

The Pennsylvania State University
The Graduate School
School of Public Affairs

**CENTRAL AND LOCAL GOVERNMENTAL FISCAL BEHAVIOR
UNDER FISCAL FEDERALISM—AN ANALYSIS WITH ASYMMETRIC
SETTING**

A Thesis in
School of Public Affairs
by
Yan Hao

© 2023 Yan Hao

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

June 2023

The thesis of Yan Hao was reviewed and approved* by the following:

Odd Stalebrink

Associate Professor of Public Administration

Thesis Advisor

Chair of Committee

Younhee Kim

Associate Professor of Public Administration

Dissertation Committee Member

Daniel J. Mallinson

Associate Professor of Public Administration

Dissertation Committee Member

David Argente

Assistant Professor of Economics

Dissertation Committee Member

*Signatures are on file in the Graduate School.

Abstract

How central government and subnational government share funding and administrative responsibilities has always been a topical and difficult issue for most sovereign states in public administration and public finance area. Introduced by the German-born American economist Musgrave [1], fiscal federalism has been massively investigated as a general framework to deal with the issue of funding and responsibilities in both the unitary and federal systems. The field of fiscal federalism studies how to divide responsibilities (including finances) between central and subnational governments to supply public goods and services with economic efficiency and achieve various public policy objectives. Determining the optimal division of responsibilities is difficult because of varying subjective views about what the role of government should be. As a result, fiscal federalism research generally renders no judgment on the proper level of total government intervention or what types of services governments should provide. The research focuses instead on how responsibilities are assigned across multiple layers of government once policymakers have decided to implement a given policy, and what trade-offs may be involved in administering it.

In this paper, I analyzed the framework of fiscal federalism by separately investigating four questions in terms of both central and subnational level governments. By analyzing the theoretical design and practical situation, I generate a overall understanding about the general fiscal federalism setting, explained the gap between theoretical design and actual administration process theoretically and empirically tested if the theoretical inference is reliable. TO be more specific, by comparatively analyzing the fiscal structure design and administrative reality in United States and China, I investigated the role of political intention in causing the difference, and explained theoretically why the administrative reality and theoretical design are different in both countries under the asymmetric setting using game theory tools. Besides, I also did some empirical test to statistically support some of the theoretical inference.

Key words: fiscal federalism, asymmetric game theory analysis, comparative study

Table of Contents

| | |
|---|-----------|
| List of Figures | vi |
| List of Tables | vii |
| List of Symbols | viii |
| Acknowledgments | x |
| Chapter 1 | |
| Introduction | 1 |
| 1.1 About Fiscal Federalism | 1 |
| 1.1.1 Fiscal Federalism Structure in America | 2 |
| 1.1.1.1 Revenue and Responsibilities of different levels governments | 2 |
| 1.1.1.2 Intergovernmental Transfer in America | 5 |
| 1.1.2 Introduction of the Structure in the Following Chapters | 6 |
| Chapter 2 | |
| Questions on the Central Level | 8 |
| 2.1 How to Evaluate the Fiscal Federalism System | 9 |
| 2.1.1 First-Generation Theory of Fiscal Federalism | 9 |
| 2.1.2 Second-Generation Theory of Fiscal Federalism | 11 |
| 2.2 How Intergovernmental Transfer Decision is Actually Made | 13 |
| 2.2.1 Game Theory Modeling of Bargaining Process | 13 |
| 2.2.2 Some Empirical Evidence for the Grants Distribution | 15 |
| 2.3 An Empirical Investigation on IGT Distribution Mechanism | 16 |
| 2.3.1 Sample and Characteristic Selection | 17 |
| 2.3.2 Principle Components Analysis of Social and Economic Charac- | |
| teristics | 18 |
| 2.3.3 Political Impact Investigation | 19 |
| Chapter 3 | |
| Questions on the local level | 21 |
| 3.1 | 21 |
| 3.2 | 21 |

| | |
|--|-----------|
| Chapter 4 | |
| What is the Actual Decision Making Process in the Central Government | 22 |
| 4.1 The Actual Decision-making Process of Intergovernmental Transfer in America | 22 |
| Chapter 5 | |
| What is the Effect of Fiscal Policy on Local Government | 23 |
| 5.1 How to Explain the Fly Paper Effect | 23 |
| 5.2 What May be the Impact on the Supply of Public Goods of Local Government | 23 |
| Chapter 6 | |
| How to Explain the Difference between the Asymmetric Behavior between central and local government. | 24 |
| 6.1 How to Explain the Fly Paper Effect | 24 |
| 6.2 What May be the Impact on the Supply of Public Goods of Local Government | 24 |
| Appendix A | |
| Supportive Data and Figures | 25 |
| A.1 Data | 25 |
| A.2 Figures | 25 |
| Appendix B | |
| Results | 26 |
| B.1 Introduction | 26 |
| B.2 More Declaration | 26 |
| Appendix C | |
| Title of the Third Appendix | 28 |
| C.1 Introduction | 28 |
| C.2 More Declaration | 28 |
| Appendix D | |
| Title of the Fourth Appendix | 30 |
| D.1 Introduction | 30 |
| D.2 More Declaration | 30 |
| Appendix E | |
| Title of the Fifth Appendix | 32 |
| E.1 Introduction | 32 |
| Bibliography | 33 |

List of Figures

| | | |
|-----|---|----|
| 1.1 | Fiscal Federalism Structure | 2 |
| 1.2 | Source of Revenue for Multiple Level of Governments in 2019 | 3 |
| 1.3 | Source of Revenue for Multiple Level of Governments in 2019 | 4 |
| 1.4 | Venn graph on public goods and services supplying | 4 |
| 2.1 | How to evaluate the fiscal federalism | 13 |
| 2.2 | Social Characteristics Principle components Analysis | 19 |
| A.1 | Fluctuation of Revenue Structure | 25 |

List of Tables

| | | |
|-----|--|----|
| 1.1 | Divide Grants by level of Restriction Attached | 5 |
| 1.2 | Divide Grants by Form of Administrative Procedure | 6 |
| 1.3 | General Setting of the Questions in Fiscal Federalism Analysis | 7 |
| 2.1 | Effective Tax Revenue in America | 9 |
| 2.2 | States Sample and Grouping | 17 |
| 2.3 | Social characteristics for Sample States | 18 |

List of Symbols

- α The first greek letter, p. ??
- α The first greek letter, p. ??
- α The first greek letter, but we should really add some more text, though we need it to go on two lines, p. ??
- α The first greek letter, p. ??
- α The first greek letter, p. ??
- α The first greek letter, p. ??
- α The first greek letter, p. ??
- α The first greek letter, p. ??
- α The first greek letter, p. ??
- α The first greek letter, p. ??
- α The first greek letter, p. ??
- α The first greek letter, p. ??
- α The first greek letter, p. ??
- α The first greek letter, p. ??
- α The first greek letter, p. ??
- α The first greek letter, p. ??
- α The first greek letter, p. ??
- α The first greek letter, p. ??
- α The first greek letter, p. ??

α The first greek letter, p. ??

α The first greek letter, p. ??

α The first greek letter, p. ??

α The first greek letter, p. ??

α The first greek letter, p. ??

