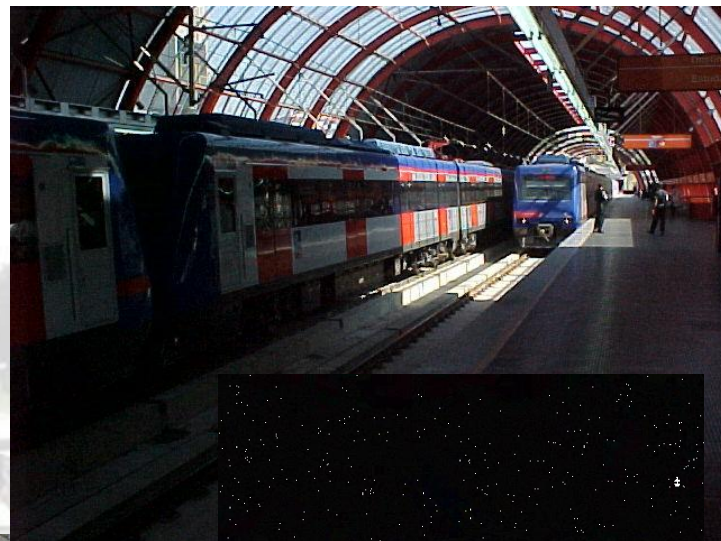
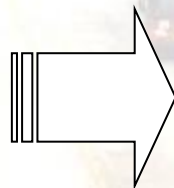
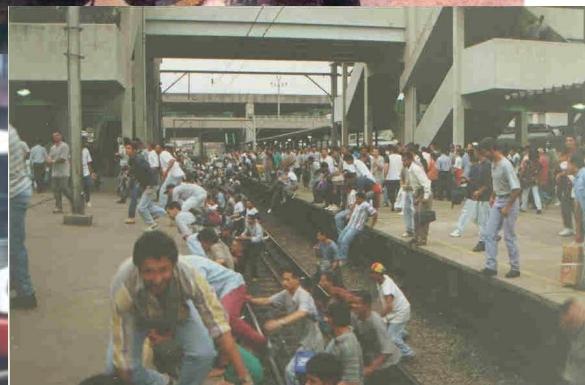


Public Transport in Latin America: a view from the World Bank

- ▶ Arturo Ardila-Gomez
- ▶ Senior Urban Transport Specialist
- ▶ The World Bank
- ▶ MIT April 6 2012





A background image of a city street. On the right side, there is a dedicated bus lane with a white roof structure. A red bus is stopped in this lane. A pedestrian is walking on the sidewalk next to the bus lane. The street has a yellow line marking. In the background, there are trees and buildings.

Presentation contents

- ▶ **Relevance of urban transport interventions**
- ▶ **Main urban transport problems in LAC cities**
- ▶ **LAC strategy to improve urban transport. Examples from our portfolio**
- ▶ **Main Lessons**
- ▶ **Looking forward: how to scale up Bank support?**

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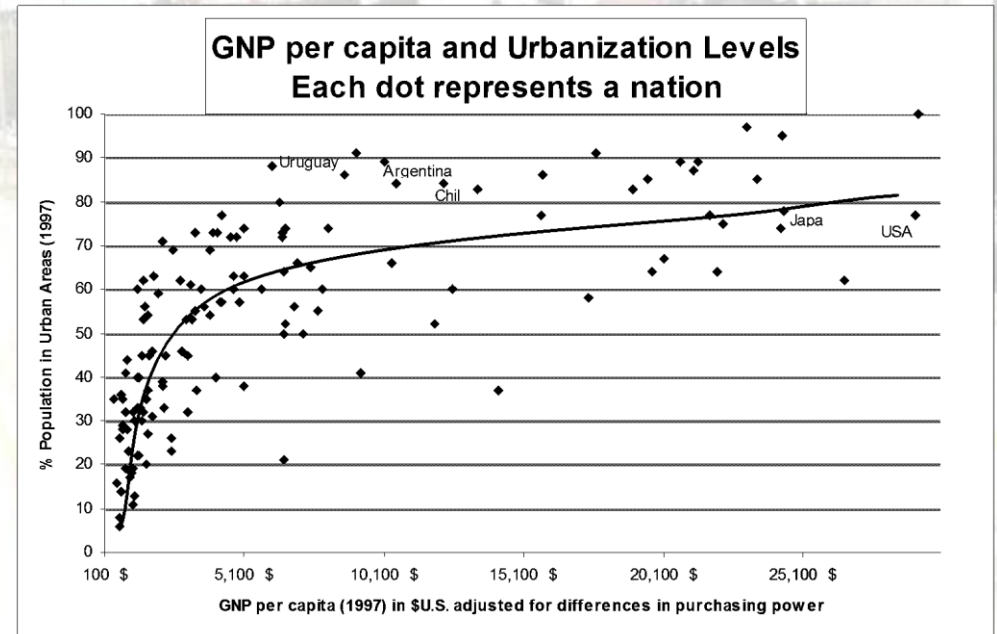
Relevance at the macro level. Impact on economic growth

High levels of urbanization in LAC

Ever-growing share of countries GDP generated in cities

Cities concentrate big pockets of poverty

Positive link between economic growth and urbanization, between transport efficiency and labour market efficiency.



Potential gains from urbanization are sensitive to local conditions

Local public services affect business costs in cities, and thus the potential gains from agglomeration

Transport is one of these crucial public services

Relevance at the micro level. Impact on poverty.

Long travel times, up to three hours per day in big cities

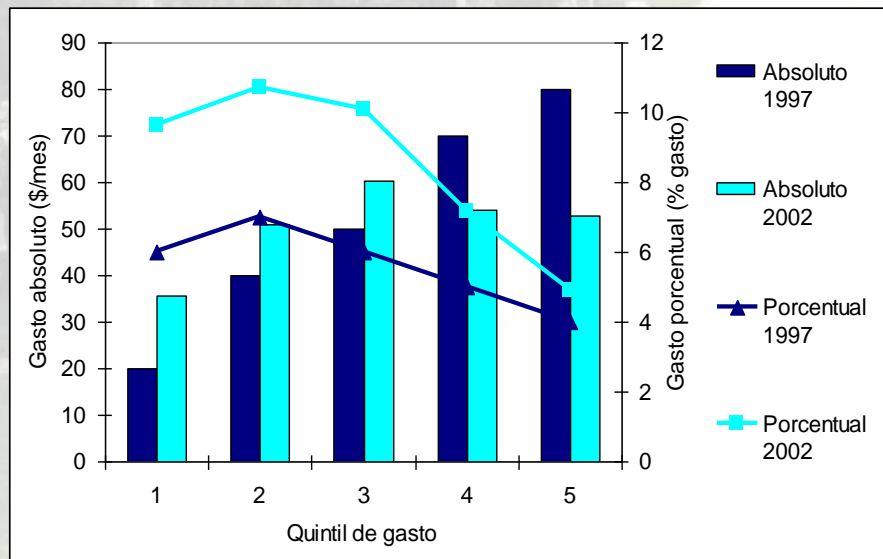
Low quality transport generates social exclusion, poor accessibility to job opportunities, to schools, to hospitals, etc.

Urban transport represents a high % of households expenditures (higher than all other utilities combined, up to 25% in São Paulo)... except for the poorest who end up not traveling at all or walking / bicycling.

