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Tax Competition when the Quality of Public Services Matters: An Analysis in a Rural Context*

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Abstract: This paper constructs a regional tax competition model where the quality of public services matters for residents. Workers benefit from local public services only when these services meet a sufficient quality standard; otherwise, taxes are perceived as wasteful. Local governments have the choice of supplying high-quality public services, which imposes a relatively high tax burden on residents, or offering minimal services and a low tax rate, allowing residents to enjoy more private consumption. This paper asks two questions: If local governments compete over tax rates to maximize social welfare then, (1) under what conditions is a high-tax, high-public service level policy viable, and (2) when is this policy superior to a low-tax policy? We use our results to motivate a discussion on public service provision in rural communities, focusing on the determinants of the local tax base and the set of public services demanded given the current demographic conditions in rural areas. We also propose extensions to the modeling strategy that would allow for a more robust differentiation in the challenges faced by rural compared to urban local governments in providing public services.

Keywords: Rural Government Finance, Income Taxation, Rural Development

JEL Codes: R51, H24, O18

1. INTRODUCTION

The variety of public services offered by local governments—such as schools, transportation networks, healthcare access, social services, and recreational facilities—plays a critical role in the quality of life of a community and shapes households' decisions about where to live. Because these services involve substantial fixed costs and may benefit from economies of scale, the average cost of providing adequate public services is often considerably higher in

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rural areas with smaller and more dispersed populations relative to metropolitan areas. Yet expectations regarding the quality and scope of public services have risen, placing additional fiscal pressure on local governments. Consequently, the challenge of maintaining high-quality public services without imposing an insurmountable tax burden on local residents has become a defining feature of rural livability.

As the population increasingly shifts toward urban areas, local governments in regions facing depopulation often propose tax incentives in an attempt to lure workers and firms. If the policy is successful and the region's population rises, the growth in the tax base can potentially offset the decline in per-capita tax revenue, allowing for better-funded public services. However, if these population gains fail to materialize, the region will face lower tax collections. Given the high fixed costs of public goods, many public services may no longer be feasibly funded, which can further reduce the attractiveness of a region. [1] This issue is particularly relevant for rural regions, which often struggle with attaining the critical mass necessary to supply many public goods. Local governments face the choice of either providing high-quality public goods like those in metropolitan areas or imposing minimal tax rates and providing minimal levels of public goods. The contribution of this paper is to develop a tax competition model where the quality of public services matters for residents. Based on the results of our theoretical model, we discuss both the types and the levels of public goods supplied by local governments, and the corresponding tax burden in a rural context.

Our model builds on a standard regional tax competition model (for surveys, see Wilson, 1999; Keen and Konrad, 2011). The key technical refinement we introduce is that households derive utility from local public goods only once these goods reach a sufficiently high level of quality. Below this threshold, additional tax revenue generates no marginal benefit for residents. As a result, the local government prefers to set the lowest feasible tax rate and provide only the minimum allowable level of public goods.[2] This framework captures the idea that many public goods may only prove particularly useful to households when they are sufficiently well funded, and if they are not, then the private cost of paying taxes ultimately outweighs the public benefits, such that taxes are viewed as "wasteful" by households. We use this framework to address two questions: (1) under what conditions is a high-tax regime feasible, and (2) if that condition is met, when does a high-tax regime yield a higher household welfare than a low-tax regime?

Our primary result identifies three factors that determine whether a high-tax regime yields higher welfare than a low-tax regime: the size of the real tax base, the welfare gains households derive from access to higher-quality public goods, and the net loss in private con-

[1]Not only will tax revenues decline, but local governments may also face the risk of financial collapse. For example, Yubari City in Japan went bankrupt in 2006. Yubari City prospered from mining in the early 1900s, but the mines closed in 1990. As a result, the population declined rapidly, and the city's finances deteriorated. After the bankruptcy, Yubari City has decided not only to reduce its civil service workforce but also to increase taxes and cut back on essential expenditures. As a result, the population has declined further, and as of 2025, the proportion of residents aged 65 and over in Yubari City stands at 54%, significantly exceeding the national average of 30%. For details, see Seaton (2010).

[2]In our model a "high-tax regime" refers to a local government imposing high tax rates while providing high-quality public services. Conversely, a "low-tax regime" refers to a local government imposing low tax rates while providing minimal public services

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sumption associated with higher taxes. Given this result, we discuss why rural communities often struggle to satisfy these conditions and, when they are satisfied, which types of public goods are most likely to generate meaningful improvements in rural livability. In addition, we propose extensions to our model that would allow for a more robust differentiation between rural and urban public finance.

The earlier literature on tax competition shows that when local governments compete in taxing mobile factors, they tend to set tax rates that are too low and provide suboptimal levels of public services. This outcome arises because, unlike in a cooperative benchmark where regions internalize migration externalities, each jurisdiction ignores the fiscal externalities imposed on others when lowering its tax rate to attract mobile factors (Zodrow and Mieszkowski, 1986). In this setting, upward tax harmonization by regions can lead to a Pareto improvement. The New Economic Geography framework suggests that when agglomeration economies are present, these results may not hold. Agglomeration economies imply that there are taxable rents in larger regions, such that local governments can increase tax rates without driving out workers (Baldwin and Krugman, 2004). Similarly, Lopez and Morita (2024) show that when agglomeration economies are present, larger regions are able to sustain more progressive tax policies.

However, much of this literature is grounded in urban or large-region contexts. This assumption may not be innocuous when attempting to translate these theoretical insights into policy for rural areas. Indeed, rural communities are not simply smaller cities and may differ in their demographic composition relative to cities in a variety of ways (e.g., income levels, average age). There are also difficulties that are more pronounced in rural communities, such as greater difficulty for women or minority workers to find high-quality jobs (Carnevale et al., 2024). Given these differences, it is reasonable to expect that the demand for and set of local public services will differ for rural communities compared to urban ones.

