11.943J/ESD.935
Urban Transportation, Land Use, and the Environment in Latin America: A Case Study Approach

18 April, 2002

Class 10:
The Santiago Metropolitan Area
The Santiago Metropolitan Area (SMA)

Latitude: 32°56’ – 34°17’ South
Longitude: 69°47’ – 71°43’ West
The National Context

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Chile</th>
<th>LAC</th>
<th>Upper Middle-Income Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>GNI per capita (US$ 2000)</td>
<td>4,600</td>
<td>3,680</td>
<td>4,620</td>
</tr>
<tr>
<td>Urban Population</td>
<td>86</td>
<td>75</td>
<td>76</td>
</tr>
<tr>
<td>Life Expectancy at Birth</td>
<td>76</td>
<td>70</td>
<td>69</td>
</tr>
<tr>
<td>Infant Mortality (per 1000 births)</td>
<td>10</td>
<td>30</td>
<td>28</td>
</tr>
<tr>
<td>Access to Improved Water</td>
<td>94%</td>
<td>85%</td>
<td>87%</td>
</tr>
<tr>
<td>Illiteracy (15+)</td>
<td>4</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Population AAGR (94-00)</td>
<td>1.4</td>
<td>1.6</td>
<td>1.3</td>
</tr>
</tbody>
</table>

The National-Regional Context

- National Government
  - Executive Branch
    - Elected President – Majority of popular vote (run-off), one 6-year term
    - Appointed Ministers
  - Legislative Branch (Bi-camaral)
    - Elected Representatives (*diputados*) – 160 from 60 electoral districts – directly elected 4-year terms
    - Elected (38), Appointed (9) and lifetime (2) Senators – directly elected serve 8-year terms

- 13 Regions, divided into Provinces
  - Executive: Presidentially-appointed governors & Regional Arms of National Ministries
  - Regional Councils, elected by Municipal Government Councils in form of Electoral College
  - Provinces, Governor, with little power
The Local Context - Decentralization

- The Municipality - government presiding over the *comuna*
- Formally established by law in 1991
  - Local municipal elections first held in June, 1992
  - 341 municipal governments across the country
- Directly elected Mayor and Council
- Some degree of financial and local planning/investment autonomy
<table>
<thead>
<tr>
<th>Area of Intervention</th>
<th>Government Entity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transportation</strong></td>
<td></td>
</tr>
<tr>
<td>Infrastructure</td>
<td>MINVU (SERVIU)</td>
</tr>
<tr>
<td>Construction &amp;</td>
<td>MOPTT</td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
</tr>
<tr>
<td>Planning</td>
<td>MINVU, MOPTT</td>
</tr>
<tr>
<td></td>
<td>SECTRA, MIDEPLAN</td>
</tr>
<tr>
<td>Operations</td>
<td>MOPTT, METRO, EFE</td>
</tr>
<tr>
<td></td>
<td>SEREMOPTT UOCT</td>
</tr>
<tr>
<td><strong>Land Use</strong></td>
<td></td>
</tr>
<tr>
<td>Planning</td>
<td>MINVU</td>
</tr>
<tr>
<td></td>
<td>MIDEPLAN</td>
</tr>
<tr>
<td>Development</td>
<td>SERVIU</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
</tr>
<tr>
<td>Planning</td>
<td>CONAMA</td>
</tr>
<tr>
<td></td>
<td>COREMA</td>
</tr>
<tr>
<td>Enforcement</td>
<td>CONAMA MOPTT</td>
</tr>
<tr>
<td></td>
<td>MINIMALUD</td>
</tr>
<tr>
<td></td>
<td>COREMA</td>
</tr>
</tbody>
</table>
The RM

- Six Provinces, 52 Municipalities
- Smallest of the nation’s 13 regions in size, but home to 40% of population
- Province of Santiago (32 comunas), Greater Santiago (34 comunas), the SMA (?? comunas)
- 90% of RM population in the 34 comunas of Greater Santiago
The RM Topography and Meteorology

- 2,800 km² Basin – 500 m above sea level
  - 80 kms N-S by 30 kms E-W
  - surrounded on E by the Andes (pre-cordillera peaks of 3,200 m), on W by Coastal Range (cordillera de la Costa with peaks of 2,000 m), with smaller ranges to the North and South
  - Mapocho River runs directly through Santiago, the Maipo runs just south of the SMA.

- Mediterranean Climate
  - Warm, dry, breezy in summer; cold winter, with infrequent storms.

