Economies of Scale in Ontario Municipal Services: Are Larger Municipalities Really More Efficient?

Presentation to the Institute on Municipal Finance and Governance, University of Toronto

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Presentation Outline

1. Introduction and Preliminaries

2. Amalgamation History and Provincial Policy

3. Municipal Structure and Operating Cost Structure

4. Statistical Estimation Process and Model

5. Estimation Results and Applications of the Model

6. Implications for Provincial Policy

7. Open the Floor to Questions

1 – Introduction and Preliminaries

1.1 – Why are Ontario's municipalities important?

- Operating costs alone consume 6% of Ontario's GDP!

- Municipalities provide critical local services, and facilitate a political forum for local residents/taxpayers

- Municipal is the level of government closest to the people

1.2 – What exactly is my goal?

- Estimate the relationship between municipal operating costs and size; are larger municipalities able to achieve lower costs?

2 – Amalgamation History and Provincial Policy

2.1 – Two Waves of Municipal Amalgamation:

- (1953-1974) First Wave: Metro & Regional Municipalities
    Directly provincially forced
    Lower-tier mergers; cities brought into the Regions
    Transfer of greater responsibility to Regions
    Examples: Region of Waterloo, Region of Halton

- (1996-2001) Second Wave: Mergers province-wide
    Directly and indirectly provincially forced
    Variety of merger types (vertical, horizontal, etc.)
    Several large-scale amalgamations into single-tiers
    Reduction in municipalities: 815 to 447 (45%)

2.2 – Municipal Restructuring Laws (1995-Present)

- *Savings and Restructuring Act* (1995)
  - Single-municipality trigger
  - Local disagreement & Restructuring Commissioners
  - Municipality of Chatham-Kent (1998)

- *City of Toronto Act* (1997)
  - Total amalgamation of Metropolitan Toronto (1998)

- *Fewer Municipal Politicians Act* (1999)
  - Special Advisors merged 4 regional municipalities

- *Municipal Act* (2001-Present)
  - Restructuring proposals & O.Reg. 216/96

Ontario Regulation 216/96 (Under the Municipal Act (2001))

3. (1) The following types of restructuring are established as types of restructuring for the purposes of subsection 173 (1) of the Act:

1. Amalgamating local municipalities or annexing to a local municipality, a part of a local municipality or unorganized territory.

2. Separating a local municipality or part of a local municipality from an upper-tier municipality.

3. Joining a local municipality, part of a local municipality or unorganized territory to an upper-tier municipality

4. Incorporating or dissolving an upper-tier municipality.

5. Amalgamating upper-tier municipalities.

6. Dissolving all or part of a local municipality.

7. Incorporating a local municipality. O. Reg. 216/96, s. 3 (1); O. Reg. 422/96, s. 2 (1); O. Reg. 205/03, s. 3 (1-3).

(2) Subsection (1) does not include,

(a) a restructuring that results in any part of an upper-tier municipality not being part of a local municipality;

(b) a restructuring that results in any part of a local municipality,

(i) being part of more than one upper-tier municipality, or

(ii) being part of an upper-tier municipality if any other part of the local municipality is not part of that upper-tier municipality;

(c) a restructuring that results in an upper-tier municipality consisting of a single local municipality;

(d) a restructuring that results in territory becoming unorganized territory;

(e) a restructuring that results in an increase in the number of local municipalities;

(f) a restructuring referred to in paragraph 7 of subsection 3 (1) that results in unorganized territory becoming part of the local municipality that is incorporated. O. Reg. 216/96, s. 3 (2); O. Reg. 422/96, s. 2 (2); O. Reg. 205/03, s. 3 (4-6).

