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The Distributional Consequences of Interlocal Agreement Cost Allocation Strategies

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Abstract

In an era of fiscal stress for many local governments in the United States, intergovernmental cooperation has become a focus for cost savings. Cooperation and consolidation is a recognition that existing boundaries and service delivery mechanism simply are too inefficient and burdensome for a community to maintain. City and county officials face a basic tradeoff in assessing the merits of cooperation involving the desire of many citizens for sovereignty and local decision making authority versus the potential cost savings associated with the economies of scale of larger government units. As intergovernmental agreements are negotiated, the issue of cost allocation among various parties often becomes a major issue. Some cost allocation formulas emphasize ease of implementation, while potentially shifting the burden onto one or another party. Complicated cost allocation formulas may reduce burden sharing or donor situations, but at greater cost of implementation and maintenance. A simple economic model is presented in this analysis to highlight the distributional consequences of various cost allocation strategies among parties to intergovernmental agreements.

I. Introduction

Local governments in the United States, which includes townships, cities, counties and other special districts, have been forced over the past few decades to rethink their service provision of local public goods such as fire and police projection, solid waste management and back office operations. Collaboration amongst local governments has become part of the strategy to achieve financial efficiency and quality service delivery. This continuum of collaboration may include informal handshake agreements, buy-sell contracts, administrative boards, authorities and outright political consolidation.

Intergovernmental or interlocal contracts have become a common tool for local governments to achieve economically and financially efficient methods for service delivery. Fiscal stress in urban areas, changing population density and land use, changes in state laws and other factors have spurred the use of interlocal bargaining or contracting. These contracts represent functional consolidation as opposed to political consolidation. In almost all cases, individual jurisdictions retain ownership of assets and the responsibility for funding their share of the costs of the service provision. As part of the contract negotiations, the local governments must decide on factors such as financing, management and administration and cost allocation.

These cost allocation decisions are often part of the crux of the negotiations between governmental units. In essence, the question boils down to "how is the bill going to be split"? In some cases, such as water and sewer, an easily identifiable user allows local governments to split the bill based on usage. However, for many services such as fire and police protection, such easily identified measures do not exist.

Therefore, some formula must be used to split the bill. Factors such as property values, population, usage (fire runs, crime rate) or others have all been used in practice.

The choice of factors where the end user is difficult to identify has important distributional consequences regarding how the net benefits (benefits minus costs) will be allocated across parties. For example, a factor such as property value may be easy to define and use but may have important distributional consequences for local governments and their citizens. Under such a system, the major user of the service may not be the major payer of the service. In some cases that may be acceptable, but in other cases that type of outcome may harm negotiations and lead to a breakdown in cooperation. Often, negotiators vie for an easy to use system, such as population or property value, without considering the distributional consequences on the local government units. While the transaction costs of data collection and monitoring must be considered, very little analysis has been provided on the economic consequences of alternative cost allocation schemes.

The focus of this analysis is on the challenge of constructing the cost allocation mechanisms as part of the general negotiation required to secure an intergovernmental agreement. A general welfare economic model will be presented that highlights the issues facing local governments as they attempt to determine the impact of various cost allocation formulas. For analytical purposes, three cost allocation schemes will be compared: (1) equal proportion cost sharing regardless of usage, (2) equal proportion cost sharing with flexible service provision and (3) usage or marginal cost sharing. The economic impact of three generic cost allocation strategies will be compared for two representative local government units.

II. Literature Review

There has been limited research on the role of interlocal or intergovernmental agreements in the popular and academic literature, although it is beginning to grow in the legal, political science and economics fields. The U.S. Advisory Commission on Intergovernmental Affairs in a much cited set of studies in the early 1960's, 1970's and 1980's surveyed local jurisdictions on their use of interlocal agreements (ACIR, 1985). They found there was use of such agreements to provide services as up to 50% of local jurisdictions used such devices. Further, almost all states had provided legal authority for local jurisdictions to enter into intergovernmental contracts as of 1985.

The most frequently cited reason for intergovernmental contracting was "economies of scale" and "cost savings" (ACIR, 1993). The major limitation cited on intergovernmental agreements was the issue of the "loss of local autonomy". These characteristics provide bookends for framing the discussion presented in this analysis.

Beyond the ACRI, researchers have analyzed other rationales behind interlocal contracting. These reasons include cost savings (Morgan and Hirlinger, 1991; Stein, 1990, Soneblum et al., 1977), regional coordination among various parties (Savitch and Vogel, 2000) and the establishment and long term stability of relationships among various local government entities (Wood, 2004; Thurmaier and Wood, 2002).