Acknowledgments

Chapter 1 | Introduction

1.1 About Fiscal Federalism

The field of fiscal federalism studies how to divide responsibilities (including finances) among federal, state, and local governments to improve economic efficiency and achieve various public policy objectives. Determining the optimal division of responsibilities and funding is difficult because of varying subjective views about what the role of government should be. As a result, fiscal federalism research generally renders no judgment on the proper level of total government intervention or what types of services governments should provide. The research focuses instead on how responsibilities are assigned across multiple layers of government once policymakers have decided to implement a given policy, and what trade-offs may be involved in administering it. To be more specific, Central and local governments have their own way to generate revenue and supply public goods and services separately. Besides, central government compensate the low income subnational government by doing transfer payments, which is so called intergovernmental transfer, so local governments especially the low-income local government still got the ability to supply the necessary public goods and services. To summarize, central and local governments got the ability to collect the revenue so to supply the necessary public goods and services with the consideration to achieve the political intention. Depend on the general fiscal federalism setting, I'll give an overall view of the fiscal federalism structure in the rest of this chapter. Three key points are vital for the understanding: the revenue source for different levels of government, the public service responsibilities, and the financial connection between central and subnational governments, as is shown in Figure 1.1

For the following part of this chapter, I'll give a basic introduction about the fiscal federalism structure in USA, to be more specific, I'll describe the revenue and responsi-

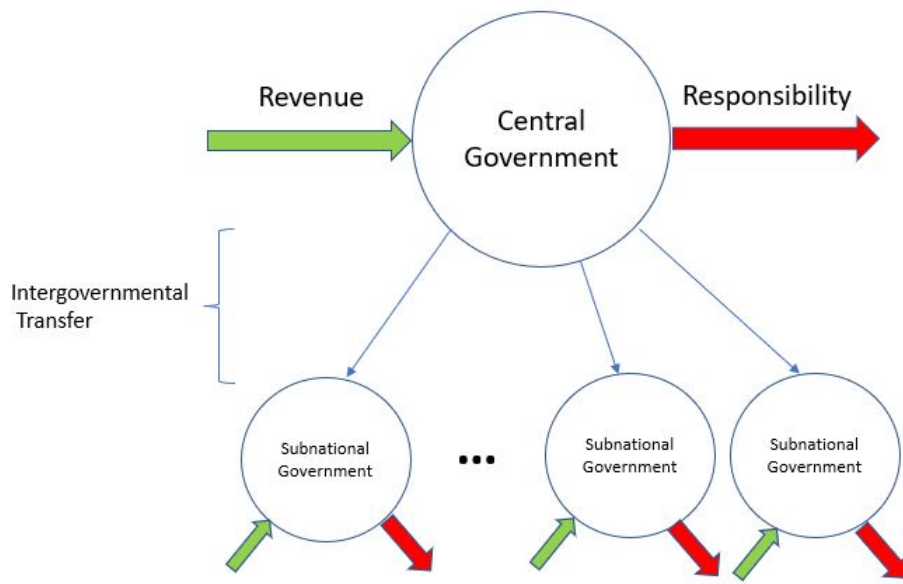


Figure 1.1: Fiscal Federalism Structure

bilities of different levels of governments, and the intergovernmental transfer between different levels of governments.

1.1.1 Fiscal Federalism Structure in America

1.1.1.1 Revenue and Responsibilities of different levels governments

The United States constitution stipulated that states keep the remaining rights, which means except for the clear defined rights that federal government have, states government keep the undefined rights. Besides, the constitution set no instruction about the responsibilities between state and local governments. This feature combined with the fact that America is a huge country with rich diversity lead to an interesting administrative fact: the responsibilities of state governments in each states are not identical. Within each states, the local governments form up their responsibilities based on the actual needs, thus the local governments are not identical neither. Thus the follow introduction are not describing the administrative reality precisely, but are introducing the general structure.

Under current fiscal federalism system in America, federal, state and local governments rely on different source of income, have different function in supplying the public good and

federal government reimburse the state and local government through intergovernmental transfer. On revenue side, from the breakdown of the source of revenue of fiscal year 2019, 50% of the federal revenue comes from the individual income tax, 7% from corporate income tax, 36% is social insurance or payroll tax. On the other hand, on state and local level, intergovernmental transfer accounts for more than 30 percent on average, followed by sales taxes and property tax.

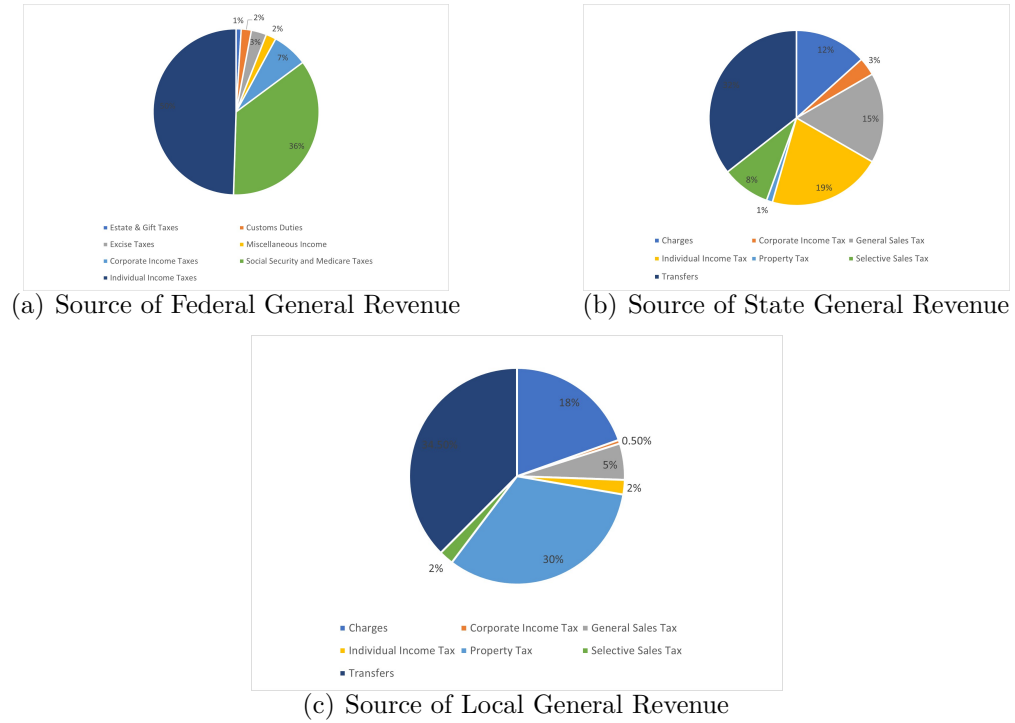


Figure 1.2: Source of Revenue for Multiple Level of Governments. Data Source: The Department of the Treasury and the Bureau of the Fiscal Service

On the expenditure side, federal, state and local government functions differently in supplying public goods and services. Filtered out the public-goods-unrelated expenditure such as interest from debt, federal government is paying for income security, social security, health, national defense, highways and infrastructure, medic care, social services such as education, training and employment. Similarly, if filtered out the expenditure which are unrelated to the public goods and services in state and local governments, the left parts include public welfare, elementary and secondary education, higher education, health and hospitals, highways and roads, police, courts, housing and community development.