2.3 – Policy Rationales for Amalgamation (1996-2001):

- Less municipal government
  Fewer municipalities, boards, politicians, and expenditures

- Cost savings from economies of scale
  Eliminate duplication and overlap

- Capture costs and benefits within same jurisdiction
  Build clear lines of accountability

- Assessment pooling & "strong"/"viable" municipalities
  Accommodation of provincial downloading
  Property tax subsidy (without provincial grants)

2.4 – Why Amalgamation was/is a Difficult Political Sell

(At Least) Three Political Problems:

- Mergers result in property tax redistribution
  Zero-sum game: High assessment subsidizes low

- Residents often bristle at the loss of community
  Loss of accessibility, accommodating diverse preferences

- Spillover externalities difficult to quantify
  Spillovers = residents benefiting from services in other
  municipalities where they don't pay taxes or vote

Economies of scale: Positioned as "Win-Win"

2.5 – Two Landmark Amalgamations During Second Wave

- Metropolitan Toronto merged with constituent municipalities to create (new) City of Toronto ("Mega-City") (1998)

    - First city-region single-tier amalgamation in Ontario

- County of Kent merged with its constituent municipalities and the separated City of Chatham to create the Municipality of Chatham-Kent (1998)

    - First city-county single-tier amalgamation in Ontario

2.6 – From Recent Amalgamation History to Economic Research

- Every single Restructuring Commissioner and Special Advisor had the following in common:

    - Appointed by the Province without local input/consent
    - Recommended *total amalgamation*[1] (LT + UT = ST)
    - Cited cost savings from economies of scale (larger municipalities) as a major rationale for amalgamation

- Therefore, it would be interesting to test to what extent larger municipalities are able to reduce costs

- This can be accomplished by estimating average cost curves for the provision of municipal services

[1] The Special Advisor for Haldimand-Norfolk, Milt Farrow, was a slight exception in that he recommended two single-tier counties rather than one single-tier county.

3 – Municipal Structure and Operating Cost Structure

3.1 – Municipal Structure in Ontario

- Municipalities in a Two-Tier System
    Lower-Tiers (e.g. City of Owen Sound, Township of Brock)
    Upper-Tiers (e.g. Region of Peel, County of Simcoe)

- Single-Tier Municipalities
    (e.g. City of Toronto, County of Prince Edward, City of Guelph, City of Thunder Bay)

- Distribution of Municipal Structure
    445 Municipalities (LT = 241, UT = 30, ST = 174)

3.2 – Operating Cost Structure

- Municipal Production
    - Underlying technology: $Y = F(X)$
    - Layers of administration and front line staff