Besides the rationale for interlocal contracting, researchers have examined the factors influencing the likelihood of intergovernmental cooperation. The most cited factor regarding the likelihood of cooperation is the general area of transaction costs. These costs are the "friction" that prevent or inhibit parties from coming to potentially mutual beneficial agreements (North, 1990). Transaction costs take several forms such as

measurement costs (Is the service identifiable and measurable?), enforcement (ease of ensuring that activities are actually undertaken) and negotiation and bargaining (upfront cost of coming to an agreement). Of course, transaction costs are influenced by the number of participants and the degree of heterogeneity of the citizens of the involved in the bargaining process. Finally, the presence of asset specificity is likely to lead to greater transaction costs in bargaining as the risk of exposure to the collapse of agreement for each party increases. Asset specificity has been found to be a factor in the decision making process of public sector managers (Brown and Potoski, 2003).

There are various structural factors, besides transaction costs, that may make it more or less likely that such cooperative behavior will be observed. In one case, the presence of professional administrators versus part time elected officials will increase the likelihood of cooperation. Both political culture and demographics share the demand and use of services by communities (Visser, 2002; Morgan and Hirlinger, 1991). Widely divergent communities may find it far more difficult to cooperate. Another factor that affects the likelihood of interlocal contracting is the institutional or government rules that constrain or promote these types of activities (Ferris, 1986).

The literature has explored the questions of the rationale behind intergovernmental cooperative ventures and the factors that make it more or less likely to be undertaken. One aspect of this issue that has not been explored is the issue of cost allocation strategies and the impact of such strategies on the welfare of the respective cooperating government entities. Any intergovernmental contract situation must determine a formula or method for splitting the cost amongst the parties. In a simplified manner, the basic cost allocation strategies may include a fixed share for each party,

marginal cost pricing or even cross party subsidies. This research is aimed at exploring the social welfare implications of cost allocation strategies that may be utilized in an intergovernmental contract setting.

II. Conceptual Framework

A model originally conceived of by (Barzel (1971), Tullock (1969) and Buchanan (1971, 1973) provides a useful framework for conceptualize the decision calculus and outcomes associated with intergovernmental decisions. A simple economic model will be presented to highlight the main features that will provide some guidance on the welfare impact of various cost allocation strategies underlying decisions to cooperate among local governmental units. Using this framework, the key variables that would potentially determine the welfare implications can be demonstrated.

Imagine there are two local government units who are geographically contiguous and all are currently performing a typical set of local public services such as police and fire protection, solid waste pickup and removal, water and sewer system service, parks and recreation and general government administration. At some point, perhaps a downturn in the local economy, local leaders begin communicating about the possibility of joining services. A model is needed to predict the total benefits and costs of such a cooperative venture and the impact of alternative cost sharing arrangements.

Based on this depiction, one critical variable is the inherent differences between communities in terms of service preferences and the associated elasticities. As confirmed by more recent research forays (e.g. Alesina and Spolare, 2004), community preferences for public goods or services play a major role in the tradeoffs community's must consider

in joining with their neighbors. These differences that may be correlated with income, race, educational attainment or other factors, determine to what extent a community is willing to give up the sovereignty of decision making authority in regards to achieving economies of scale and cost savings.

Using a model first developed by James Buchanan (1970, 1971), a conceptual framework will be presented to explain the forces influencing intergovernmental cooperation. Figure one (depicted on the following page) represents the basic model as represented in Buchanan (1971). The graph contains two linear demand functions for community X and community Y[1]. These demand functions represent the two communities and their respective local governments involved in service delivery.