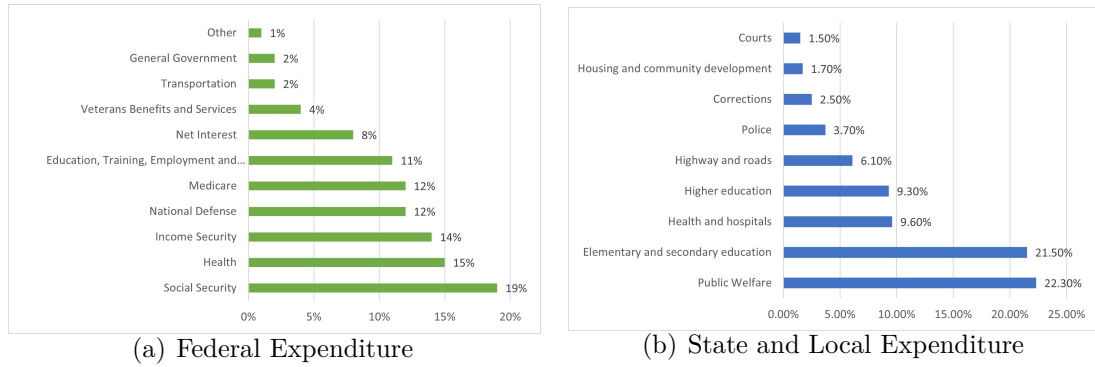


Figure 1.3: Source of Revenue for Multiple Level of Governments. Data Source: The Department of the Treasury and the Bureau of the Fiscal Service

Though The revenue and expenditure structure of federal, state and local government are relatively stable. Figure 1.3 shows a cross-sectional data of 2019. A time series fluctuation is presented in Figure A.1 attached in Appendix A. Information in Figure A.1 shows that it's not a big deal to capture the revenue structure by just breakdown the data in one year.

Federal, state and local government has their unique function in supplying public goods, for example, the federal government is supplying national defense exclusively, while state and local government is the sole supplier in police, courts, housing and community development. Meanwhile, some of the areas are overlapped by both layers of governments, such as public welfare, education, health, highway and infrastructure construction.

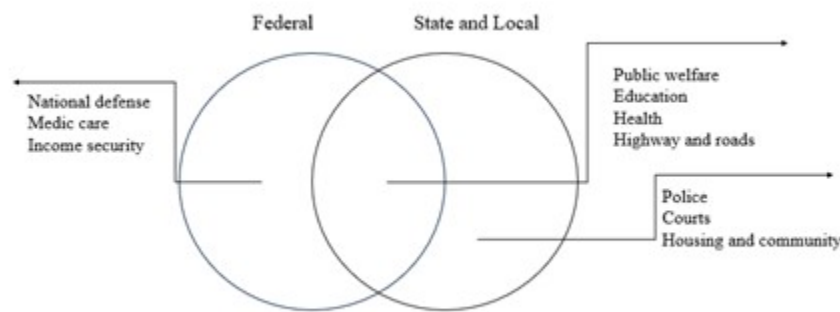


Figure 1.4: Venn graph on public goods and services supplying by federal, states and local government

1.1.1.2 Intergovernmental Transfer in America

In the US fiscal federal system, the Federal government imposes significant influence on state and local fiscal decision making through various grants-in-aids programs (GIA) or intergovernmental transfer(IGT). Annually, these programs amounts to nearly \$700 billion, or close to 20 percent of overall federal revenues [2]. Grounded in fiscal federalism, these programs, are guided by the idea that the allocation of publicly funded goods and services should be the responsibility of state and local governments, due to their closer proximity to the constituents. The sought for advantages of such division include: reduced costs associated with planning and administration, the ability to account for spatial differences, and increased opportunities for citizens to influence political decision-making [3]. IGT from federal government help to narrow the gap between revenue and expenditure of state and local government, encourage the supply of specific public goods and promote the horizontal equity among states

Generally, grants-in-aids programs in the US federal fiscal system, can be categorized across two dimensions including the level of restrictions that are attached to the awards, and the administrative procedures that govern the award process. In terms of restrictions, GIAs can be organized into categorical grants, block grants and general revenue sharing grants. Categorical grants include formula categorical grants, open-ended reimbursement categorical grants and project categorical grants. Project categorical grants are awarded with relatively strict set of activities that are attached to a specific purpose. Block grants are awarded to fund specific programs, but carry relatively few restrictions. The main difference is that block grants do not attach a specific purpose to how recipients spend the award. General revenue sharing grants carries the least amount of restrictions. In brief, these awards can be spent for any purpose, as long as it is not prohibited by federal or state law. According to the Congressional Research Service report [2], there are about 600 grant-in-aid programs, and categorical grants account for about 95 percent of the programs and more than 80 percent of total grant outlays.

Table 1.1: Divide Grants by level of Restriction Attached

| Level of Restriction | | |
|---------------------------|--------------------|---------------------------|
| Low Restriction | Medium Restriction | High Restriction |
| Formula Categorical Grant | Block Grant | Project Categorical Grant |
| Open-ended Reimbursement | | |
| General Revenue Sharing | | |

In terms of the administrative procedures that govern the awards, the grants can be categorized into three categories including projects grants or competitive grants, formula grants/formula-project grants, and Reimbursement grants. For competitive grants, states should apply by submitting a request and get the grants through a competitive process. They are intended to improve the efficiency of funding allocation by encouraging grantees to seek funds for well-planned and exemplary projects. Formula grants are distributed to states through mathematical formulas decided by social characters within the jurisdiction. Typically the factors in the formula depends on the intention of the grants, and common factors may include population, poverty level, income per capita, unemployment rate, enrollment in public schools, etc. Finally, reimbursement grants awards state and local governments in the form of a reimbursement for a specific percentage of state and local spending on a program. The reimbursement amount does not carry a specific limit. Reimbursement grants could be divided into open and closed ended reimbursement grants. The matching mechanism in reimbursement grants is a very intriguing consideration in public economic literature when evaluating the distortion effect. For matching grants, federal governments will reimburse a specific ratio for each 1 dollar of state and local expenditure. Based on whether federal government set a cap on the matching grants, matching grants can be divided into open-ended matching grants and closed-ended grants.

Table 1.2: Divide Grants by Form of Administrative Procedure

| Form of Administrative Procedure | | |
|----------------------------------|--|---------------------------|
| Submitting Request | By Formula | Reimbursement |
| Competitive Grants | Formula grants Formula-project grants | Project Categorical Grant |

1.1.2 Introduction of the Structure in the Following Chapters

The goal of this paper is to systematically describe the fiscal federalism structure, explain some of the fiscal phenomenon in the administrative process on the theoretical level using some game theory tool and empirically test the theory I brought up, especially in America. I form the paper by asking and trying to answer a series of questions. The general questions in this research can be divided into theoretical questions and practical questions. Theoretical questions are asking what an ideal framework should be, and practical questions are asking what the actual situation is and I will try to explain the gap between the theoretical design and actual administrative reality. Besides, at least

two layers of governments exists in fiscal federalism structure, so by asking theoretical questions and practical questions in two layers of government, I can generate a 2×2 table shown in Table 1.3.

Table 1.3: General Setting of the Questions in Fiscal Federalism Analysis

| | Layers of Governments | |
|----------------------------------|--|---|
| | Central | Local |
| Theoretical Questions (ought) | 1.What an ideal fiscal structural should be? | 2.What is the optimal reaction for the fiscal policy from central government? |
| Practical Questions (is) | 3. What is the actual decision making process in the central government? | 4.What is the effect of fiscal policy on local government? |

Questions about central government, which are questions on the left side in Table 1.3 will be investigated in chapter 2, in which I will talk about how to evaluate a revenue and responsibilities combination under a fiscal federalism setting, how a intergovernmental transfer decision is made. Questions about local government on the right side are included in chapter 3, in which I'll talk about the reaction of local government when they receive the intergovernmental transfer. Besides, in chapter 3, I'll try to explain subnational governments' behavior using some game theory tool under the asymmetric setting. In chapter 4, I'll try to find some empirical evidence of the theory inference I generated in chapter 3.