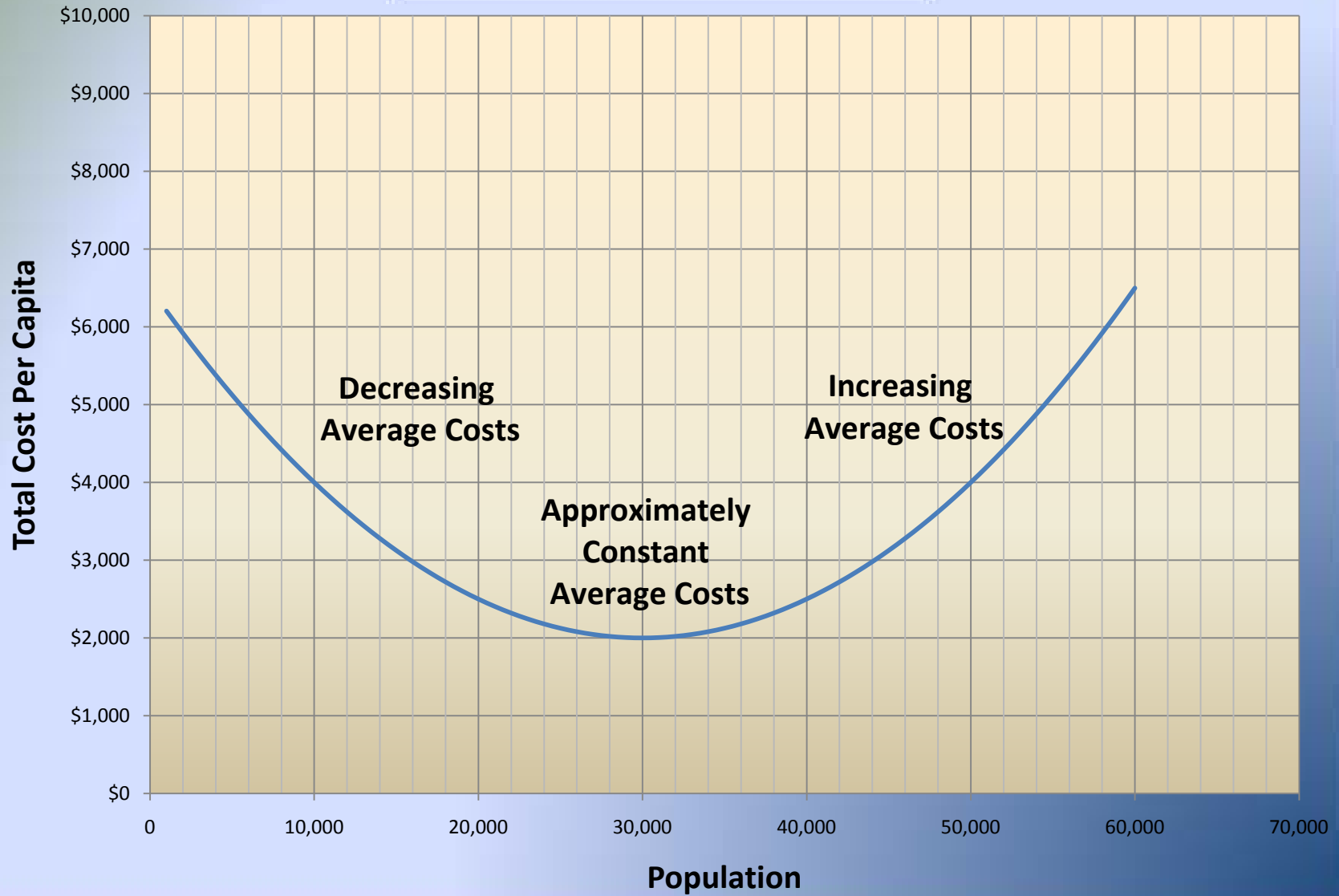- Types of Operating Costs
    - Variable Costs (VC)
    - Fixed Costs (FC)
    - Total Costs (TC); where TC = VC + FC
    - Average (Total) Costs (AC); where AC = TC/Population

- Extent and direction of scale economies have a particular relationship to the slope of the AC curve; they depend on the underlying production technology

4.0 – Statistical Estimation Process and Model

4.1 – Analyzed Operations

- 10 Operations (50% of operating costs) & Overall Operations
    - General Government
    - Fire
    - Police
    - Roads
    - Winter Control
    - Waste Collection
    - Ambulance
    - Parks
    - Recreational Programs
    - Recreational Facilities

4.2 – Estimation Methodology

- Estimated average cost equation

$$\frac{TC_{mft}}{H_{mt}} = C + \sum_{j=1}^{J} \alpha_j (H_{mt})^j + X'_{mt}\beta_f + Z'_{mft}\theta_f + D'_m\gamma_f + Y'\delta_f + u_{mf} + e_{mft}$$

m = municipality, f = function/operation, and t = year

$$X'_{mt} \equiv \left(\frac{UG_{mt}}{H_{mt}}, \frac{CG_{mt}}{H_{mt}}, \frac{CVA_{mt}}{H_{mt}}, \frac{PIL_{mt}}{H_{mt}}, LandArea_m \right)$$

$$D'_m \equiv (LT_m, UT_m, ST_m, Urban_m, UTArea_{m1}, \ldots, UTArea_{m31}, North_m)$$

$$Z'_{mft} \equiv \begin{cases} (Salary_{mt}, Volunteer_{mt}, CSV_{mt}, PrivFire_{mt}) \; if \; f = Fire \\ OPP_{mt} \; if \; f = Police \\ (PaveRoad_{mt}, UnpaveRoad_{mt}) \; if \; f = Roads \\ WinterRoad_{mt} \; if \; f = Winter \; Control \\ Tonnes_{mt} \; if \; f = Waste \; Collection \\ (TrailKm_{mt}, ParkArea_{mt}) \; if \; f = Parks \\ RecHours_{mt} \; if \; f = Recreational \; Programs \\ RecSpace_{mt} \; if \; f = Recreational \; Facilities \\ 0 \; otherwise \end{cases}$$

$$Y' \equiv (y_{2005}, y_{2006}, y_{2007}, y_{2008})$$

Error Terms: $\qquad u_{mf} + e_{mft}$

- Analyzing total costs per household (MPAC vs. StatsCan.)

