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THE PUBLIC SECTOR, MIGRATION, AND HETEROGENEITY

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ABSTRACT OF DISSERTATION

Carlos J. Lopes

The Graduate School

University of Kentucky

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THE PUBLIC SECTOR, MIGRATION, AND HETEROGENEITY

ABSTRACT OF DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Business and Economics
at the University of Kentucky

By
Carlos J. Lopes

Lexington, Kentucky

Co-Directors: Dr. John Garen, Professor of Economics
and   Dr. William Hoyt, Professor of Public Policy and Economics

Lexington, Kentucky

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ABSTRACT OF DISSERTATION

THE PUBLIC SECTOR, MIGRATION, AND HETEROGENEITY

Questions on the optimal size of government always provoke intense political debate. At the center of this is the public goods problem, where certain goods and services are "under-provided" by the market due to problems with rivalry and excludability. These goods are usually provided by the public sector and financed through taxes. Questions emerge over the optimal level of provision, as different individuals value these goods differently. This dissertation consists of two studies which address preferences for the size of government from different perspectives.

The first study provides a method that can be used to estimate demand for changes in levels of public provision. Using individual level Census data on migration from 1990 and 2000, I demonstrate how preferences are revealed through migration responses. Though policy convergence precludes the estimation of optimal levels for different demographic groups, I find that balanced-budget increases in education expenditures tend to attract most demographic groups while other expenditures tend to repel most individuals. Young, college educated, relatively high-income individuals tend to be more responsive to, and therefore appear to have higher preference intensity for, fiscal changes.

This is true even when controlling for their increased propensity to migrate. Evidence inconsistent with welfare migration is found, suggesting that policies intended to address the race-to-the-bottom in welfare benefits may be counterproductive. In addition, the ability of the Tiebout migration process to homogenize a jurisdiction is limited by relatively small fiscal changes among jurisdictions and similar migration responses among demographic groups.

The second study empirically explores the effect of ethnic heterogeneity on government size for countries throughout the world. In the developed world, heterogeneity is found to reduce the size of budgetary government, consistent with previous studies and predictions in the literature. In the undeveloped world, however, heterogeneity is found to increase the size of non-budgetary government and may increase the overall size of government.

Carlos J. Lopes

December 8, 2010

THE PUBLIC SECTOR, MIGRATION, AND HETEROGENEITY

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Chapter 1: Introduction

Results from the recent 2010 U.S. congressional elections have generated the largest number of seat changes in the House of Representatives since 1948. While this is the largest recent change, Table 1.1 provides data on US Congressional elections since 1930. This table shows that large swings and changes in power have been relatively common throughout history. In order for such changes to take place, a relatively large portion of the voting population must be dissatisfied with the representatives who they previously voted into office.

There are a number of possible explanations. One possibility is that a myopic voting base changes its preferences depending on the state of the economy (Alesina and Rosenthal, 1995). GDP growth data included in Table 1.1 provides evidence from congressional elections consistent with this idea. GDP growth is negatively correlated with Democratic gains and positively correlated with Republican gains.[1]

A second possibility is that politicians are not responsive to the demands of voters (Besley and Case, 1995; Jacobs and Shapiro, 2000). In the long-run, this could generate a voting base that views elections with apathy and chooses not to participate.

I provide an additional explanation. Voters may be rationally ignorant when deciding which policies to support. Due to high information costs, voters have little incentive to educate themselves about each politician's political platform, especially considering the possibility that candidates may change their position once elected. On the other hand, individuals are more likely to have credible information about, and

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[1] $\rho_d = \begin{matrix} -0.29 \\ (p=0.07) \end{matrix}$, $\rho_r = \begin{matrix} 0.27 \\ (p=0.09) \end{matrix}$

therefore more likely to form a strong opinion about, incumbent politicians and policies that were actually enacted. Ceteris paribus, when faced with two policy options given by two different candidates, voters may find it difficult to form a strong preference for one versus the other. However, voters may find it easier to evaluate the performance of a particular policy after it has been enacted, or a politician who has been in office.

In this sense, voters are less likely to cast a vote for than against a particular policy or politician. Therefore, elections may not necessarily give us an idea of the politicians and policies that voters want, but rather an indication of how strongly voters *do not* want the politicians and policies they already have.

Under the first explanation, election outcomes depend on the state of the economy. Under the other explanations, policies enacted by elected politicians do not necessarily represent the preferences of the voting base. Regardless of the explanation, if voters are consistently dissatisfied with the policy proposals of elected representatives, then election outcomes will provide a questionable estimate of demand for public provision. Alternative methods are likely to provide more efficient indicators of demand for public provision.

Demand Estimation Techniques

A functioning market for true public goods does not exist due to problems with rivalry and excludability. In addition, public provision of private goods crowds out some private transactions in the affected markets.[2] Due to these problems, demand for publicly-provided goods cannot be estimated directly from observed market transactions. As a practical matter, these goods are provided through the political process, and

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2   See Tullock (1969) and Barzel (1969). Barzel (1973) demonstrates this empirically for education.

individuals must attempt to express their preferences through this process. In democracies, this involves supporting the candidate whose platform most closely matches the individual's preferences, though limited information can be inferred from election outcomes.

Ciriacy-Wantrup (1947) suggested that individuals could be directly asked how much they would be willing to pay for additional quantities of the publicly-provided good. This approach became known as the contingent valuation method, and uses surveys to elicit demand for public provision.

Hotelling (1947) suggested another method that estimates demand indirectly by observing transactions involving related goods. Individuals who engage in certain observable behaviors are assumed to have revealed their preference for these related goods. For example, the value of publicly-provided recreational facilities can be estimated by observing transportation expenditures incurred by individuals to reach a park. Methods based on this approach are known as revealed preference methods, since actions taken by individuals are assumed to reveal their demand for goods and services.

This study provides a framework for a revealed preference demand estimation method based on interjurisdictional competition for mobile labor. Tiebout (1956) theorized that under specific conditions, an efficient market-based solution to the public goods problem does exist. Perfectly mobile individuals with full information about policy mixes in a large number of jurisdictions will migrate to the jurisdiction that provides the levels and types of provision they desire. In equilibrium, individuals will sort, and preferences in each jurisdiction will become homogeneous. In reality,

individuals are not perfectly mobile and there are a limited number of jurisdictions. This prevents migration from producing a perfectly efficient outcome. However, this type of migration can still provide information about preferences for public provision.

Under theories of fiscal competition, jurisdictions can compete with one another for these mobile residents because individuals compare their demand for publicly provided goods and services to fiscal policy in different jurisdictions when making these migration decisions. These migration decisions are observable at the individual level. This study uses data on these migration decisions and fiscal policies in competing jurisdictions to estimate demand for publicly provided goods. I argue that migration outcomes are potentially a better indicator of policy preferences than that of election outcomes or survey responses for several reasons.

First, the probability that one vote will have a decisive effect on an election outcome is small. In addition, policy changes are subject to institutional constraints, and the election of a particular politician does not guarantee that a specific policy will change in any particular way. Because the expected benefit from voting is relatively small, rational voters have few reasons to inform themselves about the issues. Similarly, survey respondents have little incentive to truthfully reveal their preferences or collect information. Potential migrants know that they will leave behind the fiscal regime of their initial jurisdiction, and subject themselves to the policies of their destination jurisdiction. Because the costs and benefits of migration are more certain, migrants have greater incentives to research available options.

Secondly, elections and survey responses are unlikely to produce a stable set of

preferences that can be used to guide fiscal policy. Kramer (1973) notes that "a very modest degree of heterogeneity of tastes" can produce Condorcet cycling in multidimensional policy space. Put differently, voters in a majoritarian system may not be able to rationally determine where to spend an additional dollar because there may not be a product that voters would prefer to all others in pairwise contests, especially when there are a wide range of tastes and preferences. This is because preference intensity is usually not addressed by voting systems or surveys. If results indicate that voters prefer education to police protection to anti-poverty programs, but also prefer anti-poverty programs to education, then these responses are of questionable use. We could not use them to decide where to spend the next dollar, or if the next dollar should even be spent. In contrast, migrants consider their preference intensity across all dimensions before making decisions, thus negating the possibility of cycling.

In addition, the platforms of winning political parties do not provide the detailed information needed to construct demand schedules for specific types of public provision. Voters in the US traditionally perceive that the probability they will affect the outcome of an election is greater if they vote for one of the two leading political parties and believe that they must "choose the lesser of two evils." By doing so, voters limit their choices of policy combinations. These individuals may act as "single-issue" voters who cast their vote based on the one policy dimension they feel is most important. It would be difficult to estimate preferences for fiscal policy from election outcomes and exit polls because it would be erroneous to assume that an individual agrees entirely with the platform of the candidate that he or she voted for. Surveys tend to similarly "pigeonhole" responses.

In contrast, migrants have a multitude of potential destinations to choose from. This allows them more options to search for a better match between their preferences and policy outcomes. As all of these jurisdictions have pre-existing policy mixes, migrating to one of them will are guarantee that migrants have some direct control over the policy mix they are exposed to in the short run. For these reasons, migration decisions may be a better indicator of demand for public provision of goods and services. Policies that are most likely to attract mobile residents can be deduced from migration outcomes.

There are some potential shortcomings from using migration. In general, low-income individuals have lower migration rates, and this may make them appear to be more satisfied with public policies than high-income individuals. In reality, it is difficult to determine whether those who did not migrate are satisfied migrants or unsatisfied individuals who face relatively high moving costs. In addition, Tiebout-style migration is thought to be more likely at the local level because information and migration costs are lower. However, both of these costs have been falling over time due to technology and we might expect more interjurisdictional migration at the state level (Rhode and Strumpf, 2003). Also, information on competing jurisdictions may be easier to obtain at the state, rather than local level. In addition, Tax Foundation data from 1902-2001, shown in Table 1.2, suggests that centralization at the state-local level has continued through 2001. This suggests that policies of higher levels of government are becoming more relevant, and state-level Tiebout migration should be more apparent in recent data.

Public Provision, Heterogeneity, and Political Institutions

Tiebout migration cannot provide a completely efficient solution to the public goods problem by matching preferences to policy mixes. It also cannot completely homogenize jurisdictions. In reality, individuals with different preferences will reside in the same jurisdiction. This preference heterogeneity might be expected to affect public provision.

A number of empirical studies have documented an inverse relationship between ethnic heterogeneity and some types of government spending.[3] Many studies attribute this relationship to a relatively efficient transfer of information within tight-knit homogeneous groups that increases both the prevalence of group norms and the costs of violating these norms. Under these "technology" and "strategy selection" mechanisms, individuals are more likely to express preferences closer to the group mean because they are more likely to be aware of and consider group interests when expressing their political opinion, and the penalties for defectors may be considerably greater.[4] It may also be possible that individuals in certain groups genuinely have similar preferences because of shared experiences, and these preferences differ between groups. Under this "preference" mechanism, a diversity of groups will imply a diversity of preferences, and the lack of political consensus may produce lower levels of public provision.[5]

Any observed homogeneity of within-group preferences can be attributed to either actual preferences or the homogenizing effect resulting from the technology or strategy

3   Poterba (1997), Easterly and Levine (1997), Alesina, Baqir and Easterly (1999), LaPorta et al (1999), Tanzi and Schuhknecht (2000).
4   Glaeser et al (2000), Alesina and LaFerrara (2000), Costa and Kahn (2003), Miguel and Gugerty (2005), Habyarimana et al (2007), Lyall (2010).
5   Mueller and Murrell (1986), Alesina and LaFerrara (2000), Alesina and LaFerrara (2005)

selection mechanisms, making it difficult to distinguish between these mechanisms. Experimental methods provide evidence of the technology and strategy mechanisms by demonstrating that individuals will change their behavior depending on their ethnic similarity to other players, but find less evidence of the preference mechanism.

An analysis of migration decisions can provide evidence consistent with the preference mechanism by estimating preferences separately for individuals in different demographic groups. As these individuals are migrants, the bonds between them and their new community may be relatively weak, and may be less aware of or responsive to group norms. Because these individuals can more effectively sever group ties, they also face reduced costs for defecting from group norms.

In democracies, all of these mechanisms have the ability to affect fiscal policy because individuals can express their political views. If individuals in developing nations find themselves subject to a non-democratic government, they may have less political power, and these mechanisms will be less likely to affect policy outcomes. In these cases, the standard relationship between government and heterogeneity may not apply.

In some cases, a positive relationship between heterogeneity and government size may emerge. Alesina et al (2000) find a positive relationship between ethnic fragmentation and government employment. They conclude that politicians can create public employment opportunities for members of interest groups. By doing so, politicians can disguise redistributive efforts and consolidate political power. Glaeser and Saks (2006) show that racial fractionalization is correlated with corruption. Annett (2001) shows that if ethnic fractionalization leads to political instability, higher levels of

government consumption will result, as politicians in power attempt to appease opposing political forces.

Boettke (2001) argues that the Soviet Union used regulations and restrictions on market activity as an alternative to conventional taxation to extract resources from the economy. Brennan (2002) suggests that in some cases, regulation can act as an alternative to Pigouvian taxes and subsidies. He notes that regulation is more efficient because it avoids the excess burden problems by taxes and "provides greater degrees of freedom in focusing behavioural adjustment on those individuals whose performance generates external benefits." On the other hand, regulation may be less efficient because it is likely to involve higher enforcement costs, and more information is required to find socially efficient quantities. Regulations would be expected to appear if governments perceive that these benefits outweigh these costs. If fiscal policy is ultimately a series of Pigouvian taxes and subsidies, regulation becomes a substitute for fiscal policy.

If regulation and fiscal policy are substitutes, then budgetary measures will understate government size, especially in developing countries. Musgrave (1969) states that countries with a relatively low level of development are more likely to rely on indirect taxes (e.g., sales taxes) than direct taxes (e.g., income taxes) because administration of the latter is too costly. Even indirect taxation may be less useful in countries with undeveloped financial systems and large undergound barter economies. In these cases, regulations may be the most viable alternative. Tanzi (1998) finds that developing nations cannot collect taxes as efficiently as developing nations can, and find it more difficult to engage in budgetary redistribution. Governments in these nations

would be more likely to enact regulations and engage in quasi-fiscal activities.[6] Gupta et al (2003) empirically find that transition economies have reduced government expenditures as a share of GDP, but relatively high overall levels of government involvement in the economy. When non-budgetary government is taken into consideration, the relationship between heterogeneity and government size may be different.

Outline of Dissertation

The remainder of this study consists of four additional chapters. Chapter 2 uses standard public finance literature to provide a background for a review of three strands of literature. First, the standard models of tax competition are contrasted with the Leviathan model. Alternative models of tax competition are discussed briefly. Empirical tests of these theories are also examined. Second, indirect methods of demand estimation and revealed preference techniques are briefly explored. Finally, I review empirical studies that link migration trends with taxation and publicly provided goods and services.

Chapter 3 is an empirical study of migration patterns, fiscal policy and heterogeneity. This study focuses on interstate migration in the United States from 1985-2000. Individual migration decisions are interpreted as preferences for relative changes in fiscal policies between states. This study differs from previous migration studies in that it uses individual, rather than aggregate data. Because individuals do not consider the effect of their migration decision on the fiscal policy of their state of origin, this approach avoids some problems faced by aggregate studies. While this is not the first

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6 Quasi-fiscal activities are activities that simulate fiscal policy using implicit taxes and subsidies, but do not affect conventionally measured budget deficits. Examples include subsidized lending and exchange rates guarantees (Mackenzie and Stella, 1996).

study that uses individual level migration data, it is to my knowledge the first revealed preference analysis that is not limited to one specific fiscal policy or demographic group.

Chapter 4 reviews the literature on the relationships between heterogeneity, government size, and political institutions, while Chapter 5 examines these relationships empirically. Specifically, the effect of heterogeneity is examined in both democratic and non-democratic countries, and particular attention is given to non-budgetary forms of intervention. Chapter 6 summarizes the conclusions of the previous chapters and explains their contributions to the literature. Policy implications are discussed, as are avenues for future research.

Table 1.1: Seat Changes, U.S. Congressional Elections

Election Year	House of Representatives		Senate		GDP Growth
	Democratic	Republican	Democratic	Republican	
1930	-16	+19	-8	+8	-8.6
1932	+97	-101	+12	-12	-13.1
1934	+9	-14	+9	-10	10.9
1936	+12	-15	+5	-6	13
1938	-72	+81	-7	+6	-3.4
1940	+5	-7	-3	+3	8.8
1942	-45	+47	-8	+9	18.5
1944	+20	-18	-1	+1	8.1
1946	-54	+55	-11	+12	-10.9
1948	+75	-75	+9	-9	4.4
1950	-28	+28	-5	+5	8.7
1952	-22	+22	-2	+2	3.8
1954	+19	-18	+2	-2	-0.6
1956	+2	-2	0	0	2
1958	+49	-48	+16	-12	-0.9
1960	-20	+21	-1	+1	2.5
1962	-4	+2	+3	-3	6.1
1964	+36	-36	+2	-2	5.8
1966	-48	+47	-3	+3	6.5
1968	-4	+5	-5	+5	4.8
1970	+12	-12	-2	+1	0.2
1972	-13	+12	+2	-2	5.3
1974	+49	-48	+3	-3	-0.6
1976	+1	-1	0	+1	5.4
1978	-15	+15	-3	+3	5.6
1980	-35	+34	-12	+12	-0.3
1982	27	-26	0	0	-1.9
1984	-16	+16	+2	-2	7.2
1986	+5	-5	+8	-8	3.5
1988	+2	-2	+1	-1	4.1
1990	+7	-8	+1	-1	1.9
1992	-9	+9	0	0	3.4
1994	-54	+54	-8	+8	4.1
1996	+2	-2	-2	+2	3.7
1998	+5	-5	0	0	4.4
2000	+1	-2	+4	-4	4.1
2002	-7	+8	-2	+2	1.8
2004	-3	+3	-4	+4	3.6
2006	31	-30	+6	-6	2.7
2008	24	-24	+8	-8	0
2010	-68	+64	-6	+6	N/A

Source: Clerk of the U.S. House of Representatives, BEA

Table 1.2: State and Local Centralization Over Time

Year	Expenditures		Revenues	
	State Share (%)	Local Share (%)	State Share (%)	Local Share (%)
1902	12.42	87.58	17.46	81.87
1913	13.16	86.84	17.73	81.67
1922	19.2	80.80	23.87	74.04
1932	24.13	75.87	28.83	68.23
1942	32.65	67.35	45.73	47.75
1952	34.96	65.04	46.21	45.52
1962	36.14	63.86	43.34	43.34
1972	38.06	61.94	44.22	39.36
1982	40.32	59.68	47.79	36.28
1992	43.37	56.63	48.41	36.45
2001	44.01	55.99	39.33	30.64

Source: Tax Foundation, Inc., *Facts and Figures on Government Finance*, 38th ed., (Washington D.C.: Tax Foundation, Inc., 2005), Table D1, pp. 143-144

Chapter 2: Literature Review

Modern economic analysis of public finance began to emerge in the late 19th century when Pantaleoni (1883) conceptually applied the marginal theory of value to public economics, suggesting that public funds should be distributed in such a way as to receive the highest total utility. Sax (1884, 1887) noted a conflict between resources that are employed to produce goods intended to benefit the "collective," and those employed to produce "individual" goods. De Viti De Marco (1888) stated that an individual's share of the cost of a publicly provided good should depend on that individual's marginal utility, though he pointed out that finding these marginal utilities would be impractical. Wicksell (1896) suggested that the questions of taxation and spending be combined into one, and that government expenditures should only increase as long as the value of the goods and services supplied exceed the value of the resources needed (e.g., tax revenue) to supply them. Theoretically, efficient public provision of goods and services could occur without forcible taxation if the state would charge individuals according to their demand for goods and services. This would result in unanimous agreement on the level of government expenditures.

The Preference Revelation Problem

Lindahl (1919) formally depicted the equilibrium that would result when these individual tax prices are set, and described a method that could be used to find these prices. Individuals could be asked to reveal the quantity of goods they would prefer at a given price, then individual prices could be altered until all individuals desired an equal quantity of the public good. Assuming that individuals would truthfully reveal their

preferences, finding the optimal quantity would still be problematic, as suggested by Musgrave (1939), since this process only provides for an equitable distribution of tax burdens.

Samuelson (1954) provided a complete theory and described the efficient level of publicly-provided good as one that sets the marginal social utility equal to the marginal social cost, and assigns Lindahl taxes to individuals according to the benefit received. This would result in agreement on tax rates and a level of publicly-provided good that is neither inefficiently large nor small.

Samuelson acknowledged Wicksell's earlier point that individuals would have strong incentives to under-represent their preferences for publicly provided goods in order to decrease their tax burden and free-ride. This "preference revelation problem" prevents the practical implementation of a Pareto optimal allocation of resources.

In the absence of unanimous consent, the function and size of government is ultimately determined by political institutions. These political processes spark fierce debate over policy changes that produce both winners and losers, with individuals preferring different levels of government involvement in a number of policy dimensions. Because of inefficiencies in tax systems and difficulties assessing each individual's true preferences for government, it becomes difficult to determine whether levels of government are in general inefficiently large or small.[7]

In most cases, individuals can choose to participate in these political processes. In his popular treatise on individual responses to organizational inefficiencies, Hirschman

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7 One proposed solution involves complicated voting mechanisms that provide incentives for individuals to truthfully reveal their preferences, such as the Groves-Clarke mechanism. However, the costs to implement these mechanisms generally exceed the inefficiencies associated with second-best solutions.

(1970) referred to two options. The first of these is "voice." In democracies, individuals who are dissatisfied with policy formulations can voice their preferences by contacting their representatives or voting in elections. Though the probability that a single individual will have an effect on a political outcome is relatively low, the cost of exercising these options is also relatively low.

Hirschman referred to another option as "exit," where an individual chooses to leave the group. Barone (1912) observed that individuals who face large enough burdens may emigrate from the jurisdiction. By doing so, they can migrate to another jurisdiction with a more favorable policy mix. While this option is more costly, it avoids the political process and gives individuals some direct control over the fiscal policies to which they are exposed.

Tiebout Migration and Fiscal Competition

Tiebout (1956) suggested that migration in response to fiscal policy could provide an efficient decentralized solution to the public goods problem, at least at the local level. If individuals with complete information could freely migrate among a large number of jurisdictions, each with different mixes of publicly provided goods and services, then they would choose to locate in the jurisdiction that best suits their interests. In this world, residents would be matched with their desired levels of government, and the fiscal preferences of the population within each community would become relatively homogeneous.

While Tiebout's solution may provide a welfare-enhancing outcome, it alone is unlikely to provide a completely efficient solution to the public goods problem because

the assumptions are too restrictive. In reality, migration is not costless, and if moving costs are high enough, mobile residents may choose to remain in an area, even if they would be better off in another jurisdiction. There are a limited number of jurisdictions to choose from. Individuals may not be able to find a location with policies that perfectly suit their needs, and may have to settle for some inefficiencies. Information on tax burdens and policies in different jurisdictions can only be acquired at a cost, and individuals may not have complete information when making decisions.

In addition, those who do migrate may impose externalities on others. Weisbrod (1964) argued that the costs of publicly-provided education accrue to the jurisdiction where students currently reside, while benefits from publicly-provided education accrue to jurisdictions where individuals ultimately reside. Buchanan and Goetz (1972) described two types of fiscal externalities that are generated as an individual migrates into a jurisdiction. The individual provides a benefit to the destination jurisdiction by providing additional tax revenues. The individual may impose a cost if publicly-provided club goods are consumed.[8]

Some individuals can provide net benefits or net costs to a jurisdiction. High-income individuals tend to contribute more to the tax base than low-income individuals, and are therefore more likely to provide net benefits. If these high-income individuals are also likely to emigrate out of a jurisdiction in order to avoid relatively high tax burdens, the tax base in the original jurisdiction may begin to erode, forcing a subsequent reduction in expenditures. Benefits from redistribution programs enacted in other jurisdictions may spillover into the original jurisdiction. To the extent that low-income

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8   Goods and services that are partially rival, or congestible in consumption. See Buchanan (1965).

individuals are mobile, they may emigrate in search of greater benefits. As high-income individuals flee from low-income individuals, a cycle begins. This cycle, along with the possibility that governments may preemptively reduce welfare benefits to prevent emigration of high-income residents, contributes to a "race to the bottom" in redistribution programs. Stigler (1957) provides this as justification for centralization of redistributive efforts. Regardless of the level of centralization of redistribution, a Tiebout-style equilibrium is prevented.

In the absence of complete centralization, jurisdictions may begin to bid against one another in order to attract mobile individuals and capital. The idea that jurisdictions compete for mobile factors was noted as early as Hayek (1939) in his discussion of interstate federalism. Oates and Schwab (1988) suggest that interjurisdictional competition involves three potential sources of inefficiencies, including conflicts of interest within heterogeneous groups, access to efficient tax instruments, and differences between the will of the electorate and policy. A large amount of theoretical work covers the relationship between this competition and these inefficiencies.