Chapter 2 | Questions on the Central Level

Fiscal federalism is one typical form of fiscal decentralized structure. One consensus among economist and public administrative researchers is that decentralized fiscal structure is obviously more efficient in public goods and services supplying especially in those large and complex country with multiple level of administrative institutions. Hayek [4] states that the local government has significant advantages in knowing the information and supply proper kinds and amounts of public goods and services. Hayek's points is the starting points of the research in the advantage of fiscal federalism. Stiliger [5] followed Hayek's understanding and analyzed the necessity of intermediate and local government especially the necessity of protect the funding ability of those subnational governments. Tiebout [6] proved theoretically that voting on feat mechanism could promise the matching between public goods supply and needs. Besides, by introducing the competition rule of local governments into public area, Tiebout also proved that the decentralized structure is a promising tool in improving the administrative efficiency. Tiebout's theory seems get supported by the actual data showed in Table 2.1, which potentially reflects the difference of tax burden preference of different states. So for the following part, I'll only talk about the evaluation of decentralized fiscal structure, to be more specific, fiscal federalism.

Table 2.1: Effective Tax Revenue in America

| State | State and Local Taxes (\$ billions) | Personal Income (\$ billions) | Effective Tax Rate |
|----------------------|-------------------------------------|-------------------------------|--------------------|
| New York | 177.8 | 1,281.10 | 13.90% |
| District of Columbia | 7.5 | 55.5 | 13.40% |
| North Dakota | 5 | 39.5 | 12.70% |
| Hawaii | 9.5 | 75.4 | 12.60% |
| Vermont | 3.8 | 32.6 | 11.70% |
| United States Total | 1,652.80 | 16,820.30 | 9.80% |
| Alabama | 16.4 | 198.9 | 8.30% |
| Oklahoma | 13.9 | 174.4 | 8.00% |

Source: U.S. Census Bureau Dataset

2.1 How to Evaluate the Fiscal Federalism System

Even within the topic of fiscal federalism, the fiscal federalism structures in different countries have different content and features, needless to say, they show different impact in public goods and services supplying. Like I mentioned in Chapter 1, it's hard and nearly impossible to find a perfect stick yard criterion to compare fiscal federalism in different countries. I'll try to explain and get a comprehensive way to evaluate fiscal federalism. Literature about fiscal federalism can be roughly divided into two groups. First-generation theory of fiscal federalism concentrate on the fiscal structure itself, focusing on the efficiency of federalism in collecting revenue and offering responsibilities, and whether the revenue-responsibility combination perform well in public goods supply. Coming to second-generation theory of fiscal federalism, scholars get interested in the effect of fiscal federalism on other area such as the effect on economic development.

2.1.1 First-Generation Theory of Fiscal Federalism

One popular aspect to estimate if the fiscal structure is reasonable is to evaluate the fiscal structure economically. In another word, to estimate if the combination of funding and responsibilities meet Pareto efficiency, which happens when resources are so allocated that it is not possible to make anyone better off without making someone else worse

off [7]. This is also the most common understanding widely accepted by both economic and public administrative researcher. Under economic view, three directions are helpful in estimating the fiscal structure, including externality, information complexity and incentive compatibility. Firstly, about externality, an ideal setting is to initialize the externality as much as possible for both positive and negative externality. Oates' [8] work on fiscal federalism is a milestone for modern fiscal federalism research, one principle he mentioned in his work is that government and the residents living in the jurisdiction should pay for their negative externality and get paid for positive externality. Olson [9] states that the "free rider" issue could be overcome by making the jurisdiction and the beneficiary area identical, besides, the equilibrium under this setting could make marginal cost equal to marginal benefits. The externality evaluation is obviously an efficiency consideration.

Secondly, information complexity in administration process is also an important consideration in evaluating the fiscal federalism structure. Except for the earlier job represented by Hayek and Tiebout, Besley et al [10] set up a political economy model to simulate the decision making process in a democratic country, in their model they introduced insensitivity of central government into their model and emphasized the advantage of local government in public goods supplying. Besides, the information communication is mutual. For one, local governments know local residents' needs better, besides, local governments' behavior could be better perceived by local residents. Dethier [11] mentioned that the decentralized structure of fiscal federalism put the local government under supervision. Based on Dethier's idea and Tiebout's voting on feet framework, Baicker [12] set up a horizontal competition structure, he introduced multiple local governments and states that under yardstick competition framework, decentralized fiscal structure will help local residents get a direct evaluation about local governments' efficiency in public goods supply, thus help them easier to "vote on feet". Local governments should get pushed by this information transparency.

Finally, a good fiscal structure should have incentive compatibility. Incentive compatibility is a game theory analysis tool introduced by Leonid Hurwicz [13] widely used by business management area at first. A mechanism is called incentive-compatible (IC) if every participant can achieve the best outcome to themselves just by acting according to their true preferences. Incentive compatibility was introduced into public administration and public economics area and became an important criterion to evaluate the quality of fiscal federalism. Local governments could be motivated to supply proper amount and quantity public goods with efficiency under proper fiscal federalism setting. Eckstein [14]

points out that the proper combination between funding resource and responsibilities could be a great motivation for any kinds of organizations. Under Eckstin's setting, at least in democratic country, working hard with efficiency in public goods supplying is an weakly dominate strategy since that will attract more residents and increase more public funding resource. Another clue is that for most of the scholars, when they investigate the related topic and talk about governmental fiscal behavior, while the central government's goal is hard to define, by default they just assume the local government's target is to maximize the local fiscal revenue(Baretti, Bucovetsky,Dahlby,Jha) [15–18].

The main theme of the first-generation theory of fiscal federalism is to approve the positive effect of this decentralized structure, confirm the positive effect in public goods supplying. The main investigation is to evaluate the role of fiscal federalism in the public goods efficiency. Most of literature in this period is theoretical investigation.

2.1.2 Second-Generation Theory of Fiscal Federalism

When it comes to the second-generation theories, scholars do not merely stare at the efficiency of fiscal federalism in public goods supplying. For further step, they start to notice the relationship between fiscal federalism and other social area, such as economic development [19, 20], local government behavior [21], etc. One obvious change is that, second-generation theory researchers, though still admit the fundamental effect that fiscal federalism played in public goods supply, start to emphasize that fiscal federalism may not always works perfectly especially in developing countries [22–25]. I summarized the second-generation fiscal federalism literature and divide all these literatures into three categories, which are relationships with economic development, political intention, and effect on local governmental fiscal behavior.

The investigation about the relationship between fiscal federalism and economic development also inspired by Charls Tiebout [6]. Though Tiebout's theory has been supported by huge amounts of econometric evidence, his theory is obviously inspired by American fiscal structure. Most of the assumptions in Tiebout's setting are hard to achieve especially in developing countries. Since Tiebout just assume local governments have the ability to supply public goods with proper efficiency. Based on that assumption, he answered how to match the preference from the residents with the ability of the local government. Some second-generation theory literatures tried to open the black-box in Tiebout's assumptions. Some researchers noticed the role of production factors in fiscal federalism setting. A lot of econometric evidence that even in developed countries such as european union, the residents within one country are not moving totally freely,

needless to say the movement across different countries [26]. Even for the residents who moved across different jurisdiction, the performance in public goods supply is not their main concern according to Faguet's survey [27]. Except for the population movement, capital is also an interesting factor in fiscal federalism. McKinnon [28] attributes the economic boost in southern United States to the low factor cost including capital, labor and land. He then did a follow up research claiming that the compensation and equalization effect of transfer payment in fiscal federalism system may block the flow of production factors. Cai and Treisman [19] proved that with initial difference in resource endowment, the decentralized feature of fiscal federalism may lead to local governments' sturdiness in economic development since the moving of capital seems surely lead to development imbalance, the imbalance between different jurisdictions will destroy the enthusiasm of local governments. Based on research related to resource endowment imbalance, Treisman [23] took one step further, he emphasized that local government of the jurisdiction with low resource endowment tend to spend more on decreasing poverty instead of the target related to economic development efficiency.