- Controlling for two-tier vertical service configuration

4.3 – Ontario Municipal Data

- Data Sources
    - Financial Information Returns (FIR)
    - Municipal Performance Measurement Program (MPMP)
    - Statistics Canada

- Data Structure
    - Panel for 2005-2008 (4 Years)
    - Number of Observations = (445) X (4) = 1,780

- Data on costs, grants, current value assessment (CVA), Payments-in-Lieu (PIL) assessment, land, pop/house, LT/UT/ST, UT area, urban/rural (RSCM), north/south, year, and some service level measures

5 – Estimation Results and Applications of the Model
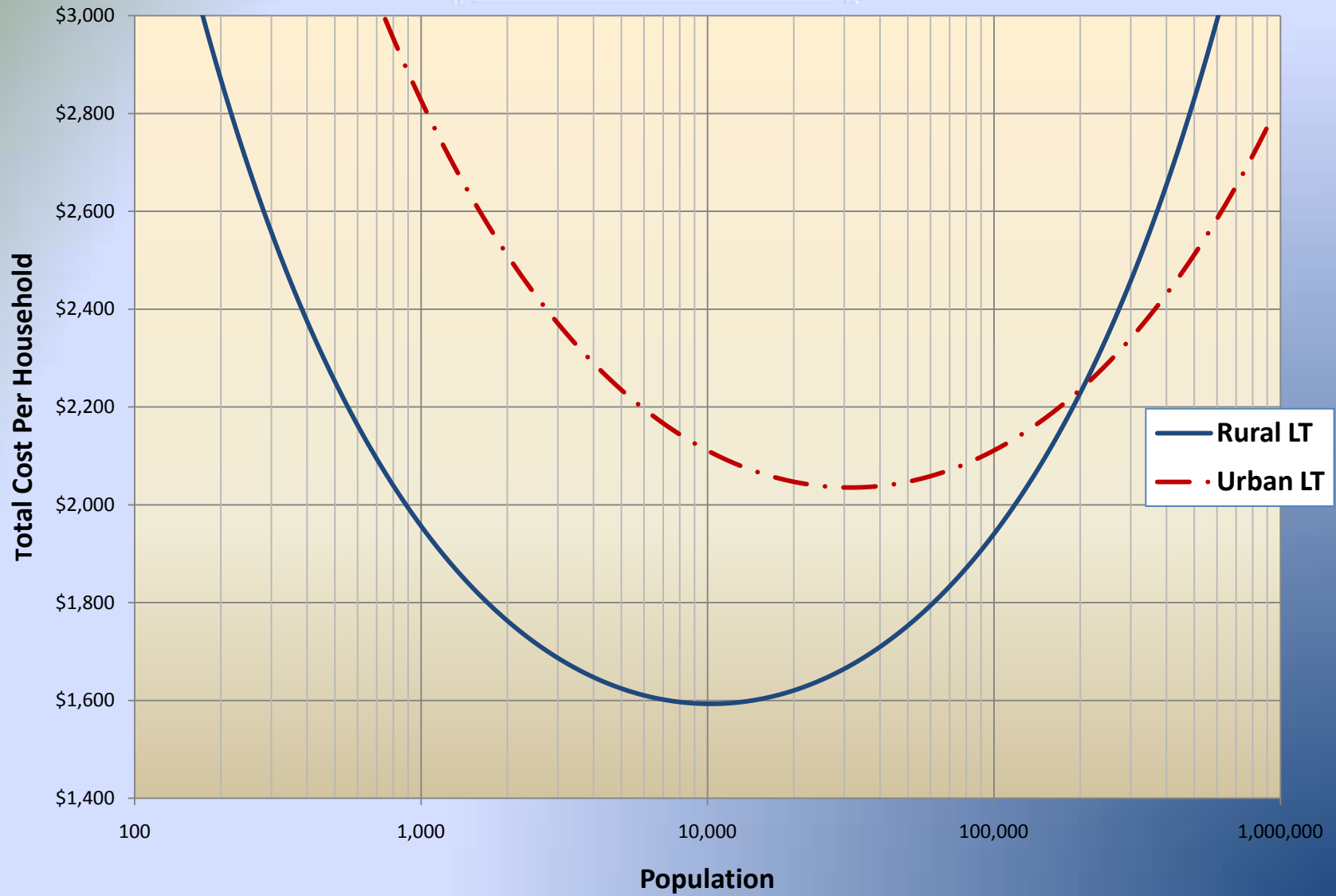
5.1 – Overall Operations

