Sustainable Urban Transport Financing from the Sidewalk to the Subway Capital, Operations, and Maintenance Financing

Arturo Ardila-Gomez, Adriana Ortegón-Sanchez

World Bank







Financing needs: an approximation

Table 1.1 City Sizes and Associated Transport Infrastructure

in km or km-lane

	Area	BRT	Metro	Local roads	Express roads
City	(blocks)	(km)	(km)	(km–lane)	(km–lane)
Medium	50 X 50	25		2,000	40
Large	250 X 250	150	50	50,000	600
Mega	500 X 500	400	250	200,000	1,500

Source: Authors based on model analysis. *Note:* BRT = Bus Rapid Transit.



Financing needs

Figure 1.1 Typical Pattern of Capital, Operation, and Maintenance Expenditures for Transport





Financing needs: an approximation

Figure 1.2 Total Estimated Costs (Capital, Operation, and Maintenance) for Medium, Large, and Mega Cities over 20 Years



Source: Authors based on model analysis. Note: BRT = Bus Rapid Transit.

ROUP

Financing needs: an example

Figure 1.3 Infrastructure Needs (a) and Estimated Total Cost of Capital and Maintenance (b) for Bogota's Road Network over 20 Years





Source: Ardila-Gomez and Ortegon-Sanchez 2013. Note: BRT = Bus Rapid Transit.

Updated for network conditions and planned works up to 2010



The underfunding trap

Figure 1.4 Schematic Representation of a City's Underfunding Trap based on Empirical Data for the Bogota Transport System



Transport & ICT

7

The underfunding trap

Figure 1.1 Typical Pattern of Capital, Operation, and Maintenance Expenditures for Transport





Underfunding Trap: structural causes

LOW REVENUES DUE TO INEFFICIENT PRICING AND ECONOMIC DISTORTIONS

that creates unbalance in favor of unsustainable modes

LOW INVESTMENT

causes construction and maintenance lag vicious cycle and deterioration IMBALANCE IN INVESTMENT RESPONSIBILITIES AND FINANCIAL CAPACITY at the city level

INSTITUTIONAL COMPLEXITY: diverse levels (global, national, local) and sectors (public, private)

PERIODICITY MISMATCH between Revenue and Expenditure



Low revenue - Implicit subsidies







Low revenue - Implicit subsidies





Analytical framework to assess and design urban transport financing

The framework addresses the following elements:

- Economic distortions and institutional complexity through application of the "Who Benefits Pays" principle based on the identification of beneficiaries (general public or direct and indirect beneficiaries)
- The need for *wiser* investments, which can reduce the financing gap in the long term



Analytical framework to assess and design urban transport financing

Match periodicity of revenue and expenditures, specifically for capital, operation, and maintenance expenses.



Escaping the underfunding trap



A comprehensive multi-level financial strategy that corrects structural causes from revenue and expenditure side



Analytical framework to assess and design urban transport financing

Standardized Assessment of 24 urban transport financing instruments with respect to

FINANCIAL SUSTAINABILITY (Innovative financing)

 stability, political acceptance, and administrative ease of instrument implementation

TRANSPORT SUSTAINABILITY (Wise investment)

economic efficiency, social equity, and environmental impact



Financing Instruments Assessment: General Beneficiaries

🔺 Upfront 🦳 Recurrent 🛕 Both

High 😑 Average 🛑 Low

		FIN	ANCIAL SUSTAINABI	LITY	TRAI	NSPORT SUSTAINAE			
FINANCING INSTRUMENT	REV LEVEL	STABILITY	PUBLIC ACCEPT	ADMIN EASE	EFFICIENCY	EQUITY	ENVIRON. IMPACT	COST	PERIOD
Public transport subsidies	odl			0	0		0	M/O	
Property tax	.0		0	0		0		C/M/O	_
National and international loans and grants	.00			0				C/M	
Carbon market	adl				0	0		C/O	A
Global Environment Facility	odl			0	0	0		C/0	
Clean Technology Fund	odl	0		0	0	0		С	
PPPs for public transport	oll	0			0			C/M/0	