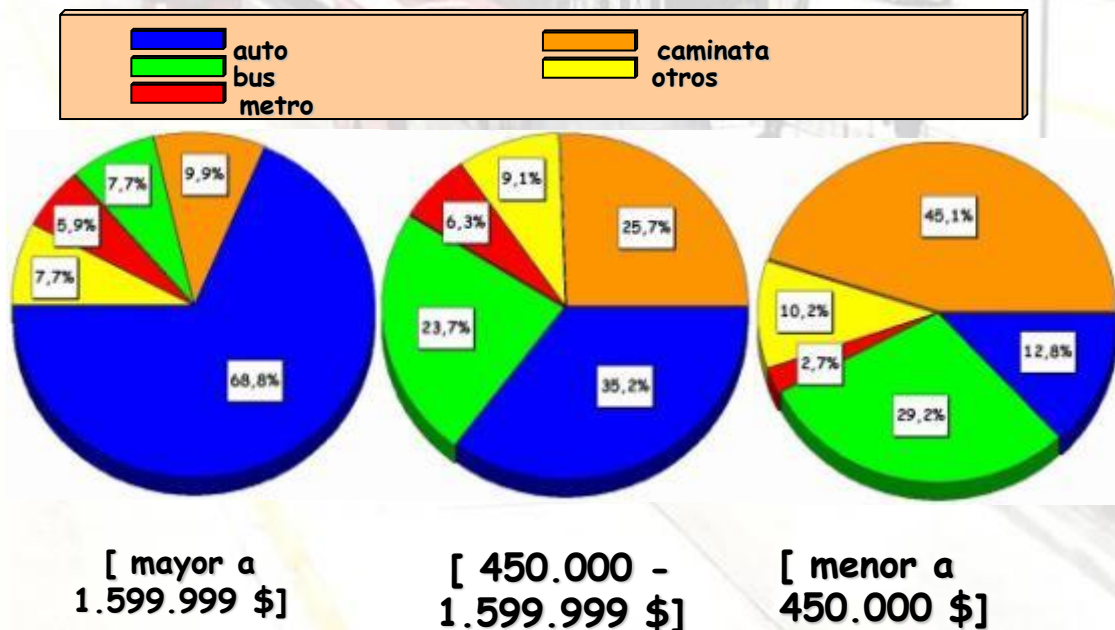
In Bogota, the poor walk on average 5.0 km!

Relevance at the micro level. Impact on poverty.

Buenos Aires : % of household expenditures on urban transport per quintile before and after the crisis.

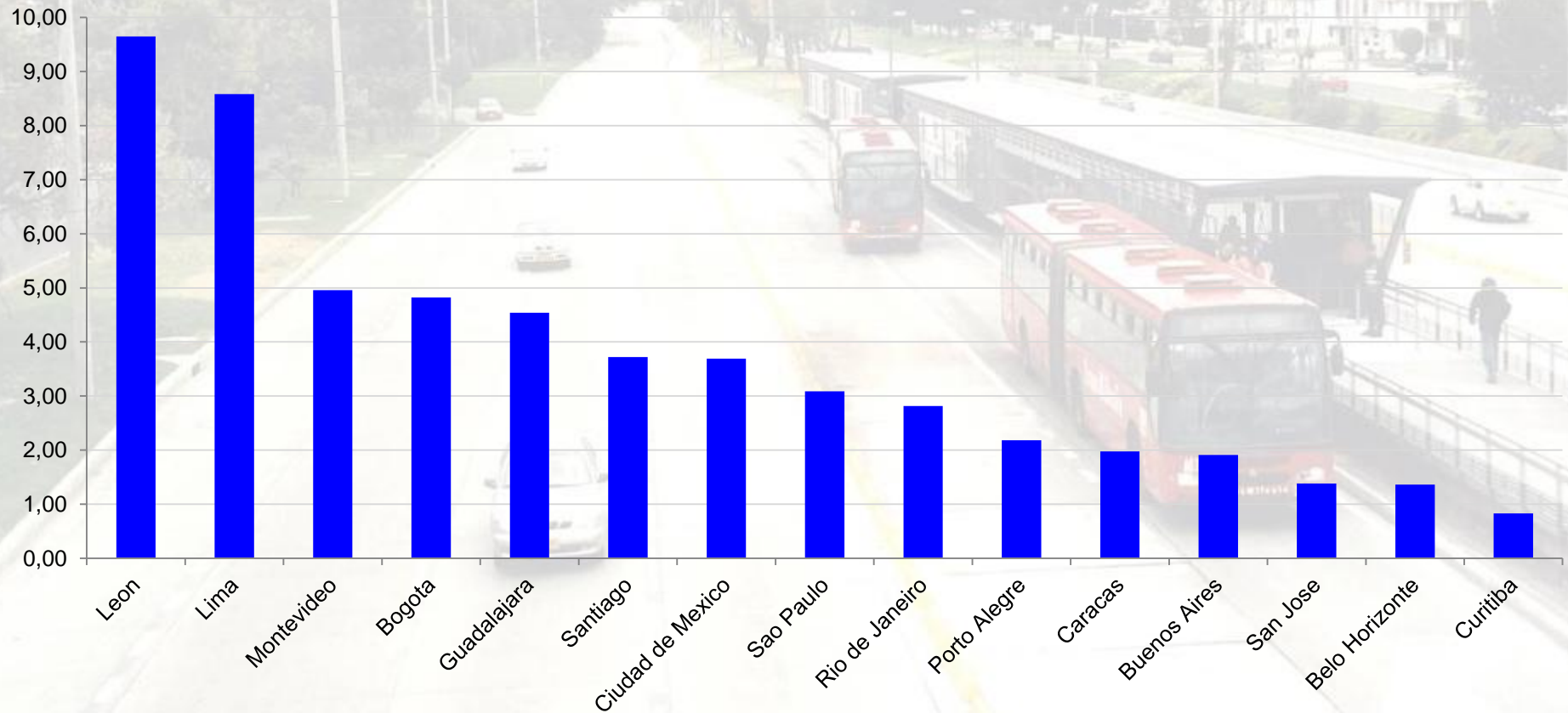


Santiago: 40% of the poor walk (compared to less than 10% for the upper quintile).
Same numbers in São Paulo