In recent years, there has been a growing reevaluation of the community attributes that make a place desirable (Deller, 2025). Traditionally, the focus has been on promoting economic development and trying to create greater employment opportunities in a community, preferably ones that offer high wages. Increasingly, however, questions surrounding the quality of life in a given community have gained traction in the local development discussion. Introducing or maintaining amenities that improve the local quality of life often requires a conversation beyond simply a focus on local production. Economic development and quality of life need not be mutually exclusive. For example, many rural communities are reliant on tourism for employment, which in turn is reliant on the maintenance and preservation of local natural amenities, ultimately raising living standards (Green, 2013). As such, it is no longer clear that a "favorable business climate" must come at the expense of diminished quality of life for local residents through lower expenditures on public services. This is particularly true if jobs follow people, and firms are attracted to places where workers are well-trained, healthy, and eager to stay. Moreover, as shown by Rodden (2024), the public sector plays an outsize role in rural economies relative to urban ones, providing rural policymakers with the potential to transition to a broader focus on quality of life in rural communities rather than solely job creation.

As the seminal work by Tiebout (1956) emphasizes, there is a fundamental link between

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public service provision and local tax rates. Households differ in their tastes for public services and in their willingness to pay for them. In this framework, they choose to reside in communities that offer the tax–public service bundle that best matches their preferences. However, households may differ in their demand for public services along many dimensions—not only spatially (urban, suburban, rural) but also by income, age, health status, and other characteristics.[3] Families with school-age children will have a different demand for public services than retirees, as will those with cars relative to those who rely on public transit. As a practical matter, it is a challenge for rural local governments attempting, at least in some nominal form, to satisfy so many competing demands. This is especially so, if the public revenue the government can rely on is limited. At the same time, this heterogeneity highlights the potential role of local governments in "place-making" and in shaping the quality of life that rural communities can offer.

The basic premise of our model is simple. It is not simply that people value public transit systems, or education or healthcare *per se*. They value reliable and consistent public transit systems, schools that offer a broad curriculum and deliver strong educational and professional outcomes, and healthcare systems that improve individual health and enhance overall quality of life. However, these services are costly, and the higher their quality, the more expensive they become. In rural communities, providing such a level of services can be challenging, as the population may be too small to distribute the costs effectively. Therefore, local governments must decide whether the community can bear the economic strain of providing high-quality local public services. Our model provides an indication of what kind of communities may be able to successfully integrate such policies. In addition, it provides a set of testable predictions on why, in practice, there is variation in rural communities across the magnitude and variety of public services.

The remainder of the paper is organized as follows. Section 2 describes the model and provides our main analytical results. In Section 3, we discuss the model in the context of rural public service provision. In Section 4, we discuss extensions that would allow for a greater differentiation between rural and urban public finance models, and in Section 5 we suggest avenues for future research and conclude.

2. THE MODEL

Here we present a conceptual model to motivate the idea that households internalize the benefits of public services only when those public services are particularly well funded. We will provide a sketch of the model and present our key result. The interested reader can find a more thorough treatment of the analytical results in the Technical Appendix.

In this model, there are $2N$ workers in the economy who have a choice of locating in either region 1 or region 2. We index regions by $i = 1, 2$, and the endogenous number of workers that choose to live in region i is given by N_i. Households have preferences over two

[3]Bucovetsky (1991) constructs an asymmetric two-country model with two factors of production: mobile capital and immobile labor. He shows that, compared to mobile capital, higher tax rates are imposed on the immobile factor, labor. Morita et al. (2020) demonstrate that capital-tax policies differ systematically between economies dominated by younger versus older generations, and that inefficiently high capital taxes are particularly harmful in aging economies.

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goods: a freely traded consumption good c_i, which is chosen as the numeraire and given a price of 1, and non-traded housing services, h_i, which commands the rental price r_i. All households supply one unit of labor inelastically for which they receive a wage w_i. They face a linear income tax t_i to fund a public good, g_i, which enters the utility function as a locational amenity $f(g_i)$, and which households take as parametric. We will describe this function in more detail below. The problem of a household in i is given by

$$\max_{c_i,h_i} f(g_i)\left(\frac{c_i}{1-\alpha}\right)^{1-\alpha}\left(\frac{h_i}{\alpha}\right)^{\alpha}, \quad s.t. \quad (1-t_i)w_i = c_i + r_i h_i, \tag{1}$$

where $\alpha \in (0,1)$ is the budget share devoted to housing. The corresponding demand functions for the utility maximization problem are given by

$$c_i = (1-\alpha)(1-t_i)w_i, \quad h_i = \alpha\frac{(1-t_i)w_i}{r_i}, \tag{2}$$

and the indirect utility function can be written as

$$V_i = f(g_i)\frac{(1-t_i)w_i}{r_i^{\alpha}}. \tag{3}$$

2.1. Production

There is a continuum of small firms that produce the numeraire good under perfect competition. For each effective labor unit, a firm can produce $A_i(N_i)$ units of output, where $A_i(N_i)$ represents agglomeration externalities in region i and $A_i(N_i)$ is an increasing function of the local population size. The total profit of firms in region i is given by

$$A_i(N_i)N_i - w_i N_i. \tag{4}$$

Perfect competition drives profits to 0, which yields the wage rate $w_i = A_i(N_i)$. We assume that external economies may be present and that the output for each labor unit is given by $A_i(N_i) = A_i N_i^{\delta}$, where the parameter $\delta \geq 0$ governs the external productivity benefits from the number of aggregate labor units. Notice that when $\delta = 0$, such that there are no external economies, the wage collapses to the constant $w_i = A_i$.

2.2. Public Good Provision and Preferences

Local governments use tax revenue to fund a local public good, g_i. Following Andersson and Forslid (2003), we assume that the production function for local public goods mirrors that of households. The local government must also acquire physical space in which to deliver services such as school buildings, clinics, offices, depots, etc., which it rents at the same price r_i faced by households. This feature captures the idea that public services are more costly to provide, all else equal, in locations where building rents are high.[4] In particular, the public

[4]Under this specification, local governments spend the tax revenue exactly as households would if they did not face the tax. The implication is that aggregate demand for both goods is independent of the tax, which simplifies the analysis.