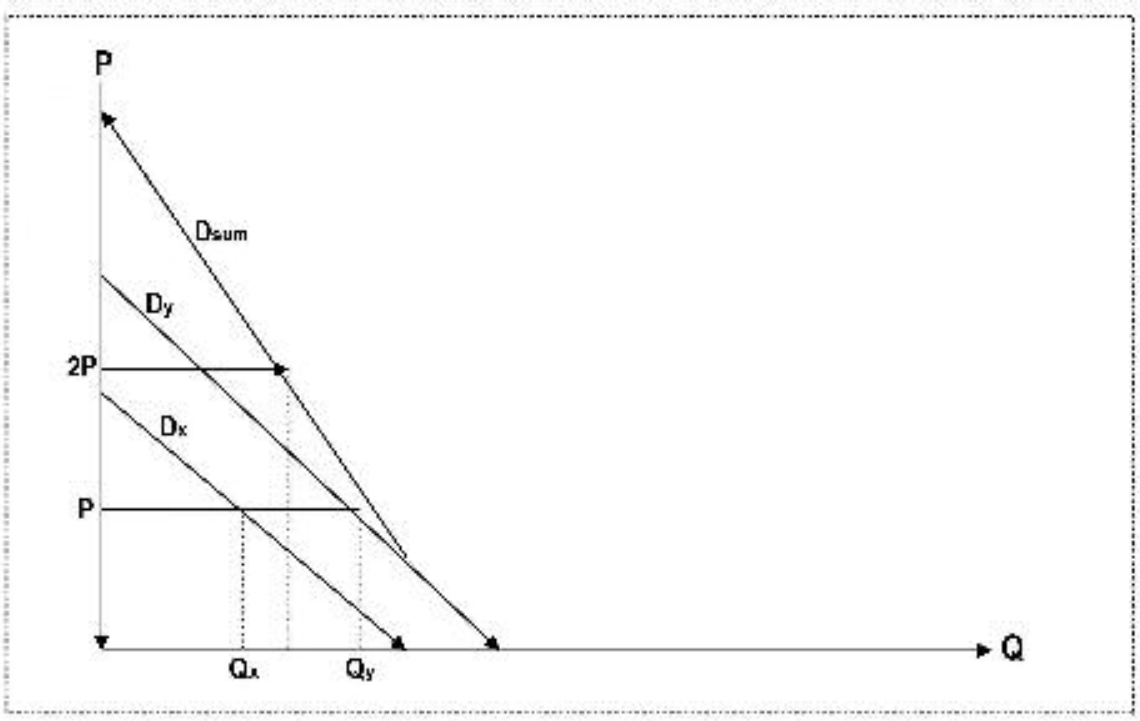
Basic Model

The two hypothetical governments could represent townships, cities, counties or even special district governments. The differences in the demand functions reflect the differences in community preferences for the public service under discussion[2]. The farther away these demand functions are from one another, the greater the differences in income become the two hypothetical communities. Differences in regional wealth have been noted as one factor that leads to difficulties or challenges in cooperation (Gerber and Gibson, 2005). It should be noted that as these income differentials widen, it becomes more difficult and a greater burden is placed on achieving economies of scale and cost savings to offset these income differentials.

[1] These community demand functions represent the aggregated preferences of citizens with a given community. The community demand functions are compensated or Hicksian demand functions and are summed vertically (as described in the classic Samuelson article) for the joint provision demand function

[2] For the differences in demand functions to represent income differentials only, the assumption is made that the community's underlying preference or utility functions are identical

Figure 1: Provision of Public Goods among Local Governments



The community demand functions are intersected by price lines (P) and (2P). These price lines represent the price of providing a particular good or service under examination such as police, fire, water or recreation and parks. When the price line intersect the community demand curve for the public good from community X, the optimal point of independent provision for that community is established (Q_x)[3]. The

[3] The quantity axis is interpreted differently than a normal supply-demand curve. The quantity axis represents a bundle of two units of a divisble "public good". Each community's demand curve is interpreted as how much they value their share of the two unit bundle. In this case, the assumption is made that each community receives a uniform provision of one unit each of the public good. This "constitutional" assumption is necessary to derive a community demand function. Note that the two community's place different values (thus different slopes to the demand curve) on their respective one unit share of the public good.

same situation holds true of community Y, except due to their higher demand for the public good, the optimal point lies at Q_y.

For this analysis, the price line is flat indicating a price taker model and there is a constant marginal cost. For most local governments, prices of labor and materials are generally fixed in the marketplace and therefore this is a fairly reasonable assumption. Another assumption in this graphical framework is that the marginal cost of service provision is similar for both communities. This is a more problematic assumption as larger communities may have lower costs due to differences in spreading out fixed costs.

The upper price line (2P) indicates the total combined cost of both communities of providing the service. It represents the cost that would be applicable if the communities created an intergovernmental agreement and provided the service jointly. In figure one, there are no cost savings to joint provisions and the joint cost curve is simply twice as high as the individual cost curve. Under these conditions, the communities wish for different quantities of the good, such as different numbers of fire trucks or different amounts of police patrols and there would be no benefits or cost savings due to joint provision.

The third or uppermost demand function (D_{sum}) is a vertical summation of the community demand curves representing total joint demand. This total demand curve can be used to assess the efficiency of joint versus self provision for local units of government. The total demand curve starts at the point where the lowest community demand curve is zero at the junction of the highest demand curve. It then slopes upward toward the vertical axis. The intersection of the community and total price lines with the total demand curve represents the point where marginal social cost equals marginal social

benefits. However, even those these points are equal, the distribution of costs and benefits across communities may vary widely.