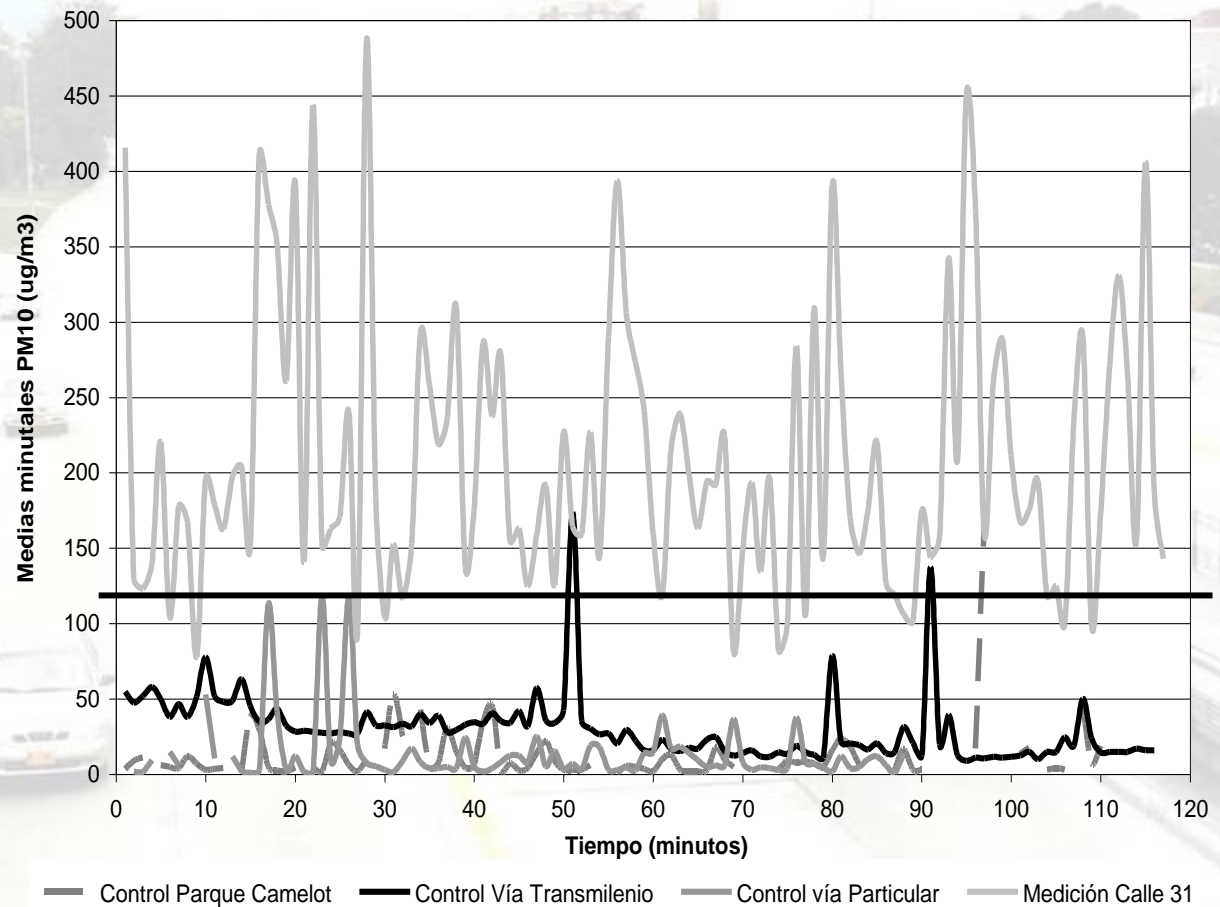
Relevance at the micro level. Impact on Accidents.

Fatalities per 10,000 cars



Relevance at the micro level. Impact on Air Pollution

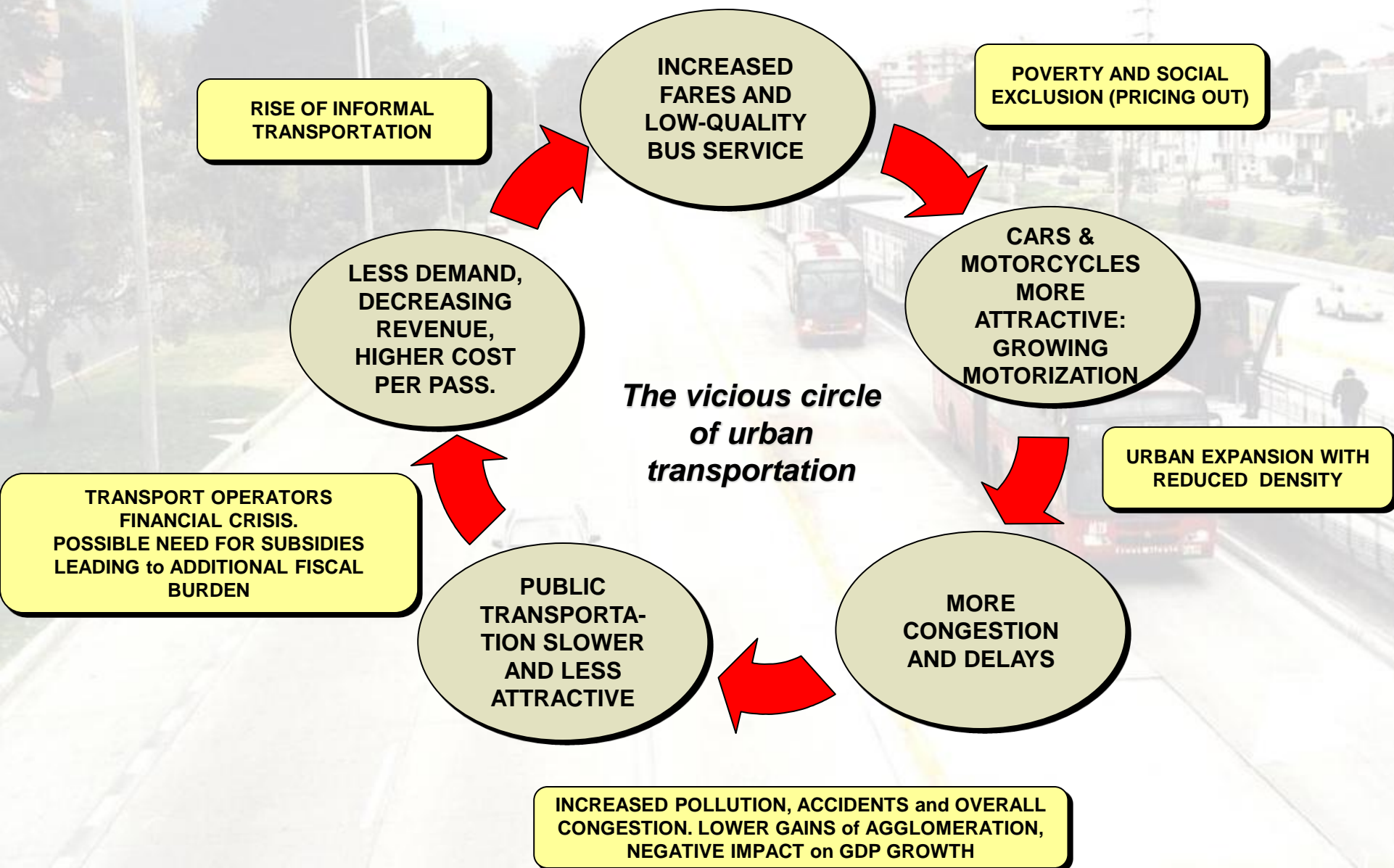
- Bogota: conventional vs. Transmilenio corridor



Source: Behrentz and Rojas, 2006

- 
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A simple diagram illustrates the “vicious circle” of urban transportation in developing countries ...



... and allows for the identification of several major, interrelated sector issues

**MAIN
SECTOR
ISSUES**

**RAPID URBANIZATION, MOTORIZATION, GROWING
CONGESTION, POLLUTION AND NOISE**

WEAK INSTITUTIONAL CAPACITY

**LACK OF COORDINATION BETWEEN LEVELS OF
GOVERNMENT IN METROPOLITAN REGIONS**

THE ORGANIZATION OF BUS TRANSPORT

EXPLOSIVE GROWTH OF INFORMAL SECTOR (VANS)

**LOW-INCOME USER: ACCESSIBILITY, AFFORDABILITY,
AVAILABILITY, ACCEPTABILITY**

URBAN TRANSPORT FINANCING

TARGETED VS. GENERAL SUBSIDIES

Inefficiencies within the urban public transport system generate negative social and environmental impacts, and weaken cities as growth engines

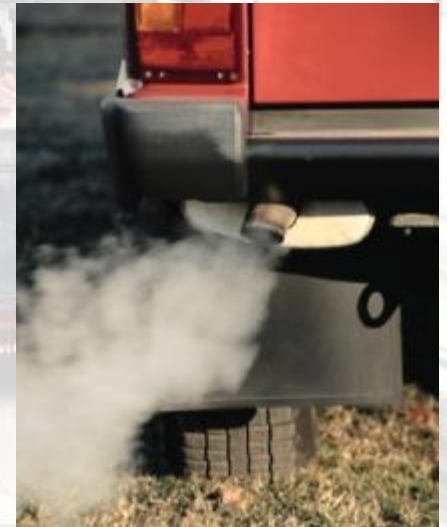
Rapid urbanization and motorization result in growing congestion, pollution and noise

- ▶ Motorization: a major trend in developing countries. Automobile and motorcycle growth is high and induced in part by poor public transport.

