

# Transportation infrastructure investments, pricing and gateway competition: Policy considerations

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## Policy questions addressed

1. Is infrastructure usage priced efficiently?
2. Does the private sector have incentives to price efficiently?
3. Is infrastructure investment aid warranted?
4. Are infrastructure operating subsidies warranted?
5. Do existing institutions, regulations & practices promote appropriate investment & pricing decisions?

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## Definitions

**Gateway:** A node or link in a transport network

**Corridor:** A link in a transport network

**Nodes:** Seaports, airports, intermodal transfer points...

**Links:** Rail lines, highways...

Here: infrastructure of any type

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## Pricing & investment decisions are linked

### Implications of pricing for investment

Prices → volumes → benefit from investment

Sign of effect theoretically ambiguous

Long life, inflexibility & lumpiness of capacity ⇒ need to anticipate changes in levels & structure of prices & taxes

### Implications of investment for pricing

Capacity expansion ⇒ less congestion ⇒ lower price

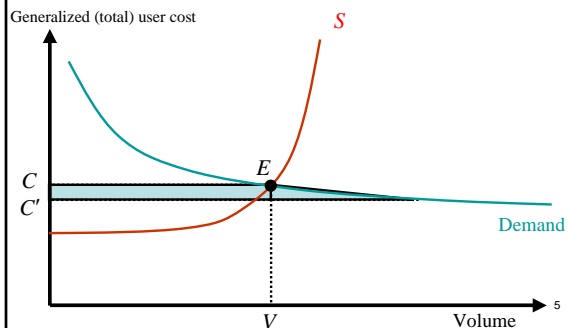
Better service ⇒ higher willingness to pay ⇒ higher price

**Focus here:** Investment to expand capacity and congestion pricing

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## Investment benefits with no congestion pricing

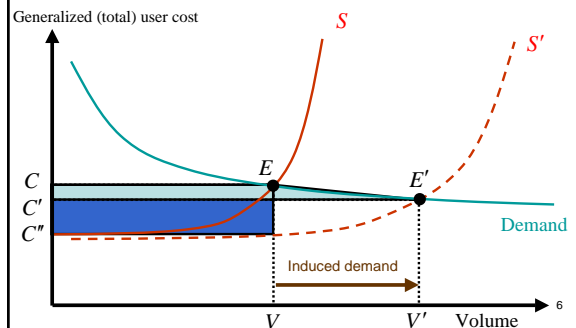
### Before capacity expansion



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## Investment benefits with no congestion pricing

### After capacity expansion



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## 1. Is infrastructure usage priced efficiently?

### Roads

Few toll roads in Canada

No congestion tolls *per se*

Highway 407 is privately operated. Subject to penalties if annual traffic levels below threshold

Tolling plans:

BC: Port Mann Bridge, Golden Ears Bridge, other bridges?

Toronto?

Case for road pricing in Canada:

Lindsey (2007, "Road tolls for thee")

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## 1. Is infrastructure usage priced efficiently?

### Airports

No congestion fees

Research (Basso & Zhang, Brueckner, Daniel, Morrison & Winston...)

### Seaports

Los Angeles and Long Beach: PierPASS program. Traffic Mitigation Fee on peak-period deliveries

Vancouver: Congestion surcharges on containers to be imposed by *major shipping lines* (see below)

### Rail

Vertically integrated

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## 2. Private sector pricing incentives

### (A) Exercise of market power

Infrastructure has imperfect or no substitutes

Supply chains  $\Rightarrow$  double marginalization

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## 2. Private sector pricing incentives

### (B) External costs of transport

#### B1: Costs borne by general public

Local emissions and greenhouse gases

Noise

Not internalized by infrastructure managers, service providers or users

Policy instruments:

Carbon tax (for all economic sectors)

Increase in fuel taxes

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## 2. Private sector pricing incentives

### (B) External costs of transport

#### B2: Costs borne by users collectively

Infrastructure wear and tear

Accidents (in large part)

**Congestion**

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## 2. Private sector pricing incentives

Q: *Do congestion costs warrant government intervention?*

A: *Not in general*

Private infrastructure managers have incentive to internalize costs borne by their customers

Minimize total costs =

Infrastructure costs +

Operating costs (freight handling, maintenance) +

Users' costs (time, extra fuel consumption, etc)

Private operators will impose congestion tolls

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## 2. Private sector pricing incentives

Three qualifications (all regarding market power)

- (1) **Price markup** is a percentage of the generalized cost  $\Rightarrow$  operator passes on to customers *more* than the cost of congestion
- (2) **Supply chains**. Each operator in a supply chain adds a markup (double marginalization)
  - Truck  $\rightarrow$  rail  $\rightarrow$  freighter  $\rightarrow$  rail  $\rightarrow$  truck
  - Airports + air freight
  - Seaports + shipping lines

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## 2. Private sector pricing incentives

### (3) "Self-internalization" of congestion costs by large users

- Airlines with multiple flights at an airport
- Major shipping lines at seaports (e.g. Vancouver!)

Users hold back on volume (monopsony power)

Congestion fees should vary inversely with each user's share of traffic. Contentious.

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## 3. Investment aid to private sector

### Risks of major infrastructure projects

- Substantial lead times for planning & construction
- High costs, long-lived, irreversible, few alternative uses
- Volatility of freight demand
- Supply disruptions: strikes, equipment breakdowns, bad weather, natural disasters, terrorist attacks ...