Second-generation theory scholars noticed the effect of fiscal federalism on local governmental behavior, such as the effect of intergovernmental transfer on local government's tax collecting effort [29], the effect of intergovernmental transfer on local governments' spending structure [30], relationship between fiscal federalism and local government debt [31] etc. The effect of fiscal federalism on local governmental's behavior will be analyzed in the asymmetric setting in Chapter 3.

Except for merely economic consideration, another consideration is political intention. Though not so popular, political factor explains a lot of fiscal federalism design that can hardly be explained by economic and efficiency theory. Fiscal federalism in Canada plays an important role in equalization across different jurisdiction, thus this fiscal system is like the glue for the political federalism, similar econometric evidence can be found in Australia [32]. However, the fiscal federalism in Italy shows a different look, the transfer payment mechanism from high fiscal revenue area to low revenue area exacerbate the conflict between different jurisdiction.

To summarize, as is shown in Figure 2.1, initial research about fiscal federalism designed a theoretical ideal framework to supply public goods efficiently. In developed countries especially in America, scholars did find some empirical evidence to support the benefits of this decentralized fiscal structure. However in developing countries, the fiscal federalism didn't work out perfectly, this administrative fact inspired the second-generation theory, scholars start to focus on the other side of the coin.

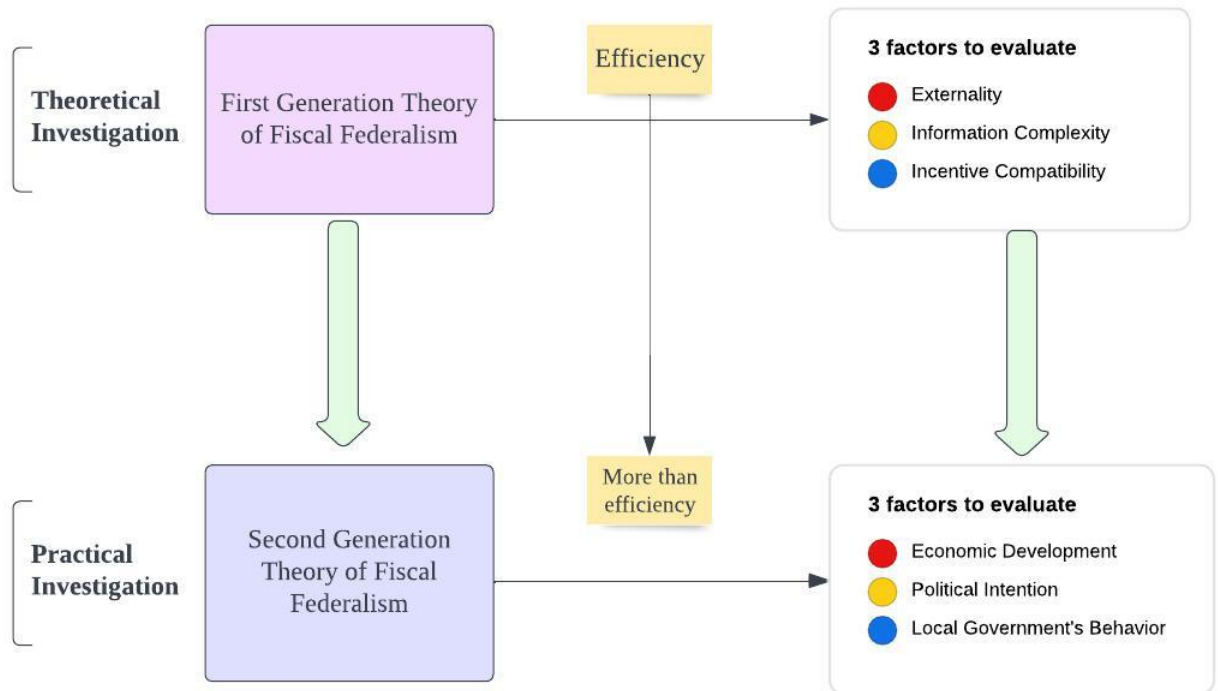


Figure 2.1: How to evaluate the fiscal federalism

Except for the combination of revenue and responsibilities within each jurisdiction, the interaction between governments is also an intriguing topic for fiscal federalism researchers. The interaction between governments can be divided into horizontal interaction which means the interaction among same level, and vertical interaction which means interaction between central and subnational governments. I'll focus on the vertical interaction in this paper.

2.2 How Intergovernmental Transfer Decision is Actually Made

2.2.1 Game Theory Modeling of Bargaining Process

In America, every year nearly \$700 billion, or nearly 20 percent of overall federal revenues, are allocated toward various state and local government grant programs. The mechanism of intergovernmental transfer distribution has always been an intriguing topic in the public finance area.

The grants distribution decision in democratic countries is viewed as an bargaining game within a specific decision-making group, such as a specific committee, the congress or the house, depends on which group is the decisive institution. For the bargaining models to simulate the grants distribution bargaining, four assumptions are quite important among all the necessary assumptions: recognition rule, voting rule, amendment rule and money-distribution rule. Recognition rule means how to decide who to make the proposal. In another word, the rule to choose an agenda setter. for example most of the literature assume the random recognition rule [33–36], which means n members among the decision making institution have equal probabilities to be chosen to make the initial proposal. Voting rule means the standard to judge if the proposal is passed, common voting rule include majority rule and unanimously voting rule. Amendment rule means the constraints on making amendments, ranging from the closed rule, in which no amendments are allowed, to the open rule, in which any and all (germane) amendments are allowed. Grants-type rule means how grants could be manipulated by decision making institution, for example, some scholars assume the decision making institution can directly decide the number among the receivers, which is referred as "earmarks" or "pork barrel" spending model.

Baron and Ferejohn [37] is the fundamental work for all the following bargaining model analysis. They assume random recognition, majority voting rule and earmarks rule. Baron and Ferejohn [37] and the generalization of their work by Banks and Duggan [38] show that legislators with proposal or agenda-setting power receive a disproportionate share of funding. Another feature of the equilibrium is that funds only go to legislators that vote for the proposal which is the winning coalition, with zero dollar goes outside of the winning coalition. Besides, according to their inference, when the proposal are brought up under closed rule, the winning coalition is minimal, which means members of the winning coalition maximize their benefits.

Though pioneering in this field, in actual political environment, bare amounts of grants are similar to "earmarks", the earmarks assumptions heavily restrict the explanatory power in grants distribution. Martin [39] extends Baron and Ferejohn's model by loosen the earmark assumption. He restrains the power of members in decision making institution by only allowing them to decide the factor of the formula, not decide the number arbitrarily. As mentioned in Chapter 1, this modification in assumption is a big step to the actual political and administration life. Martin gets some different conclusions compared to Baron and Ferejohn, unlike Baron and Ferejohn's model, Martin predicts an oversized winning coalitions, and emergence of persistent winning blocs. Besides, he proved that

when bargaining over a low-dimensional formula (i.e., a formula based on a small number of state characteristics), legislators have relatively little latitude in targeting funds to specific districts, this prediction is supported by some empirical evidence, Martin studied all the existing formula grants and count the number of the factors in the formula, he points out that 95% of the formula have less than 5 variables, which means members have less than 5 dimensions to bargain about, the ability to manipulate the formula is highly limited. Since members can only decide the factors among the formula, inevitably, some jurisdiction with similar features can be a free riders, even if the free riders do not belong to winning coalition, thus Martin predicts positive distribution outside the winning coalition.