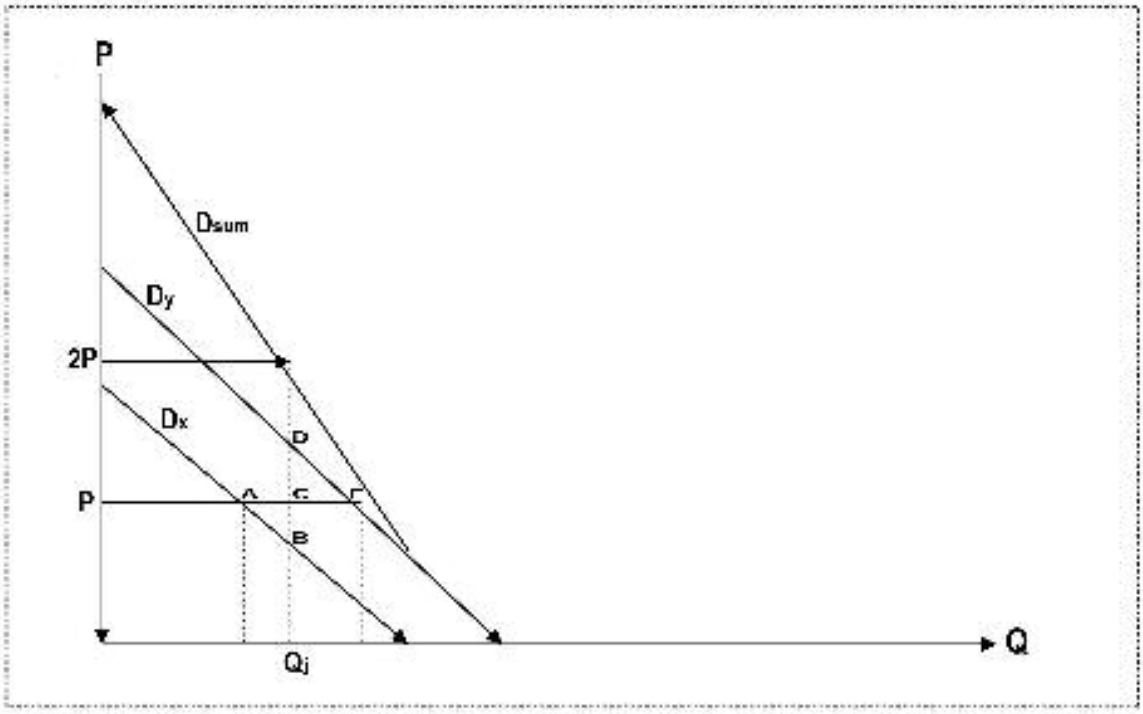
A point must be made requiring the quantity provided to different participants in a joint provision of service agreement and the impact of who receives what level of service or quantity of the public good. In the standard public good model, the quantity produced is available to all participants because of the nature or technology of the good prevents any individual from being excluded from consumption (i.e. clean air or national defense) (Samuelson, 1954). The model presented in this analysis presumes, due to a political decision rather than a technological one that the good produced is available to all residents or participants within the local government jurisdictions. This factor then leads to the result that the community demand or marginal evaluation curves can be constructed on the notion that each participating community receives an equal share of the quantity of the good being produced (1/2 share in this case). Thus, the graph reads that a community places the same value on independent or own production as equated to joint production where it shares in half of the output of the public good. [4]

With this initial setup, we can examine the implications of various decision rules regarding cost allocation in intergovernmental agreements. For this first model, the quantity-price conditions are established by a benevolent social planner who equates marginal social costs and marginal social benefits as a decision rule. This would equate to point Q_j in figure 2. Under the assumption of equal quantity (implying separate

[4] The quantity axis should be interpreted as a two unit bundle of the good being produced. Each community receives a ½ share of that two unit bundle (1 unit). The demand curves differ, one being higher than the other due to the fact that one community's income, and therefore demand for the good, is higher. In other words, one community places a greater value on their share of the two unit bundle than the other community.

communities cannot adjust their own consumption), neither party receives the amount of good they would want through independent provision. If the units agree to produce that amount through joint provision, there is a welfare loss to both parties. Community X consumes more than they would prefer resulting in welfare loss ABC and community Y consumes less than they would prefer as welfare loss depicted by the triangle CDE in Figure 2.

Figure 2: Welfare Loss from Joint Production versus Independent Production



These welfare losses help explain the difficulty of negotiating intergovernmental agreements, particularly where the level of service provision must be provided in lumpy form (or more uniform provision). Figure 2 does not indicate any type of cost savings from joint provision. The joint cost (2P) is simply double that of the individual cost (P).

Under these conditions, there is no incentive for either community to participate in a joint venture with no cost savings and uniform provision of service.