Tiebout's original article suggested that the homogenizing effect of competition would soften any conflicts of interest over time as individuals sort themselves. Wallis and Oates (1988) suggest that heterogeneity is a mechanism through which decentralization reduces the size of the public sector. With homogeneous preferences, the public sector is likely to be larger as the marginal cost of public provision is relatively low due to economies of scale. Decentralization enhances efficiency only to the extent that local governments can better accommodate small geographically sorted groups.

Oates (1972) suggested that tax competition may be harmful because the ability of mobile factors to flee from tax burdens forces governments reduce rates in order to attract capital, thereby undermining the efficiency of tax instruments. Wilson (1986), Gordon and Wilson (1986) and Zodrow and Mieszkowski (1986) provide formal theoretical foundations for this view. These models, collectively referred to as "tax competition" models, assume that benevolent governments attempt to finance the provision of goods and services through the use of distortionary taxes. Any distorting taxes will reduce the net of tax return on capital and cause an outflow of mobile capital. The tax base in the initial jurisdiction erodes as tax revenue from the migrating capital is lost. In addition to this, migrating capital may provide positive externalities for the destination jurisdiction. In order to attract mobile capital, provision is reduced to an inefficiently low level. These theories exemplify the standard Pigouvian view of interjurisdictional tax competition for mobile factors (Besley and Smart, 2002).

Other theories concentrate on the principal-agent problem between the constituency and politicians, and generally find this competition to be beneficial. Rauscher (1996, 1998) formalized the Leviathan theory, concluding that if politicians are not perfectly altruistic and distortionary taxes are used, then competition for mobile factors will serve to increase the efficiency of the public sector and eliminate bureaucratic waste. This is because the inefficiencies that result when politicians create unwanted programs will tend to drive mobile constituents away. Ceteris paribus, decentralization helps facilitate this competition by decreasing moving costs and giving mobile individuals more alternative jurisdictions to choose from.

Another mechanism by which decentralization may affect the principal-agent problem is through changes in tax structure. Puviani (1896) noted that certain tax instruments may be less noticeable to taxpayers, causing them to underestimate the tax price they pay for goods and services. Winer (1983) suggested that centralized revenue collection along with intergovernmental grants may serve a similar purpose. If less complex tax systems decrease taxpayer information costs, and local governments are likely to use fewer and less complex tax instruments, then decentralization of revenue collection can also reduce waste by decreasing the negative effects of fiscal illusion. In a Pigouvian twist on this argument, decentralization could also reduce the size of government as jurisdictions with few tax instruments becomes more vulnerable to the effects of fiscal stress. For example, in a jurisdiction that relies solely on sales taxes, revenues may be more vulnerable to the effects of business cycles.[9]

Besley and Smart (2002) find that the ability of competition to improve welfare under Leviathan ultimately depends upon the political environment. Competition is welfare improving only if it increases the ability of voters to detect "bad" incumbents. This would be possible if there are a sufficient number of "good" politicians for voters to observe. In contrast, if most politicians are wasteful, then voters will be unable to detect such behavior with yardstick measures. Under this theory, competition can reduce limited amounts of bureaucratic waste, but is ineffective if waste is widespread.

Both the Pigouvian and Leviathan models predict that increased competition resulting from decentralization will reduce the size of the public sector, though they make

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9 For a detailed discussion, see Buchanan (1967), Wagner (1976), Breeden and Hunter (1985), and Misiolek and Elder (1988).

different predictions about the welfare effects of fiscal competition. Edwards and Keen (1996) consider both the positive and negative welfare effects by modifying the Zodrow and Mieszkowski model to allow for self-interested behavior by policy makers. In this model, decentralization increases the ability of fiscal policy to induce capital flight, thereby increasing the size of the deadweight losses that result from taxes. On the other hand, if policy makers coordinate or centralize tax collection, incentives for bureaucratic waste may emerge. The net welfare effect of centralization depends on both the costs of deadweight loss and the propensity of policy makers to waste tax revenue. Decentralization is more likely to be welfare-enhancing if policy makers are more wasteful.

Other theories suggest that tax competition may actually increase the size of the public sector. Williams (1966) suggests that if positive fiscal externalities, or "spillins" are used as inputs to production, then it is conceivable that the public sector may over-provide some of these goods in the aggregate. Aaron (1969) theorized that because the marginal cost of providing a pure public good to another individual is zero, public provision can be increased to levels that are inefficiently high as a type of investment in order to attract migrants. As additional residents move into the jurisdiction the average tax bill will fall and the marginal social benefit will rise, ultimately resulting in a greater efficient quantity of public goods for all residents. Lee (1997) uses a two-period model to show that jurisdictions may over-provide goods and services in order to attract imperfectly mobile capital. Black and Hoyt (1989) suggest that there can be positive welfare implications when jurisdictions offer direct payments to attract capital. Wilson

(2005) shows that if publicly-provided goods and services can attract capital by improving its productivity, and taxes are levied on capital, then welfare-improving "expenditure" competition may increase the size of government. Because conflicting theories make different predictions about the overall welfare effects of tax competition, this question is fundamentally empirical.

Empirical Tests of Fiscal Competition

Empirical tests of fiscal competition date back to Adams (1965), who examines per capita spending on a number of publicly-provided goods in a cross section of 478 counties in 1957. He finds that as the number of government jurisdictions within a county fall, per capita expenditures rise. Oates (1972) finds little evidence of a relationship between centralization and tax revenue for a cross section of countries. Giertz (1981) finds a positive relationship in a study of state and local governments within the U.S. and concludes that these relationships are more important in subnational governments. This may be because individuals have greater freedom to migrate to other states within the United States than they do to migrate to other countries, making tax competition more relevant at lower levels of government. Sjoquist (1982) finds evidence of an inverse relationship between the level of expenditures and the number of jurisdictions in a 1972 cross section of metropolitan areas in the southern U.S. DiLorenzo (1983) constructs Herfindahl-style measures of competition in taxes and expenditures for local governments within large counties in the US in 1975, and concludes that competition is generally associated with a reduction in the level of public fiscal activity.

Oates (1985) may have been the first to explicitly mention the Leviathan model in an empirical test. In this study he examines two cross-sections of countries and US states but is unable to find any evidence of a link between centralization and the size of government. Nelson (1986) finds little evidence of Leviathan behavior in a cross section of US states, though he points out that such studies cannot definitively confirm its existence. In a later study, Nelson (1987) suggests that the type of government service must also be considered. If state government expenditures are frequently for different services than local government expenditures, then differing levels of publicly provided goods may be explained by different preferences. If, for example, citizens in a particular jurisdiction preferred higher expenditures on a service that is more likely to be provided by local governments, such as education, then higher expenditures on these programs would be correlated with decentralization. By controlling for the type of expenditure, Nelson finds evidence consistent with Leviathan behavior using data similar to that used by Oates. By considering education spending separately, Bell (1988) finds that expenditures are associated with a higher share of funding being collected at the state relative to the local level, providing evidence of a positive relationship between centralization and the level of spending.

Schneider (1986) examines the relationship between fragmentation and government growth using a sample of U.S. suburbs. Using data taken from the Census of Governments in 1972 and 1977, he finds that an increase in the number of municipalities in a standard metropolitan statistical area is associated with a reduction in the growth of expenditures per capita. Eberts and Gronberg (1988) use a larger cross section from 1977

and find that spending falls as the number of general-purpose governmental units increase in metropolitan areas. They find no evidence of a connection, however, at the state level.

Forbes and Zampelli (1989) and Zax (1989) point out that there will theoretically be greater mobility at the local level simply because moving costs between local jurisdictions are lower than moving costs between larger states. By comparing the number of competing county governments in various metropolitan areas, Forbes and Zampelli find evidence of increasing county budget size as the number of counties increases. These results appear consistent with an inverse relationship between centralization and government size, however this study does not directly control for local government expenditures. Using data from 1982 and focusing on smaller local governments, Zax finds that as the number of local governments per square mile increase within a county, or the county share of the county-local budget decreases, total government revenue tends to fall, providing evidence consistent with the decentralization hypothesis. In a study of Canada, Kneebone (1992) finds that decentralization at the local level is negatively related to expenditures while decentralization at the provincial level is not, and attributes this to Tiebout effects.

In a time-series analysis of the U.S. from 1946-1985, Marlow (1988) finds a positive relationship between centralization at the federal level and total government size. Joulfaian and Marlow (1990) use similar total government expenditure data for cross sections in 1981 and 1984. They find that the level of centralization and the number of separate governments within a state are both inversely related to total government expenditures.

Raimondo (1989) disaggregates public expenditures using repeated cross sections from 1960, 1970, and 1980. He finds evidence consistent with the decentralization hypothesis for aggregated expenditures and welfare expenditures, and finds evidence partially consistent with the decentralization hypothesis for expenditures on hospitals and highways. He finds evidence contrary to the decentralization hypothesis for expenditures on education, though this is the expected result according to Nelson's preference argument. Eberts and Gronberg (1990) also disaggregate expenditures, and use different measures of local government structure. They also find evidence consistent with the decentralization hypothesis. In a working paper version, Eberts and Gronberg (1989) also conclude that increased mobility is associated with a general reduction in the size of the local public sector as a share of personal income, though the particular relationships differ depending on the type of good and the migrating group.

Heil (1991) suggested that the observed positive relationship between centralization and government size may be mainly due to interjurisdictional competition for mobile factors. Because mobility is essentially restricted by national borders, a relationship between centralization and government would be less obvious in a cross-section of countries. He found no evidence of a relationship between centralization and government size in a 1985 cross section of countries. Stein (1999) finds evidence of an inverse relationship between centralization and the size of the public sector in a cross section of South American countries, and concludes that this may indicate relatively large gains from economies from scale.

Feld, et al. (2003) examine decentralization using a panel of data from 1980-1998 from Switzerland. They find an overall negative relationship between centralization and the size of the public sector, though this is tempered by the ability of local governments to export taxes through user fees. They find no evidence that jurisdictional fragmentation has an effect on government size, concluding that the overall effect is mainly attributable to competition between competing jurisdictions. Campbell (2004) suggests that the vertical relationship between municipalities and counties must be considered, and finds no evidence that municipal and county expenditures are substitutes. She finds that decentralization decreases municipal expenditures but has no effect on county expenditures, while jurisdictional fragmentation as measured by the number of governments per capita reduces county expenditures but has no effect on municipal expenditures. In a study using data from China, Zhu and Krug (2006) find that decentralization from the central to the province level is associated with an overall increase in government expenditures, while further decentralization to the local level is associated with a decrease in expenditures.

Grossman (1989) and Grossman and West (1994) find a positive relationship between intergovernmental grants as a share of local revenue and expenditures and find evidence of the "collusion hypothesis." They conclude that vertical tax collusion reduces the level of competition between governments. Citizens cannot flee, for example, from taxes collected by a central government, and local governments may concede taxing authority to a central government in exchange for the ability to increase expenditures. Ehdaie (1994) uses international data from 1977-1987 and finds that simultaneous

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decentralization of revenue and expenditure functions is associated with a reduction in the size of government. Shadbegian (1999) studies a panel of US states, and finds evidence consistent with both the decentralization hypothesis and the collusion hypothesis. Lalvani (2002) finds similar evidence for a panel of Indian states, also finding that intergovernmental transfers serves to reduce the relationship between centralization and the size of the public sector. Jin and Zou (2002) use panel data from 32 countries to find that revenue decentralization is negatively related to spending. They find no evidence of a relationship between spending and expenditure decentralization.

Rodden (2003) uses a large panel of international data to study the growth of governmental units. He notes that the budget-share measures of centralization may be misleading because certain programs are funded and administered at the local level due to a federal mandate, and the level of fiscal autonomy in these countries may be overstated. Scandanavian countries, for example, are highly decentralized according to this measure, but have relatively large public sectors. For this reason, he uses an error-correction model with country fixed effects to isolate long-term changes in fiscal autonomy. He finds that decentralization is correlated with a smaller public sector and that this relationship depends upon democratic governance and local revenue collection. While local fiscal autonomy is a plausible explanation, he notes that results are mainly attributable to data from Canada, Switzerland, and the U.S. It is possible that other factors such as racial or linguistic heterogeneity could be relevant.

Fiva (2006) improves on previous studies by using data that controls for revenues over which local governments have complete discretion (Stegarescu, 2005). By

examining 18 countries from 1970-2000, he finds that revenue decentralization is inversely related while expenditure decentralization is positively related to the size of the public sector. Prohl and Schneider (2009) find that both revenue and expenditure decentralization are negatively related to growth of the public sector, though expenditure decentralization has a stronger association. In addition, they find that local fiscal autonomy and democratic institutions are inversely related to public sector growth.

These types of studies can only document a relationship between some measure of centralization or fragmentation and government size. Hoyt (1995) points out that any association between centralization and spending would be expected by various alternative theories of tax competition, and these types of studies are unable to differentiate between them. This is further complicated by the possibility that multiple theories are valid, and various types of inefficiencies coexist.

A more interesting question is whether tax competition is welfare-enhancing or welfare-impeding on net. However, the concept of overprovision or underprovision is complex. Some individuals will always feel that certain goods and services are over-provided, even in a purely Pigouvian world. Similarly, even when facing Leviathan, certain groups will still feel that public provision of some service is too low. Rodden (2003) states that "Leviathan will always be a dangerous beast for some and a figment of the imagination for others." Any attempt to empirically document overprovision or underprovision is necessarily a restatement of the public goods problem, since the optimal provision level must first be established.

Demand Estimation

In democratic societies, we assume that the election process produces politicians who pursue the interests of voters. Levels of public provision ultimately emerge from the political process through elections. Some studies have analyzed election outcomes in order to extract the preferences of the underlying population. Kim and Fording (1998, 2003) match political party platform data to election outcomes to estimate the median voter's preferences for a set of western democracies. This type of study does not examine any deviation from party platforms, and therefore does not allow exploration of preference heterogeneity. Also, because these type of analyses restrict voter ideology to a one-dimensional left-right spectrum, it becomes difficult to disentangle preferences for one type of publicly provided good from another. For this reason, these types of estimates are better suited to answer questions of aggregate voter preference for overall macroeconomic policy than they are to questions about the optimal provision of individual publicly-provided goods.

The analysis of election outcomes can be thought of as a special case of the contingent valuation method. More commonly, this method uses more detailed surveys to establish preferences for public provision. While this method was originally used to value environmental goods (Davis, 1963), it has been extended to other publicly-provided goods including roads (Hensher and Sullivan, 2003), theaters (Hansen, 1997) and crime prevention (Cohen et al, 2004).

Lyons and Lowery (1989) and Teske et al. (1993) use this method to elicit satisfaction with local government provision of goods and services. While these studies

will be covered in more detail below, individuals who respond to hypothetical questions in surveys have little incentive to provide an accurate description of their true willingness-to-pay for a particular good. However, if survey responses guide policy, respondents may begin to engage in strategic behavior. If individuals perceive that their responses may affect their tax liabilities, they will have less incentive to truthfully reveal their preferences and may attempt to "free-ride" on the tax contributions of others (Wicksell, 1896).

Even if strategic bias were eliminated, and respondents did not attempt to intentionally mislead survey administrators, contingent valuation methods may still be unreliable. Diamond and Hausman (1994) suggest that survey responses are plagued with problems and are useless as a tool to predict demand for publicly-provided goods. Of these problems, the most notable is the "embedding effect," popularized by Kahneman and Knetsch (1992). As an example, when different groups are asked to value "public goods," responses for larger quantities may not be significantly different than responses for lower quantities. All else equal, we should assume that rational individuals would place higher values on larger quantities of goods. When survey responses violate this non-satiation assumption, the results become suspicious. One explanation attributes this to responses elicited from disinterested individuals with limited information. These Individuals may be reporting a perceived moral value of contributing to these goods, rather than their economic valuation of the goods, and may be answering a different question than the survey administrator intended to ask.

Other approaches attempt to value demand indirectly from observed behavior. These are generally known as "revealed preference" methods because individuals reveal their preferences for certain goods and services as they engage in certain behaviors. One, referred to as the Hotelling-Clawson travel cost method, estimates demand for recreational goods by observing travel costs incurred by visitors. Clawson (1958) and Trice and Wood (1958) implemented this method by collecting data on the distances traveled to a particular attraction, then estimating the cost incurred by these individuals. As fewer visitors are willing to travel greater distances, a demand curve can be constructed.

In another application, Oates (1969) estimates demand for public provision of education by observing relationships between levels of provision and property values. In this study of the New York metro area, he found that property taxes negatively affected home values, while education expenditures had a positive effect. The combined effects suggested, however, that a balanced budget increase in education expenditures would have a much smaller effect on property values. Anderson and Crocker (1971) and Harrison and Rubinfeld (1978) also use hedonic housing price models to estimate willingness-to-pay for pollution abatement.

Goldstein and Pauly (1981) point out that estimates of demand for local publicly-provided goods that do not control for sorting behavior suffer from "Tiebout bias." In an empirical example of this, Brookshire et al (1982) compare pollution values from a hedonic housing price model to those reported in a survey that asked individuals to report their willingness to pay for pollution abatement in Los Angeles. They hypothesize that

housing prices will report higher values for pollution than survey responses because individuals who are relatively pollution averse will incur a cost to move to a low-pollution neighborhood, and this will reduce housing prices in high pollution areas. Because pollution-averse individuals now live in a neighborhood with lower pollution, they will not be willing to pay as much for a second marginal drop in pollution and they will be less likely to express strong opinions. They find that survey responses report lower values for pollution abatement than property values do, providing evidence consistent with their theory and the Tiebout hypothesis.[10] In this case, the difference between revealed preference estimates and contingent valuation estimates gives us an idea of the extent of Tiebout bias.

Rubinfeld et al. (1987) suggest that this type of bias is also present in studies of income heterogeneity and private school enrollment. Communities with greater degrees of income heterogeneity are observed to have a larger percentage of students enrolled in private schools. While this could mean that high-income parents are more likely to send their children to private school to avoid a negative peer effect, it could also mean that communities with large numbers of private schools attract those with higher incomes. Bergstrom et al. (1988) devised a method to test for efficient public provision of education that involves the usage of an instrumental variables procedure to correct for Tiebout bias.

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10 In a meta-analysis of 79 studies, Carson et al (1996) also find that contingent valuation studies report lower values than revealed preference studies.

Migration

Migration studies date back to Ravenstein (1876, 1885, 1889) who examines the 1861, 1871, and 1881 censuses of the United Kingdom. He constructs migration patterns by comparing an individual's birthplace to their current residence, and observes a number of patterns that he refers to as the "laws of migration." Within these laws are the ideas that migration is more likely to to occur over relatively short distances, with technological improvements in transportation, and when there are economic costs and opportunities that differ between jurisdictions.

Barone (1912) suggests that fiscal policy can affect migration decisions, as individuals compare the cost of their tax burden to the cost of migration when deciding whether to emigrate from their current jurisdiction. Sjaastad (1962) provides a formal theoretical basis for this view by modeling migration as investment decisions. He concludes that individuals will migrate if the net present value of the benefits of migration exceed the net present value of the costs, and uses this to explain why younger individuals are more likely to migrate. He suggests that the relationship between these costs and benefits depend on, among other things, the "revenue policies of state and local governments." Todaro (1969) theorized that individuals would consider employment risk when considering a move from a rural to urban area. These ideas sparked numerous empirical studies that attempt to document various predictors of migration.[11] The majority of these are beyond the scope of this study, which focuses specifically on fiscal policy as a predictor of migration.

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11 For extensive reviews, see Greenwood (1975, 1985, 1993), Greenwood et al (1991), Charney (1993), Dowding et al (1994), and Brueckner (2000).

Adams (1965) studies a panel of U.S. counties from 1957, and uses the percent of households that had recently migrated into a jurisdiction as a predictor of demand for different types of expenditures. He finds a positive relationship between in-migration and per capita expenditures on police, fire, sanitation, recreation, street maintenance, and general administrative expenditures. He interprets this as evidence that these services are underprovided by the public sector. While he attributes this to an undervaluation of the "preferences and tastes for public services of newcomers," this is also consistent with a strain on existing levels of public provision in growing jurisdictions. Jurisdictions may find it more politically feasible to wait until the tax base grows before increasing the level of public provision. Attempts to do this proactively would place a relatively large burden on the existing tax base.

Cebula, et al (1973) and Cebula (1974) find that high levels of per capita spending on welfare programs are associated with relatively high gross immigration of low-income minorities over the migration period from 1965-1970. Though other studies confirm this relationship, these early studies suffer from data aggregation problems. Cebula and Avery (1983) find no significant relationship from 1970-1975, and attribute this to problems using race as a proxy variable for low-income individuals.

Cebula (1977) finds that migration patterns are endogenously determined with education spending for the same time period, in that education expenditures attract individuals who are most interested in public provision of education, and these same individuals affect education policy when they become residents. These early studies generally focused on one type of expenditure or program.

Schneider and Logan (1982) estimate the effect of different categories of revenue and expenditure policies on economic growth. They use growth rates for particular groups as a proxy for migration, and find no evidence that expenditures or tax rates are related to growth, though they do find that average tax receipts per capita are positively associated with growth of rich households and negatively associated with growth of poor households. In a similar study, Helms (1985) introduces the idea that taxes and expenditures should be considered jointly to find the net effect on growth. He finds that taxes are negatively associated with growth in general, but some types of taxes can have a positive association when used to finance expenditures on education, health and highways. He also finds that taxes used to finance transfer payments are negatively associated with growth.

Sharp (1984) was one of the first studies to use individual-level micro data in a migration study. In this study, the HUD's 1978 quality of urban life survey was used to compare the likelihood of moving to statements about government in an open-ended question about "problems." Though nationally representative, relatively few usable observations were found to be usable from this sample data, and limited evidence of Tiebout sorting was found. Sharp points out the complexity of migration decisions and the difficulty of attributing migration to a single factor.

Later studies used surveys that specifically asked about satisfaction with the public sector and migration. These studies had the advantage of using data less subject to interpretation, although samples were restricted to a select few cities and were not nationally representative. Lyons and Lowery (1989a, 1989b) use micro data from

telephone surveys to study citizen response to dissatisfaction with tax and expenditure policy at the local level. They compare data from Louisville, KY, which was decentralized at the time, to that from Lexington, KY, which has a consolidated county-local government. They find no evidence that residents from Louisville are more satisfied with the public sector than are residents from Lexington, and contest the idea that citizens in decentralized jurisdictions are more satisfied with the public sector. They also find little evidence of Tiebout sorting, and attribute this to high information costs about competing policies. They conclude that there are not enough individuals with detailed knowledge of the local public sector relative to that in competing jurisdictions to promote efficiency-enhancing Tiebout migration. Further, in areas where sufficient competing jurisdictions exist, those who are likely to migrate due to dissatisfaction with the public sector represent a relatively small subset of the population who are likely to have less invested (both socially and financially) in their current residence.

In contrast, Percy and Hawkins (1992) conduct a similar study using survey data from the Milwaukee area, finding results consistent with the Tiebout thesis. They attribute this to MSA-wide data used in their study, as opposed to data from a single county in the Lyons and Lowery study as well as unobservable characteristics that differ between Milwaukee and Louisville.

Teske et al (1993) suggest that changes are driven more by competition for new residents than attempts to retain current residents. Because of this, a subset of marginal individuals can promote efficiency through Tiebout sorting. They support this view with a survey of individuals from eastern Long Island used to determine the level of

information that individuals possess. They find that overall, only 21% of individuals have accurate information about local school expenditures relative to competing jurisdictions. On the other hand, high-income individuals with children in school are more likely to have accurate information, especially if they are recent movers to the jurisdiction. They suggest that policies are more likely to be responsive to the interests of these relatively-well-informed incoming individuals. This idea is supported by Conway and Rork (2006), though their study is based on aggregate data.

Other studies use nationally representative public micro samples. These surveys are broader in scope, and normally do not ask individuals if they are satisfied with different specific functions of government. Studies that rely on this data must infer this information from responses to other questions. While this poses the problem of assuming that these responses are related to preferences for government, it avoids the problems that result from assuming that individuals are interested in and have information about the goods and services in question. In addition, respondents have less of an incentive to intentionally provide inaccurate information, as they are less likely to perceive that responses about migration could be used to guide policy. Herzog and Schlottmann (1986) use data from the 1980 Census to estimate the probability that an individual migrated out of an MSA in response to fiscal policy. They find that education quality and recreational opportunities reduce the probability that an individual will leave the jurisdiction, while crime and taxes increase this probability. Fox, Herzog and Schlottmann (1989) confirm this result, but find no evidence that education and welfare expenditures attract individuals. They also find that property taxes increase the

probability that individuals will leave a jurisdiction, and income taxes reduce the probability that individuals will move into a jurisdiction.