- Thermal Inversion
  - Persists throughout the year
  - Exacerbated in fall and winter
Economy of the RM

- Fundamental, continuously growing role in Chile’s economy
  - Despite intentions over the years at decentralizing growth
- 1986-1996
  - RM economy AAGR: 7.9%; Nation: 6.8%
  - RM share of GDP: 42% ⇒ 47%
  - RM share of industrial activity: 44% ⇒ 52%
  - RM share of construction activity: 37% ⇒ 41%
  - RM share of commercial activity: 65% ⇒ 68%
- All banks and 46 of 47 of major economic groups HQ’ed in RM
- National center of education (universities)
Composition of RM’s Economy

Source: Banco Central, 1999

Employment: Government/Social Services, 28% jobs; Industry, 23%; Commercial 20%
Since 1997 Asian crisis, etc. has cooled the national economy:

- 97-98: 3.4%; 1998-1999: -1.4%; 2000: ~5%


Greater Santiago unemployment: ~14% (2000)
Certainly important, but….

- Exports account for just 13% of RM’s GDP (vs. 30% for nation)

RM's Exports - 1999

- APEC 29%
- NAFTA 20%
- MERCOSUR 21%
- EU 13%
- Pacto Andino 17%
RM Population Evolution

Nation
Region Metropolitana

17% of nation

40% of nation
Population Growth & Demographics

- Early 1900s: Santiago as nation’s administrative center
- Mid 1940s: Import substitution policies led to industrial, financial commercial concentration in Santiago – trends that have continued...
- Recent Population Growth Trends (AAGR)

<table>
<thead>
<tr>
<th></th>
<th>RM</th>
<th>Nation</th>
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</thead>
<tbody>
<tr>
<td>1970-1982</td>
<td>2.62%</td>
<td>2.03%</td>
</tr>
<tr>
<td>1982-1992</td>
<td>1.97%</td>
<td>1.64%</td>
</tr>
</tbody>
</table>
Population: Regional Distribution

- 1970: 42% of RM’s population concentrated in the comuna of Santiago and 10 directly adjacent comunas
- 1992: These same comunas account for 26% of RM’s population
  - 3% population decline
- Major growth in West, South, Southeast
Population Dynamics

Influencing Factors

- Low peripheral land prices (Public housing projects)
- Middle and Upper Income suburbanization
- Increasing commercial and service land uses in central areas

Note: Each ring is comprised of comunas within the following approximate radial distance from CBD (in km from rough geographic center of comuna) - 1st Ring, <5; 2nd Ring, 5<10; 3rd Ring, 10-15; 4th Ring, 25-45; 5th Ring, 50-100.
Population Dynamics: Densities

Note: Each ring is comprised of comunas within the following approximate radial distance from CBD (in km from rough geographic center of comuna) - 1st Ring, <5; 2nd Ring, 5<10; 3rd Ring, 10-15; 4th Ring, 25-45; 5th Ring, 50-100.
Population Dynamics – the Future?

- RM growth expected to continue to outpace nation
- By 2020
  - AAGR 1.75%: 8.8 million
  - AAGR 1%: 7.3 million

- Where will that population reside?
- Will recent past growth trends hold true?
Demographics: Ages & Households

HH Size
- 1982: 4.82 persons
  - 3.5 to 5.7
- 1992: 4.25 persons
  - 3 to 4.8
- By 2010: 3.7
Socioeconomic Characteristics

Indigent: Annual HH Income < $500 (US$1996)
Poor: Annual HH Income < $1000 (US$1996)
The Segregated City-Region
The Segregated City

- Migration historically led to “invasions” and precarious housing
  - Poblaciones > ciudades callampas > campamentos > “asentamientos precarios”
  - Major efforts in recent years to supply public housing

- Segregation exhibited through inequalities in: housing quality, education, municipal infrastructure provision, greenspace, etc.
The Segregated City
The Segregated City
Urban Expansion – the SMA

1940: 100 km²
1995: 600 km²
Urban Expansion – Patterns, Influences

Overall Densities constant through 1950s
- though important shift in densities toward periphery

Densities decline during 1960s
By early 1970s, urbanization approaches growth boundary
- densities start rising

First Metropolitan Land Use Regulatory Plan
- includes urban growth boundary
- first major transport investments
- city begins losing “compact traits”

Urban Growth Boundary Lifted
- after 1981-82 economic crisis city begins expanding 70% faster than population
- densities decline at most rapid rate in history

Note: Land Area for 1995 is projection; Population for 1985 and 95 are based on interpolations (with AAGR from 1982-92 and 1982-98)
Growth Patterns – Influencing Factors

Lifting the Growth Boundary in 1979

In More Recent Years
- Reinvigorated road construction
- Low density suburban subdivisions
- Distant public housing projects and “invasiones”
- Industries on southeastern & northern fringes and in West near Airport on Ring Road
- Demographics – middle class “boom”: From 1992-97, 60% of urbanization in 4 “middle class” comunas