Country	Cars and motorcycles per 1000 inhabs.	Motorcycles as % of total motorized vehicles
Brazil	202	22%
Colombia	65	39%
Chile	168	2%
Ecuador	66	9%
Mexico	227	3%
USA	797	3%
China	54	83%
India	18	71%
Vietnam	262	95%

Rapid urbanization and motorization result in growing congestion, pollution and noise

- ▶ Private automobile main source of emissions.
- ▶ Trucks and buses very noisy
- ▶ Congestion exists in major cities, and is responsible for substantial negative externalities

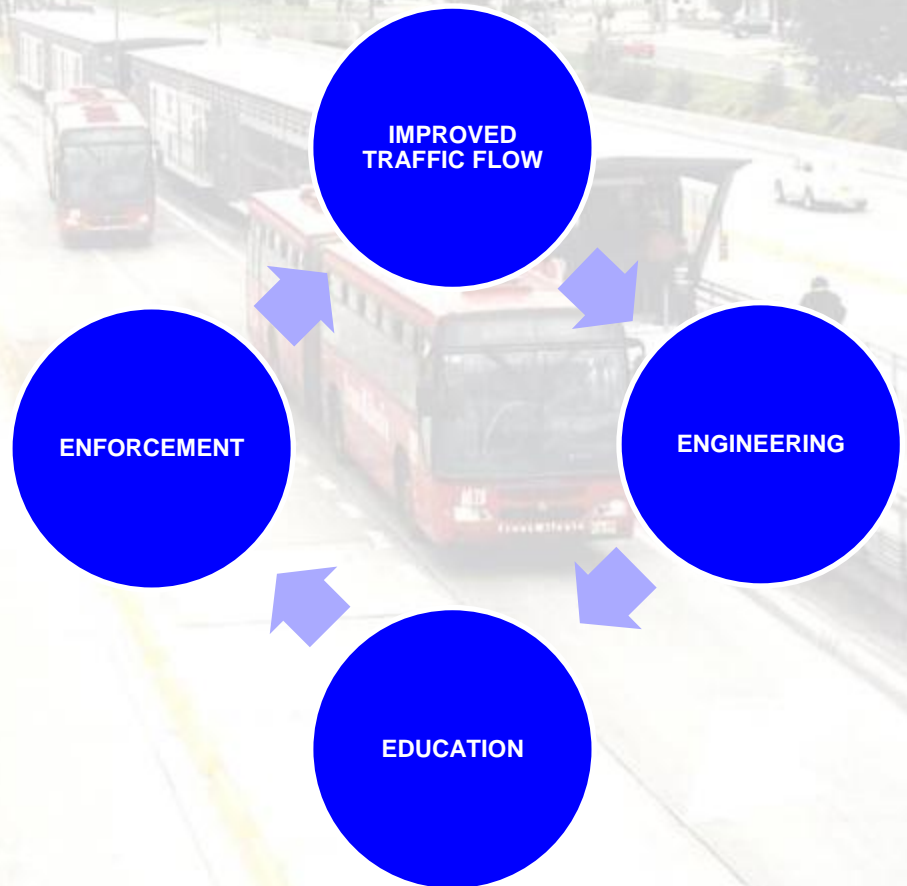


*Limited road space is taken by private auto with very limited priority for public transit, increasing door-to-door travel times. **NEED TO GIVE PRIORITY TO PUBLIC TRANSPORT***

Weak institutional capacity

- ▶ Few transport, traffic engineers
- ▶ Few transport planners
- ▶ Too many lawyers vis-a-vis number of engineers/planners
- ▶ Traffic lights: often lack proper timing and coordination (generate instead of lowering congestion)
- ▶ Low capacity to enforce laws
- ▶ Low capacity to educate drivers and pedestrians

Virtuous cycle of Traffic Management: E.E.E.



Lack of coordination between levels of Government in metropolitan regions

- ▶ No formal metropolitan regions defined
- ▶ No formal metropolitan coordination bodies
- ▶ Need to use federal/national power to create these bodies to avoid duplication of efforts and wastage at the metropolitan region level



EXAMPLE

	FEDERAL GOVMT.	PROV. OF BS.AS.	LOCAL MUNICIP.	CITY OF BS. AS.
Commuter Trains	●			
Taxicabs			●	●
Buses within Bs.As. City	●			
Buses City – Prov. of Bs.As.	●			
Buses between PBA municipalities		●		
Buses within PBA municipalities			●	
Metro	◐			◐

Municipal buses, inter-city buses and rail/metro are not integrated neither physically nor tariff wise

The organization of bus transport has weak regulatory framework

- ▶ Mostly permissions, not concessions, assigned many times for life and passed from generation to generation
- ▶ Competition in the market with little or no barriers to entry
- ▶ Multiple routes; trend to oversupply and overlapping
- ▶ Bus vs. informal vans:



Formal articulated buses in Bogotá

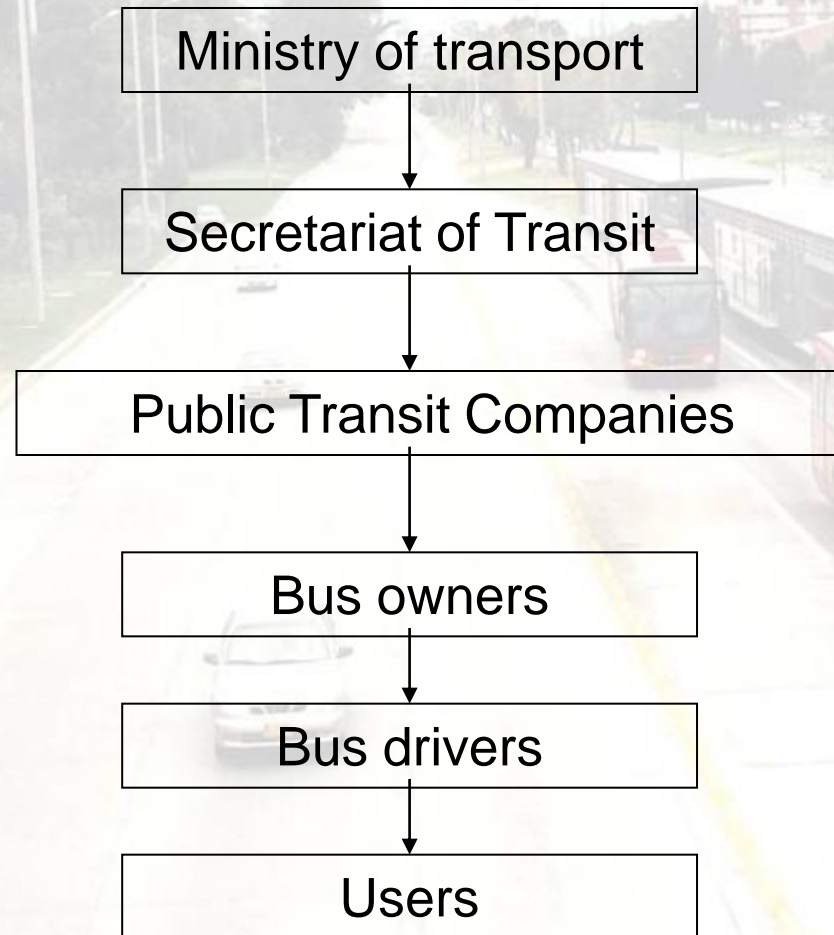


Informal transport in Lima

Duplication of routes, high tariffs, bus congestion, lack of hub-and-spoke services, no tariff integration



The organization of bus transport: Mexico, Central America, Colombia, Chile, Perú...