2.2.2 Some Empirical Evidence for the Grants Distribution

Except for the general introduction related with intergovernmental transfer in Chapter 1, a challenge with the distribution of IGT is that they take place in a political environments, where individual political agendas have the potential to influence the outcome of IGT allocations in ways that are inconsistent with the intended structure of the distribution procedures. Based on some classic game theory analysis within the congress. Given the important role of GIA in the US federal system, the influence of politics on the allocation of IGT often comes at a high cost. There is plenty of anecdotal examples that illustrates the potential costs, including Robert Carlyle Byrd's spending two decades of his career directing as much federal spending as possible to his home state, saying he wanted to be "West Virginia's billion-dollar industry".

In Markusen, Saxenian and Weiss's [40] descriptive study, they define three distinctive swings in the distribution of federal grants to cities in the 1960s and 1970s during which federal grants grew by a tremendous amount and northeastern and midwestern cities benefit most from 1965-1972, southern and western cities benefits most from 1972-1975, and a slight swing back in favor of the first group from 1975-1978. One possible inference in their article is that the political background may partially explained this swings. Stegarescu [41] explains that the degree of IGT decentralization is a result of population, unemployment, trade-openness, presidential regimes and electoral systems based on the test result of the panel data of 17 nations. Kasdin [42] does an empirical test and mentions that state or local government governmental network complexity is a factor influencing federal transfer amount and federal controlling extent. He finds that higher-level government tends to relinquish some control when lower governmental network is highly complicated, but the amount of the transfer is negatively related

with the complexity. One possible relationship behind this relationship is that high complexity is a barrier hinder politicians to claim the political credit, thus they are less motivated to secure the fiscal revenue for their representative jurisdiction. Larcinese, Rizzo, Testa [43] tested the impact of the president on the amount of federal transfer to state government. They find that state that heavily supported the incumbent president in past presidential elections tend to receive more funds. Wallis [44] also emphasizes the political effect on the amount of intergovernmental transfer. He claims that states with the high volatility of presidential vote receive significantly more federal support based on his study on the longitudinal data of all states in the U.S. Markusen, Saxenian and Weiss [40] defined the supply side and demand side when investigating the mechanism of the IGTs decision-making process, even though they don't point out the specific factors, they emphasize that the IGTs is the result of the political, economic and social characteristics of both demand and supply side.

All these literature seems imply the political factor even some biased factor impact the intergovernmental transfer. To summarize the literature listed above, one implication is that the factor that impact the intergovernmental transfer comes from not only from the legislative decision-making institution, also from administrative branch. Another implication is that political stance of local jurisdiction seems influential in intergovernmental distribution.

2.3 An Empirical Investigation on IGT Distribution Mechanism

Combined with Martin's [39] conclusion introduced in section 2.2.1 and all the literature implying the political impact mentioned above, I design and conduct an longitudinal empirical test to statistically investigate the intergovernmental transfer mechanism. Specifically, I try to solve two questions in this empirical design, for one, following Martin's inference, how much extent does states share similar characteristics so the IGT benefits goes outside of the winning coalition. Another questions I wander is, following Markusen, Saxenian and Weiss's framework, if we got the social and economic characteristics control, how much can political factors affect the IGT. The reason I focus on the political factors is that, contradictory to what we discussed in section 2.1, the political factor seems unrelated to efficiency, thus may cause more distortion and waste of resources. Besides, examination on political factors could be important because of the

sharp rise in hostility between democratic and republican parties. The potential effects of political party control may impact the IGT grants distribution significantly.

2.3.1 Sample and Characteristic Selection

I focus on the direct IGT from federal government to state governments in America. To incorporate the political impact into the data framework, I did a stratified sampling to collect states sample from traditional republican states, traditional democratic states and swing states. The state grouping method are based on two criterion, the historical presidential election result and the winning rate following Beachler,Donald,Bergbower,Matthew etc.'s work [45]. The democratic states and republican states are those chose same party in the president election since 1984 with wining rate over 58%. The swing states are those have chosen president from two parties and the winning rates are less than 58%.

The states collected into my sample can be listed as Table 2.2

Table 2.2: States Sample and Grouping

| States | Group | Code |
|----------------|--------------|------|
| Wyoming | Red States | 0 |
| Idaho | | |
| Kansas | | |
| Nebraska | | |
| North Dakota | | |
| Maryland | Blue States | 1 |
| Massachusetts | | |
| Rhode Island | | |
| New York State | | |
| Washington | | |
| Pennsylvania | Swing States | 2 |
| Nevada | | |
| Wisconsin | | |
| Ohio | | |

The social and economic characteristics that commonly included in the formula when doing the intergovernmental transfer are population, working age population weight, median household income, unemployment rate and road mileage [2]. I collected all factors mentioned in Dilger's service [2] of the sample states, and did proper operation for data regression convenience and better data visualization. The characteristics I collected and source of data can be listed as Table 2.3.

Table 2.3: Social characteristics for Sample States

| Variables | Definition | Operation | Source | Time Period |
|-----------|-------------------------------|--------------------|-------------------------------------|------------------------------------|
| lgp | Population | Log transformation | Census of bureau | 2000-2019 annually collected |
| wapw | Working age population weight | No operation | Census of bureau | 2000-2019 annually collected |
| mhi | State median household income | Log transformation | Census of bureau | 2000-2019 annually collected |
| ur | unemployment rate | No operation | Census of bureau | 2000-2019 annually collected |
| prm | public road mileage | Log transformation | Bureau of transportation statistics | 2000-2019 annually collected |

2.3.2 Principle Components Analysis of Social and Economic Characteristics

As mentioned above, too many factors may exist in the formula that decides the grants distribution. What's even worse, one can distinguish the multicollinearity problem in the variables I collected just by intuition, for example, working age population weight and unemployment rate are strongly related variables, higher population is doomed to occupy more public road. To answer the first question, these two problems are obvious hinder thus it's hard to judge how similar jurisdictions could be in social and economic characteristics directly. So I conduct a primary components analysis to reduce the data dimension and overcome multicollinearity problem to check if the reduced-dimension data are cluster distributed or scattered distributed.

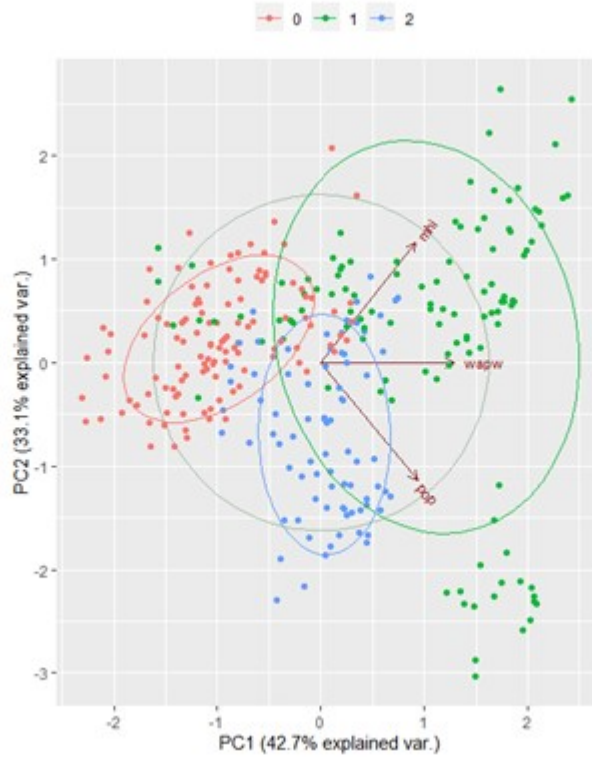


Figure 2.2: Social Characteristics Principle Component Analysis

2.3.3 Political Impact Investigation

The goal of this section is to develop and test a theoretical framework that seeks to further advance the understanding of how the above factor outside of the bargaining institution can affect the spatial distribution of IGT. Toward this end, based on the literature implication I collected in section 2.2.1 and 2.2.2, I explore how combination of party control across legislative and administrative branches affects the distribution of IGT. The factor I'm interested includes whether legislative and administrative branches is unified, whether Democratic or Republican party has different preferences, and whether party control is aligned across the federal and state governments. The general hypothesis proposed is that party control filters into the distribution of IGTs through pressures imposed on administrators from central government officials that are seeking political support in certain states. In addition to party control, we also examine how the perceived importance of a state in the federal political process affects the distribution of IGT. The effects of such pressures becomes visible in several ways, including through party loyalties and that loyalties in the award process who are responsive to. The distribution of IGT is affected by (1) political party distribution across the federal and state government,