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good is given by

$$g_i = \max_{c_i^g, h_i^g} \left(\frac{c_i^g}{1-\alpha}\right)^{1-\alpha} \left(\frac{h_i^g}{\alpha}\right)^{\alpha} \quad s.t. \quad t_i w_i N_i = r_i h_i^g + c_i^g, \tag{5}$$

where c_i^g and h_i^g are the demand for the numeraire good and housing services, respectively, by the local government. Given the tax revenue, the level of the public good is

$$c_i^g = (1-\alpha) t_i w_i N_i, \quad h_i^g = \alpha \frac{t_i w_i N_i}{r_i}, \quad g_i = \frac{t_i w_i N_i}{r_i^{\alpha}}. \tag{6}$$

A key feature of this model is that households care about the quality of public goods. Specifically, they only value additional expenditure on public goods when a minimum quality threshold is met. For values of the public good below that threshold, the benefit of public goods is constant and independent of expenditure. The preferences for the public good are given by

$$f(g_i) = \begin{cases} 1 & \text{if} \quad g_i \leq \hat{g}_i \\ ((g_i - \hat{g}_i) + 1)^{\gamma} & \text{if} \quad g_i > \hat{g}_i \end{cases}, \tag{7}$$

where g_i is the actual level of the public good, $\hat{g}_i$ is the threshold level of public good provision after which additional tax revenue generates additional benefits to residents in region i, $\gamma > 0$ captures how rapidly welfare rises with increasing levels of public good provision.[5] As an example, a poorly funded public transit service may provide a temporary safety net if, for example, a car breaks down. However, only if the service is sufficiently timely and reliable will it become a reasonable substitute for a private vehicle. Thus, $\hat{g}_i$ reflects the point at which that transition occurs in region i. $\hat{g}_i$ can also be interpreted as a reference point for public service provision relative to other locations such as those found in areas that rural residents may use as a benchmark. For example, $\hat{g}_i$ may be interpreted concretely as the point at which obstetric care becomes locally available in a community. Many rural communities retain a hospital but have no obstetric unit. Kozhimannil et al. (2020) report that by 2018, roughly 56 percent of rural counties had no hospital-based obstetric care, whereas among urban counties the number with such services registered a slight net gain over the same period.

If the quality of public goods in cities is very high, rural residents will not be satisfied unless the quality of public goods in their own areas approaches such a standard. [6] We assume that $\hat{g}_i > 1$, such that the threshold level of the public good is greater than the

[5]The underlying assumption that residents receive no benefit at all from any increase in tax revenue for values of $g_i < \hat{g}_i$ is admittedly strong. Our results are robust to a more general framework where $f(g_i) = \left(a(g_i - \underline{g})\right)^{\gamma}$ when $g_i < \hat{g}_i$ and $f(g_i) = (a\hat{g}_i + b(g_i - \hat{g}_i))^{\gamma}$ when $g_i > \hat{g}_i$, with a and b, $b > a$, the marginal benefit of increasing the public good level, respectively, depending on whether it is below and above$\hat{g}_i$. As we discuss below, $\underline{g}$ represents a minimum level of expenditure required on public good provision. However, such a model is much more technically intensive. Therefore, to emphasize the intuition and the discussion around policy solutions in rural areas, we have chosen to focus on the simpler case. We plan to expand the theoretical model to incorporate these features in a separate paper.

[6]Deichmann and Lall (2007); Olsen (2017) show that household satisfaction depends not only on the level of services in their own community but also on the level of services in a reference group. This may prove particularly important for rural local governments if they are attempting to attract urban residents.

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benefit when that threshold is not met. Clearly, if $g_i/\hat{g}_i < 1$, then all residents receive a constant level of benefit, which in our setup is simply equal to 1. In addition, we assume that there is a minimum level of expenditure required on public goods given by $\underline{g}$, with $\hat{g}_i > \underline{g}$. This may reflect specific minimum levels of police protection, fire safety, educational services, road construction, and other public services mandated by state or federal law. Such legal requirements ensure that a minimum level of taxation is necessary.

A direct implication of (7) is that no local government chooses a level of public good provision strictly between $\underline{g}$ and $\hat{g}_i$. Expenditure in that range generates no marginal benefit to households while reducing private consumption, so the government either provides the mandated minimum or provides at least $\hat{g}_i$.

2.3. Housing

Each region has one unit of available land, which can be used to provide housing services. Developers rent land from absentee landlords at the land rental price q_i.[7] Denoting by H_i the number of units of housing produced per unit of land, the profit function for a developer is given by

$$\pi_i = r_i H_i - \frac{\eta}{1+\eta} H_i^{\frac{1+\eta}{\eta}} - q_i, \tag{8}$$

where $\eta \geq 0$ is the price elasticity of housing supply. This parameter is key in determining the migration elasticity of households in response to exogenous shocks.[8] Profit maximization yields the housing supply function and land rental rates,

$$H_i = r_i^{\eta}, \quad q_i = \frac{1}{1+\eta} r_i^{1+\eta}. \tag{9}$$

Note that the scaling term $1/(1+\eta)$ for q_i represents the share of revenue that goes toward land rents. Equating housing supply with the demand for housing services by both individuals and the local government, and using (2), (6), and (9), yields the housing rental rate,

$$r_i = \left(\alpha A_i N_i^{1+\delta}\right)^{\frac{1}{1+\eta}}. \tag{10}$$

[7] In this model, the assumption of absentee landlords is innocuous for our results and is simply to reduce the number of parameters. If we were to suppose that all rents were redistributed regionally back to households, this would simply scale the rental equation by the constant $\alpha/(1-\alpha)$ that is independent of taxes. In addition, our analysis remains qualitatively robust to a change in the tax mechanism, from, say, the income tax to the property tax. This result follows from the assumption that local governments spend tax revenue in the same way that individual households would.

[8] For simplicity, we have focused on the case where all workers are identical, and the sole source of congestion is through an increase in the housing price as a region grows. However, quantitative spatial economic models have demonstrated that we can tractably integrate individual preference heterogeneity, where some workers are quick to move in response to economic improvements elsewhere, while others, perhaps due to social ties to their communities or family obligations, are more hesitant to leave even if there is a high opportunity cost of staying. These models have shown that this addition simply adds an additional congestion effect. As such, in our model, this can be interpreted as a lower value of η (Henkel et al., 2021).