- Scope for economies of scale varies across municipal structure, urban/rural status, and north/south status

- Minima of the average cost curves, or cost minimizing populations (CMP), also vary in a likewise manner

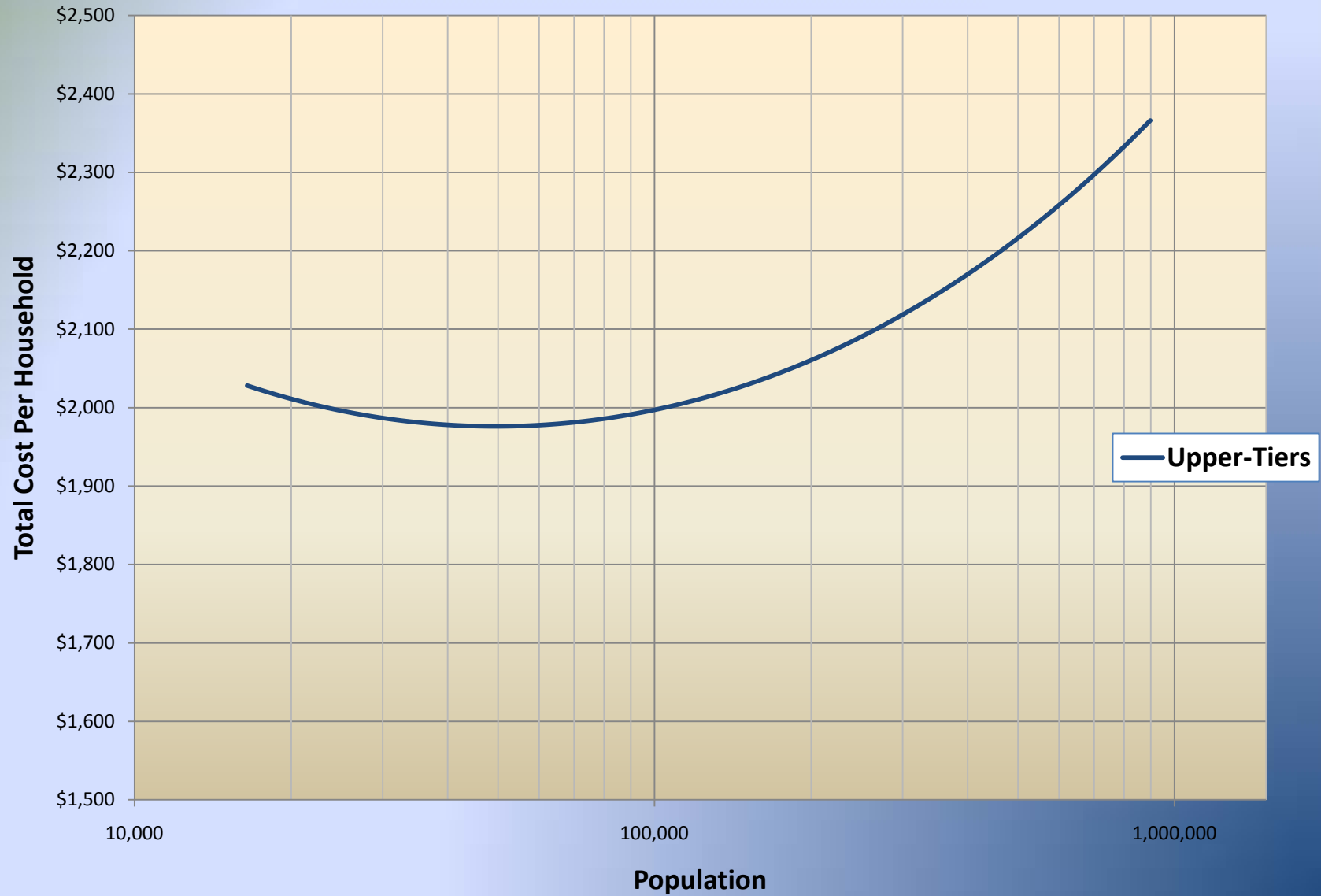- Municipalities in Two-Tier Systems CMP:

