



Multilevel innovation policy mix: A closer look at state policies that augment the federal SBIR program



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ABSTRACT

This paper examines nested, multilevel innovation policies paying particular attention to U.S. federal and state small business innovation research programs. With 45 states offering a range of SBIR Outreach and SBIR Match programs specifically designed to enhance the federal SBIR program, such programs provide a useful lens for examining the nature of the multilevel innovation policy mix. The contributions of this article are twofold. First, the article provides theoretical motivation for multilevel innovation policy responses placing emphasis on positive policy responses in which state policies enhance federal policies. Second, the article provides an empirical analysis examining the multilevel factors associated with a state government response that augments the federal SBIR program. The results from this analysis indicate these state policy actions are associated with a confluence of multilevel factors driven not only from top to down federal actions, but also from bottom to up, internal state political and economic factors as well as from lateral pressures from peer states.

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1. The innovation policy mix in multilevel systems

Innovation policy is comprised of multiple layers of public programs and investment made by different jurisdictions with overlapping objectives, diverse mandates and different resource constraints. Taken together, different levels of policies comprise a policy mix that involves significant complementary interactions and interdependencies that requires joint analysis (Flanagan et al., 2011). National innovation policies are designed to spur international economic competitiveness and thereby increase aggregate societal welfare (Kuhlmann, 2001: p.954). Whereas subnational governments, recognizing that the locus on innovative activity occurs at a more concentrated geographic scale, enact policies to build or reinforce existing local innovative capacities and capture greater returns within their jurisdiction. Taken together the rationales, domains and instruments among different administrative units define a multilevel innovation policy mix (Magro & Wilson, 2013: p.1654). The policy mix is not static but represents the agenda-setting outcome of a policymaking process that involves learning and dissemination (Flanagan et al., 2011). The resulting

multilevel policy mix is the product of differing motives, interacting incentives and diffusion. At a time when market fundamentalism guides policy debates, the full impact of multiple layers of the innovation policy mix needs to be understood so that better policy options may be articulated and implemented (Block and Keller, 2009; Schrank and Whitford, 2009).

Federalist systems provide a context to understand the dynamic interaction between different levels of government. Policy actions may be conceptualized as a response to other policies: they are adopted in a pre-existing context and institutional framework that have been shaped by successive policy changes (Uyarra, 2010). Most examinations of the multilevel policy mix focus on the European context (e.g., Uyarra and Flanagan, 2010); however, the U.S. offers an example not only for theoretical development but also for empirical examination. In the context of innovation policy, scholars have overwhelmingly focused attention on federal programs (Keller and Block, 2013; Lerner, 1999; Link and Scott, 2012; Toole and Czarnitzki, 2007; Wallsten, 2000; and others). Yet states are actively engaged with innovation policies (e.g., Berglund and Coburn, 1995; Feldman et al., 2014; Plosila, 2004). This sets the stage for greater theoretical development of the dynamic temporal relationships that define the multilevel policy mix.

This article provides a theoretical framework to consider multilevel innovation policy responses within a federalist system. We consider innovation policy responses within a dynamic context

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highlighting that initiation can originate either from the national or subnational levels to then yield a positive or null policy response. We then develop four archetypes – policy enhancement, policy experimentation, acquiescence and local exceptionalism. To be complete, there is the potential for policy counter-responses where different levels of government aim to play a substitutive role.² For the empirical analysis, we focus on the U.S. context and pay particular attention to policy enhancement, a prominent policy response as U.S. states respond to the greater resources at the federal level.

The U.S. Federal Small Business Innovation Research (SBIR) program³ provides our empirical example of policy enhancement. Established in 1982, the Small Business Administration (SBA) oversees an interagency consortium of 11 federal agencies⁴ that provide competitive extramural R&D funds to small businesses for proof-of-concept, demonstration and commercialization. Since 1984, all but five U.S. states⁵ have introduced programs formally designed to enhance the federal SBIR program. The intentional design of these programs offers an ideal case for examining the most common archetype of multilevel policy responses – specifically, state policies designed to enhance an existing federal policy. From a detailed analysis of state responses to the federal SBIR program, two different types of policy enhancement emerge. The first type offers information and consulting services that complement the federal program, while the second type provides more aggressive financial incentives that augment and extend the existing federal policy. Our analysis reveals that forty-two states have enacted SBIR Outreach programs that complement the federal SBIR program, and 17 states have enacted more aggressive SBIR Match programs to augment funding.⁶

This article provides an empirical analysis to understand the multilevel conditions that motivate state policy responses that become part of the SBIR policy mix. Specifically, we consider a range of top–down, bottom–up and lateral antecedent factors that influence the adoption of the SBIR State Match Phase I (SMP-I) program. This is the most broadly diffuse SBIR Match program and among the more aggressive state policy responses to the federal program.

