Transaction Costs and Intergovernmental Cooperation in Land Use

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Background

- 88,000 local units of government (LUGS) in the US.
- Home Rule system:
  - Cedes planning, zoning and growth management to LUGS.
  - Historically, not much reason for cooperation.
  - Land was not a constraint to growth and prosperity.
  - Land use strategies were not very important to community success, except in the past 3 to 4 decades.
  - Poor cooperation, communication, and joint decision making leading to sprawl and its consequences.
  - Consequences include higher property taxes, agricultural loss, traffic, degradation, poor schools and other adverse effects.

Background

- Today:
  - Globalization and contestability of community and economic success.
  - Individual communities are not relevant.
  - Regions are the units of economic development.
  - Inter-jurisdictional / inter-governmental strategies and cooperation more important to success.
  - Inter-governmental cooperation now a hot issue in the U.S.
  - Planning best done at the regional level because strategic assets are more regional (MSA) and better defined at the regional level.
  - Indianapolis, Detroit or Baltimore region, rather than Lomax, Novi or Laurel.

Assets Based Planning & Success

- Success driven by a whole new set of factors.
- Critical factors that are difficult to plan for or manage for success in the “New Economy”
  - Transit, Highways and Roads.
  - Economic Development and Business Attraction.
  - Farmland and Agriculture.
  - Parks and other Green Infrastructure.
  - Universities and Talent Attraction.
  - Enabling Environment for Business.

Multi-jurisdictional Cooperation

- Fostering multi-jurisdictional and regional planning has become a more prominent goal of state governments in the U.S.
- Regions and states now struggling to gain better control of land use for smart growth, economic and quality of life reasons.
- Many states exploring policy options to encourage multi-jurisdictional cooperation.
  - Particularly important with today's budgetary crises.
- Perceived Short and Long-term Benefits of cooperation can include:
  - Decrease in service cost (cost savings/economies of scale).
  - Improved service delivery (service quality).
  - Improved level of service (service quantity/economies of scale).
  - Strategic growth:
    - Competitiveness.
    - Gravitas.
    - Economic Development.
    - Quality of Life.

Hierarchy of Land Use Collaboration

- Hierarchy of Land Use Collaborations
  - Government consolidation (Highest tier-tough).
  - Consolidation of specific services (ie. combined fire or police departments).
  - Joint agreements of varying levels (ie. joint land use planning agreements).
  - Mutual aid agreements (ie. fire department support).
  - Other minor informal collaborations.
  - No collaboration or agreements.
- Constraints to Collaboration
  - Power, authority, independence, autonomy, politics, agency problems, joint task complexity, distribution of benefits, collaboration costs (Transaction Costs).
  - Latter relates to size, scope, complexity, etc.

Transaction Costs and their Role in Multi-jurisdictional Cooperation

- Debate on multi-jurisdictional cooperation has focused on economies of scale.
- Debate has been silent about transaction costs.
- Econometric and political literature highlights the barriers associated with transaction costs).
- Brown and Petoski (2003):
  - Pre and Post cooperation oversight is needed to mitigate the effects of opportunism, reduce uncertainty and ensure compliance.
  - Need to overcome inter-jurisdictional differences / conflicts.
  - Many of the costs of cooperation are “front loaded”
- Need to look at issues such as benefits of alliances, degree of complexity, inter-party diversity , equity, and relative sizes of partners as they relate to multi-jurisdictional cooperation.

Objectives

- Role of transaction costs in multi-jurisdictional cooperation.
- Conceptual model for understanding transaction costs.
- Identify drivers of inter-governmental cooperation in land use.
- Empirical results from a Land Use case study of Michigan communities.

Conceptual Model

Framework for Evaluating Transaction Costs

On Economics of Cooperation

- Municipal services are funded primarily through local property taxes.
- Assume that lower costs mean lower property taxes, reduced cost of living, and enhanced quality of life.
- Discussion provides simple economic framework for exploring the relationship between transaction cost and overall cost savings.
- We focus in this model on Cost Elasticities with respect to time.