and by (2) political party affiliation (i.e., Republican or Democratic party). We also examine how the perceived importance of a state in the federal political process affects the distribution of IGT. In addition, to gain insight into we also examine whether a particular state is considered a battle ground state.

Hypothesis 1–The unified Government Hypothesis

Unified government means the administrative branch and legislative branch on federal level coming from same party. Unified government is likely to spend a higher overall spending scale since the financial powers are less limited.

Hypothesis 2–Party Specific Hypothesis

Democratic and republican parties have different preferences on the IGT scale. The preference on IGT of different parties is fuzzy here, since two possible inference may be reasonable here. In terms of the scale of government, the democratic party prefers a big government, which would lead to a higher-scale IGT, and the republican party holds the opposite idea. In terms of the administrative structure, democratic government tends to establish a centralized government, whereas republican government prefers a decentralized structure. In this way, we can get a opposite conclusion

Hypothesis 3–Alignment Hypothesis

The allocation of the IGT are affected by the political ideology. The federal government is likely to allocate more IGT to states that are controlled by same party.

Hypothesis 4–Battle Ground States Hypothesis The competition level between two parties in state would affect the IGT received by that state government. The federal government is motivated to get elected or reelected; thus, the federal government is willing to put resources and supply more public goods to states that matter a lot for their election to get political credits.

Chapter 3 |

Questions on the local level

This chapter talks about the reaction of subnational governments when they are in the interaction with central government.

3.1

3.2

Chapter 4 |

What is the Actual Decision Making Process in the Central Government

4.1 The Actual Decision-making Process of Intergovernmental Transfer in America

Chapter 5 |

What is the Effect of Fiscal Policy on Local Government

5.1 How to Explain the Fly Paper Effect

5.2 What May be the Impact on the Supply of Public Goods of Local Government

Chapter 6 |

How to Explain the Difference between the Asymmetric Behavior between central and local government.

6.1 How to Explain the Fly Paper Effect

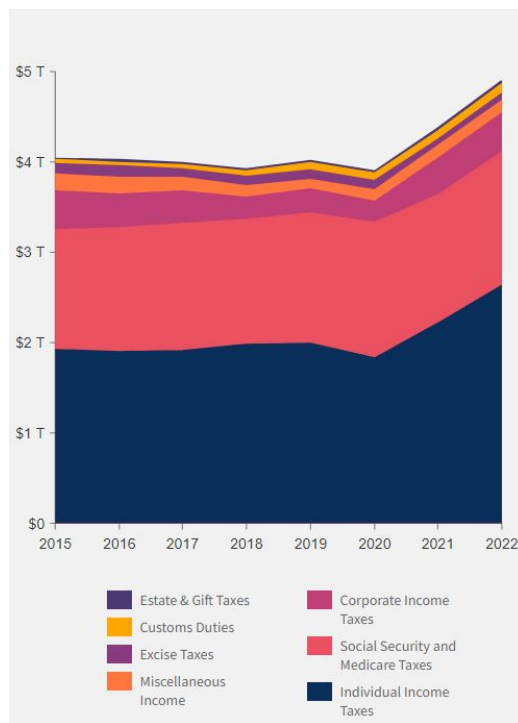
6.2 What May be the Impact on the Supply of Public Goods of Local Government

Appendix A |

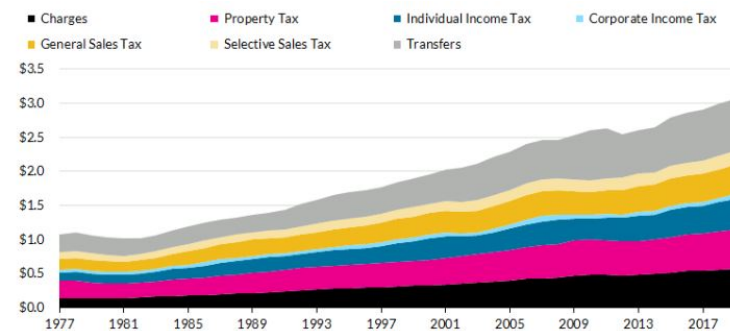
Supportive Data and Figures

A.1 Data

A.2 Figures



(a) Federal Expenditure



(b) State and Local Expenditure

Figure A.1: Fluctuation of Revenue Structure of three level governments. Data Source: US Urban Institute Dataset

Appendix B |

Results

B.1 Introduction

When in the Course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the Laws of Nature and of Nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

B.2 More Declaration

We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness. –That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed, –That whenever any Form of Government becomes destructive of these ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their Safety and Happiness. Prudence, indeed, will dictate that Governments long established should not be changed for light and transient causes; and accordingly all experience hath shewn, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same Object evinces a design to reduce them under absolute Despotism, it is their right, it is their duty, to throw off such Government, and to provide new Guards for their

future security. –Such has been the patient sufferance of these Colonies; and such is now the necessity which constrains them to alter their former Systems of Government. The history of the present King of Great Britain [George III] is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute Tyranny over these States. To prove this, let Facts be submitted to a candid world.

Appendix C |

Title of the Third Appendix

C.1 Introduction

When in the Course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the Laws of Nature and of Nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

C.2 More Declaration

We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness. —That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed, —That whenever any Form of Government becomes destructive of these ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their Safety and Happiness. Prudence, indeed, will dictate that Governments long established should not be changed for light and transient causes; and accordingly all experience hath shewn, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same Object evinces a design to reduce them under absolute Despotism, it is their right, it is their duty, to throw off such Government, and to provide new Guards for their

future security. –Such has been the patient sufferance of these Colonies; and such is now the necessity which constrains them to alter their former Systems of Government. The history of the present King of Great Britain [George III] is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute Tyranny over these States. To prove this, let Facts be submitted to a candid world.

Appendix D |

Title of the Fourth Appendix

D.1 Introduction

When in the Course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the Laws of Nature and of Nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

D.2 More Declaration

We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness. —That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed, —That whenever any Form of Government becomes destructive of these ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their Safety and Happiness. Prudence, indeed, will dictate that Governments long established should not be changed for light and transient causes; and accordingly all experience hath shewn, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same Object evinces a design to reduce them under absolute Despotism, it is their right, it is their duty, to throw off such Government, and to provide new Guards for their

future security. –Such has been the patient sufferance of these Colonies; and such is now the necessity which constrains them to alter their former Systems of Government. The history of the present King of Great Britain [George III] is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute Tyranny over these States. To prove this, let Facts be submitted to a candid world.