Blank (1988) uses micro data from the 1979 Current Population Survey to determine the effect that welfare benefits have on locational decisions of female-headed households. She then uses these estimates to simulate the effect of benefit changes in different jurisdictions. Cushing (1993) uses 1980 Census data to examine the impact of welfare programs on the metropolitan migration decisions of multiple groups, finding support for the hypothesis that these programs attract low-income and female-headed households.

Enchautegui (1997) performed a similar study also using data from the 1980 census. She compared wage and benefit differentials across states to migration decisions to estimate the responsiveness of female migrants to benefit levels. She found the effects of welfare differentials to be larger than that of wage differentials and also found the largest effects to be on single mothers and those on public assistance. Overall effects, however, were relatively small, as a 10% increase in welfare gains corresponds to an increase in the probability of migration by approximately 0.2%.

Clark and Hunter (1992) and Conway and Houtenville (2001) used Census aggregate migration data to examine characteristics that attract the elderly, finding evidence that these individuals are attracted by expenditures on health and hospitals and repelled by estate taxes and welfare expenditures.

Clark et al. (1996) use a 1/1000 sample from the 1990 Census to examine the determinants of elderly migration with individual-level data. They find that elderly

individuals react to fiscal variables in different ways, depending on their age. The major contribution of this article is the introduction of the "difference" model of migration that compares 5-year changes in fiscal variables to migration decisions. For those who migrated, 5-year changes represent differences in destination state characteristics from characteristics in the state of origin. Compared to the "push" and "pull" models that solely use characteristics of origin and destination states respectively, the "difference" method is theoretically superior because it captures the effects of both.

A potential source of bias exists with these types of studies. Due to transportation infrastructure or other factors, areas that have greater opportunities for migration will have greater levels of both immigration and emigration regardless of preferences and jurisdictional characteristics. Migrants to and from these areas will be over-represented in the data.

Synthesis

This study aims to make contributions to each of these strands of literature. Specifically, this study explores the extent to which migration data can be used to answer questions of optimal public provision. Though migration cannot yield a completely efficient solution to the public goods problem, migration decisions still provide useful information. Assuming similar levels of tax progressivity, the average individual would not be willing to migrate to a jurisdiction with a larger public sector unless they were actually willing to pay for additional provision.

If individuals do "vote with their feet," then migration outcomes provide some indication of what these people are voting for, and preferences that are revealed through

migration outcomes can provide some indication of willingness to pay for public provision. If certain groups of individuals respond positively to balanced budget increases in certain types of expenditures, then this would be consistent with the idea that these groups feel that this good is under-provided, and are willing to pay for increases in provision. Conversely, if individuals are migrating away from increases in certain expenditures, then this would be consistent with the idea that these individuals feel that these expenditures are over-provided.

On the other hand, results from this study cannot necessarily settle the debate between harmful and beneficial tax competition. This is because some theories that suggest tax competition is harmful focus on the idea that migrants who leave a jurisdiction impose external costs on those who remain in the initial jurisdiction, and these external costs are not considered in this study. If results indicate that individuals are migrating to jurisdictions with higher levels of public expenditures, this may be consistent with some theories of harmful tax competition. However, it is also possible that some individuals will move to jurisdictions with lower levels of public expenditures because they feel that the level of provision in their initial jurisdiction is too high, while at the same time still eroding the tax base in the initial jurisdiction. This would be consistent with some models in both camps, and the net welfare effect would be unclear.

Results from this study contribute to the tax competition literature by providing estimates of individual responses to changes in fiscal policies. This is not the first study of migration responses to public policy, as most of the studies reviewed in the migration section provide some estimates. However, the majority of these studies are limited in

scope or use aggregate data. If the policy goal is to attract certain types of residents, the estimates produced in this study provide a blueprint for the most efficient way to do so.

This study also contributes to the empirical literature that tests for the presence of Tiebout migration by providing an explanation for Rhode and Strumpf's (2003) lack of evidence of homogenization among jurisdictions as a result of falling transportation and information costs. Coughlin et al (2006) document convergence in fiscal policies across US states from 1977-2002. While certain policies may attract one group of individuals, this study finds that the same policies can attract other groups as well. If interjurisdictional differences in fiscal policy are small, then jurisdictions would be less likely to become homogenized over time.

Chapter 3 compares migration outcomes to relative changes in fiscal policy to generate estimates of willingness-to-pay for changes in fiscal policy. Clark, Knapp and White's (1996) difference model of migration is combined with the alternative state weighting scheme used in Enchautegui's (1997) study. This study is larger in scope than these previous studies, as a larger dataset is used to consider effects on the overall population as well as a number of demographic subsamples. Similar to Helms (1985), a wide range of fiscal policies are used as explanatory variables, though migration outcomes are being modeled instead of economic growth.

Chapter 3:   Fiscal Policy and Migration

Net-migration data from the 2000 Census generally highlights large movements to the southern and western states in the US. One explanation for these movements is that strong regional economic growth provided more opportunities to potential migrants. Another set of explanations suggest that technological advances such as improvements in air conditioning and transportation have also contributed to this outcome.

More recently, Glaeser and Tobio (2007) suggest that the regulatory environment in the south promotes a relatively elastic housing supply and in turn, low housing costs, which encourage migration to the south. While these theories explain large general movements, outliers suggest there may be more to the story. A closer look at the same data shows that Louisiana experienced a relatively large net outmigration of residents over the 5-year period from 1995-2000 while neighboring states experienced large net inmigration. Despite favorable amenities, few individuals are migrating to this state. Similarly, and in constrast to surrounding states, Minnesota experienced a relatively large net inmigration, despite having a relatively harsh climate.

Graves and Linneman (1979) suggest that state-specific characteristics, such as crime rates, can affect migration. Public policies can affect these characteristics, and therefore influence migration. Academic research has examined and generally confirmed the existence of a connection, though the majority of these studies have focused primarily on the effect of one particular policy, and many do not consider the effect of expenditures. Helms (1985) connects multiple categories of public expenditures to economic growth in a balanced-budget setting. This chapter conducts a similar study that

connects multiple categories of balanced-budget expenditures to migration decisions. If citizen mobility in response to government behavior is the mechanism underlying intergovernmental competition, as unsatisfied individuals move to more favorable jurisdictions, then migration decisions may serve as indicators of the level of satisfaction with government. This paper will examine migration responses to fiscal activity for a number of demographic groups. This information is used to provide estimates of revealed preferences for public provision among these groups.

This study examines Tiebout migration across state lines in response to changes in fiscal policy. Tiebout migration is theoretically more likely at the local level, due to lower moving and information costs. However, because of the centralization of state and local governments, state fiscal policies should be relatively more important. According to the Census Bureau, 15.9 percent of the population moved between 1998 and 1999. While the majority (59.3 percent) of these were moves within the same county, 19.8 percent were intrastate moves between counties, and 17.6 were interstate moves. These statistics are relatively stable over the years, with roughly 3 percent of the population moving intrastate between counties, and another 3 percent moving interstate in a given year.

In general, the majority of interstate moves are to metropolitan areas, and these moves are motivated by something other than fiscal characteristics (e.g., employment growth). However, individuals who migrate to a multi-state MSA must choose where to reside. While fiscal characteristics may not explain the majority of migration decisions, they are still important on the margin, and the greater availability of data on state level migration decisions has driven the choice of states as the geographic level of observation.

Theoretical Model and Empirical Specification

The government in jurisdiction j chooses a combination of tax and expenditure policies in order to maximize a utilitarian social welfare function, which is defined as:

$$\max_{\tau_j, G_j} \sum_i V_j^i(x_j^i, G_j, A_j) \qquad (3.1)$$

where V_j^i represents the indirect utility of individual i in jurisdiction j. Similar to Enchautegui (1997), Conway and Houtenville (1998) and Gale and Heath (2000), consumption of private goods is represented by x, public provision is represented by G, and A refers to a vector of jurisdictional amenities. Consumption of private goods depends on disposable income, which is a function of wages (w_j^i), taxes (τ_j^i), and housing prices (h_j) in jurisdiction j.

$$x_j^i = x_j^i(w_j^i, \tau_j^i, h_j) \qquad (3.2)$$

where $\dfrac{\partial x_j^i}{\partial w_j^i} > 0, \dfrac{\partial x_j^i}{\partial \tau_j^i} < 0$ and $\dfrac{\partial x_j^i}{\partial h_j} < 0.$ While previous models examined aggregate effects, this model examines the effect of different expenditure and tax combinations on different individuals. Therefore, G and τ represent vectors of expenditure and tax categories respectively. Earnings, tax rates, and housing prices are considered exogenous to the individual, as are public expenditures and amenities in each period. Wages depend on the number of laborers in a particular jurisdiction as well as the exogenously determined level of physical capital. Housing prices depend on the number of individuals in a jurisdiction. Governments can alter the population in their jurisdiction by attracting individuals (or inducing them to leave) with fiscal policy. The inelasticity of land and

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physical capital ultimately constrain the government's ability, as wages fall (rise) and housing prices rise (fall) as individuals enter (leave) the jurisdiction. Governments also face a balanced budget constraint that requires expenditures to be financed with taxes. Individuals are not subject to a balanced budget constraint, as some consume more publicly provided goods than they pay for in taxes and vice-versa.

In a two-period model, individuals begin at equilibrium in one of 48 initial jurisdictions at time t. Individuals are assumed to initially be in the jurisdiction that provides the highest available level of utility net of moving costs. Some will have chosen this jurisdiction because the fiscal policies most closely suit their preferences. While fiscal policy changes may still benefit these individuals, no other jurisdiction will provide a higher level of utility. Other individuals may realize that they would receive a higher level of utility in another jurisdiction, but choose to stay because of high moving costs. In both cases, individuals are at equilibrium as they initially have no incentive to move from the beginning jurisdiction. This condition is formally described in equation (3.3) below:

$$max\,(V^t_1,\ldots,V^t_{j-1},V^t_{j+1},\ldots,V^t_{48})-V^t_j-C_i<0 \qquad (3.3)$$

where C_i represents moving costs which differ for each individual i and follow a random distribution. By letting $\Delta V = V_a - V_j$, where $V_a = max(V_1, \ldots, V_{j-1}, V_{j+1}, \ldots, V_{48})$, condition (3.3) can be simplified as $\Delta V^t - C_i < 0$.

The assumption that individuals begin at equilibrium may introduce some Tiebout bias. Individuals who have already moved prior to the beginning of the observed

migration period may face different costs for a second move. This may affect their propensity to migrate during the migration period.

Exogenous shocks simultaneously occur in all jurisdictions, causing amenities and levels of physical capital (and therefore wages) to change. In addition, fiscal policies in each jurisdiction change, as governments attempt to increase aggregate utility. Government policy responses will exhibit random variation for several reasons. One source of variation is competition between political groups. These groups have different levels of power across juridictions and may cater to a certain demographic or have differing ideas about policies intended to raise social welfare. A second source of variation may arise due to legal institutions that limit policy responses.[12] In addition, variation in transfers from a higher level of government may can contribute to variation in policy response.[13]

In response to these changes, residents must then choose to remain in their original state or migrate to another state. In period *t+1*, individuals maximize utility by choosing which state to reside in, and will migrate out of jurisdiction *j* if the following condition holds:

$$max\,(V_1^{t+1},\ldots,V_{j-1}^{t+1},V_{j+1}^{t+1},\ldots,V_{48}^{t+1})-V_j^{t+1}-C_i>0 \tag{3.4}$$

which simplifies to: $\Delta V^{t+1}-C_i>0$

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12 For example, Kentucky's HB44 (1979) places an upper limit on annual increases in revenue collected via property tax to a nominal 4% above last year's receipts..
13 For example, states that successfully compete for "Race to the Top" funds will have more fiscal policy options than those that do not receive these transfers.

If individuals were assumed to be living in the utility maximizing state in period t, inter-jurisdictional migration will only occur if changing conditions increase expected utility in a different jurisdiction enough to justify incurring moving costs. For this reason, fiscal changes in alternative states relative to those in the initial state are the main determinants of migration. In order for an individual to move, both equations (3.3) and (3.4) must hold, and the gain as a result of moving to another state must be sufficient to offset moving costs. A necessary condition for this is that changes in at least one of the alternative jurisdictions must be more favorable than changes in the initial jurisdiction j. That is, $\Delta V^{t+1} > \Delta V^t$.

For individuals that did migrate, ΔV^{t+1} exceeded ΔV^t. That is, $V_a^{t+1} - V_j^{t+1} > V_a^t - V_j^t$. Rearranging yields $V_a^{t+1} - V_a^t > V_j^{t+1} - V_j^t$, which states that the utility change from the fiscal policy change in the alternative jurisdiction exceeded the utility change in the initial jurisdiction j. Specifically,

$$\frac{\partial V}{\partial A} \Delta A_a + \frac{\partial V}{\partial G} \Delta G_a + \frac{\partial V}{\partial \tau} \Delta \tau_a + \frac{\partial V}{\partial P} \Delta P_a > \frac{\partial V}{\partial A} \Delta A_j + \frac{\partial V}{\partial G} \Delta G_j + \frac{\partial V}{\partial \tau} \Delta \tau_j + \frac{\partial V}{\partial P} \cdot \Delta P_j \qquad (3.5)$$

where ΔA_a represents the change in amenities in the alternative jurisdiction. This can be rewritten as

$$\frac{\partial V}{\partial A} (\Delta A_a - \Delta A_j) + \frac{\partial V}{\partial G} (\Delta G_a - \Delta G_j) + \frac{\partial V}{\partial \tau} (\Delta \tau_a - \Delta \tau_j) + \frac{\partial V}{\partial P} (\Delta P_a - \Delta P_j) > 0 \qquad (3.6)$$

For migrants, equation (3.6) is assumed to hold. By observing migration patterns in response to changes in the state of origin relative to changes in alternative states, utility-increasing changes in fiscal policy can be observed. If individuals are observed to

migrate in response to relative balanced-budget increases in education, then this implies positive marginal utility with respect to education. Ceteris paribus, if education expenditures increase in the alternative jurisdiction relative to jurisdiction j, then an individual living in jurisdiction j who desires greater public provision of education will move to the alternative jurisdiction if the increase in utility exceeds the moving costs.

The probability that a mobile individual will migrate in period $t+1$ is formally described by the following equations:

$$Pr(X) = \beta_0 + \beta_1 X_i + \beta_2 \Delta T_j + \beta_3 \Delta G_j + \beta_4 \Delta A_j + \epsilon \qquad (3.7)$$

$$\Delta T_j = (\tau_a^{t+1} - \tau_a^t) - (\tau_j^{t+1} - \tau_j^t) \qquad (3.8)$$

$$\Delta G_j = (g_a^{t+1} - g_a^t) - (g_j^{t+1} - g_j^t) \qquad (3.9)$$

$$\Delta A_j = (a_a^{t+1} - a_a^t) - (a_j^{t+1} - a_j^t) \qquad (3.10)$$

where X_i is a vector of demographic characteristics. ΔT_j is a vector of weighted changes in alternative state taxes, relative to state of origin, ΔG_j is a vector of similarly weighted relative changes in expenditures, and ΔA_j is a vector of weighted relative changes in amenities. Amenities include jurisdictional characteristics that may affect moving costs (Berger and Blomquist,1992) as well as measures of the quality of public provision. These changes will be positive if increases in alternative states exceed increases in state j. The vectors of fiscal variables τ_j, g_j, and a_j, represent values from jurisdiction j, while τ_a, g_a, and a_a are weighted averages of values from potential destination states:[14]

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14 An alternative specification assigns τ_a, g_a, and a_a values from actual destination states for migrants, and is used in models (1) and (2) below.

$$g_a^t = \Omega_j \Gamma^t \qquad\qquad (3.11)$$

$$\tau_a^t = \Omega_j \Theta^t \qquad\qquad (3.12)$$

$$a_a^t = \Omega_j \Phi^t \qquad\qquad (3.13)$$

Γ^t, Θ^t, and Φ^t are matrices containing measures of expenditures, taxes, and amenities respectively for each state at time t, and Ω_j is a weighting matrix specific to jurisdiction j.

Five-year changes in the state of origin are compared to changes in alternative states to create a measure of relative fiscal policy changes. Relative changes are the change during the migration period in state levels of taxes and expenditures subtracted from weighted nationwide average changes in state taxes and expenditures. Weighted nationwide averages differ for each state, as alternative states weighted differently for each state. The weighting matrix is similar to that used by Enchautegui (1997) and the migration "flow" matrix used by Conway and Rork (2004). This weighting scheme uses the actual number of migrants to destination states to create weights. Fiscal values for alternative states are weighted by migrants to each alternative state as a fraction of total outmigration from the home state j. Figure 3.1 illustrates this calculation. Potential alternative states containing no immigrants originating from jurisdiction j are assigned a weight of zero. Weighted values of each alternative state are summed to then generate τ_a, g_a, and a_a, which represent taxes, public provision, and amenities, respectively. This "flow" method has the advantage of making no assumptions about determinants of migration or moving costs, as it uses actual decisions made by individuals to predict

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alternatives. For migrants, actual values for destination states are used in one specification while predicted values are used in another specification.

Figure 3.1: Migration Weights
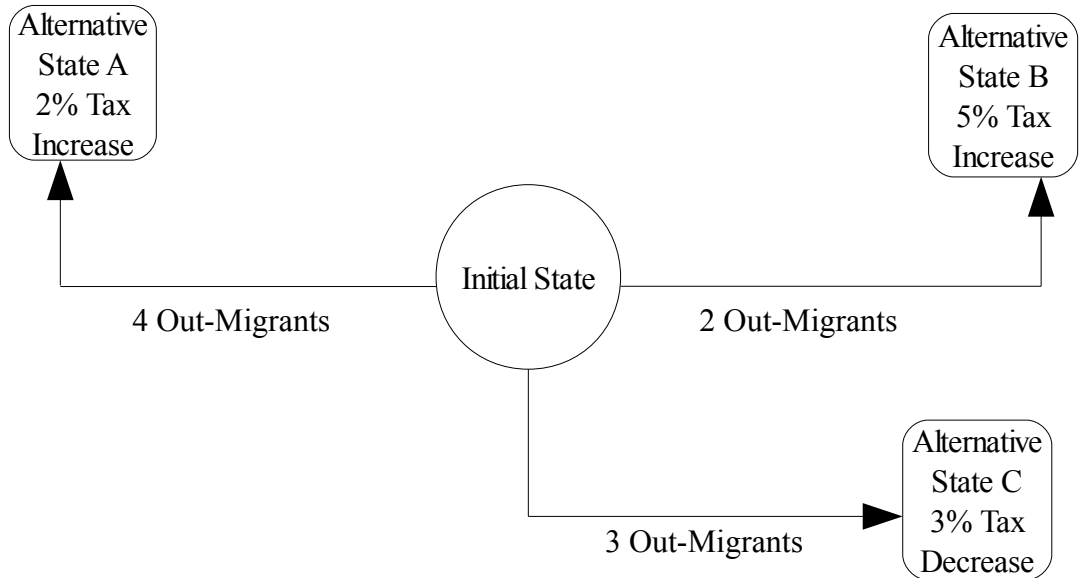
In this example, the tax increase in the theoretical next-best alternative state would be:

$$\frac{4 \cdot 2\% + 2 \cdot 5\% - 3 \cdot 3\%}{4 + 2 + 3} = 2\%$$

These specifications allow examination of fiscal changes in other states relative to changes in the state of origin, and can be used to determine which changes are likely to induce migration. These models are estimated using a logit procedure. Marginal effects are calculated according to Anderson and Newell (2003).

Sonstelie and Portney (1978) suggest that municipalities can alter property values with public provision and Brueckner (1982) describes a test that can be used to determine provision levels that maximize property values. By constructing a relationship between fiscal policy and the probability of attracting mobile individuals, this idea can be

modified to create a test for optimal provision. In order to determine what fiscal policies will maximize the probability that individuals will locate in a given jurisdiction, a quadratic can be estimated.

$$Pr(X) = \beta_0 + \beta_1 \Delta T_j + \beta_2 \Delta T_j^2 + \beta_3 \Delta G_j + \beta_4 \Delta G_j^2 + \epsilon \tag{3.14}$$

$$\gamma_1 + 2 \cdot \gamma_2 \overline{\Delta T_j} \tag{3.15}$$

$$\gamma_3 + 2 \cdot \gamma_4 \overline{\Delta G_j} \tag{3.16}$$

Equation (3.14) will produce estimates of the effects on migration for a marginal change in state characteristics. Equations (3.15) and (3.16) represent the marginal effect of taxes and public provision, respectively. Figure 3.2 shows this relationship graphically. P(Q) represents the probability that a mobile individual will reside in the jurisdiction at the end of the migration period, either because they decided not to emigrate, or they immigrated from another jurisdiction. Q represents balanced budget public provision, since provision must be financed with taxes. Q represents g = τ for a particular jurisdiction.

In reality, political rent and bureaucratic inefficiencies cause the total amount of τ to exceed the value of g provided, and individuals will prefer a lower level of provision than they would in a purely Pigouvian world with no inefficiencies. Q* represents the optimal quantity of public provision when government inefficiencies are considered, while Q^P represents that in a Pigouvian world. This study assumes that any inefficiencies remain constant and similar across jurisdictions throughout the migration period, and therefore have no bearing on individual migration decisions.

At extreme levels of Q, individuals will find the jurisdiction undesirable, either due to low levels of provision or high taxes. Q* represents the level of Q that maximizes the probability of attracting mobile residents. This also represents the optimal level of Q, or "bliss point" according to mobile individuals. This relationship can be modeled with a quadratic. At levels near Q*, marginal changes in Q will have little effect on P(Q). At levels above (below) Q*, marginal increases will decrease (increase) P(Q). By observing the changes in P(Q) associated with a given change in Q, we can observe the slope of P(Q) for a particular value of Q. Using this information, Q* would be the level of Q for which the slope would be zero for a marginal change in Q.

Figure 3.2: Migration and Public Provision
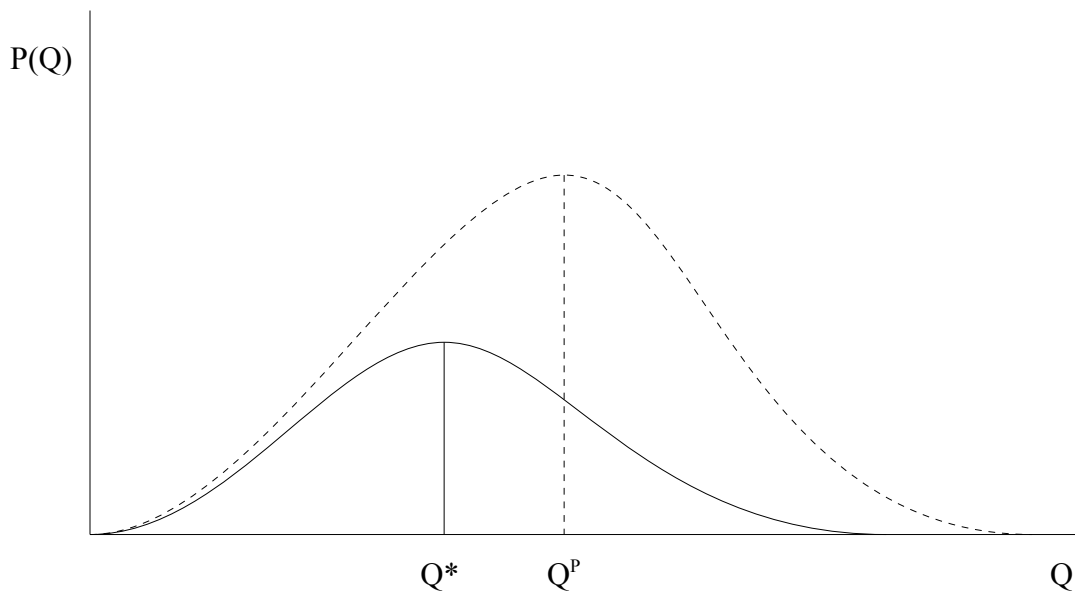
While Figure 3.2 represents the aggregation of the migration response curves for all individuals in an economy, the relationship between P(Q) and Q is different for every subgroup. Figure 3.3 shows this relationship for an economy with 2 subgroups. Q^H

represents the quantity of public provision that coincides with the bliss point for high-income individuals, while Q^L represents the quantity that coincides with low-income individuals. When individuals are aggregated, the economy-wide migration response curve emerges. In general, fiscal policy may have a greater effect on the migration decisions of high income individuals simply because they are more mobile to begin with. If this is true, then the provision of Q^H will have a greater effect on the probability of migration for high-income individuals than the provision of Q^L will have on low-income individuals.