Cost Structure w/o Transaction Cost

- We examined the joint costs of collaborators with/out the assumption of positive transaction costs.
- When two communities collaborate, each brings to the combined situation elements of (if not all of) their existing independent costs.
- Assume cooperation in multiple areas of service by m communities.
- n services being provided by the i^{th} community.
- Cost per unit of the j^{th} service is $P_{j.}$
- Service volume (population served or the size of the tax base) is Q_i.
- Therefore, total cost of providing services by the i^{th} community TC_i is:

$$(1)\ TC_i = \Sigma_j^n\ (P_j\ Q_j).$$

- *Total cost of service provision is the sum of the product of the unit cost of providing each service and the population of the served community.*

Cost Structure w/o Transaction Cost

- Denote the total joint cost for the combined communities as TC where:

$$(2)\ TC = \Sigma_i^m\ TC_i$$
$$= \Sigma_i^m\ \Sigma_j^n\ (P^i_j\ Q^i_j).$$

- To simplify, assume m = 2.
- The total joint cost is as follows:

$$(3)\ TC = TC_1 + TC_2$$
$$= \Sigma_i^2\ \Sigma_j^n\ (P^i_j\ Q^i_j)$$
$$= \Sigma_j^n\ (P^1_j\ Q^1_j) + \Sigma_j^n\ (P^2_j\ Q^2_j).$$

- Equation (3) eliminates any difficulty factor in the process of cooperation.

Cost Structure w/o Transaction Cost

- Explore changes in costs via elasticities.
- Denote the percentage change in a variable as Є where $Є_x = \delta \ln x = \delta x/x$.
- Hence,

  (4) $Є TC = Є(TC_1+TC_2) = (TC_1 /TC)\, Є(TC_1) + (TC_2 /TC)\, Є(TC_2)$
  $= (TC_1 /TC)\, Є(\Sigma_j^n (P^1_j\, Q^1_j)) + (TC_2 /TC)\, Є(\Sigma_j^n (P^2_j\, Q^2_j))$.
- $TC_i /TC = S_i$ which is the share of the total initial joint budget that is attributable to the i^{th} community.
- That is, budget shares $S_1 = TC_1/ TC$ and $S_2 = TC_2 /TC$.
- Hence,

  (5) $Є TC = S_1\, Є(\Sigma_j^n (P^1_j\, Q^1_j)) + S_2\, Є(\Sigma_j^n (P^2_j\, Q^2_j))$
  $= S_1\, S^1_j\, \Sigma_j^n (ЄP^1_j\, ЄQ^1_j) + S_2\, S^2j\, \Sigma_j^n (ЄP^2_j\, ЄQ^2_j)$.

Cost Structure w/o Transaction Cost

- Adjustability of post collaboration total joint costs depends on:
  - relative sizes of the budgets of collaborating communities.
  - relative costs of each service that is being coordinated.
  - adjustability of the costs of each service.
  - adjustability of the size of the serviced clientele.
- Even when costs savings occur, their impact on joint costs would depend on the share of the community whose costs and service size is most adjustable.

Cost Structure w/o Transaction Cost

- Collaborating on a service with significant cost saving could yield little benefit if the bulk of the saving is due to activities of a community with a small share of the joint initial costs.
- If the potential for reduced cost is higher when a dominant community also has huge potential for savings, then, what are the benefits of partnering, unless the added size of the smaller community provides the source of innovation for cost savings?
- If a small community can help a larger community achieve savings by moving the combined entity to a new level of efficiency, there is incentive on both sides for cooperation, even though the momentum for cost saving arises from the size of a larger community.

Introducing Transaction Costs

- Transaction costs, themselves, are a function of the costs of service delivery and the scope of the serviced clientele.
- Denote the transaction cost of cooperation for the i^{th} community as CC_i where:

$$(6)\ CC_i = \rho\, m\, TC$$
$$= \rho\, m\, (\Sigma_i^m \ \Sigma_j^n\, (P^i_j\, Q^i_j))$$
$$= \rho\, m\, ((\Sigma_j^n\ (P^1_j\, Q^1_j) + (\Sigma_j^n\, (P^1_j\, Q^1_j)),$$

where:

  - TC is combined initial cost of cooperating communities and it proxies degree of complexity associated with budget size to be reduced.
  - m is the number of communities and it also proxies degree of complexity.
  - ρ is a cost coefficient or difficulty factor and it makes cooperation cost depend on the two complexities factors m and TC.