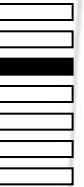


The organization of bus transport: leads to competition in the market



- ▶ Competition in the market known as the “penny war” in several countries
- ▶ Wrong incentives:
 - Inflated fare
 - Oversupply
 - Low quality, except in terms of frequency
 - high travel times
 - High accident rates
- ▶ But: fair coverage and low waiting times (passengers like these attributes. i.e. high frequency and not walking)

The organization of bus transport: weak regulation



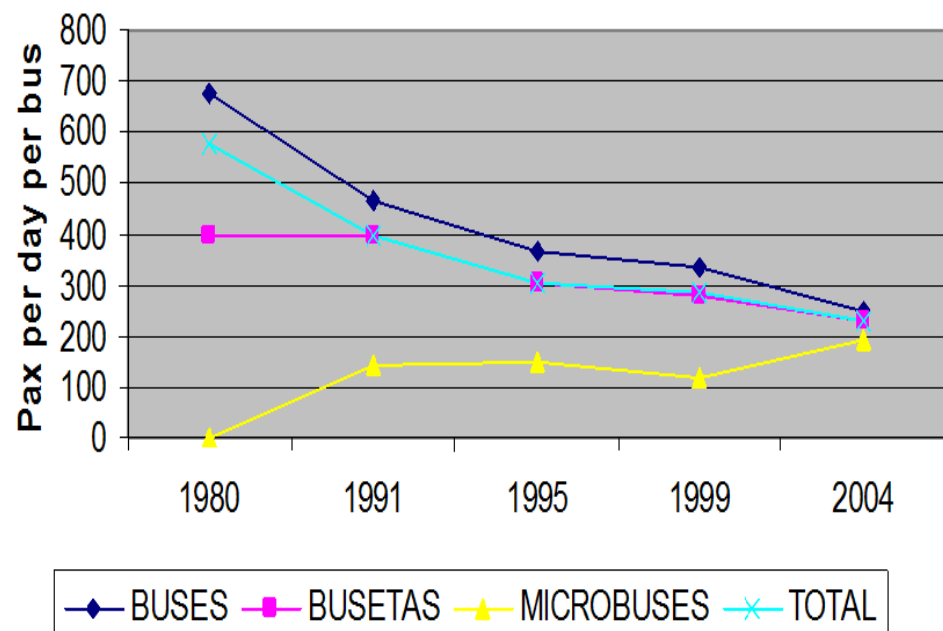
- ▶ Regulation favors the regulated party over the user and perpetuates negative incentives

$$\text{Fare} = \frac{\sum \text{fixed and variable costs}}{\text{Passengers per bus}}$$

- ▶ Way to calculate fare promotes oversupply and assigns commercial risk to the passenger—the party least able to control this risk



The organization of bus transport: example from Bogota



- High frequency demands larger-than-needed fleets and higher-than-efficient fares

Real Increase in Fares, Before and After Transmilenio

	1995-2000	2000-2010
New Bus	7.0%	10.1%
Old Bus	52.9%	28.4%
New Small Bus	46.0%	10.1%
Old Small Bus	129.4%	28.4%
Microbus	22.3%	-19.7%
Transmilenio	N.A.	13.3%

- Small vehicles (“vans”) enter the market because of ability to offer high frequency and navigate faster congested streets

The explosive growth of informal sector (vans) complicates urban transport even further

- ▶ Why are they multiplying? Lower price (tariffs reductions, financial aids), unemployment
- ▶ Can they be turned into an ally rather than being seen as the enemy?
- ▶ How can they be controlled? Barriers to entry
- ▶ Can they be part of a competition for the market arrangement and integrate with mass transit?

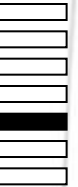


Lima



They add to congestion if they don't work as feeders, are more often than not illegal, are unsafe, stop where they want, don't pay taxes, but people like them because they are door-to-door transport

Low-income users request accessibility, affordability, availability, and service acceptability



- ▶ Huge concentration of poor/low-income users in the periphery of metropolitan areas or in pockets close to downtown
- ▶ They spend over 20% of their net income in home-to-work trips
- ▶ They often have money for one leg but cannot afford returning home
- ▶ Access to closest public transport hard and unsafe
- ▶ Availability is low
- ▶ Leave very early to get to work return very late home: family problems

Buenos Aires after the crisis

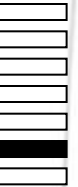
- ▶ Poorest households switch out of public transport towards walking and cycling (12% first quintile)
- ▶ Budget share absorbed by public transport rises substantially among lowest quintiles

Sao Paulo

- ▶ Number of walking trips almost 40% of daily trips, long distances
- ▶ Non recipients of subsidies paying almost 20-25% of their gross incomes for UT
- ▶ Users of trains mainly between 2 and 4 Minimum Salaries

As a result, access to employment, health and education facilities is becoming more and more difficult for the poor

Public urban transport financing is a major issue; in LAC, the private sector has a relevant role



- ▶ Where do the funds for investment, maintenance come from when revenues are not sufficient to cover costs?
- ▶ Should we favor an urban transport fund?
- ▶ What are other financing mechanisms?
- ▶ How to establish financing priorities?
- ▶ Designing adequate and reliable urban transport financing mechanisms is a priority in all LAC countries

Private Sector Financing

- ▶ *Traditional in the bus industry*
- ▶ *Revenue perception, guarantees*
- ▶ *Concession or Public-Private partnership (PPP) laws*
- ▶ *How to foster Private Sector Participation ?*
- ▶ *PPP are possible and desirable with the proper risk mitigation and an enabling environment for the PS as well as a good regulatory agency*

Targeted vs. general subsidies

- ▶ Targeted (valeur-transport) vs. blanket
- ▶ The impacts of flat fares in large cities
- ▶ What are the advantages and disadvantages of alternative subsidies to the poor?
- ▶ How can subsidy fraud be controlled ?
- ▶ Is the Bank willing to finance initial subsidies out of loan proceeds?



Targeted subsidies are theoretically better and they might be enhanced and better controlled by the smart card. But they must be offered to both formal and informal employees

- 
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The Bank approach to break the vicious circle is based on several pillars, derived from the sector policy and the Region particular problems

ESTABLISHMENT OF A
REGIONAL TRANSPORT
COORDINATION
COMMISSION

- ▶ A need to coordinate transport policy and planning
- ▶ Growing trend towards decentralization, as well as lending to sub-national entities

INTEGRATED URBAN
TRANSPORT, LAND USE
AND AIR QUALITY
STRATEGY

- ▶ Coordination of transport planning with land use and air quality policies, at a regional level

*A seminal document has established
the Bank sector policy in 2002*

The Bank approach ... (*continued*)

**FINANCING MECHANISMS
TO ENSURE LONG-TERM
FINANCIAL
SUSTAINABILITY**

- ▶ Careful design of regulatory mechanisms, as Transmilenio
- ▶ Fare adjustment as a critical issue

**PROGRESSIVE PRIVATE
SECTOR PARTICIPATION
IN OPERATIONS AND
INVESTMENT**

- ▶ BOT schemes in rail projects
- ▶ Public-private partnership in BRTs

The Bank approach to break the vicious circle is based on several pillars, derived from the sector policy and the Region particular problems

REORGANIZATION AND IMPROVEMENT OF THE PUBLIC TRANSPORTATION SYSTEM

- ▶ Competition for the Market
- ▶ Reorganizing network layout with formal services over trunk and feeders corridors
- ▶ High capacity modes on trunk corridors: BRT, rail transit, LRT
- ▶ Intramodal and intermodal service integration
- ▶ Fare integration