Figure 3.3: Disaggregated Migration and Public Provision
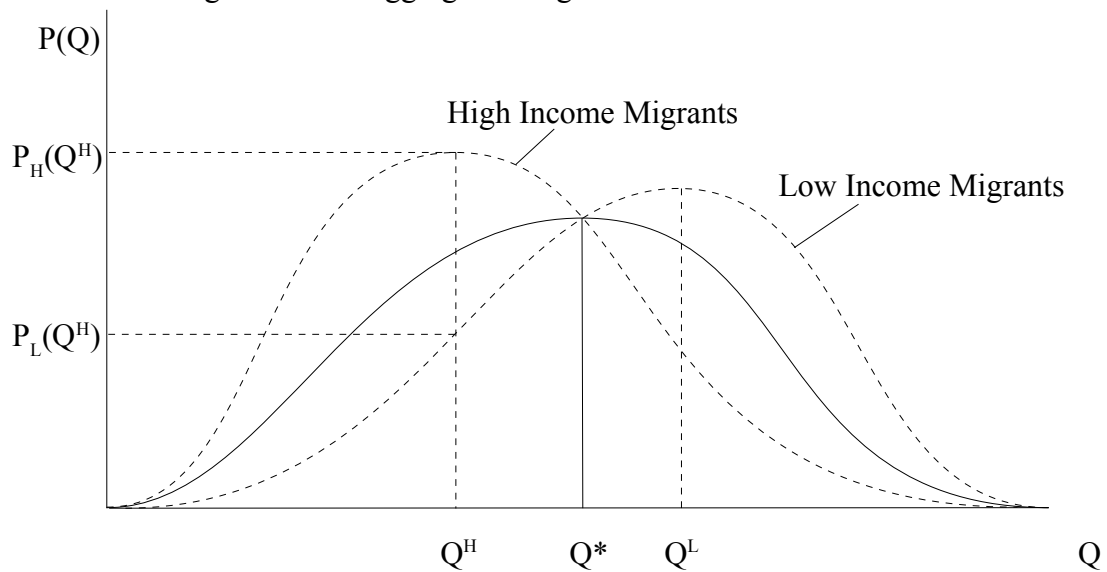
If high-income individuals do prefer less public provision, then provision levels below Q* will tend to attract a higher percentage of these individuals, ceteris paribus. In certain cases this can change the demographic makeup of the population. At the most extreme example with perfect mobility, provision levels would have a homogenizing effect on the population (Tiebout, 1956). In the absence of perfect mobility, the

population may remain heterogeneous (Rhode and Strumpf, 2003). If Q^H is provided, this will maximize the probability that mobile high-income individuals will locate in the jurisdiction in question. This probability is represented by $P_H(Q^H)$. $P_L(Q^H)$ represents the probability that a low-income individual will locate in the jurisdiction in question under Q^H. Marginal increases from Q^H would be expected to increase the probability that low-income individuals will locate in the jurisdiction. Through disaggregation, estimates will produce preferred levels of provision for different subgroups.

In aggregate studies, the number of individuals that migrate to a certain state will affect the fiscal policies of that state. If fiscal policy can attract migrants, but migrants also affect fiscal policy, estimates will suffer from endogeneity bias. Because this study uses micro data, endogeneity is assumed to not be present. Individuals do not take into consideration the effect of their migration decision on the fiscal policies of their destination state. Because migrants represent a minority of the overall population, it is assumed that their decisions will have a relatively small effect on overall fiscal policies. To the extent that policy change can be driven by mobile individuals, an aggregation issue may still exist.

Data

As is common practice in migration studies, the analysis is restricted to the 48 contiguous U.S. States. State-level fiscal data from 1985-1990 and 1995-2000 are taken from the Census Bureau. Measures of various taxes collected from own sources and expenditures are converted to dollars per $1000 of personal income and dollars per capita. These are then used to construct data on fiscal changes over the two migration

periods. Table 3.1 provides the average initial values of these fiscal measures for these 48 states.

These measures represent average levels of taxes and expenditures, and may not represent actual levels experienced by a particular individual. While individual-level tax estimates are available through NBER's Taxsim, it is more difficult to obtain accurate individual-level estimates of burdens for other tax instruments. For this reason, estimates of individual responses created from this data represent responses to average changes in taxes rather than responses to changes in taxes for a particular subgroup.

Expenditures exceed state tax receipts since a large degree of expenditures are financed with debt or federal funds. If the sum of changes in expenditures is equal to the sum of changes in revenues, equations (3.7) and (3.14) will be unidentified. For this reason, intergovernmental transfers are excluded as a source of revenue. Average 5 year changes are provided in Table 3.2.

On average, real per capita total taxes rose by $511.59, from $1,768.73 to $2,280.32, an increase of 29 percent. Similarly, expenditures rose by $995.05, from $3,691.83 to $4,686.88, an increase of 27 percent. Relative changes are created from these original fiscal changes by comparing the changes in the initial state to the changes in the "next best" state. Fiscal policy changes in a theoretical "next-best" state are computed using the weighting method discussed in the previous section. For migrants, relative changes are constructed using two different methods. The first method, used by Enchautegui (1997), compares changes in the initial state to changes in actual destination states, while the second method assigns the same imputed values as with nonmigrants.

Individual-level data was taken from the decennial census. Demographic information includes age, race, education, income, and number and age of children. Table 3.3 provides summary demographic statistics by education and household income.

Data on migration is also taken from the decennial census, and results from geographic location at the time of the census and a question asking individuals where they lived 5 years ago. Those who lived in a different state are classified as migrants, while those in the same state are considered non-migrants. Kaplan and Schulhofer-Wohl (2010) find that in 2000, previous state locations were imputed by the Census Bureau for individuals who did not respond to questions in the Current Population Survey about migration. This process was more likely to assign alternative previous states to those who did not migrate across state lines than to assign the same previous state to non-respondents who actually did. Because of this, the data tends to overstate the number of individuals who migrated. They find that from 1999-2005, the interstate migration rate for the 10 to 12 percent of CPS respondents with imputed data is 3 to 5 times greater than that of those with actual data. A lower 2 percent of the data in the 2000 decennial census was imputed, and this bias will therefore be less prevalent in the decennial census (Nash, 2001). However, imputations that do exist in the decennial census could cause this study to overstate the propensity of individuals to migrate in response to fiscal policy, as this analysis relies heavily on migrant data.

Table 3.4 shows the average 5-year real changes experienced by individuals, broken down by migrant status, education, and age. Ceteris paribus, younger individuals and those with more years of education tend to be more likely to migrate. In all cases,

migrants experienced smaller increases in taxes and expenditures than nonmigrants. While this is consistent with the idea that migrants are moving away from balanced budget fiscal activity, this is also consistent with the idea that migrants are moving to dense areas that experience economies of scale in public provision. Increases per capita along with decreases as a share of personal income suggest that, for migrants, personal income increased at a faster rate than taxes and expenditures.

In order to control for the quality of public provision, per capita violent crimes data is taken from the Bureau of Justice Statistics. Average college entrance exam scores by state are taken from ACT to be used as a proxy for school effectiveness. Average energy costs by state are taken from the Energy Information Administration.

Results

Table 3.5 presents marginal effects for the logit models of equation (3.14) using overall taxes and expenditures, per capital fiscal measures and the full sample. Models (1) and (2) use imputed fiscal measures for alternative states for nonmigrants. Actual alternative state values are used for migrants. Model (2) introduces quadratic terms for taxes and expenditures. Models (3) and (4) are analogous, but use imputed values for alternative states for all individuals. In general, taxes repel individuals and expenditures attract individuals. For models (1) and (3), Wald tests reject the hypothesis that the net effect of taxes and expenditures is zero with a confidence level in excess of 99%. As the effects of taxes are larger in magnitude than the effects of expenditures, and the net effect of additional fiscal activity is to reduce the probability that an individual will locate in a particular jurisdiction. This suggests that mobile individuals are choosing to locate in

areas where fiscal government is growing at a slower rate. A $1000 per capita increase in expenditures financed with state or local taxes would reduce the probability that an individual will locate in the jurisdiction by 0.58 percent in model (1), and 2.29 percent in model (3).

The quadratic specification in models (2) and (4) can be used to find estimates of critical points for relative changes in taxes and expenditures. In model (2), the critical point for tax changes is $0.65. In model (4), the critical tax change is -$1.70. The critical expenditure change is $0.48 in model (2) and $1.30 in model (4). These estimates may be of questionable use. Theoretically, all these critical points should represent maxima, however, only relative taxes for model (4) represents a maxima. In the other cases the estimated coefficients on the quadratic terms are positive, and the critical points derived from these estimates represent minima. The models in these cases are fitting quadratics that are convex with respect to the origin, suggesting that the data does not follow the shape predicted in Figure 3.2. For the ranges of fiscal variables in the data, migration responses could follow a shape similar to that of high income individuals at a high level of public provision shown in Figure 3.3. In other words, over the range of fiscal changes in the data, migration responses could be convex with respect to the origin because we are in the tail of the normal distribution.

Another explanation is that groups may be polarized politically within demographically homogeneous groups. There may be considerable divergence between Democrats and Republicans, for example, within a relatively homogeneous community. Some may care more about increasing expenditures while others may care more about

reducing taxes. This could generate a situation highlighted by Alesina, Baqir and Easterly (1999), where the average individual's preference is, on average, considerably different than that of the "median voter," though policies are still dictated by the median voter. In these cases, the data points may be following more extreme versions of the subgroup migration response curves shown in Figure 3.3. This is illustrated below in Figure 3.4. In this case, a median level of Q is set as a compromise between low levels of provision and high levels of provision that would be preferred by one of the two subgroups. This median level is not considered optimal by most individuals. Consequently, marginal changes will attract one group but repel the other. A marginal increase from Q* would repel some individuals who desire lower levels of provision, but may attract substantially more individuals who desire higher levels of provision, and vice versa. Q* may actually appear to minimize the probability that all individuals locate in the jurisdiction. This probability, which is the sum of the probability curves for both groups, is represented by the dotted line in Figure 3.4. If we never empirically observe Q* falling below Q^L or above Q^H, then we might expect a quadratic model to fit a convex curve. However, even when relatively small subsamples are considered in quadratic models, minima persist.

Figure 3.4: Within-Group Polarization
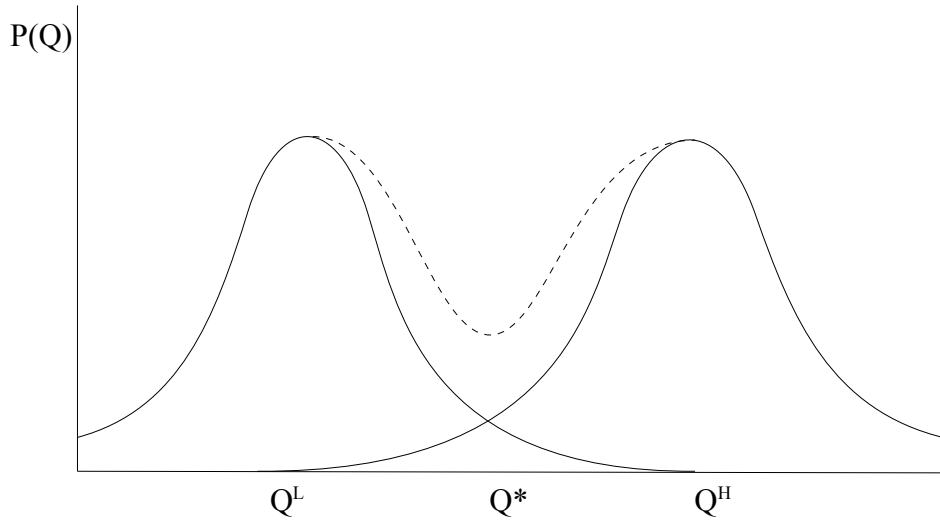
Other explanations question the existence of Tiebout migration at the state level. Scully (1991) documents convergence in fiscal policy between states in the US through 1986. This convergence would reduce the benefits available to any potential migrant, and is used to explain why Tiebout migration would be less likely as a result. However, states may still differ considerably in their mix of taxes and expenditures.

Another explanation suggests that Tiebout migration is less likely to exist in response to aggregated fiscal policies. To illustrate this point, Table 3.6 presents the standard deviation for each fiscal measure for each of the states. With the exception of elementary education, disaggregated tax and expenditure categories have considerably greater variation than aggregate categories. Those of us who return from the grocery store are more likely to have paid a similar amount for our purchases than we are to have

purchased a similar basket of goods. In the same way, individuals are more likely to prefer different types of public provision than they are to prefer different expenditure levels. Consequently, it may be more difficult to observe Tiebout-style migration in response to aggregate expenditures than in response to individual expenditures.

Table 3.7 presents estimates using fiscal measures as a share of every $1000 in personal income. Models (5) and (6) use actual values for migrants, while models (7) and (8) impute values for migrants. The income share models differ from the per capita models in that they suggest that individuals are migrating toward balanced budget increases in provision. Model (5) suggests a $1 increase in expenditures financed through additional taxes will increase the probability that an individual locates in the jurisdiction by 0.097 percent, while model (7) suggests only 0.009 percent. Model (6) fits a quadratic, and suggests critical relative decreases of $0.34 and $2.20 on taxes and expenditures respectively. Model (8) also fits a quadratic, and suggests a decrease $6.00 for every $1000 of personal income in expenditures will maximize the probability of location in a jurisdiction at the end of the migration period. Model (8) fits a convex quadratic for taxes and suggests that a decrease of $6.25 will minimize the probability of location in a jurisdiction. These quadratic estimates would also be subject to the caveats discussed above.

The per capita measures are common in the literature, but can be criticized as the cost of living varies across jurisdictions. Expenditures, while nominally greater in one jurisdiction, may represent a lower level of public provision. Measures as a share of personal income may overcome this limitation but may be subject to other weaknesses.

Because many of the goods in question are at least partially nonrival, relatively large jurisdictions may realize significant economies of scale. If states with larger tax bases can take advantage of economies of scale, expenditures as a share of personal income may be lower than in a competing state even if the actual level of provision is higher.

A third specification uses per capita measures of expenditures in combination with taxes as a share of personal income. The intuition is that individuals care about their tax liabilities in proportion to their income, but do not consume publicly-provided goods in proportion to their income. Estimates using this specification are also shown in Table 3.7. The marginal impact of balanced budget fiscal activity was calculated at the mean income for all individuals. In a quasi-R^2, the estimated coefficients from this model have a predictive ability of somewhere between 2.59 and 6.33 percent greater than the constant term alone (Shtatland et al,2000).

Table 3.8 provides results using data from the 1990 census for comparison. The linear models produce evidence that individuals are moving away from taxes and towards expenditures. On net, individuals are moving towards balanced budget increases in fiscal activity. All four quadratic models in Table 3.8 fit convex functions, suggesting that the critical tax increases and expenditure decreases appear to minimize the probability that individuals will locate in a jurisdiction.

Table 3.9 reports income and tax coefficients for models (1) through (8) estimated using a restricted sample that excludes individuals nearing retirement age. Results are generally similar, with the exception of model (1) which suggests the relative balanced

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budget increases in fiscal activity is positively associated with locational decisions. In general, the imputed data provides smaller estimates of the effect of expenditures.

Table 3.10 presents the 2000 and 1990 results of linear models estimated with disaggregated taxes and expenditures. Alternative state data is imputed for all individuals in these models. These models allow the marginal effect of a balanced budget increase in specific types of expenditures to be calculated. New expenditures are assumed to be financed using different tax instruments in proportion to their original distribution as shown in Table 3.1.

With the exception of corporate income taxes in the 1985-1990 migration period and estate taxes for the 1995-2000 period, these models generate negative coefficients for all taxes. Though the coefficient on estate taxes appears large, a $1 increase would more than double estate taxes from the 1995 level of .73 for every $1,000 of personal income, while a $1 increase in other taxes would be relatively small.

In general, education expenditures are positively related to migration decisions, while expenditures in other categories are negatively related. This is consistent with the conclusions of Evans and Karras (1994), who find that public expenditures on education are productive and contribute to economic growth, but other expenditures do not. For the 1990 Census, welfare expenditures are positively related and higher education expenditures are negatively related to migration decisions.

It seems counterintuitive that individuals would migrate away from increases in safety, highway, and utility spending, given the theoretical idea and empirical confirmation in Table 3.7 that individuals are attracted by public provision. This may be

attributable to characteristics of specific types of provision and unobservables. Spending on public safety programs is valued in order to protect individuals from crime, a characteristic that would tend to drive away mobile individuals, and for this reason violent crime is included in the model as a control variable. Beyond crime control, however, police and corrections services are of questionable value. Individuals may be migrating away from areas with relatively large public safety programs but relatively little crime. Additional expenditures in this case would be relatively ineffective, compared to areas with high crime and low police expenditures.

Ceteris paribus, individuals should prefer additional spending on highways, though individuals appear to migrate away from it. If spending on roads follows disrepair, traffic congestion and need for new construction, a measure of this type of spending may be a proxy for poor transportation infrastructure.

Certain types of provision, such as public utilities are commonly privatized. In these cases, public spending on these programs will fall dramatically, though the programs themselves remain in place. If inefficiencies provided incentives for privatization, which in fact resulted in more efficient provision, then the public would be more satisfied with the program, even though public spending on the program fell. This may also be the case with highways, as toll roads in some states are privatized.

Table 3.11 presents the marginal effect of balanced budget changes for a variety of demographic subsamples. Results are provided for subsamples in order to examine the interaction effects of income, age and education. These subsamples demonstrate considerable heterogeneity in willingness to pay for public provision. Most surprising is

the negative sign on balanced budget increases in welfare expenditures for low income individuals. Results are similar for single-female-headed households at the bottom quintile of the income distribution, a group that has traditionally had a strong empirical link with welfare migration. These results require explanation.

When taxes are not considered, the marginal effect of relative changes in welfare expenditures is positive for these individuals. This suggests that these balanced-budget effects are being driven by individual responses to taxes. Low-income individuals have different tax burdens than high-income individuals and are likely to pay the majority of their taxes through different instruments. Low-income individuals, for example, are likely to pay less through property and individual income taxes than are high-income individuals. In addition, they are not likely to bear the full burden of additional welfare expenditures with additional taxes. Therefore, these balanced-budget results should be interpreted as the average individual's willingness-to-pay for additional quantities of public provision, and do not conflict with previous empirical studies that document welfare migration. Low-income individuals may not be "willing to pay" for additional quantities of welfare expenditures, though they may still desire additional quantities and may even be willing to engage in welfare migration, as evidenced by the positive coefficients on welfare expenditures. In both cases, results indicate a negative willingness-to-pay for all types of public provision.

Another puzzling result is the positive sign on balanced budget expenditures on welfare and migration for the top income quintile. As would be expected, there is a negative relationship between migration outcomes and welfare expenditures for this

group when taxes are not considered. Therefore, this result is driven solely by positive coefficients on some of the tax variables. Only selective sales and corporate income taxes generate negative coefficients for this group. As this group is more likely to receive income from investments, they may prefer certain forms of taxes because the burden is primarily borne by others. The relatively large coefficients on sales taxes may be positive because sales taxes are thought to be more regressive, and these taxes are less likely to be borne primarily by high-income individuals. Another explanation is that these tax measures may be correlated with expenditure categories that high-income individuals have strong preferences for. For example, relative changes in property taxes as a share of personal income have a correlation with relative changes in expenditures on elementary education of 0.36. Relative changes in individual income taxes have a correlation with expenditures on higher education of 0.31. High income individuals may in fact dislike taxes, but may value expenditures on education more. If this is the case, the coefficients on property and income taxes will be upwardly biased, while the coefficients on education will be downwardly biased. However, these two biases will tend to cancel each other out when balanced budget changes are considered. These two examples highlight the problem of examining individual group responses to aggregate tax changes.

Single-female-headed households in the bottom 20% if the income distribution do not appear to be unsatisfied with the level of spending on safety programs including police, fire, and corrections. These results differ from those of the full sample, which migrate away from these expenditures. Perhaps these individuals are more likely to use these services as they are more likely to live in low-income neighborhoods that are

inherently more dangerous. On the other hand, income constraints make these individuals less likely to migrate, and they may be unable to escape from states with increasing crime rates and increasing expenditures on these programs.

Policy makers may be most interested in attracting young college-educated individuals. Estimates suggest that balanced-budget expenditures on elementary and secondary education have the strongest positive relationship with migration for this group. Expenditures on health programs have a smaller positive relationship, while other expenditures have a negative relationship.

The final four columns in Table 3.11 provide estimates of the elasticity of migration with respect to increases in fiscal categories broken down by educational attainment. Individuals without a high-school diploma are less likely to migrate in response to increases in expenditures on higher education. Similarly, individuals with a high-school diploma but no college are likely to migrate away from increases in all fiscal categories. Both of these results may partially be driven by the fact that these individuals are unlikely to bear the full burden of any increases in taxes, and should be interpreted as their willingness-to-pay for public provision, rather than their political preferences for public provision. Those with some, but less than 4 years of college are migrating toward balanced-budget increases in education expenditures. Interestingly, those with college degrees seem willing to pay for increases in multiple types of expenditures, including education, safety, and health.

Because different groups have different responses to changes in fiscal policies, any changes to fiscal policy will have distributional implications. With the exception of

spending on higher education, fiscal policy changes are unlikely to attract one group while repelling another. In most cases, all individuals would be attracted (or repelled) by the same fiscal changes, but at different rates. These fiscal changes can have a larger effect on individuals from a particular group.

Table 3.15 simulates the impact on the population of the average state of a $1 increase in each expenditure category financed with taxes. The data used to produce these estimates is from a 1 in 20 sample of the underlying population, and results were multiplied by 20 to produce simulated impacts on the underlying population. These estimates use the mixed specification, and assume that individuals with larger incomes will bear a larger share of the tax burden. Simulated impacts are calculated for various demographic subcategories, including education, age, and income. In most cases, education expenditures have a positive 5-year impact on population, while expenditures in other categories tend to have a negative impact on population. Expenditures on higher education tend to have a negative impact on the population with a high school diploma or less education, as well as a negative impact on the population in the lower half of the income distribution. These same expenditures on higher education tend to have a positive impact on young individuals, those in the top half of the income distribution and those with some college experience.

Higher education expenditures may in some cases attract those who wish to raise their relatively low levels of education. Individuals respond to the Census survey with their income and education levels at the end of the migration period, and some will have had lower levels of income and education at the beginning of the migration period. In

some cases, individuals will have been attracted by states with higher education expenditures that provide greater opportunities for individuals wishing to increase their level of education.

Given that there are 171,421,060 individuals from the 48 continental states represented in this study, there are approximately 3,571,272 individuals in the average state. A $1 relative increase in expenditures per capita would therefore equate to an annual increase of $3,571,272 in fiscal activity. Estimates of migration responses for various demographic subgroups are presented in Table 3.12. These estimates are produced using the number of individuals who actually moved during the migration period as a base. A $1 increase in higher education expenditures per capita would attract approximately 98 individuals to the average state over 5 years. In this case, the annual cost to attract one of these individuals with higher education expenditures would be approximately $36,441.55.

On the other hand, a $1 relative decrease (i.e., an annual reduction in fiscal activity of $3,571,272) in expenditures per capita on police, fire, and corrections would attract approximately 193 individuals in over years. In this case, approximately one individual would be attracted for each $18,504.00 annual reduction in expenditures. While this policy may increase the overall population, it may not be desirable as it also slightly decreases the population of college-educated individuals and those in the top income decile. Reductions in other programs, such as welfare and utilities, seem to attract all individuals, but require larger annual reductions of $62,653.89 and $21,007.48 respectively, to attract one individual.

The estimates in Table 3.12 represent the average state, though there can be considerable variation among states. For example, between 1995 and 2000, Florida was more likely to attract individuals of retirement age, while Nevada was more likely to attract young, single, college educated individuals. It is interesting to note that individuals of retirement age do not appear to be affected by fiscal characteristics, though a relatively large number are migrating to Florida. Many of these retired individuals are likely migrating in search of unique amenities, and fiscal characteristics have relatively little impact on their choices.

Tables 3.13, 3.14, and 3.15 provide estimates for Florida, Nevada, and Kentucky respectively. Simulation estimates suggest that individuals can be attracted to Florida with annual increases in higher education expenditures of $27,556.77, while Nevada can attract individuals for $15,258.19. Because individuals are more likely to travel to these states, marginal individuals can be attracted by these states with relatively low levels of fiscal policy changes. On the other hand, individuals are less likely to travel to other states. For example, Kentucky would have to spend approximately $40,229.06 in higher education expenditures in order to attract or retain a mobile individual.

If individuals can be attracted with fiscal policy, then fiscal policy can also affect the tax base in a jurisdiction. According to the Tax Foundation, the average state resident in Florida, Nevada, and Kentucky paid $1,846, $1,423, and $1,183 respectively in state taxes in 2000. While migrants are more likely to be high-income individuals who pay higher than average taxes, it seems unlikely that tax receipts from these individuals would be large enough to offset the cost to attract any of them with fiscal policy.