Transaction Costs

- Cooperation is not costless and the search for savings, negotiations, monitoring, and regulation costs money.
- Obviously, post cooperation, ρ must start out greater than zero and approach zero over time.
- Functions specified so that ability of CC_i to decline to zero is compromised by the m and TC complexity factors which do not go away.
- Management and decline of ρ would determine the extent to which transaction costs can be reduced or eliminated.
- That is, ρ must be zero before the total benefits of economies of scale can be realized.
- If ρ is high or does not decline rapidly, then the potential benefits of cooperation are reduced.

Elasticity of Transaction Costs

- Introducing dynamics assuming ρ is fixed:

$$(7)\ \epsilon CC = \rho\, m\, (\epsilon\, (\Sigma_i^m\ \Sigma_j^n\ (P^i_j\, Q^i_j)))$$
$$= \rho\, m\, (S_1\, \epsilon\, (\Sigma_j^n\, (P^1_j\, Q^1_j)) + S_2\, \epsilon\, (\Sigma_j^n\, (P^2_j\, Q^2_j)).$$
$$= \rho\, m\, (S_1\, S^1_j\, \Sigma_j^n\, (\epsilon P^1_j\, \epsilon Q^1_j) + S_2\, S^2_j\, \Sigma_j^n\, (\epsilon P^2_j\, \epsilon Q^2_j)).$$

- Potential reduction in transaction cost is affected by the relative sizes of the collaborating communities, the adjustability of the unit costs of providing services by cooperating communities, and the proportion of the total budget attributable to services whose costs could be reduced.
- If the Ps are slow to adjust downward or the Qs grow in size (people demanding more services), then transaction cost would be slow to adjust downward.

Cost Structure with Transaction Costs

- Combining transaction cost and basic costs:

$$(9)\ \text{ЄTC} = S_1 S^1_j \Sigma^n_j (\text{ЄP}^1_j\ \text{ЄQ}^1_j) + S_2 S^2_j \Sigma^n_j (\text{ЄP}^2\text{j}\ \text{ЄQ}^2\text{j}) + \rho\, m\, (S_1 S^1_j \Sigma^n_j (\text{ЄP}^1_j\ \text{ЄQ}^1_j) + S_2 S^2_j \Sigma^n_j (\text{ЄP}^2_j\ \text{ЄQ}^2_j)).$$

$$= (1 - \rho\, m)\, ((S_1 S^1_j \Sigma^n_j (\text{ЄP}^1_j \text{ЄQ}^1_j) + S_2 S^2_j \Sigma^n_j (\text{ЄP}^2_j\ \text{ЄQ}^2_j)).$$

- We treat ρ as fixed, but later analyze it in the context of adjustments.

Cost Structure with Transaction Costs

- Conclusions regarding the benefits of cooperation (cooperation depends on):
  - the relative sizes of cooperating units.
  - the relative sizes of the budgets for each service provided.
  - the relative service areas (population) of cooperating units.
  - the potential to reduce costs in the short and long run.
  - the number of communities involved in cooperate (complexity).
  - the adjustability of the costs of each service.
  - the adjustability of the sizes of the serviced communities.
  - the number of communities cooperating.

Implications

- Analysis suggests that even when costs and service populations are adjustable, these are subject to relative community shares and relative shares of total budgets.
- The ability to realize joint cost savings depends on which community is responsible for the accrual of those costs (“Why bother if you can achieve it on your own?”).
- If communities can effectively reduce costs on their own, then there will probably be limited incentive to cooperate.
- The extent to which collaboration will encourage cost saving depends on how much the cooperation process itself drives communities toward searching for joint cost savings.
- State policies need to target the reduction of ρ as well as the P_js, by assisting communities to discover opportunities for such reduction.

Michigan Land Use Planning Case Study

Michigan Survey

- The model is overly simplistic, particularly as it is silent about benefits of cooperation.
- It highlights the sources of transaction costs.
- Relative magnitudes of transaction costs should be reflected in the probability a community would cooperate with another community.
- We concentrated on land use planning cooperation across municipalities to generate preliminary evidence of the impacts of attempts to decrease transaction costs.