Appendix E |

Title of the Fifth Appendix

E.1 Introduction

When in the Course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the Laws of Nature and of Nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

Bibliography

- [1] MUSGRAVE, R. A. (1971) “Economics of fiscal federalism,” *Nebraska Journal of Economics and Business*, pp. 3–13.
- [2] DILGER, R. J. and M. H. CECIRE (2015) *Federal grants to state and local governments: A historical perspective on contemporary issues*, Congressional Research Service.
- [3] MUSGRAVE, R. A. (1997) “Devolution, grants, and fiscal competition,” *Journal of Economic perspectives*, **11**(4), pp. 65–72.
- [4] HAYEK, F. A. (2009) “The use of knowledge in society,” in *Knowledge management and organizational design*, Routledge, pp. 7–15.
- [5] STIGLER, G. J. (1998) “The tenable range of functions of local government,” *International Library of Critical Writings in Economics*, **88**, pp. 3–9.
- [6] TIEBOUT, C. M. (1956) “A pure theory of local expenditures,” *Journal of political economy*, **64**(5), pp. 416–424.
- [7] PARETO, V. (2014) *Manual of political economy: a critical and variorum edition*, OUP Oxford.
- [8] OATES, W. E. ET AL. (1972) “Fiscal federalism,” *Books*.
- [9] OLSON, M. (1993) “Dictatorship, democracy, and development,” *American political science review*, **87**(3), pp. 567–576.
- [10] BESLEY, T. and S. COATE (2003) “Centralized Versus Decentralized Provision of Local Public Goods: A Political Economy Approach,” *Journal of Public Economics*, **87**(12), pp. 2611–2637.
- [11] MARTINEZ-VAZQUEZ, J. and R. M. McNAB (2003) “Fiscal decentralization and economic growth,” *World development*, **31**(9), pp. 1597–1616.
- [12] BAICKER, K. (2005) “The spillover effects of state spending,” *Journal of public economics*, **89**(2-3), pp. 529–544.

- [13] HURWICZ, L. (1973) "The design of mechanisms for resource allocation," *The American Economic Review*, **63**(2), pp. 1–30.
- [14] ECKSTEIN, O. ET AL. (1958) "Water resource development-the economics of project evaluation." *Water resource development-the economics of project evaluation*.
- [15] BARETTI, C., B. HUBER, and K. LICHTBLAU (2002) "A tax on tax revenue: The incentive effects of equalizing transfers: Evidence from Germany," *International Tax and Public Finance*, **9**, pp. 631–649.
- [16] BUCOVETSKY, S. and M. SMART (2006) "The efficiency consequences of local revenue equalization: Tax competition and tax distortions," *Journal of Public Economic Theory*, **8**(1), pp. 119–144.
- [17] DAHLBY, B. (2011) "The marginal cost of public funds and the flypaper effect," *International Tax and Public Finance*, **18**, pp. 304–321.
- [18] JHA, R., M. S. MOHANTY, S. CHATTERJEE, and P. CHITKARA (2000) "Tax efficiency in selected Indian states," in *Advances in public economics*, Springer, pp. 91–104.
- [19] CAI, H. and D. TREISMAN (2005) "Does competition for capital discipline governments? Decentralization, globalization, and public policy," *American Economic Review*, **95**(3), pp. 817–830.
- [20] BARRO, R. J. (1991) "Economic growth in a cross section of countries," *The quarterly journal of economics*, **106**(2), pp. 407–443.
- [21] JIN, H., Y. QIAN, and B. R. WEINGAST (2005) "Regional decentralization and fiscal incentives: Federalism, Chinese style," *Journal of public economics*, **89**(9-10), pp. 1719–1742.
- [22] KEEN, M. and M. MARCHAND (1997) "Fiscal competition and the pattern of public spending," *Journal of public economics*, **66**(1), pp. 33–53.
- [23] TREISMAN, D. (2002) "Decentralization and the Quality of Government," *unpublished paper, Department of Political Science, UCLA*.
- [24] BARDHAN, P. (2002) "Decentralization of governance and development," *Journal of Economic perspectives*, **16**(4), pp. 185–205.
- [25] BUCOVETSKY, S. (2005) "Public input competition," *Journal of Public Economics*, **89**(9-10), pp. 1763–1787.
- [26] OATES, W. E. (2004) "An essay on fiscal federalism," in *Environmental Policy and Fiscal Federalism*, Edward Elgar Publishing, pp. 384–414.

- [27] FAGUET, J.-P. (2004) “Does decentralization increase government responsiveness to local needs?: Evidence from Bolivia,” *Journal of public economics*, **88**(3-4), pp. 867–893.
- [28] MCKINNON, R. I. (1993) *The order of economic liberalization: Financial control in the transition to a market economy*, JHU Press.
- [29] MOGUES, T. and S. BENIN (2012) “Do external grants to district governments discourage own revenue generation? A look at local public finance dynamics in Ghana,” *World Development*, **40**(5), pp. 1054–1067.
- [30] HINES JR, J. R. and R. H. THALER (1995) “Anomalies: The flypaper effect,” *Journal of economic perspectives*, **9**(4), pp. 217–226.
- [31] QIAN, Y. and G. ROLAND (1998) “Federalism and the soft budget constraint,” *American economic review*, pp. 1143–1162.
- [32] OATES, W. E. (2005) “Toward a second-generation theory of fiscal federalism,” *International tax and public finance*, **12**, pp. 349–373.
- [33] KALANDRAKIS, A. (2004) “A three-player dynamic majoritarian bargaining game,” *Journal of Economic Theory*, **116**(2), pp. 294–314.
- [34] ANESI, V. and D. J. SEIDMANN (2015) “Bargaining in standing committees with an endogenous default,” *The Review of Economic Studies*, **82**(3), pp. 825–867.
- [35] DIERMEIER, D. and P. FONG (2011) “Legislative bargaining with reconsideration,” *The Quarterly Journal of Economics*, **126**(2), pp. 947–985.
- [36] ROSENSTIEL, L. (2021) “Congressional Bargaining and the Distribution of Grants,” *Legislative Studies Quarterly*.
- [37] BARON, D. P. and J. A. FEREJOHN (1989) “Bargaining in legislatures,” *American political science review*, **83**(4), pp. 1181–1206.
- [38] BANKS, J. S. and J. DUGGAN (2006) “A general bargaining model of legislative policy-making,” *Quarterly Journal of Political Science*, **1**(1), pp. 49–85.
- [39] MARTIN, G. J. (2018) “Dividing the dollar with formulas,” *The Journal of Politics*, **80**(2), pp. 479–493.
- [40] MARKUSEN, A. R., A. SAXENIAN, and M. A. WEISS (1981) “Who benefits from intergovernmental transfers?” *Publius: The Journal of Federalism*, **11**(1), pp. 5–36.
- [41] STEGARESCU, D. (2006) *Decentralised government in an integrating world: quantitative studies for OECD countries*, vol. 34, Springer Science & Business Media.
- [42] KASDIN, S. (2016) “The Decision to Grant,” *Public Budgeting & Finance*, **36**(1), pp. 68–84.

- [43] LARCINESE, V., L. RIZZO, and C. TESTA (2006) “Allocating the US federal budget to the states: The impact of the president,” *The Journal of Politics*, **68**(2), pp. 447–456.
- [44] WALLIS, J. J. (1987) “Employment, politics, and economic recovery during the Great Depression,” *The Review of Economics and Statistics*, pp. 516–520.
- [45] BEACHLER, D. W., M. L. BERGBOWER, C. COOPER, D. F. DAMORE, B. VAN DOOREN, S. D. FOREMAN, R. D. GILL, H. HENDRIKS, D. HOFFMANN, R. JACOB, ET AL. (2015) *Presidential Swing States: Why Only Ten Matter*, Lexington Books.

Vita

Yan Hao

The details of my childhood are inconsequential.