Conclusion

This chapter uses migration decisions to create revealed preference estimates of willingness to pay for public provision. In general, high-income individuals and those with a college education are more likely to be willing to pay for public provision. Specifically, these individuals appear to be willing to pay for increases in expenditures on education, and perhaps to a lesser extent, expenditures on healthcare. Most individuals appear to be satisfied with the current level of spending on utilities, though those with a college education seem to migrate away from it. This may be because they are migrating into areas that are privatizing these functions. No one appears to be willing to pay for the provision of highways. Expenditures on highways appear to have a positive benefit only to low income individuals with less than a high school education. Perhaps high-income individuals are migrating to areas with developed transportation infrastructures. These areas may benefit from economies of scale and may be less likely to report an increase in their per capita expenditures on roads.

Individuals are attracted to decreases in welfare spending. This also includes low-income individuals who are more likely to benefit from such programs. While this may seem counterintuitive, this result does not necessarily suggest that all low-income individuals demand reductions in these programs, since there may be some unobservable difference between low-income individuals who migrate and low-income individuals who do not. However, this does suggest that welfare migration is not a significant problem, and should not be used as a justification to reduce welfare spending and engage in a race-to-the-bottom with other states.

According to these results, states that wish to attract (or create) young, relatively high income, college educated individuals should increase spending on higher education or health programs and finance this spending with reductions in spending on other programs.

The ability of fiscal policy to homogenize a jurisdiction appears to be limited by preexisting heterogeneity within the overall population. Young, educated and high income individuals display higher intensity of preference. However, expenditures that attract individuals from one group will likely attract individuals from other groups as well. More radical changes in fiscal policies and/or other forms of government intervention in the economy would likely produce more sorting and homogenization.

Table 3.1: Average Level of Taxes and Expenditure in 1995 (in 2000 Dollars)

	Per Capita		Per $1000 of Personal Income	
	Level	Percentage	Level	Percentage
Total Taxes	$1,768.73	-	$69.96	-
Property Taxes	$614.54	34.74%	$23.70	33.88%
General Sales Taxes	$394.12	22.28%	$16.01	22.89%
Selective Sales Taxes	$239.80	13.56%	$9.52	13.61%
Individual Income Taxes	$266.50	15.07%	$10.50	15.02%
Corporate Income Taxes	$93.73	5.30%	$3.67	5.25%
Estate Taxes	$4.96	0.28%	$0.18	0.26%
Other Taxes	$155.08	8.77%	$6.37	9.10%
Total Expenditures	$3,691.83	-	$146.29	-
Elementary Education	$706.28	19.13%	$28.32	19.36%
Higher Education	$277.88	7.53%	$11.29	7.72%
Police, Fire, and Corrections	$182.75	4.95%	$7.02	4.80%
Health and Hospitals	$309.81	8.39%	$12.47	8.52%
Highways and Transportation	$240.01	6.50%	$9.63	6.58%
Welfare	$565.34	15.31%	$22.26	15.21%
Utilities	$234.16	6.34%	$9.31	6.36%
Interest on Debt	$211.08	5.72%	$8.31	5.68%
Other Expenditures[15]	$964.52	26.13%	$37.68	25.76%

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15 Includes all other expenditures. Values for this category are calculated by subtracting all other categories from total expenditures.

Table 3.2: Average 5-Year Change (2000 Dollars)

	Per Capita	Per $1000 of Personal Income
Total Taxes	$511.59	$20.19
Property Taxes	$92.62	$3.69
General Sales Taxes	$135.61	$5.42
Selective Sales Taxes	$41.97	$1.73
Individual Income Taxes	$193.31	$7.50
Corporate Income Taxes	$3.04	$0.11
Estate Taxes	$11.35	$0.44
Other Taxes	$33.69	$1.30
Total Expenditures	$995.05	$40.52
Elementary Education	$245.63	$9.69
Higher Education	$106.11	$4.36
Police, Fire, and Corrections	$106.88	$4.34
Health and Hospitals	$42.59	$1.84
Highways and Transportation	$85.83	$3.60
Welfare	$97.45	$4.13
Utilities	$38.00	$1.50
Interest on Debt	$17.40	$0.67
Other Expenditures	$255.17	$10.38

Table 3.3: Demographics and Migrants by Group, 2000 Census

Education	Full Sample	Less than HS	High School	Some College	College
N	8,571,053	1,671,182	2,579,283	2,341,035	1,979,553
Migrants	0.074	0.047	0.053	0.078	0.118
Household Income	$63,494	$39,120	$51,640	$64,187	$98,699
Never Married	0.13	0.13	0.12	0.13	0.16
Female	0.53	0.52	0.54	0.55	0.50
Black	0.10	0.14	0.10	0.10	0.06
Hispanic	0.09	0.22	0.07	0.07	0.04
Avg Number of Children	0.65	0.61	0.61	0.73	0.69
Children (<6 yrs) Present	0.14	0.12	0.12	0.16	0.17
Older Children Present	0.28	0.25	0.27	0.31	0.28

Income Quantiles	Bottom Income Quartile	25%-50% Income Quartile	50%-75% Income Quartile	Top Income Quartile	Top 5% Income Quantile	Top 1% Income Quantile
N	2,146,114	2,142,355	2,139,874	2,142,710	428,550	87,116
Migrants	0.065	0.073	0.074	0.084	0.093	0.092
Household Income	$15,464	$37,810	$62,018	$138,760	$269,346	$432,130
Never Married	0.17	0.14	0.12	0.11	0.09	0.08
Female	0.60	0.52	0.50	0.50	0.49	0.49
Black	0.15	0.10	0.08	0.06	0.04	0.04
Hispanic	0.11	0.10	0.08	0.06	0.05	0.05
Avg Number of Children	0.51	0.67	0.76	0.71	0.70	0.81
Children (<6 yrs) Present	0.11	0.15	0.16	0.14	0.14	0.16
Older Children Present	0.21	0.27	0.32	0.32	0.30	0.34

Table 3.4: Average 5-Year Tax and Expenditure Changes by Group (Real 2000 Dollars)

Education	Age	N	Migrants	Fraction of Migrants	Real Tax Increase Experienced by Migrants		Real Expenditure Increase Experienced by Migrants		Real Tax Increase Experienced by Non-migrants		Real Expenditure Increase Experienced by Non-migrants	
					Per Capita	Per $1000	Per Capita	Per $1000	Per Capita	Per $1000	Per Capita	Per $1000
<HS	25-34	261,788	21,758	0.08	214.08	-0.44	943.68	19.25	422.09	2.74	1301.14	23.53
	35-49	431,360	23,856	0.06	186.69	-1.11	924.63	19.25	404.50	2.30	1291.59	23.68
	50-64	384,817	14,736	0.04	88.63	-2.72	828.10	19.42	376.05	1.57	1279.07	24.00
	65+	593,217	17,465	0.04	131.62	-3.05	874.11	17.37	361.53	1.08	1272.31	23.89
	Total	1,671,182	77,815	0.05	163.42	-1.66	900.34	18.86	385.02	1.76	1283.15	23.81
HS	25-34	469,821	39,877	0.08	253.71	-0.41	1061.39	20.79	369.55	1.27	1277.26	23.79
	35-49	908,028	48,764	0.05	207.84	-1.04	1005.97	20.81	359.69	0.91	1275.18	23.73
	50-64	642,446	27,983	0.04	75.64	-3.18	822.90	19.09	354.22	0.72	1274.02	23.73
	65+	558,988	20,442	0.04	95.25	-3.81	826.85	16.47	357.34	0.59	1267.68	22.89
	Total	2,579,283	137,066	0.05	177.40	-1.71	958.00	19.81	359.53	0.85	1273.60	23.56
HS+	25-34	531,414	63,368	0.12	285.41	-0.42	1112.41	20.30	388.30	1.61	1293.04	23.52
	35-49	946,602	69,979	0.07	243.57	-0.68	1049.15	20.42	388.52	1.51	1290.79	23.19
	50-64	551,836	34,765	0.06	136.83	-1.72	915.32	20.87	389.49	1.62	1289.76	23.30
	65+	311,183	15,444	0.05	102.35	-3.04	841.61	17.96	388.17	1.62	1281.22	23.08
	Total	2,341,035	183,556	0.08	225.91	-0.99	1028.18	20.26	388.66	1.57	1289.72	23.27
College	25-34	443,495	100,831	0.23	377.12	-0.51	1258.96	18.95	394.54	1.34	1283.08	22.02
	35-49	778,229	82,694	0.11	294.31	-0.90	1112.23	18.76	396.32	1.35	1276.83	21.73
	50-64	503,452	36,115	0.07	163.68	-1.90	970.03	20.38	396.97	1.43	1279.20	21.92
	65+	254,377	14,445	0.06	64.21	-4.26	805.15	16.55	391.69	1.46	1274.31	22.20
	Total	1,979,549	234,085	0.12	295.63	-1.09	1134.54	18.95	395.51	1.39	1278.34	21.90
Totals		8,571,053	632,522	0.07	233.51	-1.27	1036.61	19.51	380.47	1.35	1280.94	23.17

Table 3.5: Logit Estimation, Probability of Migration, Per Capita Fiscal Measures

Variable	(1)	(2)	(3)	(4)
	Non-Imputed Migrant Data		Imputed Migrant Data	
total taxes	-0.000025 (0.000003)***	0.000065 (0.000002)***	-0.000003 (0.000003)	-0.000017 (0.000003)***
total taxes^2		0.000002 (0.000000)***		-0.0000002 (0.0000000)***
total expenditures	0.000043 (0.000001)***	0.000019 (0.000001)***	0.00001 (0.000001)***	-0.000013 (0.000002)***
total expenditures^2		0.0000008 (0.0000000)***		0.0000002 (0.0000000)***
age	-0.022357 (0.000145)***	-0.019048 (0.000048)***	-0.02246 (0.000147)***	-0.022529 (0.000145)***
age^2	0.000145 (0.000001)***	0.000124 (0.000000)***	0.000146 (0.000001)***	0.000146 (0.000001)***
female	-0.000839 (0.000667)	0.000405 (0.000594)	-0.000847 (0.000666)	-0.000948 (0.000667)
hispanic	-0.029108 (0.001311)***	-0.04419 (0.001168)***	-0.037706 (0.001315)***	-0.038418 (0.001315)***
black	-0.049961 (0.001226)***	-0.007126 (0.00108)***	-0.053417 (0.001227)***	-0.053389 (0.00123)***
highschool	0.000634 (0.001189)	0.003947 (0.001052)***	0.002098 (0.001188)*	0.002304 (0.001188)*
somecollege	0.086423 (0.001149)***	0.06586 (0.001165)***	0.08601 (0.001146)***	0.085761 (0.001149)***
college	0.199108 (0.001128)***	0.161148 (0.001522)***	0.198909 (0.001125)***	0.198413 (0.001129)***
single	-0.02041 (0.001003)***	-0.025278 (0.000852)***	-0.02044 (0.001004)***	-0.021157 (0.001003)***
child < 6	-0.00349 (0.00124)***	-0.002434 (0.0011)**	-0.004201 (0.001239)***	-0.00445 (0.00124)***
child > 5	-0.078228 (0.00131)***	-0.067246 (0.001241)***	-0.078612 (0.001309)***	-0.07872 (0.00131)***
number of children	0.005701 (0.000636)***	0.00505 (0.000567)***	0.006028 (0.000636)***	0.00617 (0.000636)***
unemployment	-0.03117 (0.000674)***	-0.066637 (0.000763)***	-0.019398 (0.000706)***	-0.011568 (0.000773)***
poverty	0.001236 (0.00018)***	0.000002 (0.00017)	0.003263 (0.000186)***	0.005166 (0.00019)***
energy prices	0.019845 (0.000953)***	-0.0186 (0.000927)***	0.027814 (0.000996)***	0.038261 (0.001039)***
test scores	0.012907 (0.001289)***	-0.000765 (0.001198)	0.045585 (0.001365)***	0.041223 (0.001366)***
violent crime	-0.008492 (0.000418)***	-0.011206 (0.000383)***	-0.002827 (0.000442)***	-0.005612 (0.000445)***
population density	-3.53e10 (1.76e10)**	-1.26e12 (1.73e10)***	9.85e10 (1.83e10)***	-5.43e11 (2.16e10)***

* , **, and *** indicate p<0.10, p<0.05, and p<0.01, respectively.

Table 3.6: Relative Standard Deviation, Fiscal Measures

Tax Category	Relative Standard Deviation		Expenditure Category	Relative Standard Deviation	
	Per Capita	Per Income		Per Capita	Per Income
Property Taxes	52.20	47.64	Elementary Education	30.08	27.55
General Sales Taxes	52.66	52.98	Higher Education	40.61	45.75
Selective Sales Taxes	67.92	68.24	Police, Fire, and Corrections	36.93	36.91
Individual Income Taxes	72.21	62.98	Health and Hospitals	104.30	101.82
Corporate Income Taxes	301.55	276.42	Highways and Transportation	71.15	69.33
Estate Taxes	122.94	124.96	Welfare	72.75	77.56
Other Taxes	311.83	287.55	Utilities	105.94	97.78
			Other Expenditures	58.35	55.08
Total Taxes	39.91	34.17	Total Expenditures	25.54	28.79

Table 3.7: Logit Estimation, Probability of Migration, Per Capita, Per Income, and Mixed Fiscal Measures

2000 Census	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Per Capita — Relative Changes in Per Capita Tax and Expenditure Categories				Per Income — Relative Changes in Tax and Expenditure Categories for each $1000 of Personal Income				Mixed — Relative Changes in Tax Categories as a Share of Mean Personal Income Combined with Relative Changes in Expenditure Categories Per Capita			
	Non-Imputed Migrant Data		Imputed Migrant Data		Non-Imputed Migrant Data		Imputed Migrant Data		Non-Imputed Migrant Data		Imputed Migrant Data	
total taxes	-0.000025 (0.00000)***	0.000065 (0.00000)***	-0.00003 (0.00000)***	-0.000017 (0.00000)***	-0.0003 (0.0001)***	0.0017 (0.0001)***	-0.00009 (0.00008)	-0.0005 (0.0001)***	-0.0001 (0.0001)	-0.0043 (0.0001)***	0.00039 (0.00008)	0.00004 (0.00009)
total taxes^2		0.000002 (0.00000)***		-0.0000002 (0.00000)***		0.0022 (0.0000)***		-0.00007 (0.00000)***		-0.0021 (0.00001)***		-0.00012 (0.00000)***
total expenditures	0.000043 (0.00000)***	0.000019 (0.00000)***	0.00001 (0.00000)***	-0.000013 (0.00000)***	0.0010 (0.0000)***	0.0022 (0.0000)***	0.0004 (0.0000)***	0.0006 (0.0000)***	0.00004 (0.00000)***	0.00004 (0.00000)***	0.0000059 (0.0000017)	0.00001 (0.00000)***
total expenditures^2		0.0000008 (0.00000)***		0.0000002 (0.00000)***		0.0005 (0.0000)***		0.00005 (0.00000)***		8.64e-7 (5.63e-9)***		-1.7e-7 (3.37e-9)**
net impact, additional $1 fisc	0.002%		-0.002%		0.07%		0.031%		0.03%		0.04%	
critical tax change		$0.65		-$1.70		-$0.32		-$0.28		-$1.02		$0.17
critical expenditure change		$0.48		$1.30		-$2.20		-$0.17		-$23.15		$29.41

Table 3.8: Logit Estimation, Probability of Migration, Per Capita and Per Income Fiscal Measures, 1990

1990 Census N=7,628,856 (Imputed Migrant Data)	(3)	(4)	(5)	(6)
	Per Capita — Relative Changes in Per Capita Tax and Expenditure Categories		Per Income — Relative Changes in Tax and Expenditure Categories for each $1000 of Personal Income	
total taxes	-0.00004 (0.00000)***	-0.00015 (0.00000)***	-0.00003 (0.00000)***	-0.00198 (0.00088)***
total taxes^2		0.0000002 (0.0000000)***		0.000031 (0.000001)***
total expenditures	0.00001 (0.00000)***	0.00007 (0.00000)***	0.00001 (0.00000)***	0.00073 (0.00004)***
total expenditures^2		0.00000015 (0.00000000)***		0.00006 (0.00001)***
net impact, additional $1 fisc	0.005%		0.10%	
critical tax change		$460.80		$32.38
critical expenditure change		-$234.15		-$5.98

Table 3.9: Relative Changes in Total Taxes and Expenditures, Ages 25-60

	(1b)	(2b)	(3b)	(4b)
	Per Capita	Per Capita	Per Capita, Imputed	Per Capita, Imputed
total taxes	-0.00006 (0.000015)***	0.00004 (0.00000)***	-0.00010 (0.000016)***	-0.00004 (0.00000)***
total taxes^2		0.000002 (0.000000)***		-0.00000009 (0.00000001)***
total expenditures	0.000170 (0.000007)***	0.00002 (0.00000)***	0.000041 (0.000008)***	-0.000011 (0.000002)***
total expenditures^2		0.0000009 (0.0000000)***		0.0000002 (0.0000000)***
net impact of additional $1 per capita fiscal activity	0.011%		-0.006%	
optimal tax change		-$8.71		-$189.96
optimal expenditure change		-$9.57		$32.08

	(5b)	(6b)	(7b)	(8b)
	Per Income	Per Income	Per Income, Imputed	Per Income, Imputed
total taxes	-0.00286 (0.000371)***	0.0018 (0.0001)***	-0.00237 (0.000392)***	-0.0010 (0.0001)***
total taxes^2		0.0026 (0.0000)***		-0.00004 (0.00001)***
total expenditures	0.00383 (0.000166)***	0.0026 (0.0000)***	0.00163 (0.000175)***	0.0005 (0.0000)***
total expenditures^2		0.0006 (0.0000)***		0.00004 (0.00000)***
net impact of additional $1 per income fiscal activity	0.10%		-0.07%	
optimal tax change		-$0.35		-$11.78
optimal expenditure change		-$2.19		-$6.15

Table 3.10: Full Sample, 2000 and 1990 Censuses

Variable	2000 Census (N=8,571,053)			1990 Census (N=7,628,856)	
	Per Capita	Per Income	Mixed	Per Capita	Per Income
Δ Property Tax	-0.0002 (0.0000)***	-0.0036 (0.0003)***	-0.0044 (0.0003)***	-0.00004 (0.00001)***	-0.0010 (0.0001)***
Δ General Sales Tax	-0.00005 (0.00001)***	-0.0008 (0.0002)***	0.0007 (0.0002)***	-0.00004 (0.00001)***	-0.0003 (0.0001)**
Δ Selective Sales Tax	-0.0004 (0.0000)***	-0.0087 (0.0003)***	-0.0078 (0.0003)***	-0.0007 (0.0000)***	-0.0104 (0.0003)***
Δ Individual Income Tax	-0.00014 (0.00001)***	-0.0026 (0.0001)***	-0.0024 (0.0001)***	-0.0002 (0.0000)***	-0.0032 (0.0001)***
Δ Corporate Tax	-0.0004 (0.0000)***	-0.0099 (0.0006)***	-0.0047 (0.0006)***	0.00013 (0.00003)***	0.0060 (0.0005)***
Δ Estate Tax	0.00022 (0.00006)***	0.0080 (0.0015)***	0.0064 (0.0015)***	-0.0011 (0.0001)***	-0.0153 (0.0017)***
Δ Interest on Debt	-0.000022 (0.000018)	-0.0016 (0.0005)***	0.0008 (0.0005)	-0.0008 (0.0000)***	-0.0137 (0.0003)***
Δ Elementary Education	0.0003 (0.0000)***	0.0064 (0.0001)***	0.0002 (0.0000)***	0.0005 (0.0000)***	0.0082 (0.0001)***
Δ Higher Education	0.0003 (0.0000)***	0.0072 (0.0003)***	0.0003 (0.0000)***	-0.00011 (0.00002)***	-0.0021 (0.0003)***
Δ Safety	-0.0003 (0.0000)***	-0.0078 (0.0004)***	-0.0003 (0.0000)***	-0.0005 (0.0000)***	-0.0101 (0.0004)***
Δ Health and Hospitals	-0.00011 (0.00001)***	-0.0017 (0.0002)***	-0.00008 (0.00001)***	-0.00014 (0.00001)***	-0.0019 (0.0002)***
Δ Highways	-0.00010 (0.00001)***	-0.0032 (0.0003)***	-0.00008 (0.00001)***	-0.00008 (0.00001)***	-0.0009 (0.0002)***
Δ Welfare	-0.000004 (0.000006)	-0.0007 (0.0001)***	-0.00003 (0.00001)***	0.0002 (0.0000)***	0.0034 (0.0002)***
Δ Utilities	-0.0003 (0.0000)***	-0.0054 (0.0003)***	-0.0003 (0.0000)***	0.00012 (0.00001)***	0.0014 (0.0001)***
Δ Other Taxes	-0.00011 (0.00001)***	-0.0039 (0.0004)***	-0.0037 (0.0004)***	0.0004 (0.0000)***	0.0047 (0.0002)***
Δ Other Expenditures	0.00009 (0.00001)***	0.0024 (0.0001)***	0.00006 (0.00001)***	0.00010 (0.00001)***	0.0021 (0.0001)***
Effect of Balanced Budget Changes on P(x)					
Elementary Education	0.0116***	0.2804***	0.0154***	0.0356***	0.6413***
Higher Education	0.0105***	0.3564***	0.0229***	-0.0231	-0.3841
Safety	-0.0461***	-1.1431***	-0.0418***	-0.0659***	-1.1847***
Health and Hospitals	-0.0287***	-0.5308***	-0.0166***	-0.0262	-0.3657
Highways	-0.0275***	-0.6778	-0.0173***	-0.0204**	-0.2633***
Welfare	-0.0180***	-0.4257***	-0.0114***	0.0032	0.1678***
Utilities	-0.0432***	-0.8958***	-0.0367***	-0.0004***	-0.0329***
Other Expenditures	-0.0088***	-0.1228***	-0.0026***	-0.0019***	0.0298***

Table 3.11: Marginal Effect of Balanced Budget Changes in Fiscal Categories on P(x)

	Individuals < 60	Age<60, Bottom 20% Income	Age<60, Top 20% Income	Single Female w/Children, Bottom 20%	College Educated Individuals < 35	Less than High School	High School	Some College	College
N	6,420,179	963,059	1,440,403	261,941	443,495	1,671,182	2,579,283	2,341,035	1,979,553
$1 Increase Per Capita									
Elementary Education	0.0109***	-0.0055***	0.0304***	-0.0057***	0.0385***	0.000171***	-1.2E-05***	5.31E-05***	0.000113***
Higher Education	0.0106***	-0.0171***	0.0459***	-0.0187***	0.0472***	-0.00029***	-0.00029***	0.000188***	0.000192***
Police, Fire, Corrections	-0.0391***	-0.0704	0.0001***	-0.0757	0.0127**	-0.00043***	-0.00084***	-0.00068***	1.44E-05***
Health and Hospitals	-0.0289***	-0.0621***	0.0077***	-0.0690***	0.0116***	-0.00038***	-0.0007***	-0.00032***	6.35E-05***
Highways	-0.0309	-0.0249***	-0.0237***	-0.0166***	-0.0446***	-5.9E-05***	-0.00027***	-0.00027***	-0.00013***
Welfare	-0.0161***	-0.0402***	0.0074***	-0.0354***	-0.0016**	-0.00023***	-0.00032***	-0.00018***	-6.3E-07***
Utilities	-0.0383***	-0.0637***	-0.0146***	-0.0580***	-0.0281***	-0.00054***	-0.00067***	-0.00035***	-0.00011***
Other Expenditures	-0.000071***	-0.0301***	0.0150	-0.0222***	0.0116***	-0.00022***	-0.00024***	-5.5E-05***	3.07E-05***
$1 Increase Per $1000 of Personal Income									
Elementary Education	0.2412***	0.0346***	0.5942	0.0325***	0.8253***	0.005567***	-0.00016***	0.000589***	0.002519***
Higher Education	0.3338***	0.0454***	0.7623***	-0.0146***	0.7509***	-0.00444***	-0.00236***	0.005885***	0.003582***
Police, Fire, Corrections	-1.0034***	-1.2243***	-0.4937***	-1.3134	-0.1802***	-0.00808***	-0.01859***	-0.0176***	-0.00102***
Health and Hospitals	-0.5698***	-1.3501***	0.3336***	-1.4409***	0.4538***	-0.00636***	-0.01558***	-0.00664***	0.002391***
Highways	-0.7710**	-0.4215***	-0.7539***	-0.2461***	-1.3591***	-0.00058***	-0.00499***	-0.00667***	-0.00408***
Welfare	-0.3991***	-0.8824***	0.1421***	-0.7308***	-0.0818***	-0.00464***	-0.0081***	-0.00475***	4.43E-05***
Utilities	-0.7828***	-1.5920***	-0.0604***	-1.3628**	-0.4496***	-0.01117***	-0.01561***	-0.00699***	-0.00181***
Other Expenditures	-0.1042***	-0.5088***	0.3536***	-0.2814***	0.2517	-0.00289***	-0.00433***	-0.00068***	0.000839***
Mixed Specification: $1 Increase Per Capita, Financed with Taxes as a Share of Personal Income									
Elementary Education	0.000135***	0.000166***	0.000240***	0.000162***	0.000347***	0.000179***	0.0000003***	0.000062***	0.000105***
Higher Education	0.000215***	0.000208***	0.000431***	0.000188***	0.000509***	-0.000179***	-0.000128***	0.000298***	0.000203***
Police, Fire, Corrections	-0.000361***	-0.000534***	-0.000008***	-0.000578***	0.000161***	-0.000469***	-0.000856***	-0.000656***	0.000027***
Health and Hospitals	-0.000194***	-0.000066***	-0.000133***	-0.000137***	-0.000028***	-0.000124***	-0.000479***	-0.000262***	0.000023***
Highways	-0.000228***	0.000128***	-0.000363***	0.000204***	-0.000508***	0.000066***	-0.00011***	-0.000198***	-0.000148***
Welfare	-0.000117***	-0.000046***	-0.000053***	-0.000003***	-0.000104***	-0.00012***	-0.000231***	-0.000157***	-0.000021***
Utilities	-0.000326***	-0.000298***	-0.000214***	-0.000234***	-0.000342***	-0.000463***	-0.000588***	-0.000309***	-0.000129***
Other Expenditures	-0.000024***	0.000015***	0.000068***	0.00009***	0.000068***	-0.000139***	-0.000173***	-0.000022***	0.00002***