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2.4. Spatial Equilibrium

The timing of the model is such that local governments set tax rates, after which residents choose their location. As is standard in the literature, we solve the model by backwards induction by first calculating the population distribution conditional on regional tax rates, and we solve for the tax rates that are consistent with the population distribution, given the local government's objective function.

In the model, it is assumed that workers can freely move across locations. Therefore, the utility must equalize for residents in each region in an interior equilibrium in which both regions are populated. We use the equation of motion that is commonly employed in the New Economic Geography, and assume that workers migrate according to the function;

$$\dot{N}_i = N_i(2N - N_i)(V_i - V_j), \tag{11}$$

where $\dot{N}_i$ is the time derivative of the number of workers in region i. In equilibrium, $\dot{N}_i = 0$ holds in an interior equilibrium when $V_i = V_j$. [9] Combining (2), (6), (7), (10) with (3) yields the indirect utility as a function of the number of households, N_i, local tax rates, t_i, and constant terms that are independent of i. Note that there are two possibilities. One in which $g_i > \hat{g}_i$ and another in which $g_i < \hat{g}_i$. These can be written as

$$V_i = \kappa(1 - t_i)A_i^{1-\frac{\alpha}{1+\eta}} N_i^{\delta - \frac{\alpha(1+\delta)}{1+\eta}} \quad \text{for} \quad g_i \leq \hat{g}_i \tag{12}$$

$$V_i = \kappa \left(\kappa t_i A_i^{1-\frac{\alpha}{1+\eta}} N_i^{(1+\delta)(1-\frac{\alpha}{1+\eta})} - \hat{g}_i + 1\right)^{\gamma} (1 - t_i)A_i^{1-\frac{\alpha}{1+\eta}} N_i^{\delta - \frac{\alpha(1+\delta)}{1+\eta}} \quad \text{for} \quad g_i > \hat{g}_i, \tag{13}$$

$$\text{with} \quad \kappa \equiv \alpha^{-\frac{\alpha}{1+\eta}}.$$

The term $\alpha/(1+\eta)$ summarizes the extent to which cost-of-living in a region increases with population size. As long as the net effect is negative, such that an increase in the private cost-of-living more than offsets the gains in public service provision, the interior equilibrium is stable. If this were not the case, then from a welfare perspective all households would be driven to locate in a single region. This result is consistent with quantitative spatial models with the "no-black-hole" condition in New Economic Geography models (Krugman, 1991; Redding and Rossi-Hansberg, 2017). We assume that the conditions required for a stable equilibrium are satisfied throughout the analysis.[10]

2.5. The Choice of Tax Rates Under a Symmetric Equilibrium

In this section, we summarize the objective of the local government of each region in choosing the tax rate and present the key analytical results. We focus throughout on the symmetric equilibrium, imposing $A_1 = A_2 = A$, and $\hat{g}_1 = \hat{g}_2 = \hat{g}$, so that regions differ neither

[9] In this model, full agglomeration does not occur. Intuitively, under full agglomeration, land prices in a deserted region go to zero, and the marginal utility derived from land becomes infinite. As a result, the indirect utility also becomes infinite, such that some residents in the core will move toward the empty region.

[10] As can be seen in the Technical Appendix, this requires the parameter restriction $\delta < \frac{\alpha(1+\delta)}{1+\eta}$, which ensures that a population increase will lower welfare at the margin.

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in productivity nor in the level of provision at which public services become valuable to residents. [11] We assume that the local government's problem is to choose tax rates to maximize aggregate welfare. Specifically, the local government maximizes $W_i = V_i N_i$, where W_i is the Benthamite social welfare function. We define t^l as the tax rate associated with $\underline{g}$, and t^h as the tax rate associated with providing a public good level of at least $\hat{g}$. We analyze two cases: when the local government imposes a tax t^h and supplies public goods $g_i > \hat{g}$, and when the local government imposes a tax t^l and supplies a minimum level of public good, $\underline{g}$. In this paper, the former is referred to as the "high-tax regime" and the latter as the "low-tax regime".

Before presenting our results, we define $Y \equiv \kappa(AN^{(1+\delta)})^{1-\frac{\alpha}{1+\eta}}$ as (real) pre-tax regional income, or the tax base, measured in terms of the public good.

Result 1. *Under the high-tax regime, the tax rate is*

$$t^h = \frac{\hat{g}-1}{Y}\frac{\chi}{\chi-\gamma}, \quad \chi \equiv \frac{(1-\delta)+\frac{\alpha(1+\delta)}{1+\eta}}{(1+\delta)(1-\frac{\alpha}{1+\eta})}. \tag{14}$$

Under the low-tax regime, the tax rate is

$$t^l = \frac{\underline{g}}{Y}. \tag{15}$$

An increase in N reduces tax rates in both regimes. The parameter restriction for household welfare to be higher under the high-tax regime relative to the low-tax regime is

$$\underbrace{Y\left(\left(\frac{\gamma(\hat{g}-1)}{\chi-\gamma}\right)^{\gamma}-1\right)}_{\substack{\textit{Tax Base} \times \\ \textit{Individual Public Good Welfare Gain}}} - \underbrace{\left(\frac{\chi}{\gamma}\left(\frac{\gamma(\hat{g}-1)}{\chi-\gamma}\right)^{1+\gamma}-\underline{g}\right)}_{\substack{\textit{Welfare Weighted} \\ \textit{Aggregate Consumption Loss}}} > 0. \tag{16}$$

First, in this model, economies of scale apply to public goods, so a larger population results in a lower per capita tax burden. Second, the question is which regime households would prefer. In words, the first term on the left-hand side of the inequality in (16) captures the gain to individual welfare from the higher level of public goods under the higher tax rate relative to the lower one. Note that this term is weighted by the tax base as public goods are funded via total community income. The second term on the left captures the private loss in welfare from lost consumption through the higher tax rates. Therefore, only if the welfare gain from higher public good provision exceeds the loss of private consumption, will a high-tax regime be welfare improving. The parameter cluster χ in (14) can be interpreted as

[11] We focus on the choice by local policymakers on whether to provide high or low public service levels and the corresponding tax rate. The focus on the symmetric equilibrium allows for closed form solutions for our model. Yet, it should be noted that heterogeneity in terms of local productivity, access to natural resources or amenities, and locational advantages could generate deviations in tax rates across regions. For example, Lopez and Morita (2024) show that higher productivity locations can maintain more progressive tax policies. In addition, while we do not consider asymmetric tax competition in which one community may set a low tax rate while the other community sets a higher one, we discuss this in the future research section at the conclusion.