Cost Savings Model

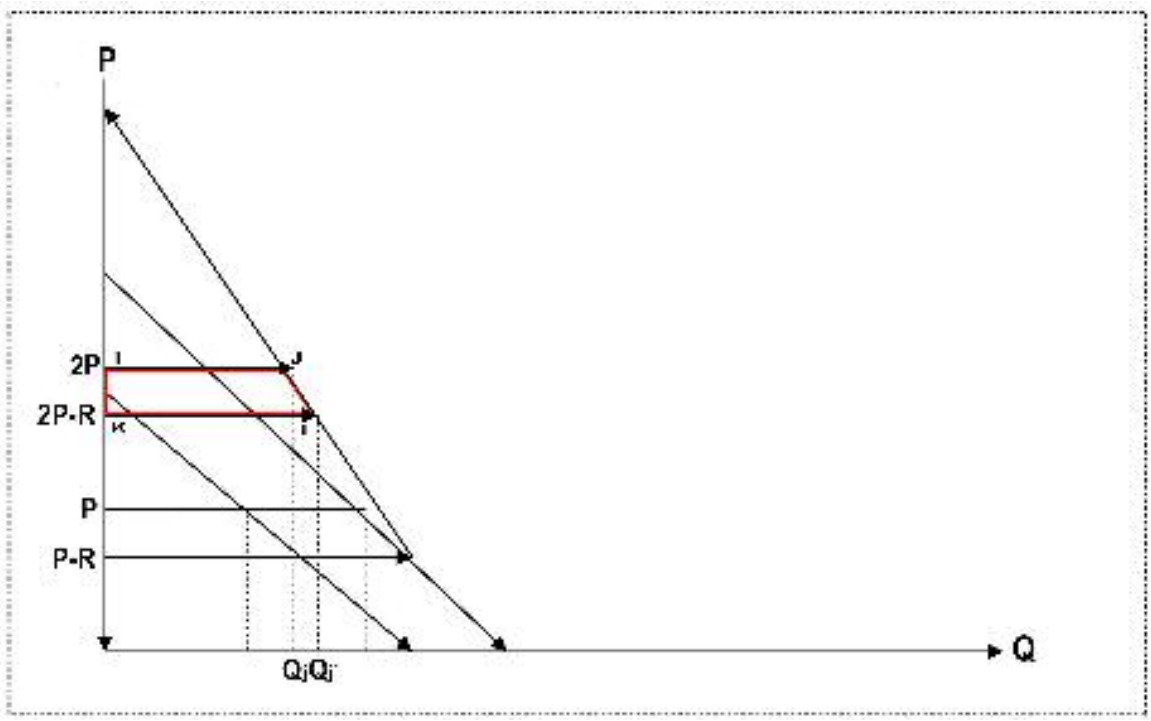
Let us introduce cost savings into the model. Cost savings are assumed to occur due to the presence of economies of scale or volume in the operation of given government enterprise or activity. Cost savings, based on the assumption of price taking behavior, increases the optimal quantity associated with the joint or total demand curve[5]. Joint provision by local governments may result in cost savings. These cost savings can be reflected in the graph by a movement in the price line. Imagine that joint provision of services results in a marginal cost reduction of (P – R) (R being the cost savings). The cost savings for joint provision is represented by the new price line 2P – R in figure 3. Furthermore, this cost savings is often considered at the basis of the rationale for undertaking interlocal agreements. The cost savings effect shifts the optimal provision of the public good from Q_j to Q_j'.

The total benefit of the cost savings is defined by the triangle IJKL. As a joint provision agreement is negotiated, a typical sticking point is the allocation of cost share and cost savings among participants. The triangle IJKL represents the total savings that can be spread across governmental participants. This cost savings or benefit of joint provision will obviously be weighed against the costs, specifically in terms of the welfare loss (loss of autonomy over the level of service to be provided) associated with the distance between joint and independent provision and citizen preferences.

[5] The optimal quantity rises because the cost savings translate into more available resources which raises the demand for the service. To some extent, these additional resources due to cost savings may also be spent on other goods and services in the community.

One solution is to simply let the units undertake independent provision. Of course with the assumption of cost savings introduced, the two governments would be giving up on the benefits associated with the shape IJKL. These cost savings are often cited as the reason for pursuing intergovernmental cooperation (ACIR, 1985). There are several solutions that the governments could pursue to achieve these benefits and minimize the costs associated with cooperation via welfare loss.