The article is organized as follows: Section 2 presents a theoretical framework for multilevel innovation policy responses within a federalist system and develops the concept of policy enhancement – state government innovation policy responses that either complement or augment federal policy. Section 3 illustrates the concept of policy enhancement with a discussion of two broad types of U.S. state SBIR programs that have been implemented in response to the federal SBIR program. Section 4 presents the methods and research design to estimate multilevel factors associated with

implementing and maintaining an SMP-I program. Section 5 discusses the empirical results, and Section 6 offers concluding comments and directions for future research.

2. Multilevel innovation policy mix

Drawing from economic policy debates, [Flanagan et al. \(2011\)](#) place attention on the policy mix, highlighting the activity between different governance levels. Importantly, this offers a clearer framework not only for understanding the public sector's complex and myriad roles but also for discerning how public policy goals are realized ([Flanagan et al., 2011](#): p.702). Multiple levels of governments have vested interests in innovation policy to strengthen the competitiveness of the economy (or selected sectors of an economy) and to increase societal welfare ([Kuhlmann, 2001](#): p.954).⁷ Considerable attention has focused on the evolution of objectives and the variety of instruments used in national innovation policy ([Dosi and Nelson, 2010](#); [Mytelka and Smith, 2002](#)). However, the spatial concentration of the benefits of innovative activity offers strong incentives for subnational innovation policies ([Jenkins et al., 2008](#)). Importantly, policies interact at the regional level; and outcomes are commonly experienced in local jurisdictions ([Uyarra and Flanagan, 2010](#)). Nevertheless, less is known about motivations for the adoption of innovation policies between different jurisdictions or governance levels that comprise a policy mix.

Policy implemented at one level of government may induce a response from other levels of government. While the literature has considered national systems of innovation ([Fagerberg et al., 2006](#)) and regional or subnational systems of innovation ([Asheim et al., 2011](#)), [Uyarra and Flanagan \(2010](#): p.683) find a tendency to overestimate the homogeneity among different levels and argue the need to compare roles. Most of the time, the national level is the highest level of jurisdiction with the greatest command of resources and ability to direct broad agendas.⁸ Subnational levels comprise smaller geographic jurisdictions and are in touch with local conditions, yet they have fewer resources. The shared imperative of bolstering economic activity among these innovation-based policies ties these multiple systems together into a policy mix. As [Brickman \(1979\)](#) notes this policy coordination is varied, ranging from national, top–down or vertical to bottom–up or horizontal. Where they vary are in terms of their capacity and approach; nevertheless, they share a common directive. Depending on the circumstances and context, actions from one level may solicit positive or null responses from other levels. Taken together these interactions form the policy mix.

We conceptualize this phenomenon broadly by considering policy actions in subsequent stages within a federalist framework: initiated by a jurisdiction at one level and followed by a response from another jurisdiction at either a different level or at the same level of government. Within a multilevel governance structure, initiation can originate either from national or subnational levels to then yield a positive or null policy response. A simple 2 × 2 matrix presents four archetypes: policy enhancement, policy experimentation, acquiescence and local exceptionalism (see [Fig. 1](#)). Policy enhancement occurs when innovation policy is initiated at the national level and yields a positive policy response; policy experimentation occurs when the policy is initiated at the subnational level and yields a positive policy response; acquiescence occurs when the policy is initiated at the national level yet yields a null policy response; and local

² We focus on the four archetypes – policy enhancement, policy experimentation, acquiescence and local exceptionalism in this article. Future research could explore counter-responses, such as current state efforts to dismantle federal policies.

³ Although the SBIR and STTR (small business technology transfer) share similarities, this article focuses on the former, which does not include the additional requirements of university collaboration.

⁴ The 11 federal agencies that participate in the SBIR program include: Department of Agriculture, Department of Commerce (National Oceanic and Atmospheric Administration and National Institutes of Standards and Technology), Department of Defense, Department of Education, Department of Energy, Department of Health and Human Services, Department of Homeland Security, Department of Transportation, Environmental Protection Agency, National Aeronautics and Space Administration, and National Science Foundation.

⁵ These include Colorado, Nevada, New Mexico, Rhode Island, and Texas.

⁶ This classification is the result of a careful study of the range of state programs designed to complement the federal SBIR program. Our data collection methods are recorded in the [Appendix](#) to encourage replication, and information on SBIR Outreach and SBIR Match programs are detailed for transparency. Despite the growing importance of state innovation policy and R&D funding, there is surprisingly little reliable, centralized documentation of these policies. [Tables 2 and 3](#) present the list of state policy responses; detailed information on these programs is available upon request from the authors.

⁷ [Paraskevopoulou \(2012: 1058\)](#) provide an overview and review of the intellectual development of the concept of innovation policy.

⁸ This is most prominent in the U.S. context; however, the distribution of power is more varied in the E.U. context.

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