet service markets. He is a fellow of the National Academy of Engineering and a senior fellow at SIEPR. He is the author of numerous articles on broadband, auctions, and telecommunications and regulation. He has been involved in research on auctions in a variety of sectors, including telecommunications, energy, and railway bidding, and has participated in designing and implementing auctions in the United States.

Andy Skrzypacz is an Associate Professor in the Department of Economics at Stanford University and co-director of SIEPR. He has published widely in the fields of industrial organization, industrial economics, and game theory. His research has focused on industrial organization, game theory, and economics. His work has been published in leading journals in economics, and regulation. He has been instrumental in developing and implementing auctions in a variety of sectors, including auctions and spectrum policy. He served on the Obama transition team. Prior to joining SIEPR, Milgrom was a research associate at the National Bureau of Economic Research, and Deputy Director of SIEPR.

Introduction

On April 13, 2009, 71 economists filed comments with the National Telecommunications Information Agency (NTIA) and Rural Utilities Service (RUS) to advocate that agencies use auctions to guide their decisions in how to disburse more than $7 billion in stimulus funding. To learn more about broadband and spectrum policy, visit [http://www-siepr.stanford.edu/index.html][1].

The broadband component of the American Recovery and Reinvestment Act (ARRA) has dual, and not entirely consistent, objectives of providing immediate economic stimulus and improving broadband service. NTIA/RUS faces a formidable challenge in determining how to spend the money quickly and efficiently in ways that meet these goals. The traditional grant application process is long, complicated, and it involves subjective and arbitrary decisions regarding which projects to fund. In other words, requesting and reviewing grant applications is not an effective way to implement the plan.
Auctions of the First Wave of Broadband Stimulus Funding and Expand the Program If Successful

Gregory Rosston

Stanford Institute for Economic Policy Research (SIEPR)

Auction Mechanisms: A Promise or a Pandora’s Box?

Gregory Rosston

SIEPR Policy Brief

Introduction

By Paul Milgrom

SIEPR Policy Brief

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One way to use auctions for a portion of the first wave of stimulus funds would be to divide the country into large geographical regions that are roughly similar in terms of population size and urban/rural mix. Then, in the first wave of stimulus disbursement, part of the U.S. population would be served through procurement auction of stimulus funds and part through a conventional grant review process. The NTIA/RUS would then compare results of the two programs to make an informed decision whether to use procurement auctions in subsequent rounds.

Should NTIA/RUS decide to continue or expand the use of procurement auctions, the mechanism can be updated to incorporate lessons from the first wave. However, even if NTIA/RUS decide to proceed through entirely conventional means, the procurement auction will undoubtedly provide important lessons to be valuable for broader policymaking.

A traditional grant application process must prove to be adequate to the task of distributing broadband stimulus grants. It is likely to be slow, cumbersome, and result in a substantial misallocation of resources. By contrast, competitive bidding, through the use of procurement auctions, can allocate the funds quickly and efficiently. While we advocate using procurement auctions to distribute all of the broadband stimulus funds, allocating even a portion of the funds using conventional means, the procurement auction approach may be useful as an experiment.

By a minimum, the broadband stimulus funds present a golden opportunity to implement rigorous evaluation techniques, which will generate knowledge that can be applied to other current and future programs. To that end it is important to include procurement auctions at least as one approach to be considered.

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