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The Decision to Decentralize Good Provision in the United States: A Study in Clean Energy Policy

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Abstract

Normative economic theory provides justification for at least partially centralized renewable energy provision due to the large, positive externalities associated with renewable energy production. However, the United States is one of the few countries without centralized renewable energy policy. Instead, the federal government actively chooses decentralized renewable energy provision by using fiscal transfers to support subnational renewable energy development. This dissertation explores why U.S. legislators choose decentralized renewable energy provision by asking two primary questions. First, what is the motivation for using federal fiscal transfers for decentralized renewable energy output considering what we know about positive spillovers and market failure associated with decentralized renewable energy production? Second, do fiscal transfers for decentralized renewable energy provision increase renewable energy production at the local level? The theoretical model proposed posits why policymakers choose decentralized renewable energy provision. The current political price associated with a specific policy issue affects legislators' choices regarding good provision. The political price associated with vying for centralized good provision is high, legislators are incentivized to choose decentralized good provision, this theory to empirically evaluate the choice to decentralize renewable energy provision. It's examining whether the current political price of renewable energy policy affects the likelihood of a legislator proposing decentralized funding for renewable energy provision. The legislators will propose funding to support decentralized renewable energy development when the political price associated with renewable energy policies is high at a given time. The results show that when the political price of renewable energy policy is low, a policymaker is less likely to use grants to support renewable energy projects, finding support for the hypothesis. The results support this hypothesis by showing that receiving a renewable energy grant is associated with significant and positive increases in solar energy production. These findings provide further insight into legislative decision-making and the role of renewable energy grants in renewable energy development in the U.S.

Keywords: *Energy Policy, Energy Grants, Fiscal Federalism, Fiscal Transfers, Legislative Decision Making*

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Background to the Study

Grants for Decentralized Renewable Energy in the U.S. The U.S. federal government distributes fiscal transfers to subnational governments to support decentralized renewable energy development. The U.S. Department of Energy (DOE) allocated $250 million in renewable energy and energy efficiency grants to state and local governments in fiscal year 2017. The DOE's Office of Energy Efficiency and Renewable Energy awards competitive and formula grants for energy efficiency and renewable energy to state and local governments through the State Energy Program. The office also awards block grants to local communities through the Energy Efficiency and Conservation Block Grant Program. Other federal fiscal transfers for renewable energy and energy efficiency occurred through the American Recovery and Reinvestment Act of 2009 (ARRA) during President Obama's administration. ARRA invested $31 billion total in clean energy mostly through fiscal transfers for clean energy projects ("Recovery Act," n.d.). Additionally, other federal agencies offer temporary and ongoing grant programs for small-scale renewable energy projects.2

The use of federal fiscal transfers in the U.S. to promote decentralized renewable energy provision is unique compared to centralized renewable energy provision in other countries. This anomaly provides motivation to ask why U.S. federal policymakers choose decentralized renewable energy provision and whether this approach is effective at increasing renewable energy output. Most countries in Europe and several in Asia have feed-in tariffs, payments made to individual renewable energy producers ("Global Renewable Energy," 2017). European countries have adopted green certificate programs, utilizing tradeable certificates to award renewable energy production and penalizing energy producers for not meeting a specific renewable energy production threshold, such as the Green Certificate Program in Norway and Sweden and the Renewables Obligation policy in the United Kingdom. Countries in South America and Russia have capacity auctions for renewable energy that allow contracts for renewable energy production. On the other hand, comprehensive renewable energy policy in the U.S. has failed while the federal government supports decentralized renewable energy development.

A Case for Centralized Renewable Energy

The current literature provides the foundation to explore the motivation to decentralize renewable energy in the U.S. and the effectiveness of renewable energy grants. Scholars argue for centralized renewable energy provision in the U.S. Laird and Stefes (2009) explain that the U.S. has an advantage compared to other counties regarding availability of natural resources and advanced technology to develop renewable energy systems. Studies also point out that the majority of the public has supported federal involvement in renewable energy policy since the 1970s (Stoutenborough et al., 2014; Laird and Stefes, 2009; Farhar, 1994). According to a survey by the Yale Program on Climate Change Communication, approximately 71 to 89 percent of a county's residents support funding for renewable energy research, and an average of 80 percent of a county's residents support funding for renewable energy development (Howe et al., 2015).