Michigan Survey, continued

- Questions investigated through a survey.
  1) Whether or not a community has partnered with another community in developing a Joint Master Plan (JMP).
  2) Whether or not a community has entered into a joint Municipal Planning Agreement with another community (MPA).
  3) Whether or not a community has been involved in some other cooperative land use plan or regulation (OC).
  4) The total number of other communities the community is partnering with (NUM).
  5) The number of years a community has been cooperating with others on land use planning and regulation (TIME).

Michigan Survey, continued

- Determinants.
  1) Incentives (external and internal).
  2) Size, scope and community intensity.
  3) Internal capacity.
  4) Preparedness.
  5) Importance of Planning.
  6) Innovation related incentives.
  7) Perception and attitude.
  8) Agency.

Michigan Survey, continued

POP	Community population (Size)
REIM	Does the community reimburse planning commissioners for training and educational activities (I Incentives)
REIM$	If so, how much (I Incentives)
STAFF	Number of full time staff hours for planning and regulation per capita (Importance).
OTHER	Do planning staff perform other duties beyond land use planning and regulation (Internal Capacity)
OUTS	Does the community outsource any planning activities (Preparedness)
OUTS%	Percentage of outsourcing (Preparedness)
TOT$	Total budget of the community per capita (Importance).
GRANTS	Does the community generate grants to support planning and land use regulation activities (Innovation).
HIST	If the history of past disputes with neighboring jurisdictions was not important to very important (History)
LEAD	If the lack of local leadership as a deterrent to joint planning has been not important to very important (Agency).
FTA	Does municipality received funding or other technical assistance to jumpstart cooperative efforts (E Incentive)
INTR	Importance of local public interest in supporting cooperation, according to respondent (Agency)
POSI	If the official has a positive opinion of the value and appropriateness of cooperation in land use planning
NEUT	If the official has a neutral opinion of the value and appropriateness of cooperation in land use planning
NEGA	If the official has a negative opinion of the value and appropriateness of cooperation in land use planning
POPD	Population density (Complexity and Size).

Empirical Results, Not Corrected for Heteroskedasticity

	JMP Logit		MPA Logit		OC Logit		NUM		TIME	
	Coef	P>|t|	Coef	P>|t|	Coef	P>|t|	Coef	P>|t|	Coef	P>|t|
POP	-0.0001	0.097	-0.0000	0.855	0.0000	0.245	0.0000	0.006	0.0001	0.057
REIM	0.2412	0.670	0.1677	0.798	-0.6453	0.069	-0.1465	0.641	-1.2839	0.380
REIM$	0.0088	0.193	0.0047	0.546	-0.0033	0.506	0.0053	0.202	0.0315	0.107
STAFF	0.0001	0.617	0.0001	0.619	0.0001	0.318	0.0001	0.018	0.0003	0.488
OTHER	0.6701	0.065	-0.8214	0.058	0.1482	0.561	0.3912	0.075	-0.3282	0.748
OUTS	0.1240	0.780	0.7611	0.135	0.1174	0.700	0.1031	0.695	-0.6046	0.621
OUTS%	0.0121	0.092	-0.0087	0.358	-0.0018	0.749	0.0048	0.335	-0.0168	0.469
TOT$	-0.0000	0.508	-0.0000	0.513	0.0000	0.708	0.0000	0.674	-0.0000	0.160
GRANTS	-0.7693	0.257	0.1651	0.778	0.2695	0.520	-0.3594	0.340	0.7201	0.679
HIST	-0.0860	0.588	0.3867	0.054	-0.1929	0.091	-0.0027	0.978	0.0788	0.862
LEAD	0.0806	0.664	0.1538	0.502	-0.0696	0.587	-0.0202	0.857	-0.2409	0.642
FTA	1.3082	0.001	1.4325	0.001	0.7115	0.030	1.4329	0.000	0.6060	0.656
INTR	0.1902	0.441	0.3010	0.306	0.0964	0.580	0.1641	0.271	0.3859	0.574
POSI	0.2248	0.564	0.4167	0.391	0.9011	0.002	0.9085	0.000	2.5897	0.022
NEUT	-0.1539	0.794	1.3515	0.020	0.5454	0.180	0.1189	0.725	0.2835	0.857
NEGA	-0.7480	0.278	-1.3375	0.225	1.0036	0.010	0.2546	0.449	0.9938	0.525
POPD	0.0001	0.379	-0.0002	0.549	-0.0000	0.869	-0.0002	0.068	0.0004	0.453
CONST	-3.5214	0.001	-5.5125	0.000	-0.7679	0.269	0.3118	0.607	5.4946	0.048
R^2/ Pseudo R^2	0.0814		0.1687		0.0810		0.2643		0.0534	
Adj R^2							0.2274		0.0070	