Table 3.12: Simulated Distributional Effect, Average State, Balanced Budget Changes in Fiscal Categories, Mixed Specification

	Migrant Population	Age < 60	Age<60, Bottom 20% Income	Age<60, Top 20% Income	Single Female w/Children, Bottom 20%	College Educated Individuals < 35	Less than High School	High School	Some College	College
Mobile Population[16]	556,362	481,611	70,703	120,216	18,702	96,441	65,230	115,248	160,820	215,063
5-Year Effect of a $1 Annual Per Capita Relative Increase on the Population of the Average State										
Elementary Education	64	52	9	23	2	25	10	0	8	18
Higher Education	98	82	12	41	3	37	-10	-12	38	35
Police, Fire and Corrections	-193	-138	-30	-1	-9	12	-25	-81	-85	5
Health and Hospitals	-80	-74	-4	-13	-2	-2	-7	-45	-34	4
Highways	-83	-87	7	-34	3	-37	4	-10	-26	-25
Welfare	-57	-45	-3	-5	0	-8	-6	-22	-20	-4
Utilities	-170	-124	-17	-20	-3	-25	-25	-56	-40	-22
Other Expenditures	-17	-9	1	6	1	5	-7	-16	-3	3

	Individuals 25-37	Individuals 38-47	Individuals 48-61	Individuals >61	Bottom Income Quartile	25%-50% Income Quartile	50%-75% Income Quartile	Top Income Quartile	Top Income Decile
Underlying Population	260,478	127,977	98,095	69,811	118,461	134,907	140,711	162,283	69,807
5-Year Effect of a $1 Annual Per Capita Relative Increase on the Population of the Average State									
Elementary Education	22	8	8	0	-18	5	17	27	12
Higher Education	35	13	14	0	-22	15	19	48	27
Police, Fire and Corrections	-41	-38	-40	0	-98	-64	-25	-5	2
Health and Hospitals	-36	-16	-9	0	-43	-26	-28	-10	2
Highways	-45	-17	-6	0	-21	-22	-22	-30	-14
Welfare	-23	-6	-10	0	-42	-20	-8	-4	-1
Utilities	-46	-26	-31	0	-71	-55	-49	-22	-7
Other Expenditures	-4	-2	-5	0	-36	-11	-5	9	4

16 Total number of individuals 25 and over who migrated into the average state during the 5-year migration period as well as the number of individuals who left the average state during the migration period. Fiscal policy can attract individuals, but can also reduce the probability that individuals will leave a state. For the average state, the number of individuals who migrated into a state is identical to the number of individuals who migrated out of a state.

Table 3.13: Simulated Distributional Effect in Florida, Balanced Budget Changes in Fiscal Categories, Mixed Specification

Total Population 10,251,119	Migrant Population	Age < 60	Age<60, Bottom 20% Income	Age<60, Top 20% Income	Single Female w/Children, Bottom 20%	College Educated Individuals < 35	Less than High School	High School	Some College	College
Underlying Population[17]	2,120,495	1,605,068	264,602	346,071	65,534	206,905	294,741	542,704	651,363	631,687
5-Year Effect of a $1 Annual Per Capita Relative Increase on the Population of Florida										
Elementary Education	243	172	35	66	8	54	43	0	32	53
Higher Education	372	274	44	117	10	80	-43	-57	156	102
Police, Fire and Corrections	-736	-460	-114	-2	-30	25	-113	-382	-342	14
Health and Hospitals	-305	-248	-14	-36	-7	-4	-30	-214	-137	12
Highways	-317	-291	27	-99	11	-79	16	-49	-103	-74
Welfare	-216	-149	-10	-15	0	-16	-29	-103	-82	-11
Utilities	-648	-415	-63	-58	-12	-53	-111	-262	-161	-65
Other Expenditures	-65	-32	3	19	5	11	-34	-77	-12	10

	Individuals 25-37	Individuals 38-47	Individuals 48-61	Individuals >61	Bottom Income Quartile	25%-50% Income Quartile	50%-75% Income Quartile	Top Income Quartile	Top Income Decile
Underlying Population	747,247	448,334	439,168	485,746	520,294	565,572	509,216	525,413	240,162
5-Year Effect of a $1 Annual Per Capita Relative Increase on the Population of Florida									
Elementary Education	63	27	38	1	-81	20	60	87	41
Higher Education	99	45	62	1	-96	61	69	156	92
Police, Fire and Corrections	-118	-135	-181	-2	-432	-266	-91	-18	7
Health and Hospitals	-103	-56	-38	0	-190	-108	-100	-33	5
Highways	-129	-59	-26	0	-92	-93	-80	-98	-47
Welfare	-65	-20	-43	0	-184	-86	-28	-14	-4
Utilities	-131	-91	-139	-2	-314	-229	-177	-71	-24
Other Expenditures	-11	-6	-25	0	-158	-47	-17	29	15

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17 Individuals 25 and over who migrated to Kentucky during the 5-year migration period

Table 3.14: Simulated Distributional Effect in Nevada, Balanced Budget Changes in Fiscal Categories, Mixed Specification

Total Population 1,220,655	Migrant Population	Age < 60	Age<60, Bottom 20% Income	Age<60, Top 20% Income	Single Female w/Children, Bottom 20%	College Educated Individuals < 35	Less than High School	High School	Some College	College
Underlying Population[18]	454,403	375,464	60,628	71,050	15,085	31,927	76,519	123,092	158,247	96,545
5-Year Effect of a $1 Annual Per Capita Relative Increase on the Population of Nevada										
Elementary Education	52	40	8	13	2	8	11	0	8	8
Higher Education	80	64	10	24	2	12	-11	-13	38	16
Police, Fire and Corrections	-158	-108	-26	0	-7	4	-29	-87	-83	2
Health and Hospitals	-65	-58	-3	-7	-2	-1	-8	-48	-33	2
Highways	-68	-68	6	-20	2	-12	4	-11	-25	-11
Welfare	-46	-35	-2	-3	0	-3	-8	-23	-20	-2
Utilities	-139	-97	-15	-12	-3	-8	-29	-59	-39	-10
Other Expenditures	-14	-7	1	4	1	2	-9	-18	-3	2

	Individuals 25-37	Individuals 38-47	Individuals 48-61	Individuals >61	Bottom Income Quartile	25%-50% Income Quartile	50%-75% Income Quartile	Top Income Quartile	Top Income Decile
Underlying Population	176,450	103,988	100,485	73,480	107,574	121,088	120,105	105,636	38,498
5-Year Effect of a $1 Annual Per Capita Relative Increase on the Population of Nevada									
Elementary Education	15	6	9	0	-17	4	14	17	7
Higher Education	23	10	14	0	-20	13	16	31	15
Police, Fire and Corrections	-28	-31	-41	0	-89	-57	-22	-4	1
Health and Hospitals	-24	-13	-9	0	-39	-23	-23	-7	1
Highways	-30	-14	-6	0	-19	-20	-19	-20	-7
Welfare	-15	-5	-10	0	-38	-18	-7	-3	-1
Utilities	-31	-21	-32	0	-65	-49	-42	-14	-4
Other Expenditures	-3	-1	-6	0	-33	-10	-4	6	2

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18 Individuals 25 and over who migrated to Kentucky during the 5-year migration period

Table 3.15: Simulated Distributional Effect in Kentucky, Balanced Budget Changes in Fiscal Categories, Mixed Specification

Total Population 2,534,431	Migrant Population	Age < 60	Age<60, Bottom 20% Income	Age<60, Top 20% Income	Single Female w/Children, Bottom 20%	College Educated Individuals < 35	Less than High School	High School	Some College	College
Underlying Population[19]	357,550	316,221	59,277	58,250	16,596	50,899	51,771	87,777	105,541	65,203
5-Year Effect of a $1 Annual Per Capita Relative Increase on the Population of Kentucky										
Elementary Education	41	34	8	11	2	13	8	0	5	5
Higher Education	63	54	10	20	2	20	-8	-9	25	11
Police, Fire and Corrections	-124	-91	-25	0	-8	6	-20	-62	-55	1
Health and Hospitals	-51	-49	-3	-6	-2	-1	-5	-35	-22	1
Highways	-53	-57	6	-17	3	-19	3	-8	-17	-8
Welfare	-36	-29	-2	-2	0	-4	-5	-17	-13	-1
Utilities	-109	-82	-14	-10	-3	-13	-20	-42	-26	-7
Other Expenditures	-11	-6	1	3	1	3	-6	-12	-2	1

	Individuals 25-37	Individuals 38-47	Individuals 48-61	Individuals >61	Bottom Income Quartile	25%-50% Income Quartile	50%-75% Income Quartile	Top Income Quartile	Top Income Decile
Underlying Population	170,467	83,370	65,837	37,886	92,718	95,433	88,844	80,565	30,449
5-Year Effect of a $1 Annual Per Capita Relative Increase on the Population of Kentucky									
Elementary Education	15	6	6	0	-17	3	11	13	5
Higher Education	23	9	10	0	-20	10	12	24	12
Police, Fire and Corrections	-27	-28	-30	0	-90	-45	-16	-3	1
Health and Hospitals	-24	-12	-6	0	-40	-18	-18	-5	1
Highways	-30	-12	-4	0	-19	-16	-14	-15	-6
Welfare	-15	-4	-7	0	-38	-15	-5	-2	-1
Utilities	-30	-19	-23	0	-66	-39	-32	-11	-3
Other Expenditures	-3	-1	-4	0	-33	-8	-3	4	2

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19 Individuals 25 and over who migrated to Kentucky during the 5-year migration period

Chapter 4:   Heterogeneity and Government Involvement in the Economy

While migration provides individuals an opportunity to "vote with their feet," there are a limited number of jurisdictions for individuals to migrate to and some individuals will not be completely satisfied with the size and scope of the public sector. Some individuals will demand greater levels of provision, while others will demand less, and some preference heterogeneity will remain within jurisdictions.

Throughout history, heterogeneity has generated violent conflict, especially when preferences differ (or at least are perceived to differ) along ethnic and/or cultural lines. Perpetual ethnic conflict in the Balkans and the Caucasus provide a constant reminder. Fearon and Laitin (1996) point out that interethnic cooperation is actually more common than conflict primarily because individuals fear that any conflict between ethnic groups can quickly spiral out of control. This provides strong incentives to avoid disputes, and allows a heterogeneous population to exist in a stable long run equilibrium.

Page (2007) explains how individuals with different backgrounds and experiences can enhance the ability of organizations to solve problems. On the other hand, Hall and Leeson (2010) find evidence that students in heterogeneous schools have lower test scores. Putnam (1995) points out that heterogeneous groups are less likely to trust and cooperate with one another. Easterly and Levine (1997) and Zak and Knack (2001) find an inverse relationship between heterogeneity and economic growth.

German Chancellor Angela Merkel claimed in *Der Spiegel* on October 16, 2010 that the German approach to multiculturalism has "absolutely failed," and that immigrants must begin to adopt the German language and culture. Schuck (2003)

suggests that government activity should be restricted to promoting tolerance and preventing discrimination, since attempts to promote multiculturalism are unlikely to do anything but increase ethnic tension. Similarly, Leeson (2007) suggests that interethnic cooperation arises spontaneously, and government efforts to promote this cooperation can be counterproductive.

In addition to affecting productivity in the private sector, the level of intergroup cooperation and preference heterogeneity can also affect the public sector. Olson (1965) suggested that the costs of coming to a group consensus increases with the number of competing interests. Dahl and Tufte (1973) theorize that preference heterogeneity produces a greater relative number of competing minority groups. If a consensus is required for new policies to be implemented in a democracy, then an inverse relationship between the number of minority groups and government size could result. Cutler et al (1993) introduce this idea as the "community preference model," and find that preference for public provision may depend on an individual's similarity to others within the jurisdiction. Under this model, greater levels of provision should be expected in homogeneous jurisdictions.

Alesina and Spolaore (1997) present a formal model of country formation that suggests a tradeoff between heterogeneity and country size. Large countries tend to have larger populations and benefit from economies of scale in public provision. Large countries also suffer from increased preference heterogeneity, as transactions costs are higher and citizens are less likely to agree on the role of government in the economy.

These ideas have been tested empirically. Many studies have documented a relationship between certain types of spending and heterogeneity. Easterly and Levine (1997) find that ethnic diversity is inversely related to educational attainment and infrastructure. LaPorta et al (1999) find that ethnic diversity is associated with government corruption, regulation, and a lack of property rights. They find that budgetary government size is inversely related to heterogeneity, and heterogeneous countries are more likely to have governments that perform poorly. Alesina et al (1999) find an inverse relationship between ethnic heterogeneity and government spending on education, roads, sewers and sanitation among a sample of US metropolitan areas. Kuijs (2000) finds that ethnic heterogeneity is inversely related to health and education outcomes for a sample of countries from 1980.

Other empirical studies have documented an inverse relationship between heterogeneity and levels of trust and cooperation, which would imply that heterogeneous groups would demand less public provision. In one of the most interesting studies, Costa and Kahn (2003a) find that Union Army soldiers who served in the Civil War and were from fragmented jurisdictions or were serving in fragmented units were significantly more likely to desert, be arrested, or go AWOL. Costa and Kahn (2003b) find that an increase in fragmentation from the mid 1970s to 1990 reduces the probability of volunteering and group membership for older Americans. Poterba (1997) and Goldin and Katz (1999) find an inverse relationship between education spending and heterogeneity, consistent with the idea that individuals care more about the education of members of their own group. Swee (2010) finds that political partitioning from the 1992-1995

Bosnian War tended to homogenize the region. As a result, ethnic majorities experienced an increase in the provision of education while ethnic minorities did not. Luttmer (2001) finds that support for welfare spending in an area is higher among those living in areas with larger percentages of individuals from the their own ethnic group. Vigdor (2004) finds a lower census response rate in fragmented counties, consistent with the idea that individuals in these areas have a lower sense of civic duty and are less likely to cooperate. Alesina and LeFerrara (2002), Leigh (2006a, 2006b), and Putnam (2007) find an inverse relationship between heterogeneity and survey measures of trust.

The mechanism behind this relationship seems obvious. In democracies, elections link demand for public provision to actual provision levels. Under the assumption that self-interested politicians attempt to extract rent from the voting base, there are relatively few opportunities to do so, since unpopular politicians are easily removed from office. However, these constraints do not apply in non-democratic countries, and relationships between government spending and heterogeneity are less obvious. Leaders have different levels of political control, and this control is affected by the number of competing citizen groups. Heterogeneous populations may prefer less government, but if heterogeneity also affects the relationship between preferences and actual provision, the net effect of heterogeneity is uncertain.

In general, groups in non-democratic countries will affect political outcomes if they have grievances and the opportunity to exert pressure on the state (Sorens, 2010). In order to "appease" the group, leaders can either address the grievances or attack the group's ability to exert political pressure. For the leader, the former act is costly since

resources spent on the group's demands are no longer available to be captured as rent. The latter act is costly in the sense that political capital is spent whenever coercion is used on the population, and this increases the probability of a leadership change. On the other hand, the latter act may yield benefits in terms of additional opportunities to extract rent in the future.

In unstable countries where a monopoly on violence has not developed, "governments" can closely resemble violent non-state actors and resort to highly repressive acts in order to establish and maintain control. Countries such as Afghanistan, Chad, Somalia and Sudan provide contemporary examples.

McGuire and Olson (1996) theorize that it is in everyone's best interest for one "bandit" to eventually monopolize theft, as a symbiotic relationship is formed between the bandit and the victims. The bandit has an incentive to limit their extraction of rent and provide some goods in order to secure future payments. A similar idea was introduced earlier by Mises (1957), who suggested that public opinion controls public policy in democracies as well as in dictatorships, as dictators must remain popular enough to stay in power (Caplan, 2008).

However, in heterogeneous societies with competing interests, "public opinion" is not well-defined, and would be less likely to constrain the actions of a dictator. Successful dictators in these countries commonly use a "divide-and-rule" political strategy to maintain power (Acemoglu, Robinson, and Verdier, 2004). Under this strategy, the ruler does not necessarily appease all groups, but must ensure that groups do not form the cooperative coalitions necessary to mount a successful challenge. As the

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population becomes more fragmented, leaders face fewer constraints.

Weingast's (1995) sovereign-constituency transgression game can be extended to illustrate this point. In order for a citizen to support the sovereign, the sovereign cannot transgress that citizen's rights. While this is necessary to retain that citizen's support, it is not sufficient, and citizens can still choose to oppose the sovereign. A certain percentage of the population must be appeased, or else the sovereign loses power.

A simplified specification suggests that there are only two groups, and the sovereign can transgress against one, both, or none of the groups. The groups move next, and can choose to incur a cost and challenge the sovereign, even if the sovereign has not transgressed. If both groups challenge, then the sovereign loses power. If only one group challenges, then the challenge fails and the sovereign's transgressions are successful.

Because this is a repeated game, the folk theorem dictates that groups have incentives to cooperate. If one group defects and allows the sovereign to exploit the other it can be punished in a future game if the other group decides to reciprocate. In the event that one group decides to challenge the sovereign, the other group will also challenge if the gains from removing the sovereign from power exceed the costs of challenging. Under this scenario, the sovereign has strong incentives to appease at least one group (i.e., half of the population) in order to remain in power.

If Weingast's model is modified by allowing additional (more than two) groups, these incentives may be reduced. Heterogeneous societies consist of larger numbers of groups that are less interested about the welfare of other groups. In these societies it would be more costly for multiple groups to organize and form a coalition. Ceteris

paribus, the sovereign can choose to transgress the rights from small groups with relative impunity. Due to a "Niemoller Effect," they may find it easier to single out and extract resources from small groups. Individuals are less likely to object if they are not a member of the group that the dictator is currently extracting rent from. In addition, dictators can consolidate their power by paying rent to a small loyal subgroup of "kingmakers" who are members of the same ethnic group in order to maintain hegemonic control over the other groups (Gallego and Pitchik, 2004). Acemoglu et al (2007) show that the presence of raw materials and foreign aid tend to increase this power, as both provide resources that despots can use to placate opposition. They also state that low levels of average productivity in the economy give kleptocrats more freedom to extract rent.

Dictators in homogeneous countries are more likely to be constrained by public opinion. Autocratic rulers do not necessarily have to provide productive goods, but they likely do have to take some actions in an attempt to address public opinion. These actions do not necessarily include productive public provision. Investments in mass media, for example, can be used to increase the level of power held by the sovereign (Debs, 2007). Some manage to establish a personality cult and directly manipulate public opinion by fiat.

There are relatively few studies on government activity in these non-democratic countries. This is partly because data is misleading. Schneider and Enste (2000) find that developing countries have significantly larger shadow economies. Similarly, Dreher et al (2007) show that poor government institutions appear to reduce the size of the economy,

but only because a significant portion of economic activity is being driven underground. Johnson et al (1997) find that bribes and other forms of corruption act as substitutes for official taxation, and are used to extract resources from the shadow economy in much the same way that taxes can from the official economy. Studies that examine the size of government in developing countries must control for these alternative forms of intervention.

Chapter 5:   Heterogeneity, Political Rights and the Public Sector

This study empirically explores the relationships between heterogeneity and the public sector. Measures of ethnic heterogeneity are compared to various measures of government intervention in the economy in order to determine the extent of the relationship. While previous studies generally find an inverse relationship, this study differs in that it assumes that these relationships depend upon the level of political rights in a jurisdiction. Citizens are thought to have relatively more political power in democracies, therefore changes in provision and government activity in these countries will reflect the will of the underlying population. In countries where actions taken by leaders are not subject to the same level of citizen scrutiny, government activity is less likely to reflect the will of the population. If heterogeneous groups do prefer lower levels of government activity, then inverse relationships should be more apparent in democracies.

This study also differs from previous research by including non-budgetary forms of government intervention in the analysis. In developing countries, conventional taxes would fall on a relatively small base. This is because these countries have large underground "shadow" economies. A large portion of economic activity may happen on the black market, where individuals are paid cash in exchange for goods and services, and there would be relatively little incentive to comply with income and/or sales tax legislation. In other cases, individuals barter for goods and services, and this activity would not be difficult to tax. Governments in these developing countries must rely on other methods to extract the resources needed to finance operations. In some cases,

government officials elicit bribes as payment for their services. In other cases, property is not well defined, and can be taken for public use. As previous studies focus primarily on fiscal policy, they exclude countries with relatively large shadow economies that rely on conventional taxation to a lesser extent.

In order to examine these relationships, the effect of ethnic heterogeneity on measures of budgetary and non-budgetary government is estimated for a large panel of countries. A limitation of this study is that cultural and political institutions can differ widely between countries. Comparisons of countries placed into the categories of dictatorships and democracies are not straightforward and may oversimplify these differences.

Data

Data was taken from a variety of sources. The most common index of heterogeneity used in recent literature is that constructed by Alesina et al (2002). This index contains measures of ethnic, linguistic, and religious fractionalization for 215 countries and territories. These variables represent the probability that two randomly selected individuals are from different groups, and are calculated according to equation (5.1) below.

$$1 - \sum_i race_i^2 \tag{5.1}$$

These probabilities are assumed to remain constant over time for each country. Table 5.2 lists 2007 GDP per capita and information on notable historical figures for the 25 countries with the highest levels of ethnic fractionalization. With the exception of

Qatar, each of these countries has a recent history of conflict. In almost all cases, control of the country was won through a military coup. In some cases, leaders were able to maintain a large degree of political power and control the country for an extended period of time. In other cases, leadership changed hands a number of times over a very short period of time.

Table 5.3 lists the 25 countries with the lowest levels of ethnic fractionalization. With few exceptions, these countries have relatively high levels of economic development and are more likely to have democratic governments. The average level of GDP per capita in 2007 for the most homogeneous countries is $14,281 higher than the most heterogeneous countries. Homogeneity also appears to reduce conflict and increase the level of stability in a country. However, the tendency of individuals in homogeneous groups to be less suspicious of and less likely to question the actions of others can backfire in certain cases.

North Korea is one of the most homogeneous countries in the world, and the only homogeneous country to remain under the control of a dictator. Individuals are immersed in propaganda at a young age, and are taught that they are members of a superior race, and that their leaders (i.e., Kim Il Sung, Kim Jong Il and Kim Jong Un) exhibit the highest level of moral, cultural, and genetic purity. Individuals monitor each other and report any behavioral infractions to the authorities. Those suspected of violations are sent, along with their families, to forced-labor camps. The stability of the North Korean regime depends on this race-based nationalism (Myers, 2010).

François "Papa Doc" Duvalier is another relatively well-known despot who

maintained a highly repressive regime in Haiti until his death in 1971. He cultivated his reputation as a voodoo priest to maintain control over a homogeneous population with an overarching belief system. A personality cult was established by the dictators in both North Korea and Haiti. Both leaders managed to convince the population to support their autocratic rule. This may have been more difficult with a heterogeneous population.

Tables 5.2 and 5.3 suggest that heterogeneous countries are generally more likely to be ruled by dictators, though perhaps less likely to be considered personality cults. Table 5.4 presents a list of countries of notable historical significance for comparison. Augusto Pinochet is notable because he managed to maintain control of a relatively homogeneous Chile for over 25 years without establishing a personality cult. Relatively high levels of economic growth may have contributed to political stability in this case.