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the net marginal benefit to private social welfare—meaning the portion of welfare that does not depend on the public good—from adding one more person to the region, relative to the net marginal benefit that this same person generates through the public good. This term, therefore, measures the opportunity cost of shifting from private toward public consumption when adding a new resident to a community. One way to view the tax rate under the low-tax regime is as an outside option for local governments in setting tax rates. That is, if governments are unable to provide the level of public services that residents actually desire, they set the tax rates as low as possible to ease the tax burden and boost private consumption.

The condition in (16) is our primary analytical result and forms the basis for our discussion below. However, before turning to that we first characterize the key properties in (16). Specifically, our result indicates what conditions are necessary for a high-tax, high-public-good level scenario to be preferable to a low-tax, low-public-good level one. Therefore, we identify the properties of the LHS of (16), and whether changes to a specific component causes the function to rise or fall, and thus in turn make the condition in (16) more or less likely to hold.

2.6. Predictions of the Model

What is evident is that the condition in (16) holds when Y, which, in turn, depends on population size, the productivity, and cost of living, is sufficiently high. This result is intuitive. A higher real regional income increases both the level of the public good and reduces the tax burden by reducing the tax per unit of income necessary to pay for public services of identical quality. The second is that an increase in the minimum public good level, $\underline{g}$, increases the LHS of (16), making it more likely that the condition holds. The rationale is that for a higher value of $\underline{g}$, the smaller the difference between $\hat{g}$ and $\underline{g}$, implying a smaller relative tax increase. An increase in $\hat{g}$ has an ambiguous effect. On one hand, the benefit of the public good tends to rise, yet on the other hand, so does the tax burden. It is straightforward to show that the LHS of (16) rises as long as the value of $\hat{g}$ is not too high.[12] In addition, one can show that the LHS of (16) falls with χ, since a higher χ implies a greater opportunity cost of raising the level of the public good.[13]

[12] Specifically, the condition is given by $\hat{g} < Y\left(\frac{\chi-\gamma}{\chi}\frac{\gamma}{1+\gamma}\right)+1$. This is found by differentiating the left-hand side of (16) with respect to $\hat{g}$ and setting the resulting equation greater than 0.

[13] Though beyond the scope of this research, we can easily calculate the tax rates under a cooperative tax regime when $g_i > \hat{g}$. Under such a regime, policymakers maximize $\sum_i W_i^H$ and choose the cooperative tax rate t_i^c. In a symmetric equilibrium, there is no migration effect as the policymakers internalize the externality. In this case we have the tax rate as $t_i^c = \frac{\gamma}{1+\gamma} + \frac{\hat{g}-1}{(1+\gamma)Y}$. When $t = t^c$, the level of public goods is $g^c = \frac{\gamma Y+\hat{g}-1}{1+\gamma}$. Using this result, we can show that

$$f(t_i^c) > f(t_i^h) \iff Y > \frac{(\hat{g}-1)(1+\chi)}{\chi-\gamma}.$$

Interestingly, this result implies that under a cooperative tax policy, the effective public good level could be lower than under a competitive tax policy. This occurs only if Y is sufficiently low, such that the inequality above is violated.

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3. DISCUSSION OF THE RESULTS IN THE CONTEXT OF RURAL COMMUNITIES

Given the analytical results above, in this section we will discuss the implications in the context of rural communities, focusing on two key components driving the results of (16): the real regional income level (Y) and the threshold public service level above which services are deemed high quality by households ($\hat{g}$). We will go through each in turn.

3.1. Regional Income Level (Y)

The provision of public services often entails high fixed costs and therefore benefits from economies of scale as average costs fall with the number of users.[14] In relatively small communities, it is often difficult to take advantage of these economies of scale, as the average cost may be too high to justify the expense for individual users. One consequence is that many types of public services may be provided only minimally, if at all. Thus, efforts to raise aggregate local income could support the provision of a higher-quality and more diverse set of public services.

Notice that our term Y reflects real regional income and therefore comprises three components: population size (N), regional levels of individual productivity (A_i and δ), which serves as a proxy for the average wage, and the cost-of-living (price index) in the region (α and η). Each of these components can potentially be addressed through different policy responses.

In looking at population size, we should note that the specifics in our model around what constitutes a region are vague.[15] If we were to consider strictly political borders, then clearly communities with smaller populations, all else equal, may be at a particular disadvantage in providing public services relative to their larger counterparts. However, in practice, many communities are interconnected through, for example, employment and residential location choices. Therefore, demand for public services might reasonably spill over across communities. As such, there has been discussion around the idea of "regionalism" in which interconnected communities develop partnerships in order to help reach a critical mass that will allow for a broader range of services at a higher level of quality (Lu, 2011; Green, 2013).

Additionally, recently there has been a reevaluation of the benefits of place-based policies. Earlier research tended to be more skeptical of such policies as there was a concern that there would be a net loss in shifting resources from more to less-productive locations. As such, the literature instead emphasized the benefits of "people-based" policies in which transfers are tied to individuals and are largely independent of location (Glaeser and Gottlieb, 2008;

[14] Additionally, the non-rivalry and non-excludability inherent in public goods imply that as the population grows, the per capita tax burden decreases.

[15] Our analysis focuses on population size, but population density matters as well. Where density is low, the area over which public goods must be supplied expands, raising the fiscal burden of provision, and residents must also bear higher travel costs in order to consume those goods. The latter is relevant to our threshold: for a given level of expenditure g_i, services that are costly to reach deliver less to residents, so that sparsity plausibly raises $\hat{g}_i$ as well as the cost of attaining it. This also suggests a limit to regional cooperation, which may raise the effective population served without reducing the distances involved.