   Urban Lower-Tiers: 32,000
   Rural Lower-Tiers: 10,000
   Upper-Tiers (Regions & Counties): 50,000

Lower-Tiers: Urban vs. Rural

Total Cost Per Household

Population

Rural LT
Urban LT

Upper-Tiers: Regional Municipalities and Counties

Total Cost Per Household

- $2,500
- $2,400
- $2,300
- $2,200
- $2,100
- $2,000
- $1,900
- $1,800
- $1,700
- $1,600
- $1,500

— Upper-Tiers

Population

- 10,000
- 100,000
- 1,000,000

- Single-Tier Municipalities CMP:
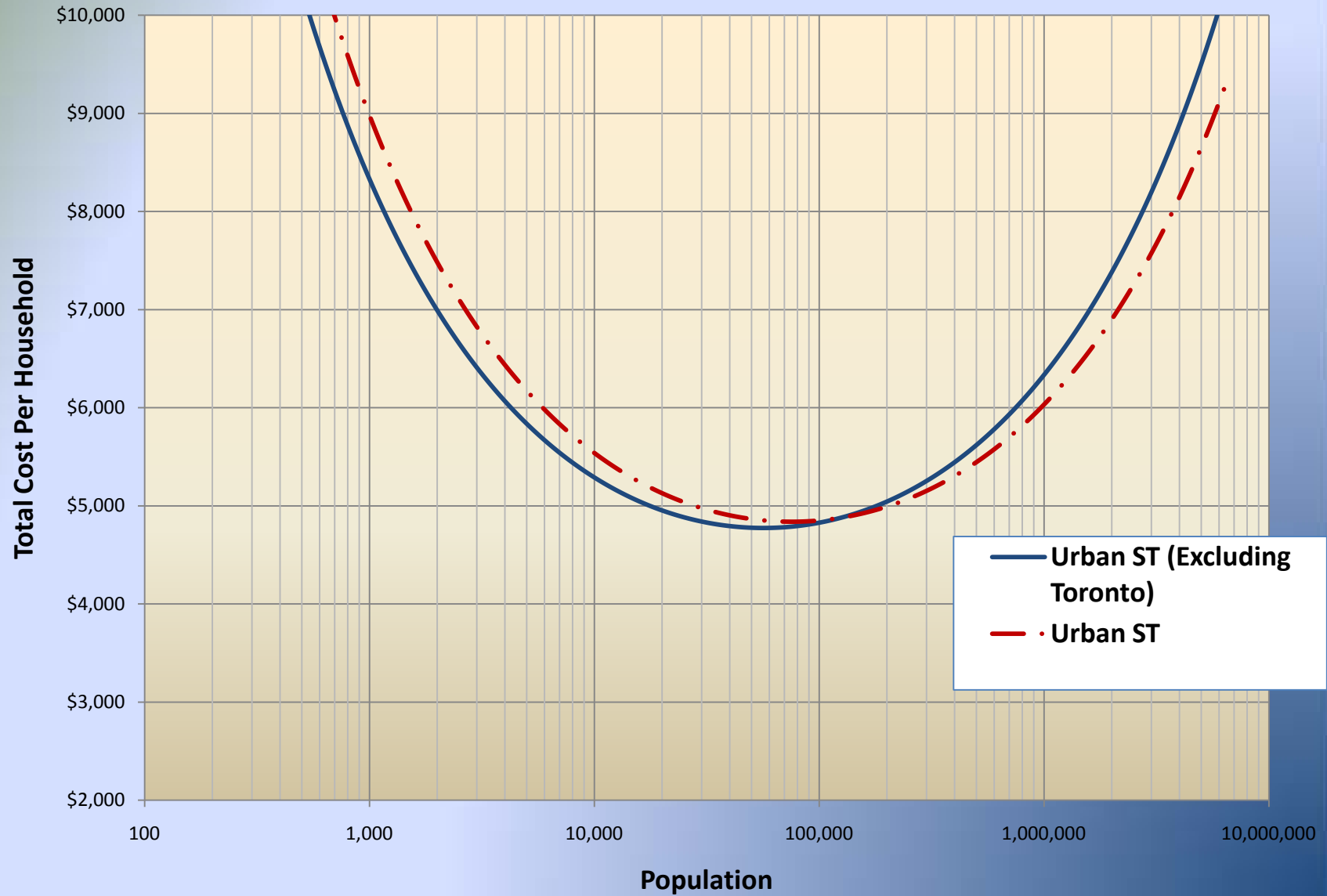
    Urban Single-Tiers: 76,000