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## 3. Investment aid to private sector

### Q: *Is the private sector biased against large and risky projects?*

A: **Controversial**


**Theory:** Optimal design capacity increased by uncertainty(?)

**Practice:** Apparent reluctance to upgrade infrastructure:

"There appears to be a market failure with respect to financing the expansion of freight transport capacity ... Because the private sector is unlikely to devote resources to areas where economic gain is uncertain, it is critical that the risks and rewards related to investments in freight transport infrastructure be characterized, especially as policymakers seek creative public-private partnerships." (Ortiz et al. 2006: 19)

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## 3. Strategic investment considerations

**Strategic**  Intended to affect decisions of competitors (or partners in supply chain)

### Lessons from literature on strategic trade policy

1. Wide scope for potentially advantageous aid (tariffs, output subsidies ...)
2. Appropriate intervention sensitive to nature of competition
3. Case for aid stronger for **strong** domestic competitors
4. Benefits of strategic aid diluted if it induces "undue" competition between domestic producers

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## 3. Arguments **for** strategic investment aid

### 1. Credible

Infrastructure long-lived

### 2. Potential winners

e.g. Port of Prince Rupert:

- Shortest ocean line-haul routes to Asia
- Deep, ice-free, uncongested
- CN rail line congestion free & low grades

### 3. Preempt capacity expansion by rivals

US? Mexico?

### 4. Infrastructure a public good for trade partners

(De Mooij et al 2005; Mun and Nakagama 2006; Fukuyama 2006)

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### 3. Arguments *against* strategic investment aid

#### 1. Costs of accelerated investment

- Diverts resources from regular operations & maintenance (e.g. US railroads)
- Raises costs of other projects
- Overheating economy generally

#### 2. Benefits diluted by domestic competition

Between Ports of Vancouver & Prince Rupert?  
Between Port of Halifax & other Atlantic region ports?

#### 3. Prisoners' Dilemma

Retaliation by other countries?

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### 4. Operating subsidies: Scale economies

(Theoretical literature on cost recovery)

#### **Scale economies in infrastructure supply**

**Airports:** Approx. constant scale economies beyond moderate traffic volumes

**Seaports:** Scale economies for at least some components of infrastructure & equipment

#### **Scale economies in infrastructure usage**

**Economies of traffic density:** Airports, liner shipping (service frequency)

**Economies of massed reserves:** Randomness in arrival times & service times

**Logistics:** Airport hubs, seaport transshipment centres

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### 4. Operating subsidies: other considerations

#### **Capacity indivisibilities**

Low traffic volumes  $\Rightarrow$  deficit

#### **Large users**

Efficient congestion charge reduced  $\Rightarrow$  deficit

#### **Benefits for regional development**

Employment (Declining importance. But may increase employment outside a port)

Agglomeration economies from local demand for traded goods, thick labour markets, technology spillovers & other positive feedback effects (New Economic Geography) **Critical mass?**

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### 4. Operating subsidies: other considerations

#### **Competitors have advantages**

US ports are subsidized

US airports receive more favorable tax treatment

Also European ports...

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### 4. Operating subsidies: Conclusions

Economies of scale & other factors create a possible case for subsidies

#### Constraints on Canada Port Authorities

- No federal subsidy
- Prohibitions on commercial activities that could provide cross-subsidy
- Limitations on borrowing to finance expansion

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### 5. Institutions, regulations & practices

#### **Dangers of making wrong decisions**

**Investment:** Too little or too much. Of the wrong type (weakest links)

**Pricing:** Failure to make structural changes

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## 5. Institutions, regulations & practices

### Danger 1: Faulty cost-benefit analysis

Twenty one types of errors in transport project appraisal (Mackie and Preston 1998)

Four errors relevant to APGCI:

- Inappropriate choice of study area
- Bad demand forecasts
- Errors in assessing strategic responses
- Appraisal optimism

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## 5. Institutions, regulations & practices

### Danger 2: Lack of coordination

- Between different transport modes
- Between governments and private sector
- Between government agencies
- Between levels of government

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## 5. Institutions, regulations & practices

### Danger 2: Lack of coordination

*"In a region so dependent upon trade, there is little coordination in western Canada of port terminal and inland road and rail infrastructure development. [The result is] over or under-utilized infrastructure, missed opportunities and the potential for duplication of investments. An inability to balance supply and demand creates negative and lasting perceptions among users who experience service problems and/or increased costs."*

(BC Ministry of Small Business and Economic Development and Ministry of Transportation 2005: 11)

*"In many cases, federal and provincial responsibilities overlap and the various regulatory regimes differ. Project developers find themselves dealing with several agencies that make no effort to coordinate...."* (Asia Pacific Foundation of Canada 2006: 25)

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## 5. Institutions, regulations & practices

### Danger 2: Lack of coordination

- Interdependent payoffs
- Large numbers of decision makers & stakeholders
- Inconsistent investment & budgeting decisions

Attempts to integrate policy in Canada

- Transport Canada Policy Group
- Translink (future uncertain)

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## 5. Institutions, regulations & practices

### Recommended reforms

Greater reliance on direct user charges

- Road pricing
- Airport congestion pricing(?)

Changes to policy regarding seaports (Canada Marine

Act under review)

- Subsidy?
- Lift prohibitions on commercial activities
- Ease limitations on borrowing

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