Table 5.4 also suggests that some of the world's most famous dictators ruled countries with average levels of heterogeneity. Among these are Fidel Castro, Nicolae Ceauşescu, Francisco Franco, Saddam Hussein, and Manuel Noriega. One of the most interesting characters is Saparmurat Niyazov of Turkmenistan, also known as "Turkmenbashi the Great." Niyazov is notable for renaming airports, cities, calendar months, and passing meteorites after himself and family members, writing spiritual guidebooks, and building large gold-plated statues of himself, one of which would rotate to always face the sun. He is also known for political purges, a 60 percent unemployment rate, and the closure of all hospitals outside the capital city, as they were deemed to be unnecessary (Steyn, 2007).

While the U.S. has a reputation as a "melting pot," the level of ethnic

heterogeneity is 0.49, which is lower than those countries in Table 5.2. This is partly due to the way that ethnic groups are defined across countries. Ethnicity in the U.S. is primarily determined by race, though it is determined by other characteristics, such as tribal affiliation in many other countries. Due to the relatively large number of groups, some of these countries are considered to be more heterogeneous than the U.S.

From these tables, an inverse relationship between heterogeneity and political rights is apparent. Lower levels of GDP per capita provide evidence that these heterogeneous countries also have lower levels of economic development. However, the shadow economy must be also considered. While it seems unreasonable that individuals in Liberia, Somalia, and the DRC can survive on less than $500 per year, it is likely that most of these individuals produce a significant portion of their income via shadow wages. Government interference in the economy in these cases will be fundamentally different than in developed countries.

In order to measure non-budgetary government interference in the economy, data was collected from the Fraser Institute's Economic Freedom of the World Index. This dataset provides annual information on countries in each of 5 areas that include budgetary government, legal environment, integrity of the monetary base, freedom to trade internationally, and business freedom. This study emphasizes the legal environment and business freedom, as these areas most closely represent non-budgetary government activities that can act as "shadow taxes."

The legal environment represents a composite of similar scores for individual categories such as judicial integrity, military influence in the courts, and restrictions on

the sale of private property. Scores in these individual categories are generated from various sources. One of these is the World Economic Forum's Global Competitiveness Report. This report is generated from responses to surveys that are administered to approximately 13,000 business executives worldwide. Respondents were asked to rate their country's legal institutions on a scale of 1 to 7 with specific questions asked about subtopics including legal protection of property rights, the independence of the judiciary, and the ability of private businesses to challenge the legality of government actions in court.. Another source used to calculate the legal environment score is the PRS Group's International Country Risk Guide. This index produces risk scores using a proprietary econometric model. A third source is the World Bank's Doing Business index, which provides cross-sectional comparisons of the costs and time required to undertake activities associated with running a private business. Activities included in this index are the legal registration of property and the ability to enforce contracts.

Values for the Economic Freedom of the World's business freedom area represent a similar composite of measures of credit restrictions and business regulations. Scores in this area were also constructed from categories within the World Bank's Doing Business index such as minimum wages, accessibility of credit, mandated costs of hiring and firing workers, and licensing restrictions. In addition, survey response categories from the Global Competitiveness Report were included in areas such as bribes, administrative regulations, costs of dealing with bureaucracy, and the determination of wages through collective bargaining.

Population data was taken from the World Bank's 2010 World Development

Indicators, and GDP per capita was taken from the Penn World Table. Values for GDP per capita in 2008 were imputed using a Box-Jenkins ARMA model.

Political rights are measured using Freedom House's Gastil Index. This is a 7 point score that represents the level of political rights in each country. Autocratic countries that received a 6 or 7 (the two lowest scores) in 2008 are listed in Table 5.5, while Table 5.6 lists the democratic countries that received a score of 1, indicating the highest level of political rights. Though there is an inverse relationship between heterogeneity and political rights, there is a positive relationship between budgetary government and political rights. Countries with low political rights also have lower levels of legal or business rights. In many of the cases where government data is unavailable (i.e., North Korea, Somalia, Sudan), it is obvious that few legal or business freedoms exist.

Table 5.1 provides summary statistics and correlation tables for each of the measures of government activity broken down by the level of political rights. Countries with lower levels of political rights have lower levels of budgetary government, but higher levels of non-budgetary activity. Because the measures of non-budgetary government activity are based on a 1-10 scale, with 1 being the highest and 10 being the lowest level of government activity, positive correlations between budgetary and non-budgetary measures suggest that the actual activities are inversely related. All categories of non-budgetary government activity are therefore inversely related to budgetary activity. This is consistent with Boettke (2001) and Brennan's (2002) suggestion that "subsidy and regulation are alternative technologies for securing the same policy

objective is familiar to those who make international comparisons of public sector size."[20]

From the correlation tables, heterogeneity is inversely related to budgetary government in countries with high levels of political rights. Heterogeneity is positively related to non-budgetary government in countries with low levels of political rights. Heterogeneity is inversely related to government ownership of private industry in democracies, and restrictions on the sale of private property is positively associated with heterogeneity in countries with low political rights. Also consistent with this finding, the freedom to operate private business is positively associated with heterogeneity in countries with high political rights, but not in other countries.

Results

The central contribution of this chapter is to document the relationship between heterogeneity and government in countries with low levels of political rights, while considering the fact that these countries may rely heavily on shadow taxes to "finance" activity. Table 5.7 presents results of a random-effects model that is estimated for each of the three measures of government activity by level of political rights for a panel of 139 countries from 2005-2008. Heterogeneity is found to have a strong negative effect on budgetary governments in democracies, consistent with predictions in the literature. Heterogeneity is also found to have a positive effect on the level of business freedom in democracies.

Other than transfer payments, heterogeneity has little effect on budgetary government in non-democratic countries. Heterogeneity is positively related to non-budgetary government in non-democratic countries. If heterogeneity has no effect on

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budgetary government, but is found to positively affect non-budgetary government, then heterogeneity will have an overall positive relationship with government size in non-democratic countries. This is consistent with theories by Sorens (2010) that suggest that official ethnic discrimination depends upon political institutions.

For this sample, a fixed-effects specification was also estimated with heterogeneity absent from the model. Hausman tests were performed to examine the extent to which country-specific characteristics impact these results. In most cases, results from fixed effects specifications were not significantly different from the random effects specification. One notable exception is transfer payments, where estimates produced with fixed and random effects specifications differ regardless of the level of political rights. In addition, there are significant differences between fixed and random effects estimates for budgetary government measures in democracies. In these cases, countries likely have unique characteristics that explain fiscal policy in addition to those being captured by the random effects specifications.

One concern is that splitting the data by the level of political rights introduces endogeneity. If countries that have lower levels of political rights also have lower levels of legal and economic rights, then the effect of heterogeneity may be biased. In addition, bias will be introduced if the level of GDP per capita depends upon the level of government intervention in the economy. This is likely if individuals reduce their economic activity or move activity into a shadow economy in response to taxation. In this case, estimates of the effect of GDP per capita on the level of government involvement in the economy would be downwardly biased. More importantly, this biases

estimates of the effect of heterogeneity on government. Ideally, instruments could be found to proxy for the initial value of GDP per capita. However, the availability of reliable instruments is limited, especially for such a large panel of countries.

Table 5.8 presents the results of a random effects specification that omits GDP per capita. In most cases, the estimated coefficients on ethnic heterogeneity are more negative than those found in Table 5.7. This suggests that the estimates in Table 5.7 tend to understate the effect of heterogeneity on government involvement in the economy.

Another concern is that the level of political rights in countries does not vary much over time between 2005 and 2008. To address this, a larger panel of data is constructed for 122 countries dating back to 1985 from the same sources. Due to the limitations of the Economic Freedom of the World dataset, observations are included once every 5 years for 1985, 1990, 1995, and 2000. Annual data exists from 2000 through 2008. Some countries, such as former members of the Soviet Union have no observations prior to 1995. Values for population, GDP per capita, or budgetary government values were imputed for countries that were missing one observation for one of these variables. Data limitations exclude the categories of government enterprises and investment, and legal restrictions on the sale of private property in this sample.

Included in this larger sample are countries that experienced significant changes in political rights over time. Some of these, such as Albania, Hungary, Poland, and Romania, transitioned from a communist government to a democracy after the fall of the Iron Curtain. From 1985 to 1990, the average level of budgetary government activity in these countries jumped from an average of 28.8% of GDP to 45.67% of GDP. Over the

same period of time the level of legal and property rights rose from 5.6 to 7.1, suggesting non-budgetary government intervention in the economy fell.

Table 5.9 provides the average values for budgetary government, population, and real gross national income per capita measures for each of the 122 countries in this larger sample. Table 5.10 provides summary statistics and correlations. Heterogeneity is inversely correlated with budgetary government and positively correlated with non-budgetary government regardless of the level of political rights. Table 5.11 presents results from a random effects model estimated for this larger panel. Results are generally similar. In all cases, heterogeneity is inversely related to transfer payments. Heterogeneity is only inversely related to budgetary government consumption in democracies with high political rights. The inverse relationship between heterogeneity and total budgetary government is approximately 10 percentage points higher in democracies, primarily because of the effect on government consumption.

Heterogeneity is found to have an inverse effect on legal and property rights. While the effect is of larger magnitude in countries with low political rights, and heterogeneity may have a larger effect on non-budgetary government activity in non-democratic countries, the result for democracies is unexpected. Perhaps additional legal measures are needed to reduce conflict, or special interest lobbying in heterogeneous democracies produces higher levels of intervention. Perhaps the legal system is more developed in democracies and therefore produces lower scores on the surveys used to generate the legal environment variable. In addition, survey responses may take time to change while information on political institutions changes instantaneously with

institutional changes. Because of this, transitional economies may continue to receive low survey scores for years after becoming a democracy.

While the effect of heterogeneity in democracies on legal freedom is negative in both panels, it is only significant in the larger panel. Similarly, the effect of heterogeneity in democracies on business freedom is positive in both panels, but only significant in the smaller panel. Because of the subjective nature of non-budgetary measures, the net effect of heterogeneity on overall government size in democracies remains unclear.

In non-democratic countries, heterogeneity does not reduce government consumption, but does increase regulation and non-budgetary interference in the economy. If transfer payments are excluded, the net effect of heterogeneity in this case is to increase the overall size of government. It is interesting to note that in both Table 5.7 and Table 5.11, positive relationships between government consumption and GDP per capita are consistent with "Wagner's Law."

Conclusion

This chapter explores the relationships between heterogeneity and government size. Inverse relationships between budgetary government consumption and transfer payments are confirmed, at least for democracies. This is consistent with prior research that suggests that heterogeneity of preferences reduces public provision and individuals have less taste for redistribution in heterogeneous communities.

This study considers non-budgetary government as well, as developing countries with large shadow economies frequently rely on regulation and other forms of intervention in the economy. When these alternative forms of government are

considered, the standard relationship between heterogeneity and government size does not hold. This study finds that the relationship may depend upon the level of political rights.

Perhaps individuals in heterogeneous groups do prefer lower levels of public provision. However, in non-democratic countries, preferences for government activity do not necessarily materialize. No relationship between budgetary government consumption and heterogeneity is found for these non-democratic countries, though a positive relationship between non-budgetary government and heterogeneity is found.

In democratic countries, an inverse relationship between heterogeneity and budgetary consumption is found. Unexpectedly, a positive relationship between heterogeneity and non-budgetary intervention through the legal system is also found for democratic countries, though this may be due to the way the variable is constructed. In general, heterogeneity does reduce the size of budgetary government, but the effect of heterogeneity on regulation and economic freedom is not clear.

Table 5.1: Summary Statistics, 2008 (N=139)

Variable	Means by Level of Political Rights		
	Low Political Rights	Med Political Rights	High Political Rights
Government Consumption (% of GDP)	20.96	17.13	24.34
Transfer Payments (% of GDP)	4.22	6.02	15.51
Total Government (% of GDP)	25.18	23.15	39.85
Government-Owned Enterprises	3.8	5.4	8.6
Legal and Property Rights	4.9	4.9	7.2
Freedom to Transfer Property	6.9	6.9	7.8
Business Freedom	6.2	6.7	7.3
Population (millions)	80.5	46.3	25.0
Real GDP Per Capita (2008 US$)	$6,725.73[21]	$5,831.35	$22,276.24
Ethnic Heterogeneity	0.51	0.54	0.26

Correlations Between Measures of Government Activity

	Total Budgetary Government	Government Enterprises	Legal and Property Rights	Freedom to Transfer Property
Government Enterprises	0.37***			
Legal and Property Rights	0.62***	0.47***		
Freedom to Transfer Property	0.26***	0.23***	0.56***	
Business Freedom	0.25***	0.37***	0.63***	0.38***

Variable	Correlations with Ethnic Heterogeneity by Level of Political Rights		
	Low Political Rights	Med Political Rights	High Political Rights
Government Consumption (% of GDP)	-0.01	-0.05	-0.30***
Transfer Payments (% of GDP)	-0.62***	-0.12	-0.43***
Total Government (% of GDP)	-0.22	-0.10	-0.42***
Government-Owned Enterprises	-0.03	-0.29**	-0.31**
Legal and Property Rights	-0.66***	-0.09	-0.26*
Freedom to Transfer Property	-0.73***	-0.21*	0.00
Business Freedom	-0.15	-0.14	0.30*
Population (millions)	-0.30	-0.05	0.02
Real GDP Per Capita (2008 US$)	-0.10	-0.18	-0.11***

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21 Oman and UAE have relatively high GDP per capita.

Table 5.2: Heterogeneous Countries

Country	Fractionalization	GDP Per Capita[22]	Notable Figures
Uganda	0.93	$1,299	Idi Amin (1971-1979)* Yoweri Museveni (1986-)
Liberia	0.91	$409	Samuel Doe (1980-1990)* Charles Taylor (1990?-2003)*
Madagascar	0.88	$918	Didier Ratsiraka (1975-1993, 1997-2002)*
DRC (Zaire)	0.87	$414	Mobuto (1965-1997)*
Congo-Brazzaville	0.87	$3,965	Denis Sassou Nguesso (1979-1992, 1997-)*
Cameroon	0.86	$2,938	Paul Biya (1982-)*
Chad	0.86	$2,830	Idriss Déby (1990-)*
Kenya	0.86	$2,191	Daniel arap Moi (1978-2002)*
Nigeria	0.85	$2,520	Yakubu Dan-Yumma Gowon (1966-1975)* Murtala Ramat Mohammed (1975-1976)* Olușẹgun Ọbasanjọ (1976-1979, 1999-2007)* Sani Abacha (1993-1998)*
CAR	0.83	$924	Jean-Bédel Bokassa (1966-1979)* François Bozizé (2003-)*
Cote d'Ivoire	0.82	$2,377	Félix Boigny (1960-1993)*
Sierra Leone	0.82	$1,988	Siaka Stevens (1967-1985)*
Somalia	0.81	$491	Mohamed Siad Barre (1969-1991)* Mohamed Farrah Aidid (1995-1996)* Hussein Mohamed Farrah (1996-1997)
Yugoslavia	0.81	N/A	Josip Broz Tito (1953-1980)* Slobodan Milošević (1989-2000)*
Guinea-Bissau	0.81	$658	Luís Cabral (1973-1980) João Vieira (1980-1999, 2005-2009)*
Djibouti	0.80	$4,650	Hassan Aptidon (1977-1999)*
Libya	0.79	$24,281	Mu'ammar Al-Qadhafi (1969-)*
Benin	0.79	$1,491	Mathieu Kérékou' (1972-1991)*
Angola	0.79	$5,449	José Eduardo dos Santos (1979-)*
Gambia	0.79	$1,554	Yahya Jammeh (1994-)*
Zambia	0.78	$2,297	Kenneth Kaunda (1964-1991)*
Afghanistan	0.77	$797	
Gabon	0.77	$9,179	Omar Bongo (1967-2009)*
South Africa	0.75	$11,307	
Qatar	0.75	$104,707	Sheikh Hamad bin Kalifa Al Thani (1995-)
Average	-	$7,901	

* leaders who seized power in a military coup or imposed legal restrictions on political competition.

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22 Penn World Table, 6.3

Table 5.3: Homogeneous Countries

Country	Fractionalization	GDP Per Capita	Notable Figures
Comoros	0.00	$1,808.31	Bob Denard
South Korea	0.00	$24,949.65	
Japan	0.01	$32,063.24	
North Korea	0.04	$1,900.00 (est.)	Kim Il Sung (1972-1994)* Kim Jong Il (1994-)*
Tunisia	0.04	$10,641.26	Zine El Abidine Ben Ali (1987-)*
Vanuatu	0.04	$5,929.65	
Malta	0.04	$23,006.44	
Bangladesh	0.05	$2,470.90	Sheikh Mujibur Rahman (1972-1975)*
Portugal	0.05	$21,526.84	António de Oliveira Salazar (1932-1968)*
Kiribati	0.05	$1,915.07	
Swaziland	0.06	$7,746.05	King Mswati III (1986-)
Norway	0.06	$53,964.52	
Sweden	0.06	$35,270.78	
Marshall Islands	0.06	$7,649.58	
Iceland	0.08	$40,907.56	
Denmark	0.08	$36,198.32	
Tonga	0.09	$6,075.81	King Tāufaʻāhau Tupou IV (1965-2006)
Australia	0.09	$39,694.06	
Cyprus	0.09	$26,780.39	
Haiti	0.10	$1,669.38	François ("Papa Doc") Duvalier (1957-1971)*
France	0.10	$31,446.69	
Netherlands	0.11	$36,394.13	
Austria	0.11	$38,302.66	
Italy	0.11	$30,505.24	
Poland	0.12	$15,447.54	
Average	-	$22,182	

* leaders who seized power in a military coup or imposed legal restrictions on political competition.

Table 5.4: Other Notable Countries

Country	Fractionalization	GDP Per Capita	Notable Figures
Cape Verde	0.42	$8,266.29	Aristides Pereira (1975-1991)*
Chile	0.19	$21,548.43	Augusto Pinochet (1974-1990)*
Cuba	0.59	$11,762.46	Fulgencio Batista (1940-1944, 1952-1959)* Fidel Castro (1959-2008)*
Equatorial Guinea	0.35	$17,680.07	Teodoro Obiang Nguema Mbasogo (1979-)*
Guinea	0.74	$3,794.40	Lansana Conté (1984-2008)* Moussa Dadis Camara (2008-2009)* Sékouba Konaté (2009-)*
Ethiopia	0.72	$1,203.68	Meles Zenawi (1991-)*
Indonesia	0.74	$5,468.30	Suharto (1967-1998)*
Iraq	0.37	$5,103.17	Saddam Hussein (1979-2003)*
Mozambique	0.69	$2,306.26	Samora Machel (1975-1986)*
Panama	0.55	$9,480.51	Manuel Noriega (1983-1989)*
Romania	0.31	$10,506.91	Nicolae Ceauşescu (1965-1989)*
Rwanda	0.32	$1,216.32	Juvénal Habyarimana (1973-1994)*
São Tomé & Príncipe	N/A	$5,020.66	Manuel Pinto da Costa (1975-1991)*
Spain	0.42	$33,615.80	Francisco Franco (1939-1975)*
Sudan	0.71	$2,569.71	Gaafar Nimeiry (1969-1985)* Omar Hasan Ahmad al-Bashir (1989-)*
Tanzania	0.74	$944.89	Julius Nyerere (1964-1985)*
Togo	0.71	$951.65	Gnassingbé Eyadéma (1967-2005)
Turkmenistan	0.39	$12,118.94	Saparmurat Niyazov (1990-2006)*
United States	0.49	$45.597.07	
Zimbabwe	0.39	$2,448.50	Robert Mugabe (1987-)*

* leaders who seized power in a military coup or imposed legal restrictions on political competition.

Table 5.5: Countries With Low Political Rights, 2008

Country	Ethnic Heterogeneity	Budgetary Government	Legal Rights	Business Freedom
Algeria	0.34	43.32%	4.5	5.2
Angola	0.79	45.48%	3.3	5.1
Armenia	0.13	22.44%	5.5	6.8
Azerbaijan	0.20	26.99%	6.4	6.9
Cambodia	0.21	-	-	-
Cameroon	0.86	19.60%	3.5	6.4
Congo, Rep. Of	0.87	28.48%	2.9	5.7
Cote d'Ivoire	0.82	12.06%	3.1	6.1
DRC (Zaire)	0.87	13.01%	2.1	4.3
Egypt	0.18	24.94%	5.4	5.6
Fiji	0.55	30.84%	6.0	8.8
Gabon	0.77	21.14%	4.3	6.9
Iran	0.67	27.15%	6.1	5.4
Iraq	0.37	-	-	-
Kazakhstan	0.62	26.18%	6.0	7.5
Mauritania	0.62	23.19%	4.7	7.2
Oman	0.44	32.16%	7.4	7.9
Qatar	0.75	-	-	-
Russia	0.25	39.59%	5.7	5.9
Rwanda	0.32	13.22%	5.8	7.4
Tajikistan	0.51	-	-	-
Unit. Arab Em.	0.63	18.54%	7.2	7.6
Belarus	0.32	-	-	-
Chad	0.86	16.10%	2.2	5.7
China	0.15	34.11%	6.4	5.6
Cuba	0.59	-	-	-
Equatorial Guinea	0.35	-	-	-
Eritrea	0.65	-	-	-
Guinea	0.74	-	-	-
Laos	0.51	-	-	-
Libya	0.79	-	-	-
Myanmar	0.51	4.49%	3.2	3.7
North Korea	0.04	-	-	-
Saudi Arabia	0.18	-	-	-
Somalia	0.81	-	-	-
Sudan	0.71	-	-	-
Swaziland	0.06	-	-	-
Syria	0.54	16.96%	4.7	4.5
Tunisia	0.04	29.13%	6.6	7.0
Turkmenistan	0.39	-	-	-
Uzbekistan	0.41	-	-	-
Vietnam	0.24	8.38%	6.0	6.3
Zimbabwe	0.39	52.08%	3.7	4.9
Average	**0.49**	**25.18%**	**4.9**	**6.2**

Table 5.6: Countries with High Political Rights, 2008

Country	Ethnic Heterogeneity	Budgetary Government	Legal Rights	Business Freedom
Australia	0.09	35.55%	8.3	8.2
Austria	0.11	52.46%	8.4	7.4
Bahamas	0.42	20.66%	7.1	8.8
Barbados	0.14	44.21%	7.8	7.1
Belgium	0.56	56.70%	6.9	7.5
Belize	0.70	21.26%	5.7	8.8
Canada	0.71	37.30%	8.3	8.3
Chile	0.19	27.10%	7.1	7.8
Costa Rica	0.24	18.16%	6.6	6.8
Cyprus	0.09	34.16%	6.8	6.9
Czech Rep.	0.32	53.91%	6.4	7.5
Denmark	0.08	53.63%	8.7	8.1
Estonia	0.51	39.16%	7.2	7.6
Finland	0.13	50.07%	8.7	7.2
France	0.10	53.54%	7.3	7.0
Germany	0.17	50.73%	8.2	6.3
Ghana	0.67	21.99%	5.4	6.6
Greece	0.16	39.22%	6.1	5.9
Hungary	0.15	32.93%	6.3	7.3
Iceland	0.08	39.40%	8.4	8.2
Ireland	0.12	42.75%	7.9	7.8
Israel	0.34	40.10%	5.9	6.3
Italy	0.11	47.71%	5.7	6.5
Japan	0.01	42.78%	7.5	7.7
Korea, South	0.00	33.00%	6.8	6.4
Lithuania	0.32	36.44%	6.6	6.8
Luxembourg	0.53	55.16%	8.4	7.3
Malta	0.04	44.23%	7.5	7.0
Mauritius	0.46	20.56%	6.4	8.0
Netherlands	0.11	57.95%	8.2	7.5
New Zealand	0.40	35.95%	9.0	8.8
Norway	0.06	49.49%	8.8	6.9
Panama	0.55	19.85%	5.4	6.8
Poland	0.12	42.34%	5.9	6.7
Portugal	0.05	44.81%	6.8	6.2
Slovak Rep	0.25	42.64%	6.2	7.7
Slovenia	0.22	46.10%	6.0	6.8
Spain	0.42	41.95%	6.6	6.7
Sweden	0.06	57.46%	8.5	7.2
Switzerland	0.53	30.46%	8.4	7.9
United Kingdom	0.12	39.57%	8.1	7.9
United States	0.49	32.87%	7.5	7.9
Uruguay	0.25	27.09%	5.6	6.4
Average	**0.26**	**39.85%**	**7.2**	**7.3**

Table 5.7: Political Rights, Ethnic Heterogeneity, and Government, 2005-2008

		Budgetary Government				Non-Budgetary Government (Shadow Taxes)		
		Government Consumption (% of GDP)	Transfer Payments (% of GDP)	Total Consumption and Transfers (% of GDP)	Government Enterprises and Investment (0-10)	Legal Rights (0-10)	Restrictions on the Sale of Private Property (0-10)	Business Freedom (0-10)
Low Political Rights (N=101, 31 countries)	Constant	15.68%	8.52%	24.02%	5.3	5.3	7.0	6.2
	Ethnic Heterogeneity	1.21 (6.51)	-7.99 (3.49)***	-6.68 (8.21)	-0.10 (2.30)	-2.53 (0.72)***	-3.38 (1.45)**	-0.77 (0.73)
	Population (millions)	0.006 (0.007)	0.0002 (0.004)	0.006 (0.009)	-0.003 (0.003)	0.0004 (0.0008)	0.0011 (0.0016)	-0.0008 (0.0008)
	GDP Per Capita (thousands)	0.35 (0.20)	0.02 (0.11)	0.35 (0.25)	-0.08 (0.07)	0.12 (0.02)***	0.15 (0.05)***	0.07 (0.02)
	Hausman $X^2(2)$	(1.65)	(7.37)**	(0.72)	(0.61)	(1.72)	(0.71)	(2.32)
Medium Political Rights (N=273, 75 countries)	Constant	16.72%	6.97%	19.20%	7.0	4.5	7.3	6.7
	Ethnic Heterogeneity	4.04 (3.23)	-3.26 (2.77)	1.13 (4.80)	-3.68 (1.41)***	-0.41 (0.57)	-2.20 (1.10)**	-0.59 (0.47)
	Population (millions)	0.0020 (0.0051)	0.0005 (0.0044)	-0.001 (0.008)	-0.001 (0.002)	0.0008 (0.0009)	0.0001 (0.0017)	0.0006 (0.0007)
	GDP Per Capita (thousands)	0.43 (0.10)***	0.08 (0.08)	0.57 (0.14)***	0.01 (0.00)	0.10 (0.02)***	0.10 (0.03)***	0.04 (0.01)***
	Hausman $X^2(2)$	(1.47)	(12.01)***	(0.88)	(0.34)	(4.53)	(2.39)	(0.31)
High Political Rights (N=179, 47 countries)	Constant	22.09%	15.44%	37.75%	8.1	6.0	7.8	6.6
	Ethnic Heterogeneity	-5.94 (3.52)*	-14.33 (4.10)***	-20.38 (6.38)***	-2.85 (1.27)**	-0.97 (0.54)*	-0.53 (1.23)	1.13 (0.49)**
	Population (millions)	0.014 (0.015)	0.009 (0.018)	-0.005 (0.028)	-0.001 (0.005)	0.002 (0.002)	0.0068 (0.0053)	0.0003 (0.0022)
	GDP Per Capita (thousands)	0.17 (0.06)***	0.14 (0.08)*	0.29 (0.12)**	0.06 (0.02)**	0.07 (0.01)***	0.009 (0.023)	0.019 (0.009)**
	Hausman $X^2(2)$	(14.38)***	(6.38)**	(14.73)***	(0.25)	(0.13)	(0.87)	(6.90)**

*, **, and *** indicate p<0.10, p<0.05, and p<0.01, respectively.