Figure 3: Impact of Cost Savings on Welfare Outcomes



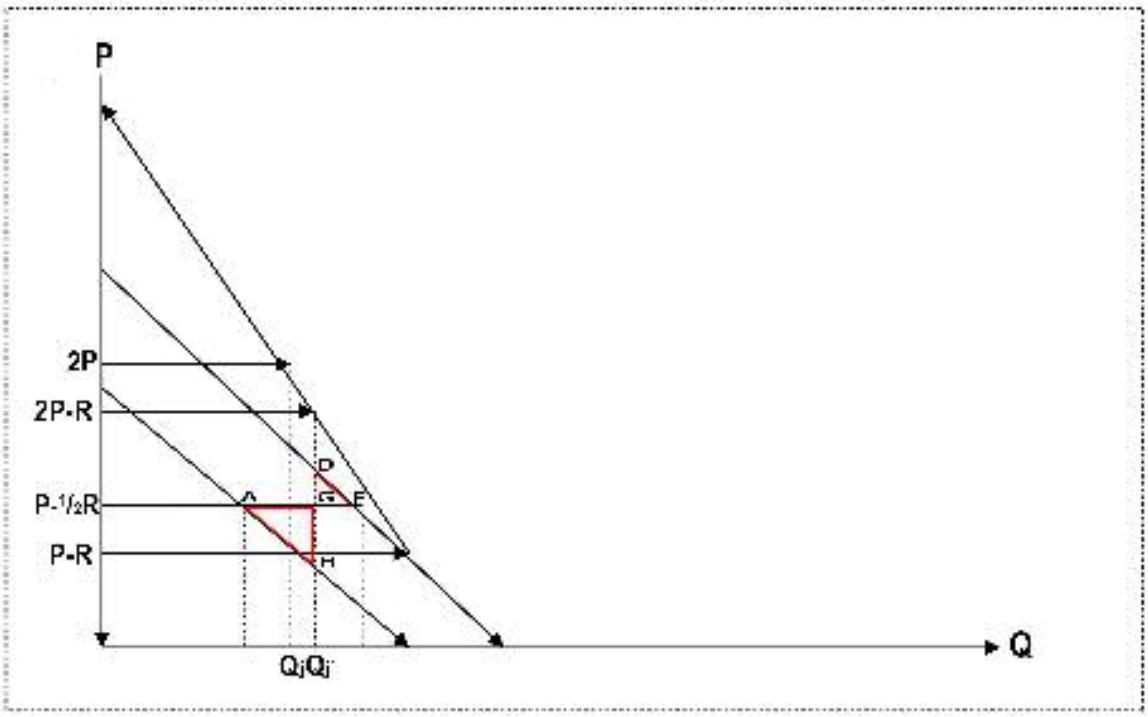
These aggregate benefits (cost savings) must be distributed across participating governmental units. The distribution of these benefits is critical to the success or failure to achieve any type of agreement related to service cooperation. There are several schemes one can imagine to distribute the benefits of costs savings. One scheme would

be a flat rate price paid by each entity. Another scheme would be a marginal pricing strategy where each entity is charged a price based on their demand for the good or service. A variation of marginal cost pricing, which could occur depending on the bargaining nature between the government entities, would be a quasi marginal cost pricing scheme where different entities may receive greater or fewer benefits. A final scheme would be, rather than focusing on price adjustments, to allow for quantity adjustments by having some level of joint provision and independent provision above a certain level for high demand communities.

Equal Cost Sharing Scenario

The first scenario to envision is one where the cost allocation or pricing for joint provision is bore at an equal level by both governmental units. For community X, this new price line indicates that their welfare loss will actually increase by the amount AHG. This is because they have moved farther way from their optimal independent provision point. For community Y, the high demand community, the cost savings shift results in a potentially reduced level of welfare loss (compare triangle CDE to DFG). Again, this result depends on the slope of the demand curves. Community X, the lower demand community, may suffer an even greater loss in welfare due to being pushed farther away from their optimal community demand for the government service. A more inelastic curve, where demand is less responsive to change in price, will lead to potentially a smaller welfare loss.