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Neumark and Simpson, 2015).

However, in the last decade, there appears to have been a change of heart in the literature on place-based policies. One rationale is that promoting greater economic activity in smaller regions and improving the quality of jobs makes it less desirable for workers to move towards larger metropolitan areas. This slowing of migration has the effect of reducing congestion in more populated locations, and in the aggregate could raise welfare (Henkel et al., 2021; Suedekum, 2025). In addition, research suggests that people tend to be less effectively mobile in practice than they are assumed to be in the traditional Rosen-Roback theory of household location choice (Rauch, 2014; Bosquet and Overman, 2019). Therefore, policies that aim to move people away from lagging regions may ultimately prove less effective than intended.

We also emphasize that place-based policies inherently contain a dynamic dimension, with effects that extend across generations of residents who locate in areas benefiting from such policies. For example, as noted by Parker et al. (2022), place-based policies tend to benefit children through greater educational quality that, in turn, leads to higher earnings as adults. However, these benefits largely accrue to those who eventually leave.

Another feature of the model that plays a critical role in regional income is through the parameter δ, which measures the strength of agglomeration economies. It is important to note in this framework that agglomeration economies have scale effects; thus, the magnitude of the impact on wages and productivity depends on the size of the local population. Therefore, we would likely expect that in rural areas, the total effect of agglomeration economies may be smaller. However, if $\delta < 1$, which is consistent with the empirical literature[16], this implies that the marginal impact on wages will be greater the smaller the initial population.[17] This implies that in rural areas, relatively small population gains can have substantial impacts on the average wage.

As noted by Bolter and Robey (2020), agglomeration economies are not limited to large cities and can be found in microgeographic clusters, such as within buildings. Furthermore, agglomeration economies do appear to decay with distance, such that more remote locations may struggle to take advantage of the benefits (Partridge and Rickman, 2008). Therefore, policies that aim to foster localization economies or knowledge spillovers in rural areas, and also create greater integration into the larger regional economy, can potentially lead to wage gains. This result would make a high-tax regime more feasible.

The cost of housing also plays a crucial role in the determination of real regional income, and in the term χ. Odeyemi and Skobba (2022) suggest that rural residents tend to be less cost-burdened by housing than their urban counterparts. However, as pointed out by Brooks (2022), the supply of housing tends to be less elastic in rural areas compared to urban areas. This is perhaps not surprising, as increasing urbanization has diminished the incentive for new housing investment in rural areas. Nonetheless, this result indicates that a sudden shock that leads to temporary population growth in a rural community can dramatically raise housing costs for residents. Combes et al. (2019) estimate the elasticity of urban costs, and they show that it increases with the population size.

[16]Standard references are Ciccone and Hall (1996); Combes et al. (2008); Combes and Gobillon (2015) and the empirical range for δ is generally below 0.1 in the aggregate, though there is variation for the value of δ depending on the industry (Abel et al., 2012).

[17]Formally, $\frac{\partial w_i}{\partial N_i} = \delta A_i N_i^{\delta-1}$, which is decreasing in N_i

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Similarly to their urban counterparts, rural areas have dealt with issues of gentrification in recent years. Improvements in information technology and its widespread adoption post-COVID have increased the number of commuters who now live in rural areas, which has tended to raise housing costs. As such, many rural residents struggle to find housing that fits their budget. Kropczynski and Dyk (2012) point out the need for additional types of housing in rural areas (e.g., single-family vs. multifamily housing units). In addition, much of the rural housing stock shows signs of decay and could benefit from maintenance and retrofitting (Pendall et al., 2016).

We should note that the affordability of housing affects not only real income in our model, but also the marginal benefit term χ, which partly determines whether a high-tax regime is feasible. Specifically, we can show that χ increases with the term $\alpha/(1+\eta)$, which guides how sharply the local price index increases with the size of the local population. As seen in the condition in (16), when χ becomes sufficiently large, the benefit from the high-tax regime falls below that of the low-tax regime. The intuition here is straightforward. As $\alpha/(1+\eta)$ increases, there are two effects: (1) individual households become more cost burdened, and (2) the cost of supplying public services rises, as local governments face the same costs as consumers. It follows that the existing financial resources simply don't stretch as far. Therefore, effective tools to lower average housing costs could also lower the barrier to providing higher-quality public services.

3.2. The Quality of Public Services for Rural Communities ($\hat{g}_i$)

As is standard in the literature, we have modeled public goods as a composite good that takes advantage of pooled financial resources from a community collected via a tax. In practice, though, public goods are a variety of services that can vary by community depending on locational and demographic characteristics. In rural communities, the types of public service needs may differ significantly from those in large urban areas. As a simple example, dense urban areas devote substantial resources to the provision of publicly accessible open space, particularly given the opportunity cost of central land, whereas rural residents typically enjoy proximity to nature at little cost. However, in places where rural open space is for the most part privately owned and thus not accessible to the public, rural governments may still need to fund parks, trails, and river access even where land is abundant. In this subsection, we highlight several specific areas of public spending that could benefit rural communities corresponding to the threshold value $\hat{g}$.

3.2.1. Healthcare

Rural communities, on average, have an older population than their urban counterparts. [18] In addition, working-age adults in rural areas tend to have worse health outcomes, higher mortality rates, and lower quality-adjusted life expectancy. This suggests that these communities often have a higher demand for healthcare services than what is currently supplied (see

[18] According to the Cabinet Office (2024), the share of the population aged 65 and over in Tokyo, a major metropolitan area, is approximately 22–23 percent, while in rural regions such as Tohoku, Kyushu, and Shikoku, it ranges between roughly 30 and 40 percent.

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Monnat (2025) for a discussion on the discrepancy between health outcomes and the supply of healthcare in rural areas). Coupled with this fact is that the overall rural population is declining, and is on average poorer than that of urban areas, which makes it difficult to maintain the scale necessary for local governments to provide additional healthcare support. Furthermore, rural areas have experienced a substantial number of hospital closures over the last two decades due to this same lack of scale (Monnat, 2025).