Financing Instruments Assessment: General Beneficiaries

🔺 Upfront 🦳 Recurrent 🛕 Both

		▲ U _l	pfront 🦰 F	Recurrent	Both		High	Averaç	ge 🛑 Low
	FINANCIAL SUST AINABILITY			TRA	TRANSPORT SUSTAINABILITY				
FINANCING INSTRUMENT	REV LEVEL	STABILITY	PUBLIC ACCEPT	ADMIN EASE	EFFICIENCY	EQUITY	ENVIRON. IMPACT	COST	PERIOD
Public transport subsidies	llia		۲	0	0	۲	0	м/о	=
Property tax	llı.	\triangleright	0	0	۲	0	۲	C/M/O	-
National and international loans and grants	Ìko	۲		0	۲	۲	٠	C/M	A
Carbon market	llia				0	0	۲	C/0	4
Global Environment Facility	llia		۲	0	0	0	۲	C/0	•
Clean Technology Fund	llia	0	۲	0	0	0	۲	С	-
PPPs for public transport	h.	0	۲		0	۲	۲	C/M/O	4



Financing Instruments Assessment: Direct Beneficiaries

Upfront Recurrent A Both High Average Low **FINANCIAL SUSTAINABILITY** TRANSPORT SUSTAINABILITY REV PUBLIC FINANCING INSTRUMENT Ρ **STABILITY** ADMIN EASE EFFICIENCY EQUITY **ENVIRON. IMPACT** TASK ACCEPT LEVEL Parking Charges C/M/ORoad Pricing C/M/O()Congestion Charges C/M/Oall Fuel Taxes/Surcharges C/M/O .0 ()Vehicle Taxation C/M/OFarebox Revenue O/M PPPs for Urban Roads C/M/0 .0



Financing Instruments Assessment: Indirect Beneficiaries

- Ophonit - Recurrent A Both - Hig							High	Average	Lov
		FINANCIAL SUSTAINABILITY			TRANSPORT SUSTAINABILITY				
FINANCING INSTRUMENT	PEV LEVEL	STABILITY	PUBLIC ACCEPT	ADMIN EASE	EFFICIENCY	EQUITY	ENVIRON. IMPACT	TASK	Р
Advertising				0			0	M/O	
Employer Contribution	•10		0	0	0	0	0	M/O	
Betterment Levies	oll	0			0	0	0	C/M	
Tax Increment Financing	٥il				0		0	M/O	
Special Assessment	.[]]	0	0		0			M/O	
Transportation Utility Fees	oll	0					0	М	_
Development Impact Fee	.:IÎ	0	0	0	0	0		С	
Negotiated Exactions		0	0	0	0	0		C/M/O	
Joint Development (PPP)		0	0	•		0	0	С	
Air Rights		0	0		0		0	M/O	



Possible uses for the Financing Instruments General Beneficiaries

Figure 4.2 Use of Financing Instruments for Different Elements of the Urban Transport System



- Urban highways
- Institutions
 - Education and enforcement
 - Maintenance

- Notmotorized and public transport
- Traffic management and ITS
 - Technology



Possible uses for the Financing Instruments

Direct Beneficiaries



- Urban highways
- Institutions
- Education and enforcement
- Maintenance

- Notmotorized and public transport
- Traffic management and ITS
- Technology



Possible uses for the Financing Instruments Indirect Beneficiaries



Urban highways

Institutions

- Education and enforcement
- Maintenance

- Notmotorized and public transport
- Traffic management and ITS
 - Technology



- Link urban transport planning and operations with urban planning.
- Combine revenue sources to ensure financial sustainability using the Who Benefits Pays principle.
- Consider the effect of instruments on transport demand. Not only the choice of transport investment but also the choice of instrument will affect the use and demand for transport systems in a city: Wise Investments



- Ensure appropriate use of public subsidies. Subsidies should be coupled with regulations, such as contract and quality performance indicators, to guarantee highquality sustainable public transport.
- Allow cities financial autonomy and capacity. A property tax can be an important tool as it is a cost-effective way to raise critical revenue to cover the capital, maintenance, and operation costs for elements of the transport system, such as, mass transit, and neighbourhood roads and sidewalks.



- Allow a role for national governments and international funding in light of climate change and the need to invest in projects that contribute to the global benefit of reducing emissions from the transport sector.
- Understand the need for a gradual introduction of user charges.



- Consider land value—based financing instruments but be aware of transaction cost and political work behind.
- The framework guides the assessment of revenue options and helps cities use instruments strategically to not only fund needed transport investment but also actually achieve their larger sustainable urban transport and development objectives.











Download the book here

- <u>Sustainable Urban Transport Financing</u> from the Sidewalk to the Subway
- or here:
- <u>https://openknowledge.worldbank.org/ha</u> ndle/10986/23521





Thank you