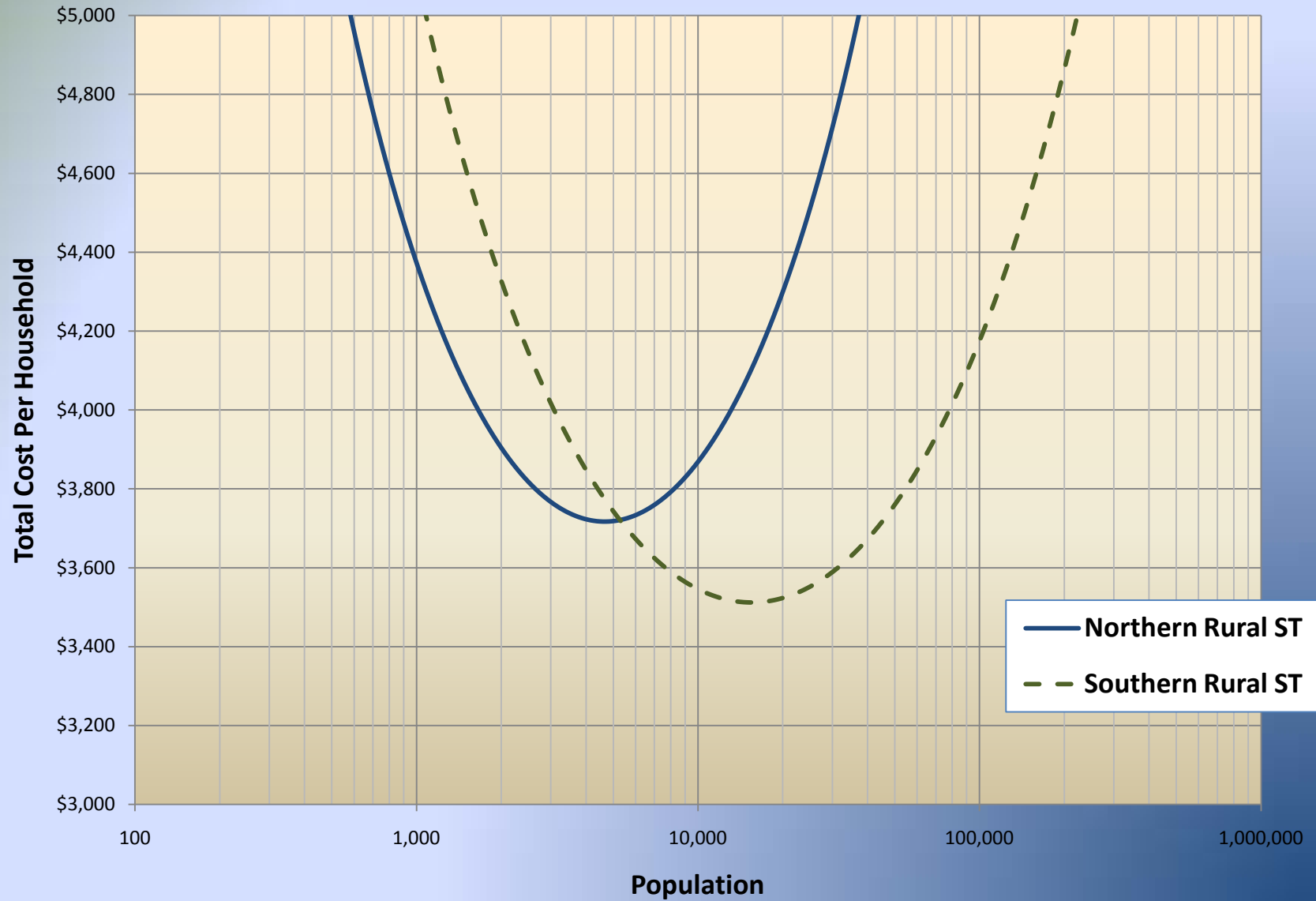   Urban Single-Tiers (Excluding Toronto): 57,000