ORIENTED TOWARDS THE POOR AND VULNERABLE USERS

- ▶ Design networks targeting the poor accessibility
- ▶ Fare levels affordable by low income users
- ▶ Emphasis on non motorized transport (pedestrians, bicycles)
- ▶ Gender issues
- ▶ Attention to disadvantaged groups

A seminal document has established the Bank sector policy in 2002

The current project portfolio is characterized by the improvement of public transport service and its orientation to the poor, addressing the other basic pillars with varied emphasis

PROJECT	REGIONAL TRANSPORT COORDINA- TION	STRATEGY INTEGRATED WITH LAND USE, AIR QUALITY	EMPHASIS IN FINANCIAL SUSTAIN- ABILITY	PRIVATE SECTOR PARTICIPA- TION	MAIN FEATURES
<i>Lima Transport</i>	<i>partial</i>	<i>low</i>	<i>high</i>	<i>high</i>	<i>BRT (busway and feeders), non motorized transport</i>
<i>Colombia Integrated Mass Transit Systems</i>	<i>yes</i>	<i>partial</i>	<i>high</i>	<i>high</i>	<i>BRTs in Bogotá and medium size cities</i>
<i>Sao Paulo Metro Line 4</i>	<i>yes</i>	<i>high</i>	<i>high</i>	<i>high</i>	<i>Turnkey and concession of a metro line</i>
<i>CBTU (Brazil) decentralization Program</i>	<i>yes</i>	<i>yes</i>	<i>low</i>	<i>low</i>	<i>Suburban rail rehabilitation, decentralization</i>
<i>Buenos Aires Public Transportation</i>	<i>yes</i>	<i>yes</i>	<i>low</i>	<i>yes</i>	<i>Metro and suburban trains rehabilitation, planning</i>
<i>Santiago urban transport</i>	<i>partial</i>	<i>high</i>	<i>high</i>	<i>high</i>	<i>Integrated transport system (metro, buses, railroads)</i>
<i>Upgrading and Greening the Rio de Janeiro Urban Rail</i>	<i>yes</i>	<i>high</i>	<i>high</i>	<i>high</i>	<i>Suburban rail concession, urban redevelopment</i>

EXAMPLES

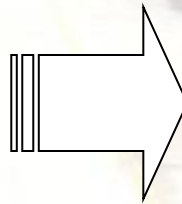
All projects are aimed at the development of efficient public transport systems, oriented towards the poor

In a simplified typology, the Bank operations can be categorized under three type of projects

Typology	MULTI – CITY MULTIPLE TRANSPORT COMPONENTS	MASS TRANSIT CORRIDORS	SINGLE CITY INTEGRATED TRANSPORT SYSTEM
Main Characteristics	<ul style="list-style-type: none"> ▶ Several cities in one country ▶ Strengthen national authority and local authorities ▶ Mix urban development and urban transportation ▶ I.e.: missing links, paving, sidewalks, lightening 	<ul style="list-style-type: none"> ▶ Focusing on one or several corridors ▶ BRT or rail mass transit ▶ Integration with other modes ▶ Urban improvement in the proximity ▶ Private sector participation ▶ Non motorized transport such as bikeways 	<ul style="list-style-type: none"> ▶ Integrated urban transport system (operational and fare integration) ▶ Linked with air quality and urban development policies ▶ Establishment of a regional transport coordination ▶ Private sector participation
Examples	<ul style="list-style-type: none"> ▶ Venezuela First Urban Transport Project ▶ Brazil First and Third Transport Project ▶ Mexico Medium Cities Urban Transport Project ▶ Colombia Integrated Tarnsit Systems ▶ Mexico UTPP 	<ul style="list-style-type: none"> ▶ <u>Metro Line 4 Sao Paulo</u> ▶ <u>Decentralization subrb. railways CBTU - Brasil</u> ▶ <u>Metro y ferrocarriles suburbanos - Buenos Aires</u> ▶ <u>Upgrading and Greening the Rio de Janeiro Urban Rail</u> 	<ul style="list-style-type: none"> ▶ Chile´s Transantiago

The support of Buenos Aires metro modernization is an example of system rehabilitation ...

EXAMPLES



... as is Sao Paulo trains modernization project

EXAMPLES



... as is Sao Paulo trains modernization project

EXAMPLES



Sao Paulo Line 4: Faria Lima –
Paulista stations opening day
(May 25th 2010)



Curitiba: the precursor



EXAMPLES

**Segregated busways
and transit-oriented development**



Transmilenio established a new paradigm in the region

EXAMPLES

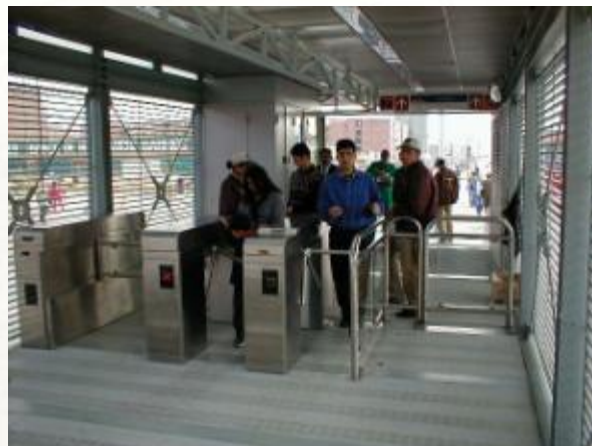


Segregated
Busways



Dedicated bus
stations

Smart Cards



Facilities for
persons with
disabilities



EXAMPLES

Transmilenio: Competition for the Market through concessions and barriers to entry that limit competition in the market from old buses

Planning, Operation and Control:

**TRANSMILENIO S.A,
Alcaldía Mayor de Bogotá**

Infrastructure (State)

- Exclusive lanes
- Stations
- Accessways
- Parking Lots & Maintenance Shops

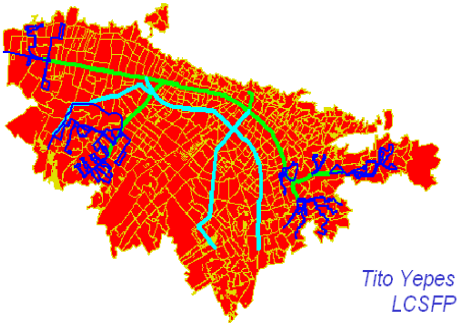
Operation (Private Sector)

- Operation companies
- Buses
- Operation Employees

Collection System (Private Sector)