Figure Four: Equal Cost Sharing Scenario

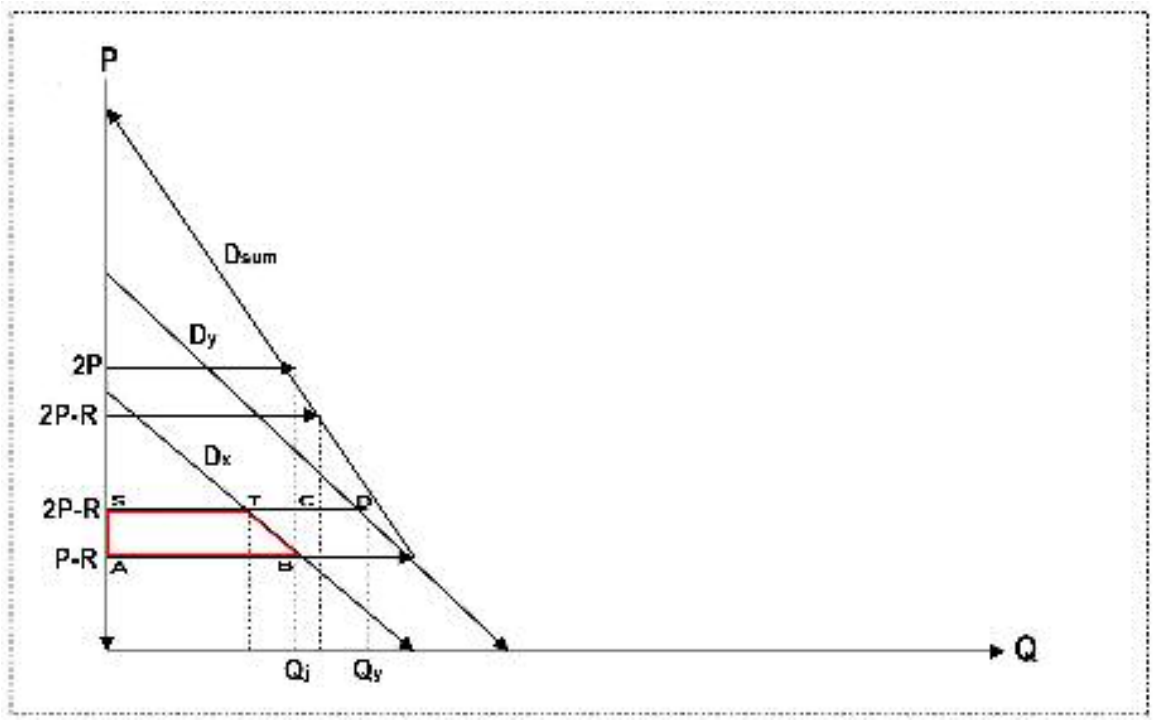


Quantity Adjustment Scenario

One solution is to allow for both joint provision and independent provision. This quantity adjustment technique assumes that the public good is only "public" within the government entity and not between entities (i.e. no interjurisdictional spillovers). The joint provision occurs to the point where the lower price line intersects the lowest community demand curve (in figure 3 point B; community X). At that level of service provision, community Y in figure 3 still demands a higher quantity. This can be accomplished by the community Y purchasing via self production. The low demand community, community X in figure 3, will gain by being able to purchase their ideal community demand level at a lower price. This results in a welfare gain of figure ABST. Community Y, the high demand community, does gain by being able to secure a certain

level of services at a lower price; it is then able to self produce at a higher cost rate and achieve its optimally desired level of services. This self production could be accomplished through private contracting or public production. Community Y would self produce the quantity from Q_j to Q_y along price line P. Under this framework, community X captures the benefits of joint production, while community Y remains indifferent at the margin. This distribution of benefits may be major factor in negotiations between communities who must still incur the upfront transaction and communication costs.

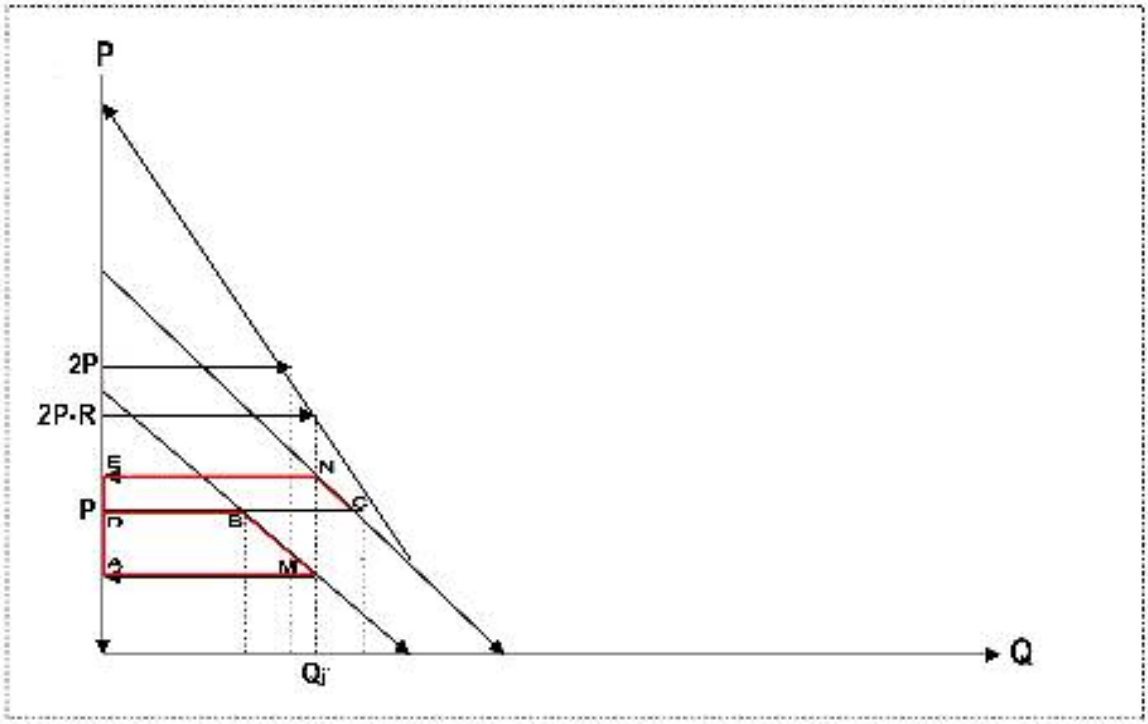
Figure Five: Quantity Adjustment Scenario



Marginal cost Sharing Scenario

Another scheme is defined by charging different tax prices or cost shares for the public good to each community. For convenience, these cost shares will be allocated based on the intersection of the each community's demand curve with the optimal joint provision line drawn from the total demand curve to point Q_j'. Thus, for community X, the point M represents the optimal provision under differential pricing. The community is in equilibrium but in fact a welfare loss still exists. For community Y, the optimal point under differential pricing is much higher due to greater demand.