    Northern Rural Single-Tiers: 4,700

    Southern Rural Single-Tiers: 15,500

Urban Single-Tiers: Toronto Included vs. Toronto Excluded

Total Cost Per Household vs. Population

Legend:
- Urban ST (Excluding Toronto)
- Urban ST

Rural Single-Tiers: Northern vs. Southern

Total Cost Per Household vs. Population

Legend:
- Northern Rural ST
- Southern Rural ST

5.2 – Individual Operations

- Operations with no economies of scale

    - Parks, Recreational Programs, and Recreational Facilities

- Operations with CMP in lower population ranges

    - Fire, Police, and Ambulance

- Operations with CMP in higher population ranges

    - General Government, Roads, Winter Control, and Waste Collection

5.3 – Economic Intuition behind U-Shaped Average Costs

- Even allowing for estimation flexibility, U-shaped average cost curves emerged as the best fit to the data

- Average costs may initially decline due to:

  o Fixed cost of municipal administration and operation
  o Specialization (e.g. Clerk/Treasurer → Clerk & Treasurer)

- Average costs may eventually rise due to:

  o Growth and layering of administration and front line staff
  o Impedance of monitoring ability and flow of information

5.4 – Application #1: The Town of Essex (Population 20,000)

- A rural lower-tier in Essex County; formed in 1999 (Town of Essex (former) + Town of Harrow + Township of South Colchester + Township of North Colchester)

- With relevant CMP at 10,000, the model predicts a savings of about 2% if plan to split town in half were implemented

- Splitting the town would also yield unambiguous efficiency enhancements from preference diversity accommodation

- Evidence suggests loss of economies of scale is an invalid justification for preventing the Town of Essex from separating into two independent lower-tier towns.

5.5 – Application #2: Potential Merger of Kitchener & Waterloo

- The City of Kitchener and the City of Waterloo are contiguous urban lower-tiers, forming part of the Region of Waterloo

- City of Kitchener (pop. 220,000) and City of Waterloo (pop. 120,000) will place merger "question" on 2010 ballot

- As urban lower-tiers, the model predicts overall per household costs would rise by 6% if the merger were to take place

- The merger would also lead to an unambiguous loss of efficiency due to a reduction in accommodation of local preference diversity

6 – Implications for Provincial Policy

6.1 – So do economies of scale exist?

- Yes, but the evidence thus far suggests they are limited

- Municipalities beyond relevant cost minimizing population (CMP) give up preference efficiencies *and* incur higher costs

6.2 – Are larger municipalities really "stronger"?

- Not necessarily; higher costs can offset gains in fiscal capacity

- Mergers may simply result in large municipality being weaker than average or weakest of merging municipalities (> CMP)

6.3 – So does the CMP achieve economic efficiency?

- The CMP is definitely ***technologically efficient***

- The CMP is a very important factor in determining the ***economically efficient*** population

- Can interpret the CMP as an ***upper-bound*** for economically efficient population in a number of economic circumstances

6.4 – Can large-scale municipal amalgamation be justified?

- Not on the basis of deriving savings from economies of scale

- Very difficult to justify amalgamations going beyond the CMP

7 – Opening the Floor to Questions

Thank you for attending.