Beyond simply the increase in demand for healthcare services, rural areas also struggle to generate supply, specifically in finding enough doctors, dentists, pharmacists, etc. who are willing to serve in these communities. As such, increased demand coupled with dwindling supply leads to longer wait times for care and higher levels of provider burnout, further exacerbating the issue (Javed, 2025; Iglehart, 2018).

The provision of healthcare services generally involves a combination of actors, including the private sector and federal, state, and local governments. More broadly, increasing local tax revenues alone is unlikely to be sufficient to overcome the many constraints that hinder rural healthcare provision. Nonetheless, local healthcare departments can play an important role in improving health outcomes, for example, in providing immunizations, initial screenings for potential illnesses, maternal and child healthcare, nutrition, etc. (Leider et al., 2020). In addition, innovations such as telehealth options or mobile clinics can provide for a larger set of healthcare services than may be available locally. Notably, where additional local revenue may prove particularly beneficial is in providing the means for local health departments to offer wages for healthcare workers that are comparable to those of the private sector, and make these jobs more attractive.

3.2.2. Education, Workforce Development and Job Quality

According to Leider et al. (2020), there are nearly identical levels of spending per K-12 students across rural and urban areas. Yet, there are indications that rural students do not have access to the same level of human capital accumulation as students in urban areas. Over time such differences can compound spatial inequalities in human capital between rural and urban areas (Van Maarseveen, 2021). In addition, there has been concern about the potential for "rural brain drain" (Lichter and Brown, 2011), as more educated individuals leave rural areas for more lucrative and diverse opportunities in urban areas. In and of itself, people choosing to move to explore opportunities in other places is not inherently problematic. Indeed, young people often leave their hometowns to try their hand elsewhere. However, there is an important distinction to be made between individuals weighing opportunities among a set of potential locations and making choices based on their own personal preferences compared to leaving a location because it does not offer a reliable set of opportunities for a broad range of skill levels. This effect is further compounded by the large number of school closures in rural areas in recent years in response to population decline. Recent research points to three notable effects. The first is that school closures tend to hasten population decline in rural communities over time. The second is a decline in social cohesion, particularly as remaining students are shifted to schools in neighboring communities. And the final effect is a decline in property values, which further reduces the benefits of the community and makes

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it difficult to attract new residents.[19] These results suggest that maintaining a high-quality local public education system is integral for sustaining the rural population.

There are of course two sides to the labor market: firms searching for workers to fill vacant positions, and workers searching to fill those positions. While there has been a substantial discussion around incentivizing firms to locate in a particular region (Barba Navaretti et al., 2021), what is often less discussed is whether the local labor force has the requisite skill level to fulfill the labor demand by firms. Coordination between firms and a variety of educational institutions or training programs (junior colleges, vocational training programs, certificate programs) can help provide both a pipeline of skilled workers for specialized firms and a clear career path for potential applicants (Bozarth and Strifler, 2019).

Furthermore, beyond simply increasing employment opportunities, job quality matters. Particularly if the goal is to retain talent in the community and further develop agglomeration economies. Higher wages are important, but they are not the sole determinant of job quality. Opportunities for advancement, tuition assistance, and flexible scheduling make jobs more appealing to workers, and provide incentives for people to stay (Bozarth and Strifler, 2019).

3.2.3. Transportation and Other Infrastructure

Transportation networks are key to connecting people with each other, with other communities, and a broad set of resources (jobs, education, healthcare, supermarkets, etc.). However, due to the generally low population density of rural areas and often lengthy distances between communities, providing an adequate supply of public transportation services can be difficult, as small communities are generally unable to take advantage of the Mohring effect, in which an increase in supply of transportation services, in turn, increases demand.

There are three particular avenues in which improvements in transportation could improve rural livability. The first is through improvements in employment opportunities. As noted above, rural communities are on average poorer. Residents also spend a greater share of their income on transportation services (Bozarth and Strifler, 2019). By expanding regional accessibility through public transportation improvements, rural workers would have greater access to employment and training opportunities. The second is to provide enhancements to quality of life, particularly for older residents. As the rural population ages, many residents will likely become unable to drive, and will require alternative transportation methods to ensure access to healthcare, supermarkets, and social engagements (Henning-Smith et al., 2017).

Finally, improvements in transport infrastructure can foster greater integration into the larger regional economy, reducing transport costs and making rural communities less remote. One feature worth addressing in this context is that transport policies that aim to better integrate rural communities may benefit those communities individually yet generate net losses in the aggregate, as more productive locations become *relatively* less attractive, which Suedekum (2025) refers to as "multilateral resistance".

In addition to physical transport, improvements in broadband connectivity, that effectively allow for virtual transportation, can also play a role in integrating rural communities

[19]For an overview on rural school closures, see Sørensen et al. (2021); Sageman (2022).

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into a region (Mack et al., 2024). First, it broadens the labor market for local workers, as many jobs post-pandemic have become virtual. Second, such improvements would act as a locational amenity, particularly for workers from more urban areas who are looking to leave the city but still need to maintain a virtual connection.

As a final point, it should be added that public services often complement one another. Educational attainment translates into productivity, which in turn raises wages and leads to adjustments in local industrial composition. These effects can improve job quality and make a community more attractive. Similarly, healthcare that extends beyond catastrophic coverage and transportation systems that are more reliable and expansive can both increase the effective labor supply in a community, thereby raising productivity and, in turn, expanding the tax base. Therefore, it is important to consider the possibility of cumulative benefits from improving local public services.

4. RETHINKING THE THEORY: DIFFERENTIATING RURAL AND URBAN PUBLIC FINANCE

For the modeling strategy in this paper we have focused on a framework that emphasizes the tradeoff between allocating community income between public and private consumption. While this framework is standard in the literature, it is also largely agnostic about the type of community, and potentially masks a number of key differences on how the public sector operates in urban and rural areas, respectively.