Explanations for Federal Inaction

Scholars speculate that the federal government's unwillingness to adopt a centralized renewable energy policy is largely due to politics. A plausible explanation for decentralized renewable energy development is that renewable energy is regarded as the primary solution to climate change (Moniz, 2015). Therefore, renewable energy policy could be subjected to the same political conflicts as climate change policy. The differences in congressional voting on environmental issues, especially climate change, have become increasingly polarized among Republicans and Democrats (Krosnick et al., 2000, Fiorina and Abrams 2008, Dunlap and McCright, 2008). These studies help to explain why the federal government has not adopted a centralized renewable energy policy. This dissertation builds on this literature by focusing on federal policymakers' decisions to financially support decentralized renewable energy development.

Dissertation Outline

This dissertation focuses on the motivation to choose decentralized renewable energy provision in the United States as revealed by decision makers' policy choices. Scholars argue for some central provision of renewable energy given its large positive externalities and market failure. However, the United States is one of few countries without a centralized renewable policy. Instead, the federal government chooses decentralization by using fiscal transfers to support subnational policies and investments. To my knowledge, no study has specifically considered the motivation to use renewable energy grants, which are unique given the arguments for centralized clean energy policy. Instead, energy scholars study effectiveness of subnational renewable energy policies (e.g. Carley, 2009; Menz and Vachon, 2006). Other studies focus on the optimal choice between centralization and decentralization (e.g. Besley and Coate, 2003; Lockwood, 2005), and numerous studies consider effectiveness of federal fiscal transfers. It contributed to the literature by focusing on two questions: First, what motivates federal legislators to propose fiscal transfers for decentralized renewable energy development considering what we know about positive spillovers and market failure associated with renewable energy investments? Besley and Coate (2003) argue that studying political decision-making furthers our understanding of the centralization decentralization trade off. Second, does the United States' unique strategy of using fiscal transfers for renewable energy provision effectively increase renewable energy output? Relied on studies in economics for the theoretical foundation to explore these two questions.

It defines renewable energy, discussing the development and prevalence of solar, wind, hydroelectric, geothermal, and biomass energy separately. The chapter briefly explains decentralized residential and commercial renewable energy systems in the U.S. and the magnitude of these developments. Then the discussion continues on energy policy at the federal and subnational levels. The chapter explains the federal and subnational policies and actions that have contributed to decentralized renewable energy development in the U.S. The discussion explains that subnational governments have adopted financial incentives and regulations to encourage renewable energy development while the federal government has partially supported subnational renewable energy development with financial incentives, including fiscal transfers for renewable energy.

Reviewed the fiscal federalism literature that discusses the centralization-decentralization trade-off. The chapter provides an overview of the three primary levels of government—the national government, states, and local governments— describing the purpose and functions of each level as they are discussed in the literature. The chapter then focuses on the tradeoff between centralization and decentralization, outlining the advantages and disadvantages of each type of public provision. This leads to the discussion of the purpose and effectiveness of intergovernmental fiscal transfers, which the federal government uses to encourage decentralized provision. The chapter concludes with implications for renewable energy grants in the U.S.

It proposes a theoretical model to explain why legislators choose decentralized public provision for goods with large spillovers. The theoretical foundation begins with legislative bargaining models that show how strategic behavior affects public provision. Following the literature, I assume that legislators respond to institutional incentives by showing that the political price associated with proposed policies affects legislators' choices. I theorize that the utility-maximizing choice for legislators is to choose decentralized output when the political price associated with a specific proposal for centralized output is high. The model is then used to explain why legislators choose to fund decentralized renewable energy in the U.S. despite normative economic justification for centralized provision.

It offers a direct empirical test of the theoretical model proposed. I hypothesize that when there is a low political price associated with renewable energy policymaking, legislators are less likely to propose funding for decentralized renewable energy. To test this hypothesis, I look at the first observable moment in the legislative decision-making process: bills introduced in Congress by legislators. I analyze a sample of renewable energy bills introduced during the 103rd to 113th Congresses to observe whether legislators proposed funding for centralized or decentralized renewable energy. Using a proxy variable for low political price, I run a linear probability model to estimate a legislator's likelihood of including funding for decentralized renewable energy. The findings suggest that legislators are less likely to propose a bill that includes funding for decentralized renewable energy development when the political price of renewable energy policymaking is low. Robustness checks offer weak support for this finding and suggest that this result is unique to renewable energy provision.