Table 5.8: Political Rights, Ethnic Heterogeneity, and Government, 2005-2008 (GDP pc omitted)

		Budgetary Government				Non-Budgetary Government (Shadow Taxes)		
		Government Consumption (% of GDP)	Transfer Payments (% of GDP)	Total Consumption and Transfers (% of GDP)	Government Enterprises and Investment (0-10)	Legal Rights (0-10)	Restrictions on the Sale of Private Property (0-10)	Business Freedom (0-10)
Low Political Rights (N=101, 31 countries)	Constant	18.35%	8.40%	26.69%	4.7	6.1	8.2	6.7
	Ethnic Heterogeneity	0.24 (6.59)	-7.95 (3.33)**	-7.64 (8.33)	0.12 (2.30)	-2.82 (0.98)***	-3.78 (1.68)**	-0.96 (0.81)
	Population (millions)	0.0054 (0.0073)	0.0002 (0.0037)	0.0057 (0.0092)	-0.0034 (0.0026)	0.0004 (0.0011)	0.0009 (0.0019)	-0.0009 (0.0009)
Medium Political Rights (N=273, 75 countries)	Constant	16.72%	7.75%	24.45%	7.6	5.4	8.2	7.1
	Ethnic Heterogeneity	1.38 (3.46)	-3.78 (2.77)	-2.37 (5.19)	-4.09 (1.40)***	-1.01 (0.69)	-2.81 (1.13)**	-0.87 (0.49)
	Population (millions)	0.0037 (0.0055)	0.0002 (0.0044)	-0.0034 (0.0083)	-0.0013 (0.0022)	0.0004 (0.0011)	0.0003 (0.0018)	0.0007 (0.0008)
High Political Rights (N=179, 47 countries)	Constant	26.02%	18.69%	44.71%	9.4	7.7	7.5	7.1
	Ethnic Heterogeneity	-7.73 (3.90)**	-15.80 (4.23)***	-23.53 (7.02)***	-3.40 (1.30)***	-1.72 (0.72)**	-0.42 (1.19)	0.92 (0.49)*
	Population (millions)	0.0060 (0.0172)	0.0152 (0.0186)	-0.0094 (0.0309)	-0.0013 (0.0056)	0.0015 (0.0032)	0.0064 (0.0052)	0.0011 (0.0022)

* , **, and *** indicate p<0.10, p<0.05, and p<0.01, respectively.

Table 5.9: Countries

Country	Government Consumption	Transfer Payments	Total Gov't Share of GDP	Population (Millions)	Real GDP Per Capita, 2008 US $	Total Number of Observations
Albania	11.28%	6.85%	17.24%	3.1	$3,599.86	12
Algeria	25.83%	8.37%	32.80%	30.6	$5,786.63	12
Argentina	15.65%	9.03%	24.68%	36.9	$12,460.84	12
Australia	23.45%	11.99%	35.44%	19.4	$30,635.71	12
Austria	25.03%	26.25%	51.28%	8.1	$31,048.22	12
Bahamas	17.50%	3.68%	21.17%	0.3	$24,449.19	12
Bahrain	32.09%	3.40%	35.50%	0.7	$22,105.97	12
Bangladesh	6.05%	2.28%	7.75%	142.0	$1,944.11	12
Barbados	24.86%	4.80%	29.66%	0.3	$22,691.78	12
Belgium	26.77%	24.71%	51.48%	10.3	$29,169.77	12
Belize	17.38%	1.56%	18.94%	0.3	$8,095.72	10
Benin	13.79%	1.11%	14.45%	6.9	$1,364.84	12
Bolivia	16.74%	4.68%	21.42%	8.4	$3,397.99	12
Botswana	41.79%	9.13%	50.92%	1.7	$7,389.17	12
Brazil	23.91%	12.76%	36.67%	175.0	$8,672.19	12
Bulgaria	19.90%	16.89%	36.80%	8.0	$7,513.22	12
Burundi	18.24%	2.21%	20.45%	6.8	$760.08	12
Cameroon	13.07%	1.98%	15.05%	16.1	$2,690.67	12
Canada	26.15%	12.56%	38.70%	30.9	$31,253.94	12
Central Afr. Rep.	11.09%	0.00%	11.09%	3.8	$948.33	12
Chad	9.34%	0.67%	10.08%	8.8	$1,859.44	12
Chile	15.91%	11.06%	26.97%	15.4	$14,006.51	12
China	25.03%	6.82%	29.01%	1,250.0	$4,778.93	12
Colombia	21.51%	6.51%	28.02%	40.1	$6,797.42	12
Congo, Dem. R.	8.72%	0.65%	9.37%	52.5	$132.50	12
Congo, Rep. Of	28.70%	3.25%	31.44%	3.1	$3,793.24	12
Costa Rica	18.34%	5.20%	23.54%	4.0	$9,671.50	12
Cote d'Ivoire	13.82%	2.27%	15.71%	17.3	$2,577.80	12
Croatia	26.76%	20.24%	47.00%	4.5	$10,534.56	10
Cyprus	21.43%	12.44%	33.87%	0.8	$20,138.65	12
Czech Rep.	30.35%	27.87%	57.13%	10.3	$18,151.78	12
Denmark	34.69%	22.40%	57.09%	5.3	$29,683.18	12
Dominican Rep.	8.64%	4.13%	12.78%	8.9	$7,271.96	12
Ecuador	13.76%	1.73%	15.49%	12.2	$5,439.84	12
Egypt	14.12%	6.58%	20.70%	71.1	$4,667.85	12
El Salvador	10.17%	1.74%	11.91%	5.9	$5,061.63	12
Estonia	25.79%	13.42%	39.21%	1.4	$12,672.31	10
Fiji	23.85%	4.22%	28.07%	0.8	$5,429.55	10
Finland	29.40%	19.63%	49.03%	5.2	$26,829.02	12
France	29.09%	25.45%	54.54%	59.5	$26,860.10	12
Gabon	22.98%	1.33%	24.30%	1.2	$8,823.04	12
Germany	24.64%	26.08%	50.71%	81.7	$27,234.27	12

Country	Government Consumption	Transfer Payments	Total Gov't Share of GDP	Population (Millions)	Real GDP Per Capita, 2008 US $	Total Number of Observations
Ghana	14.88%	1.50%	16.38%	19.8	$1,428.18	12
Greece	17.91%	18.34%	36.25%	10.9	$22,200.99	12
Guatemala	8.11%	3.34%	11.45%	11.5	$5,566.17	12
Guinea-Bissau	12.88%	0.00%	12.88%	1.3	$634.75	12
Guyana	25.71%	0.00%	25.71%	0.8	$2,263.99	12
Haiti	11.52%	1.21%	12.73%	8.7	$1,686.00	12
Honduras	15.38%	2.37%	17.74%	6.3	$3,301.61	12
Hungary	13.67%	21.88%	35.56%	10.2	$14,072.73	12
Iceland	28.54%	8.40%	36.94%	0.3	$31,842.76	12
India	15.97%	5.52%	21.49%	1,020.0	$2,815.15	12
Indonesia	11.71%	7.51%	19.22%	206.0	$4,257.52	12
Iran	20.69%	4.92%	25.61%	64.3	$8,247.55	12
Ireland	23.16%	17.82%	40.98%	4.0	$30,690.89	12
Israel	33.14%	15.01%	48.15%	6.3	$20,906.90	12
Italy	23.84%	22.82%	46.66%	57.8	$26,434.91	12
Jamaica	17.52%	0.98%	18.50%	2.6	$7,901.50	12
Japan	21.80%	14.70%	36.50%	126.0	$28,125.52	12
Jordan	22.54%	5.93%	28.48%	4.8	$4,954.15	12
Kenya	19.42%	2.25%	21.67%	32.1	$1,985.02	12
Korea, South	19.17%	9.09%	28.26%	46.7	$18,281.54	12
Kuwait	34.79%	10.53%	44.45%	2.3	$36,483.96	12
Latvia	23.62%	13.39%	37.01%	2.3	$9,887.67	10
Lithuania	22.39%	12.33%	34.72%	3.5	$10,198.65	10
Luxembourg	28.51%	22.61%	49.17%	0.4	$60,832.59	12
Madagascar	9.38%	0.88%	10.18%	15.7	$929.60	12
Malawi	16.89%	2.19%	19.09%	12.2	$1,091.43	12
Malaysia	22.10%	5.62%	27.71%	23.4	$13,655.06	12
Mali	14.13%	0.59%	14.66%	10.8	$1,113.68	12
Malta	23.90%	16.23%	40.13%	0.4	$17,530.33	12
Mauritius	16.39%	5.48%	21.87%	1.2	$15,312.43	12
Mexico	13.82%	7.42%	21.24%	97.3	$10,047.36	12
Morocco	22.50%	5.84%	28.34%	28.8	$4,866.92	12
Myanmar	8.42%	0.00%	8.42%	46.2	$214.50	12
Namibia	30.10%	3.34%	33.44%	1.9	$5,549.81	11
Nepal	11.08%	0.00%	11.08%	26.1	$1,688.62	10
Netherlands	30.13%	24.68%	54.81%	15.9	$30,267.97	12
New Zealand	22.86%	13.45%	36.31%	3.9	$22,125.66	12
Nicaragua	18.19%	6.29%	24.48%	5.1	$2,261.70	12
Niger	14.79%	0.79%	15.06%	11.5	$868.77	12
Nigeria	11.62%	0.11%	11.73%	128.0	$1,718.09	12
Norway	31.49%	20.04%	51.53%	4.5	$40,577.05	12
Oman	38.05%	2.40%	40.45%	2.4	$23,139.64	12
Pakistan	12.47%	2.66%	15.13%	141.0	$2,902.79	12

Country	Government Consumption	Transfer Payments	Total Gov't Share of GDP	Population (Millions)	Real GDP Per Capita, 2008 US $	Total Number of Observations
Panama	19.23%	5.95%	25.18%	3.0	$7,281.20	12
Pap. New Guinea	21.59%	2.64%	24.17%	5.5	$2,142.01	12
Paraguay	12.01%	3.18%	15.18%	5.4	$4,763.64	12
Peru	12.59%	3.12%	15.71%	26.0	$5,301.55	12
Philippines	12.96%	2.40%	15.36%	78.5	$3,890.80	12
Poland	22.85%	20.98%	43.84%	38.1	$10,968.16	12
Portugal	23.44%	17.88%	41.32%	10.3	$18,008.36	12
Romania	14.87%	13.18%	28.05%	22.1	$3,265.83	12
Russia	25.18%	12.84%	38.02%	144.0	$9,669.73	10
Rwanda	11.95%	2.20%	14.15%	8.5	$987.05	10
Senegal	13.35%	2.70%	16.05%	10.1	$1,849.54	12
Sierra Leone	13.25%	2.04%	15.29%	4.6	$2,011.38	12
Singapore	20.49%	3.38%	23.86%	4.0	$32,728.01	12
Slovak Rep	25.61%	20.17%	43.72%	5.4	$12,691.25	10
Slovenia	26.51%	22.09%	48.60%	2.0	$19,834.21	10
South Africa	23.88%	5.20%	29.08%	43.7	$9,004.32	12
Spain	22.68%	16.01%	38.70%	41.8	$25,160.68	12
Sri Lanka	12.43%	5.03%	17.47%	18.8	$4,592.51	12
Sweden	35.49%	24.27%	59.75%	8.9	$27,774.18	12
Switzerland	16.82%	14.28%	31.10%	7.2	$34,513.85	12
Syria	17.23%	0.00%	17.23%	17.1	$2,491.44	12
Taiwan	18.44%	3.27%	21.71%	18.1	$20,194.72	12
Tanzania	17.38%	0.43%	17.82%	35.0	$753.57	12
Thailand	16.86%	2.48%	19.34%	62.9	$7,393.46	12
Togo	11.27%	2.13%	12.36%	5.4	$979.87	12
Trinidad & Tob.	19.66%	8.39%	28.05%	1.3	$16,985.83	12
Tunisia	20.13%	8.88%	29.01%	9.5	$7,831.60	12
Turkey	15.50%	5.56%	21.07%	66.7	$6,315.05	12
Uganda	14.11%	6.94%	21.05%	25.3	$1,038.86	12
Ukraine	25.56%	18.36%	42.01%	48.0	$7,018.26	10
Unit. Arab Em.	24.00%	1.48%	25.38%	3.4	$45,135.52	12
United Kingdom	24.54%	14.78%	39.32%	59.3	$27,118.53	12
United States	18.79%	12.83%	31.62%	283.0	$37,927.73	12
Uruguay	14.51%	14.94%	29.45%	3.3	$10,487.70	12
Venezuela	17.29%	11.25%	28.54%	24.5	$10,687.34	12
Zambia	16.75%	2.72%	19.47%	10.6	$1,450.29	12
Zimbabwe	27.12%	8.43%	35.55%	11.9	$3,484.93	12

Table 5.10: Summary Statistics, 1985-2008 (N=1436)

Variable	Means by Level of Political Rights		
	Low Political Rights	Med Political Rights	High Political Rights
Government Consumption (% of GDP)	18.52	17.61	23.72
Transfer Payments (% of GDP)	4.00	5.33	15.66
Total Government (% of GDP)	22.02	22.80	39.33
Government-Owned Enterprises	3.6	5.0	7.6
Legal and Property Rights	4.5	4.8	7.5
Freedom to Transfer Property	6.0	6.6	7.6
Business Freedom	5.4	6.1	6.9
Population (millions)	78.6	44.8	24.4
Real GDP Per Capita (2008 US$)	$6,365.70	$6,656.05	$23,011.88
Ethnic Heterogeneity	0.54	0.52	0.27

	Total Budgetary Government	Legal and Property Rights
Legal and Property Rights	0.64***	
Business Freedom	0.32***	0.49***

Variable	Correlations with Ethnic Heterogeneity by Level of Political Rights		
	Low Political Rights	Med Political Rights	High Political Rights
Government Consumption (% of GDP)	-0.19***	0.02	-0.28***
Transfer Payments (% of GDP)	-0.44***	-0.27***	-0.39***
Total Government (% of GDP)	-0.33***	-0.12***	-0.40***
Legal and Property Rights	-0.31***	-0.09**	-0.27***
Business Freedom	-0.08	-0.05	0.18***
Population (millions)	-0.31***	-0.06	0.02
Real GDP Per Capita (2008 US$)	-0.10*	-0.20***	-0.16***

Table 5.11: Political Rights, Ethnic Heterogeneity, and Government, 1985-2008

		Budgetary Government			Non-Budgetary Government (Shadow Taxes)	
		Government Consumption (% of GDP)	Transfer Payments (% of GDP)	Total Consumption and Transfers (% of GDP)	Legal Rights (0-10)	Business Freedom (0-10)
Low Political Rights (N=268, 50 countries)	Constant	14.89%	14.26%	25.39%	5.4	4.6
	Ethnic Heterogeneity	-1.21 (3.44)	-15.89 (3.28)***	-15.55 (4.81)***	-2.15 (0.84)***	0.74 (0.75)
	Population (millions)	0.0062 (0.0044)	0.0018 (0.0038)	0.0043 (0.0061)***	-0.0003 (0.0011)	0.0018 (0.0009)*
	GDP Per Capita (thousands)	0.59 (0.09)***	0.04 (0.06)	0.71 (0.12)***	0.06 (0.02)***	0.02 (0.02)
Medium Political Rights (N=671, 88 countries)	Constant	15.59%	11.94%	27.24%	4.8	5.6
	Ethnic Heterogeneity	1.02 (2.85)	-12.09 (2.57)***	-11.32 (4.50)***	-0.80 (0.60)	0.33 (0.42)
	Population (millions)	0.0001 (0.0047)	0.0025 (0.0036)	0.0039 (0.0066)	0.0013 (0.0011)	0.0011 (0.0008)
	GDP Per Capita (thousands)	0.29 (0.06)***	0.056 (0.042)	0.325 (0.078)***	0.052 (0.013)***	0.006 (0.009)
High Political Rights (N=497, 54 countries)	Constant	24.54%	17.98%	41.33%	6.0	6.7
	Ethnic Heterogeneity	-8.19 (3.34)***	-15.82 (3.76)***	-25.15 (5.96)***	-1.34 (0.51)***	0.34 (0.41)
	Population (millions)	0.0099 (0.0148)	0.0033 (0.0167)	-0.0063 (0.0025)	-0.0031 (0.0024)	0.0048 (0.0020)**
	GDP Per Capita (thousands)	0.045 (0.040)	0.046 (0.046)	0.030 (0.061)	0.082 (0.008)***	0.005 (0.007)

Chapter 6:   Discussion and Conclusions

This study explores different topics related to preferences for public provision by heterogeneous groups.   While the Tiebout mechanism may not produce a completely efficient solution to the public goods problem, individual-level migration decisions may still provide information about preferences for public provision.   Chapter 3 tests this idea using 2000 census migration data to explore the extent to which migration decisions can be used to estimate demand for public provision of goods and services.   Migration patterns for various demographic groups are compared to relative changes in balanced-budget fiscal policy outcomes taken from the census of governments.

In general, individuals are found to migrate in response to relative changes in fiscal policies.   However, the ability of provision to attract mobile individuals is limited to expenditures on education, as individuals appear to be migrating away from increases in other types of expenditures.   Young individuals with relatively high levels of income and/or education have more elastic migration responses to all types of fiscal policy.   In this analysis, each demographic subgroup is considered separately, and their underlying level of mobility is captured in the estimated constant terms.   Estimated differences between each subgroup's migration responses in reaction to relative changes in fiscal policy represent differences in preference intensity.

If, after controlling for their higher propensity to migrate, young college-educated individuals are still more likely to move in response to relative changes in education spending than individuals of retirement age, it must be the case that these young have a higher preference intensity for education spending.   While individuals of retirement age

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may still feel strongly about education spending, they are less likely to consume publicly-provided educational services. This contributes to the public finance literature by providing a method to rank preference intensity for different types of public provision. A detailed analysis using information at the local jurisdictional level would be able to provide information on more fiscal categories.

One limitation of this study is that it does not control for tax progressivity at the state level. A similar analysis using more detailed information on individual-level tax burdens could be used to find the optimal levels of tax progressivity, and individual demand for public provision could be matched to individual willingness-to-pay for provision.

While preference intensity among groups can be ranked using this method, the extent to which these policies can ultimately attract mobile individuals depends on the underlying level of mobility. While migration outcomes are known, the overall level of mobility in the population remains unclear, since satisfied mobile individuals who choose not to move cannot be empirically separated from immobile, dissatisfied individuals.

Simulations provide upper and lower bound estimates of migration responses to fiscal policy under the respective assumptions that the entire population, and only those who actually migrated are mobile. Results indicate that an individual can be attracted to a jurisdiction with an expenditure of somewhere between $479.11 and $6493.22 on higher education.

One goal of this study was to create a revealed-preference method that can be used to estimate demand for publicly provided goods and services. Quadratic

specifications are estimated in order to search for "bliss points." If, for example, relative changes in jurisdiction B are twice that of jurisdiction A, we might expect a greater migration response with respect to jurisdiction B. Due to diminishing returns, this migration response in jurisdiction B should be less than twice that in jurisdiction A, and the estimated point where the migration response would be zero would be considered the bliss point.

However, diminishing returns to relative changes do not regularly appear in the aggregate fiscal data. This may be due to aggregation bias or policy convergence and low levels of variation among jurisdictions. Individuals may be less aware of relatively small fiscal changes, and there may initially be an increasing response to fiscal changes. Because extreme fiscal changes do not appear in the data, we do not observe the diminishing responses. Because of this, the quadratic specifications estimated in Table 3.7 are not concave with respect to the origin, and maxima (i.e., bliss points) cannot be found.

This also provides insight into the race-to-the-bottom literature. Low-income individuals are found to actually migrate away from balanced-budget increases in welfare spending, inconsistent with welfare migration. Also inconsistent with the theory, college-educated and high-income individuals do not appear more averse to welfare spending than other groups. Brueckner (2000) finds that states most likely are competing with one another in a race to lower welfare benefits, but in the absence of welfare migration these actions would require additional justification. In addition, if welfare migration is not widespread, then federal programs (e.g., matching grants) intended to address this

phenomenon would be counterproductive. This study shows that all individuals appear to demand less provision of welfare, and that a reduction in provision reflects the underlying preferences of the entire population.

Both the race-to-the-bottom literature and the Tiebout hypothesis suggest that policies have the ability to change the demographic makeup within a jurisdiction. Though certain fiscal policies may be more attractive to some individuals, the ability of policy to have an affect on the population is limited in the short-run because fiscal policies will attract individuals from many different demographic groups. Because of the pre-existing level of demographic heterogeneity in the overall economy, some level of demographic heterogeneity will remain within each jurisdiction.

Chapter 5 explores the relationship between heterogeneity and the size of government, while considering the possibility that non-budgetary intervention through regulation can also exist in addition to fiscal policy. Because there is relatively little variation in heterogeneity in the U.S., this chapter explores this idea in an international context. In general, heterogeneous countries are found to have lower levels of transfer payments, consistent with predictions in the literature.

Additionally, the relationships between heterogeneity and government size are found to be dependent upon the level of political rights in a country. In countries with high levels of political rights, heterogeneous jurisdictions are found to have lower levels of budgetary government consumption. In countries with low levels of political rights, heterogeneity does not appear to have an effect on government consumption.

The effect of heterogeneity on non-budgetary government is unclear in

democracies. Heterogeneity is found to increase the size of non-budgetary government in non-democratic countries. Also, the effect of heterogeneity on non-budgetary government appears to be larger in countries with low levels of property rights. If transfer payments are excluded, heterogeneity increases the overall size of government in non-democratic countries.

A future study will explore the relationships between fiscal policy and centralization in a federal system while explicitly controlling for this demographic heterogeneity. If more centralized jurisdictions are larger than decentralized jurisdictions, they are likely to have more heterogeneous populations. If these heterogeneity affects preferences for public provision, then previous tests of the "Leviathan" theory that do not consider heterogeneity may be biased. The inclusion of non-budgetary government activity in such a study may yield insightful results.

In addition, previous research has found evidence of "Wagner's Law" in industrialized nations, but little evidence in developing countries (Akitoby et al, 2006). Future research will examine the extent to which these non-budgetary measures can be used to explain this difference.

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