One such issue is the role of public sector employment. In our model, the public sector purchases inputs to produce the public good, and implicit in this assumption is that the price for those inputs is determined by the equilibrium wage. While our framework is able to capture the fact that input prices may be lower in rural areas and thus reduce the unit cost of public service provision, it ignores the fact that wages in the public sector are generally not set by the market, but instead are determined by a wage schedule set at the local, state or federal level. This is particularly important given that urban and rural local governments may face different challenges in public good provision, particularly related to their ability to hire workers given these fixed pay schedules. In large urban areas with substantial well-paying job opportunities, it may prove difficult to hire government employees if the pay schedule is well below the local equilibrium wage. Conversely, in rural areas with limited private sector employment and where the equilibrium wage is often relatively low, public sector employment plays a crucial role in the local economy. And if public sector employment falls, this could generate a substantial economic decline in the community. In fact, as documented by Rodden (2024), the local economy of rural areas in the US is often heavily reliant on public sector employment. Furthermore, these communities were hit disproportionately hard by the Great Recession as tax revenue fell, and public sector employment was slow to recover. This fact indicates that rural local governments potentially have a substantially larger role in strengthening their local economy than urban ones. And this implicit power by rural local governments potentially has some strategic value, particularly in transitioning from a framework in which local public finance, which traditionally has focused primarily on job creation, to one in which livability and quality-of-life metrics take on a more central role in assessing the vitality of rural communities.

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An additional issue is that in our model, public goods are solely funded by *local* tax revenue. This assumption omits the role of state and federal transfers for both private consumption and local public service provision. Some forms of transfers, such as SNAP benefits, go directly to households, and the extent of these transfers may be linked to local cost-of-living indices (Colas and McDonough, 2025). In contrast, other forms of transfers are provided directly to local governments to help minimize regional disparities by promoting public investment in the development of local infrastructure (Fajgelbaum and Gaubert, 2025; Henkel et al., 2021) find that in the case of Germany, such transfers are on net welfare improving, particularly as they tend to dampen the migration effect of workers from rural to urban locations, reducing the degree of congestion in already large cities. In contrast, in much of the developing world, where such transfers are not necessarily available, there has been considerable migration toward urban areas and substantial growth in the level of congestion in these areas, as seen, for example, in the expansion of the informal housing sector (Selod and Shilpi, 2021; Goytia et al., 2023). In addition, this issue also raises the question of whether effective tax burdens are higher in rural areas compared to urban ones. Here the results appear mixed. While there is some indication that tax burdens are higher in rural areas (Johnson et al., 1995; Stark, 2025), particularly due to lack of density, urban residents also face relatively higher income taxes, as tax rates are determined by nominal rather than real wages and fail to take into account the higher cost of living in larger metropolitan areas (Albouy, 2009).[20] It follows that isolating local tax decisions from that of state and federal tax and transfer programs overlooks not only the full range of revenue sources available to local governments, but also omits the degree of complementarity and interconnectedness that guide these funding decisions across the various forms of government.

As a final point, spatial models in the Rosen-Roback tradition (Roback, 1982; Rosen, 1974) tend to assume free mobility of individuals. This assumption is often justified as a long-run view where fixed costs are ignored. Yet in practice, there are often considerable costs to moving, and this issue is particularly salient in rural areas. As noted by Sørensen et al. (2021) and Sageman (2022), an important issue with the economic decline in rural areas is the corresponding decline in housing values. For most households, the primary financial asset that they have is their home. If that asset proves difficult to sell and can only be sold at a lower value than its purchase, then this can generate a feeling by residents of being "stuck". Similarly, it would likely prove difficult to attract people to move to a community if they felt their investment would potentially decline in value. Therefore, understanding mobility constraints is crucial for understanding whether a community is made up of people who wish to be there, as compared to those who simply can't leave, which seems an important indication of the quality of life in that community.

5. CONCLUSION AND SUGGESTIONS FOR FUTURE RESEARCH

In this paper, we have developed a simple regional tax competition model where households care about public goods. Specifically, it is assumed that residents derive utility from public goods expenditures exceeding a certain threshold. In this model, two tax regimes exist: a

[20] Weinstein et al. (2026) suggest that the gap in local public investment between rural and nonrural communities is driven less by differences in tax effort than by structural constraints on fiscal agency.

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high-tax regime with a high level of public services and a low-tax regime with a more basic level of public services. We derive the conditions for the high-tax regime to be superior to the low-tax one and we use this result to undertake an evaluation of the results from a rural context. In the analysis we focus on the determinants of the rural tax base and the set of public services that are particularly beneficial to modern rural communities, namely, improvements in healthcare, education and workforce development, and transportation. In addition, we consider extensions to the model that could allow for a greater understanding of the challenges faced by rural local governments in public service provision and how these may differ from urban areas.

Regarding future research, there are a number of avenues in which the analysis can be extended. The first is that we have focused solely on two symmetric regions. Yet one of the key features of rural communities is that they are "small", particularly relative to urban areas. This smallness has both some deterrents (scale, remoteness) and potential advantages (less congestion, lower cost-of-living). Isolating these effects could provide a greater scope for rural communities to compete for residents.

The second is that we have focused solely on an income tax, and taxes are only on individuals, not firms. A more comprehensive tax policy that takes into account how households and businesses contribute to public good provision would provide a better understanding of strategies that can be used to draw in either households or firms. In addition, we have not considered asymmetric tax competition, in which one community offers a low-tax, low-service bundle while another offers a high-tax, high-service one. It would be fruitful to extend the model to consider under what conditions a community would be able to sustain a high-tax, high-public-good policy without losing residents when other communities are countering with lower tax rates.

Third, rural communities are not completely isolated and are in conversation with state and federal governments. Integrating transfers from other government entities would provide a richer picture of the full scope of administering local public services at a rural scale. In addition, the location of communities relative to larger markets plays an important role in the relative isolation of a rural community. As such, adding a more thorough geography would provide a better sense of the role of trade costs and regional size matters for the ability of rural areas to finance public services. Finally, we have focused on the case where all households are ex-ante identical. However, as indicated above, rural communities are seeing demographic changes via age, income, and racial compositions. Understanding differences in demand for public goods among each of these groups is important in determining the right mix of public services a local community should provide.

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