- Equipment
- Card Based
- Fidutiary Management

Bogotá and Transmilenio



TRANSMILENIO
Bogotá, Colombia



Lima project follows the same principles

EXAMPLES



Rio de Janeiro: a long-term partnership

Rio de Janeiro
Metropolitan
Transport
Decentralization Project
(P006547)
1992

Rio de Janeiro
State
Reform and
Privatization
Loan
(P039197)
1997

Rio de Janeiro
Mass
Transit
Loan
(P043421)
1998

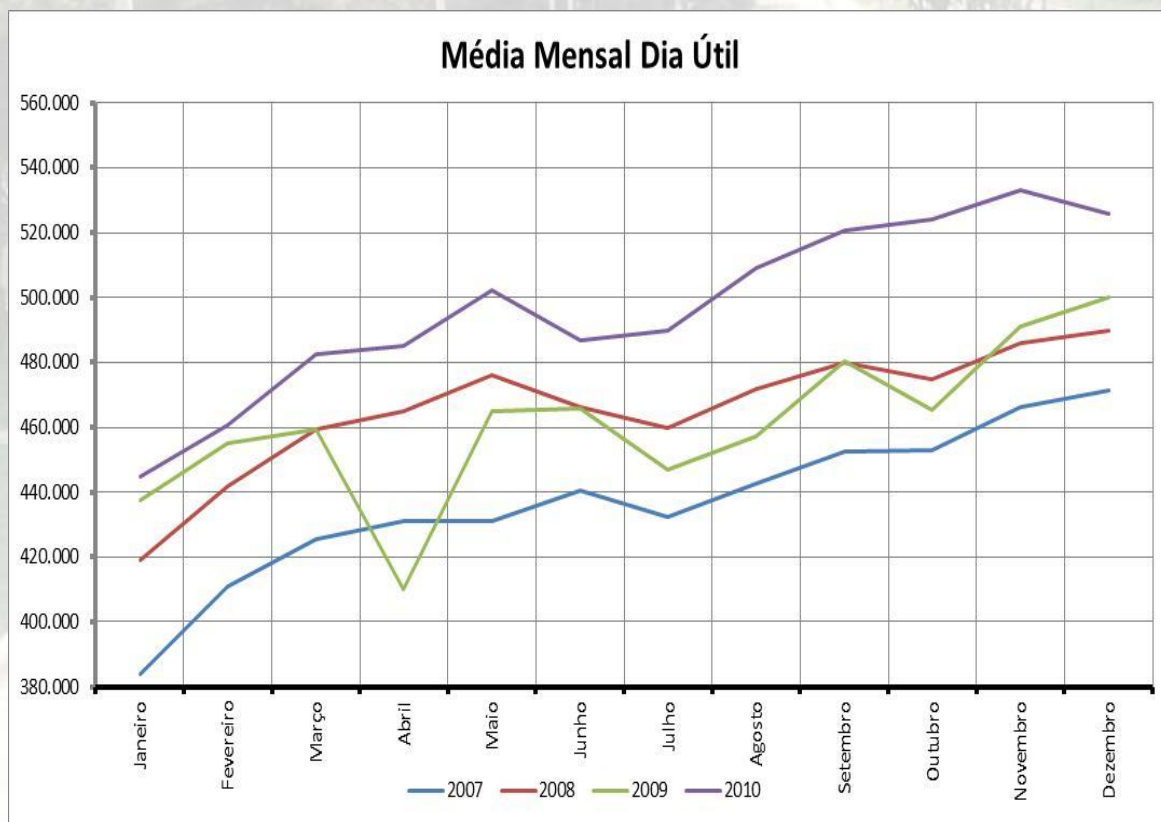
Rio de Janeiro
Mass
Transit II
(P111996)
2009

Upgrading
and
Greening the
Rio de Janeiro
Urban Rail
System
(P125630
2012)

Rio de Janeiro
Mass Transit
Additional
Financing
(P106427)
2008

Rio de Janeiro: a long-term partnership

Ridership from 150,000 in 1998 to 550,000 in 2012



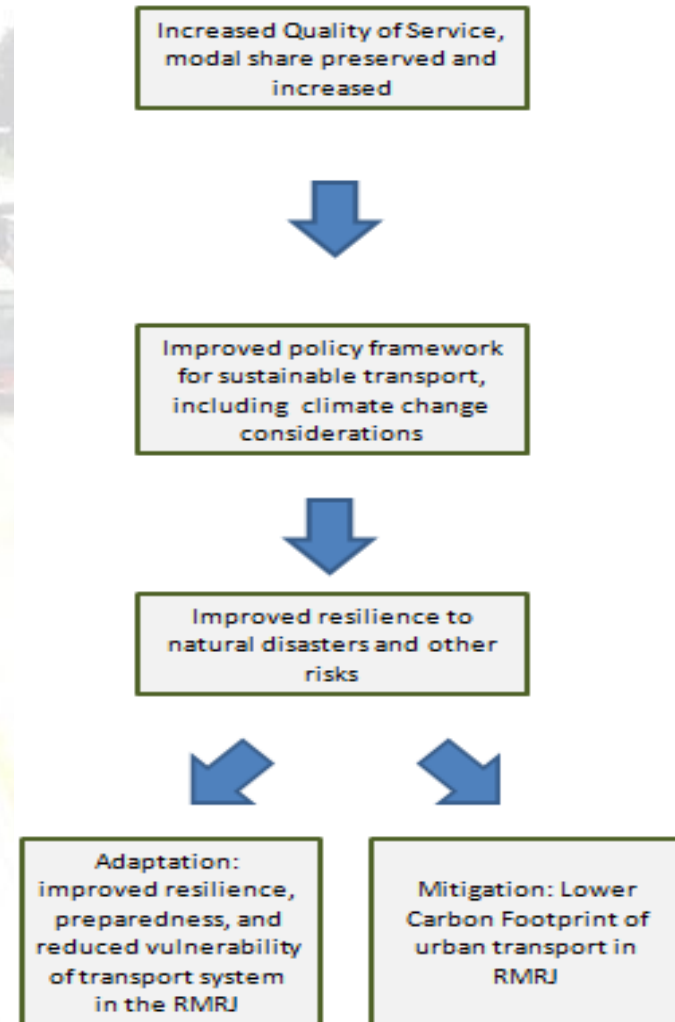
Subsidy: US\$ 121 million in 1997 to US\$ 0.00 (zero) currently