Empirical Results, Corrected for Heteroskedasticity

	JMP Logit		MPA Logit		OC Logit		NUM		TIME	
	Coef	P>|t|	Coef	P>|t|	Coef	P>|t|	Coef	P>|t|	Coef	P>|t|
POP	-0.0001	0.058	-0.0000	0.782	0.0000	0.281	0.0000	0.036	0.0001	0.067
REIM	0.2412	0.655	0.1677	0.801	-0.6453	0.061	-0.1465	0.604	-1.2839	0.408
REIM$	0.0089	0.219	0.0047	0.528	-0.0033	0.487	0.0053	0.196	0.0315	0.133
STAFF	0.0001	0.754	0.0001	0.603	0.0001	0.401	0.0001	0.200	0.0003	0.530
OTHER	0.6701	0.073	-0.8214	0.046	0.1482	0.561	0.3912	0.099	-0.3282	0.745
OUTS	0.1240	0.782	0.7611	0.154	0.1174	0.701	0.1031	0.687	-0.6046	0.606
OUTS%	0.0121	0.074	-0.0087	0.326	-0.0018	0.758	0.0048	0.441	-0.0168	0.429
TOT$	-0.0000	0.473	-0.0000	0.234	0.0000	0.709	0.0000	0.709	-0.0000	0.105
GRANTS	-0.7693	0.285	0.1651	0.769	0.2695	0.523	-0.3594	0.355	0.7201	0.654
HIST	-0.0860	0.591	0.3867	0.058	-0.1929	0.082	-0.0027	0.974	0.0788	0.854
LEAD	0.0806	0.690	0.1538	0.546	-0.0696	0.581	-0.0202	0.840	-0.2409	0.617
FTA	1.3082	0.001	1.4325	0.001	0.7115	0.038	1.4329	0.000	0.6060	0.627
INTR	0.1902	0.473	0.3010	0.344	0.0964	0.590	0.1641	0.215	0.3859	0.543
POSI	0.2248	0.590	0.4167	0.405	0.9011	0.002	0.9085	0.000	2.5897	0.027
NEUT	-0.1539	0.795	1.3515	0.020	0.5454	0.153	0.1189	0.649	0.2835	0.860
NEGA	-0.7480	0.282	-1.3375	0.200	1.0036	0.010	0.2546	0.361	0.9938	0.476
POPD	0.0001	0.326	-0.0002	0.481	-0.0000	0.867	-0.0002	0.044	0.0004	0.404
CONST	-3.5214	0.002	-5.5125	0.000	-0.7679	0.283	0.3118	0.534	5.4946	0.036
R^2/ Pseudo R^2	0.1168		0.1687		0.0810		0.2643		0.0534	

Results

- FTA (financial or technical assistance received to jumpstart cooperation- a proxy for incentives) was positively related statistically significant for all joint agreements (MP, MPA and OC) as well as in the number of partners (NUM).
- POSI (a positive opinion of the value and appropriateness of multi-jurisdictional cooperation on land use planning and regulation) was positive and statistically significant for communities cooperating in other ways (OC) as well as the number of partnering communities (NUM) and the length of cooperation (TIME).
- STAFF that perform other job duties is positively correlated with MP (joint master plan) and NUM, but the multi-tasking could be a result of, not a cause of, cooperative efforts.

Conclusions

- The results indicate that transaction costs play a key role in stifling intergovernmental cooperation.
- The large effects of FTA and POSI indicate that multi-jurisdictional cooperation, including the size and length of that cooperation, are heavily influenced by a reduction in barriers to cooperation.
- Reductions to the barriers of multi-jurisdictional cooperation, particularly transaction costs, can increase the likelihood of cooperative activities.
- Reducing transaction costs can also increase the number of those involved and the length of the cooperative agreements.