It offers an additional empirical test to evaluate the theoretical model proposed, which explains that legislators choose to invest in decentralized renewable energy when the political price of renewable energy policymaking is high. I assume that reelection and a good's output at the local level increase under decentralized provision of renewable energy. Therefore, I hypothesize that renewable energy grants increase renewable energy output at the local level. I test this hypothesis by empirically evaluating the impact of one-time renewable energy grants distributed through the American Recovery and Reinvestment Act on renewable energy production at the county-level. I find support that renewable energy production increases at the local level, at least for solar energy. Additional empirical evaluation suggests that these results are the most significant in warmer climate regions, as expected, but are not

affected by state or regional policies. And it concludes the dissertation by providing an overview and the contributions of each research. It concludes by discussing how the findings in this dissertation can be extended to future studies.

A Literature Review on the Centralization-Decentralization Trade-off

Introduction Energy policy scholars argue for a prominent federal role in energy policymaking and investments. Margolis and Kammen (1999) argue that the federal government has underinvested in renewable energy research and development, limiting the federal government's ability to respond to global climate change. Laird and Stefes (2009) compare renewable energy production in the United States to the more developed renewable energy system in Denmark. They argue that Denmark's centralized policies have helped to support renewable energy development. By comparison, they credit the underdeveloped renewable energy market in the United States to weak federal policy support. Finally, Sovacool (2008; 2009) argues that federal comprehensive policy is necessary to overcome barriers to renewable energy development, including inconsistent political support, market failure, upfront costs of investments, and misinformation about the benefits of renewable energy investments. While energy policy studies discuss issues with decentralized provision and how the federal government should address this policy issue, they do not directly consider the centralization-decentralization tradeoff of renewable energy provision. Instead, fiscal federalism studies provide the theoretical underpinnings of normative arguments concerning provision of goods, discussing the role of government, the centralization decentralization tradeoff, and the purpose of fiscal transfers. This chapter reviews the literature and then applies lessons from the literature to renewable energy provision in the U.S.

The Purpose of Decentralization

Musgrave's (1959) third objective of budgetary policy, allocation of resources, is the economic justification for federalism (Oates, 1991). Oates explains that the federal government's role is to oversee allocation of resources and provide the overall efficient level of the public good, and local governments are responsible for allocating it. Local governments can offer different levels of the public good, which increases efficiency by allowing individuals to sort into jurisdictions according to their preferences (Tiebout, 1956; Oates, 1972). Furthermore, efficiency gains through decentralization are increased by mobility of individuals but still exist without it (Oates, 1999). Decisions at the central level are removed from citizens, and decision-makers face both informational and political constraints that keep them from responding to individual jurisdictions (Oates, 1999). On the other hand, local governments know more about local preferences than the national government (e.g. Hayek, 1945; Oates, 1972; Brueckner, 1999).

Conclusions

Overview This dissertation sought to explain why renewable energy provision remains decentralized in the United States despite large spillovers associated with renewable energy output. The focus on how institutional incentives affect funding choices offers an explanation

as to why good provision may deviate from the optimal outcome suggested by normative economic theory. The approach builds on current literature by considering a legislator's initial choice of funding mechanism for good provision instead of evaluating the optimal outcome. This perspective helps to us to further understand the nuances in public funding decisions. This dissertation also contributes to energy policy studies by focusing on federal involvement in the decentralization of renewable energy in the United States, a perspective not currently considered in the literature. This approach connects the federal government's actions to support decentralized development to subnational efforts to adopt renewable energy in the United States.

Considerations for Future Research

The findings in this dissertation also raise several questions for future research. First, this dissertation focuses on legislators as the key actors in the policymaking process. The perspective considered here was necessary to explore decentralized funding for renewable energy but does not discount the significance of other actors in the policymaking process. Other actors could include the President, interest groups, other legislators, and legislative staff. For example, Hudak (2014) discusses the President's role in influencing the grant distribution process through bureaucratic control. Bordignon et al. (2008) evaluates social welfare under centralization and decentralization after accounting for lobbying interests. Future analyses could consider how the President or lobbyists influences legislators' initial decisions to propose a grant program or by clearly incorporating these actors into the political price variable.

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