Figure 6: Impact of Marginal cost Sharing on Welfare Outcomes



Under this scheme, the price charged to each community would be at points M (for community X) and N (for community Y) in figure 6. With marginal cost pricing,

community X would gain surplus relative to their situation under independent production by the area AMBD. Community Y would lose surplus (area DCNE) because they would be paying a higher price that under independent production. In this situation, it would not make sense for community Y to agree to such a cooperative venture. However, community X could offer community Y a side payment leading to a sustainable cooperative agreement. Community X would have to benefit enough from the joint provision arrangement to be able to offer a side payment and still retain some surplus. The side payment would need to be enough to make community Y indifferent between independent and joint production and still community X better off.

There is a final possible scheme involving a variation of marginal cost pricing. Different governmental units may be able, via bargaining be able to attain a lower level of cost share of price for services relative to other governmental units. Of course, other units will have to pay higher prices or cost shares in order to make up the difference and cover total expenditures. Based on the logic of this model, the gains of efficiency from cost sharing with regards to a joint service provision must be drawn from the surplus of taxes paid over service costs by the high demand communities. This redistribution of resources can only occur to a certain point; above that point the high demand community, such as community Y will exit the cooperative arrangement and self produce the service. This exist strategy will reduce the services available to the low demand community.

One can envision many scenarios under this variation of marginal cost pricing. Depending on the nature of two parties bargaining strengths, in one scenario, the lower demand communities can extract surplus from the high demand community. The limit of this transfer can be expressed in the diagram as the point where the gains in joint

provision efficiency exceed the costs in lost welfare due to transfers of cost sharing to low demand communities and the loss of welfare due to uniform provision requirements.

Proposed Research Hypotheses

This analysis leads to proposed hypotheses related to intergovernmental cooperation of uniform service provision. The first hypothesis is that the closer are two or more communities demand curves, with a particular focus on average income differences between communities, the more likely they are to cooperate. The degree of closeness reduces the welfare loss from uniform provision. Thus, even a smaller amount of cost savings will likely be greater than the amount of welfare loss from uniform provision. Nonuniform provision is particularly difficult due to the transaction costs that must be incurred by the negotiating parties in seeking agreement on the provision of service levels and the sharing of cost savings.

The second hypothesis is that the elasticity of demand for services will potentially have an impact on the relationship between cost savings and demand preferences. Communities with strong preferences for a good or service and price inelastic demands will likely lose more welfare relative to communities with elastic demand, perhaps due to more choices or substitute options. If the communities have nearly identical preferences, the gap between the two or more demand curves will remain the same and not affect the results associated with the uniform provision of service levels.

One important hypothesis that cannot be addressed is which adjustment scheme (equal share, marginal cost or quantity adjustment) are more likely to emerge under

different conditions. This important question will be left to extensions of this model or further developments with other types of approaches.

Conclusion

The use of interlocal or intergovernmental agreements, while first described in the 1960's, has become a major tool for achieving economic and service efficiency in local government affairs. This model has attempted to depict the simple welfare economics of joint production of a public good by two or more local governments. This form of interlocal agreement has become important as existing jurisdictional boundaries do not make sense in economic, political, or social terms as communities undergo change. This model has only depicted one particular form of interlocal agreement among a wide spectrum of choices.

The results indicate that each potential cost allocation formula has distributional consequences on various local government partners. Primarily, equal cost sharing, as one would expect, benefits the low demand or usage community relative to the high demand community. This economic impact must be weighed against the costs of data collection and monitoring to determine to assess if a different system would be warranted.

A usage or marginal cost system clearly provides more benefits to the higher usage community. However, even in this case, the low demand community can attempt, through negotiations to extract some net benefits for itself at the expense of the high demand community. The actual results of such a negotiation would depend on the skills and information that each party had access to. In this case, transaction costs would be incurred to ensure the measurement of the critical usage variables which could be factors

such as water usage, fire and ambulance runs and crime statistics. In either case, the benefits of marginal cost allocation would be weighed against these transaction costs.

Communities must carefully assess the tradeoffs involved in any cost allocation when entering into an intergovernmental agreement requiring such a provision. Different allocation schemes will have different impacts on community welfare and will influence the likelihood of being able to come to an agreement. Future extensions of this type of approach must include other choices such as consolidation and annexation. These choices entail different benefits and costs than a formal agreement to deliver services jointly, but where other specific services are still provided independently. Another extension would be the economics of interlocal agreements in the face on interjurisdictional externalities or spillovers. These types of spillovers are likely to change the calculus of agreement. Finally, the results should be generalized to a set of local governments beyond two.

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