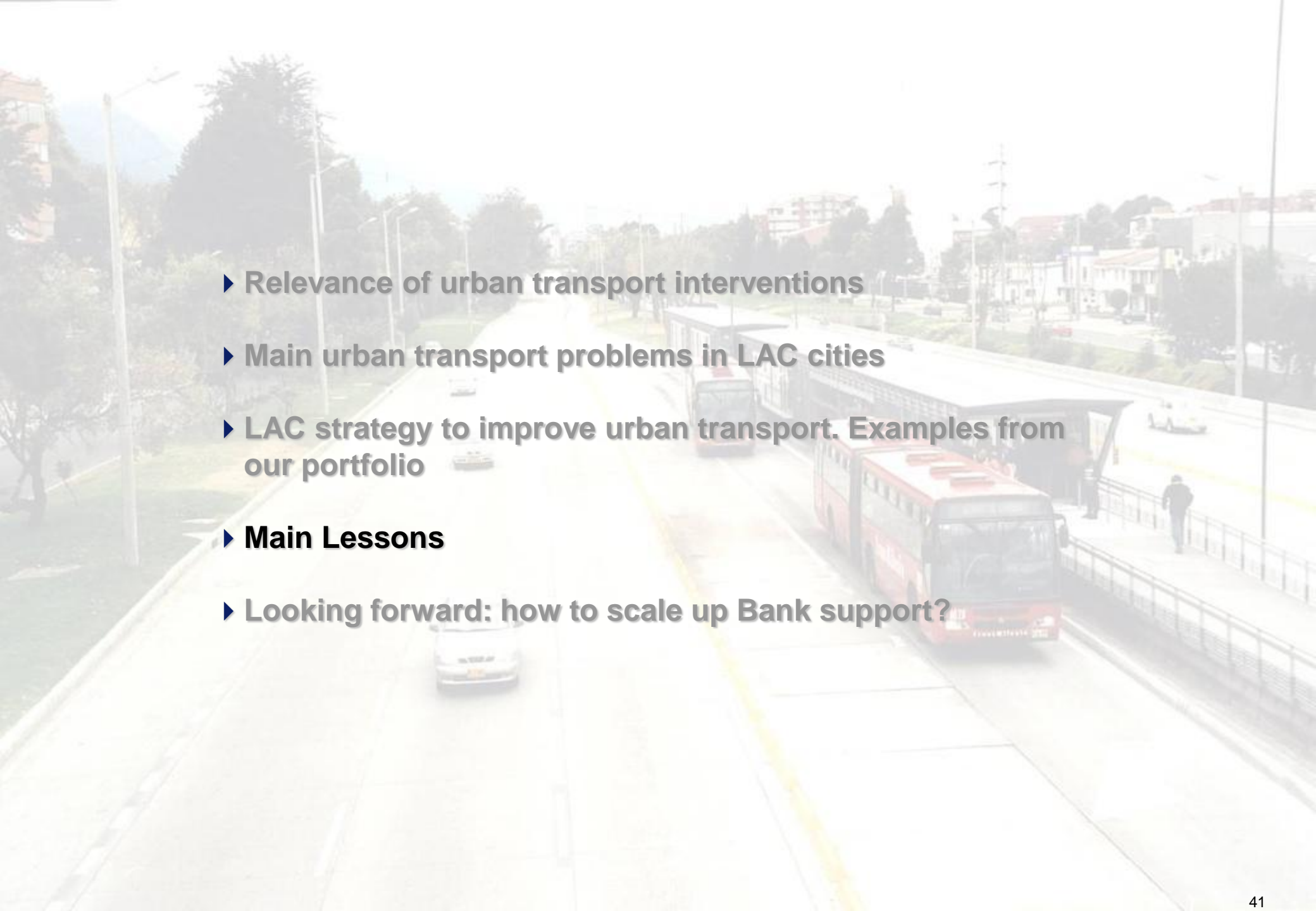


Latest loan changes dynamic: Introduces “Greening” element

PDO:

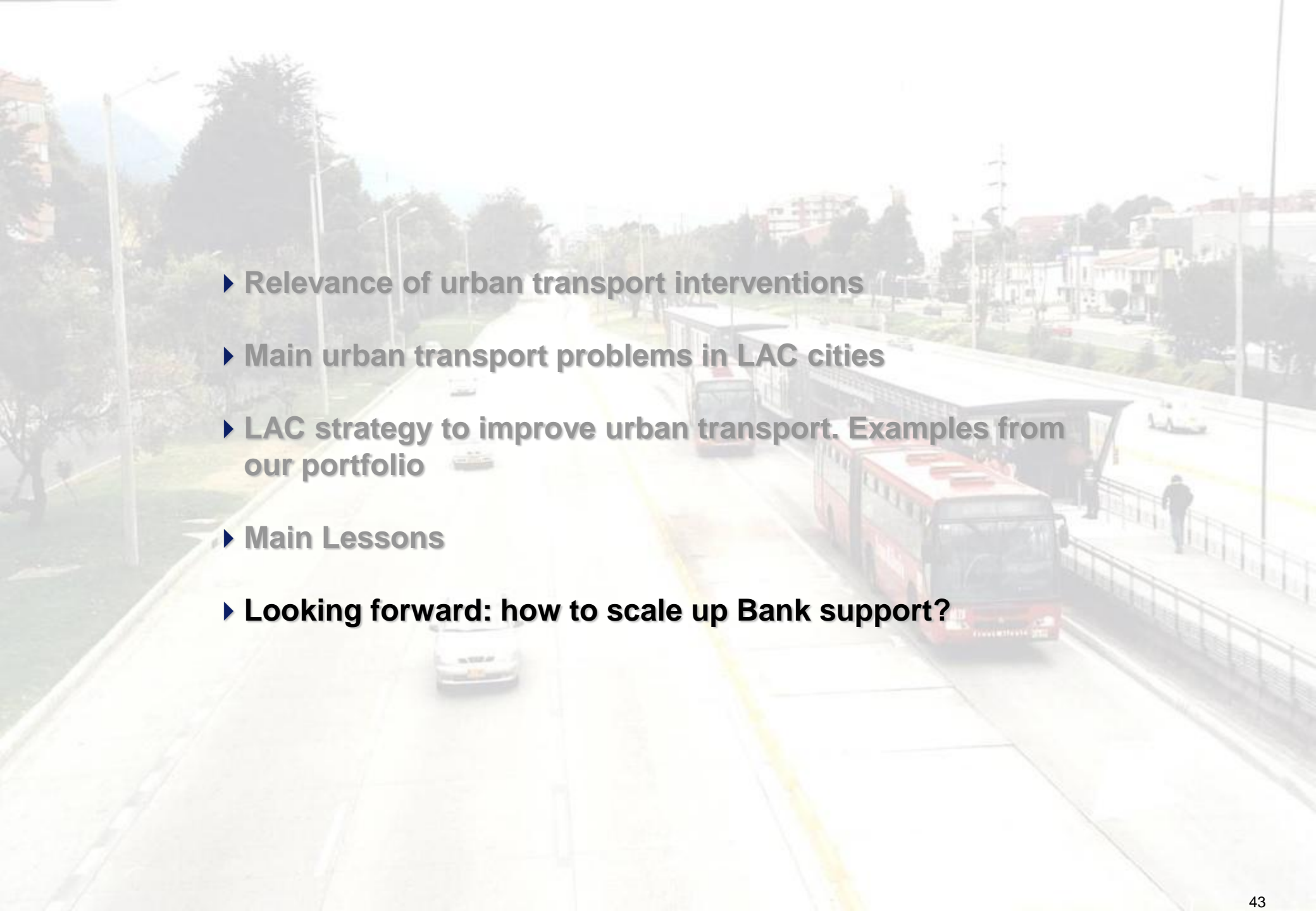
a) improve the level-of-service provided to the suburban rail transport users in RJMR in a safe and cost-efficient manner; b) to place the suburban rail transport system, in particular the D. Pedro-Deodoro rail corridor, on a lower carbon growth path; and c) to improve the transport management and policy framework in the RJMR.



- 
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Main lessons

- ▶ Priority to public transport because of its benefits, particularly to the poor
 - Priority in funding
 - Priority in physical space
- ▶ Institutional capacity and coordination
 - Project champion and leadership
 - Metropolitan coordination
 - E.E.E
- ▶ Not Bus vs. Rail: it is public transport!
 - Promote competition for the market
 - Hierarchical networks that are integrated: fare-wise and physically

- 
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Looking forward: how to scale up Bank support

- ▶ Promote a more proactive engagement in projects that give priority to urban public transport under a broadened agenda
 - Moving from corridor projects to integrated urban transportation systems
 - Strengthening cross sectoral links (air quality, urban development, social inclusion, road safety, vulnerable users)
- ▶ Better response to existing and emerging demands
 - Large agglomerations, strengthening institutional organization at the metropolitan level
 - Mid size cities, anticipating the problems and inducing better urban development patterns
- ▶ Address associated lending challenges
 - Lending to sub-nationals
 - Dealing with subsidies (design and financing) when externalities justify them

<i>Investments in Metrorail Projects</i>	<i>World Bank (\$US millions)</i>	<i>TOTAL (\$US millions)</i>	<i>Completed/To be Completed</i>
S. Paulo - CBTU	126	281	1998
Rio - CBTU	128	272	2000
Belo Horiz.- CBTU	99	199	2003
Recife - CBTU	102	204	2003
S. Paulo (CPTM)Estado	45	95	2004
Salvador CBTU/Est/Pre.	150	350	2010
Rio Mass Transit /Estado +AF	230	375	2009
Fortaleza Linha Oeste CBTU/Estado	35	35	2010
S. Paulo Metro Line 4/Est.+AF	304	1580	2010
Buenos Aires (PTUBA)	200	400	2006
São Paulo Trains & Signaling	542	1550	2011
Rio Mass Transit 2	400	550	2012
S. Paulo Metro Line 4/ Fase2	225	640	2012
São Paulo Metro Line 5	650	2450	2014
Buenos Aires (PTUBA 2)	100	138	2011

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