



Asociación Latinoamericana de
Metros y Subterráneos

Infraestructura Para la Equidad e Integración Social

El gran impacto del Metro en ciudades



Infraestructura Para la Equidad e Integración Social

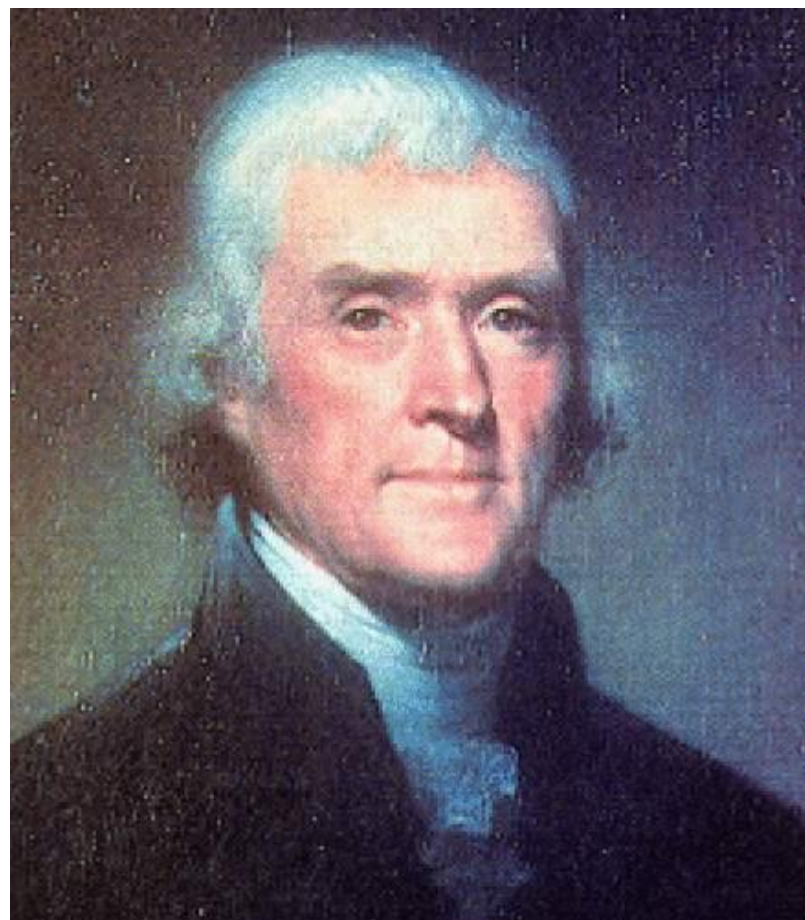
- 1.- ¿Qué entendemos por Inequidad?
- 2.- La Importancia del Contexto Latinoamericano
- 3.- Impacto de Proyectos de Metro: Antecedentes Internacionales
- 4.- La Infraestructura como Motor para la Equidad Social e Integración
- 5.- Discusión



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¿Qué entendemos por Inequidad?

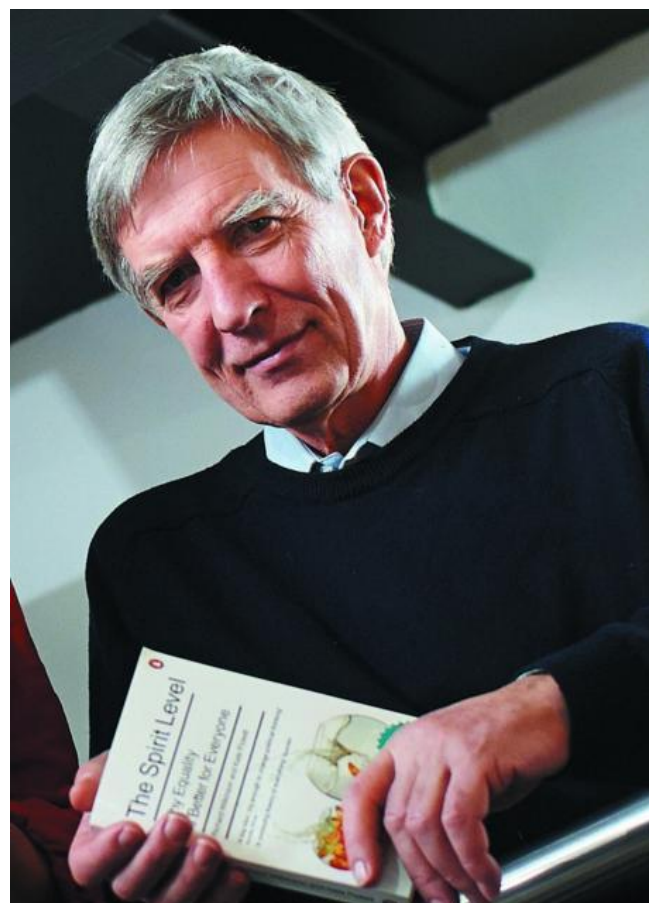
¿Qué Entendemos por Desigualdad?



Adam Smith, 1723-1790

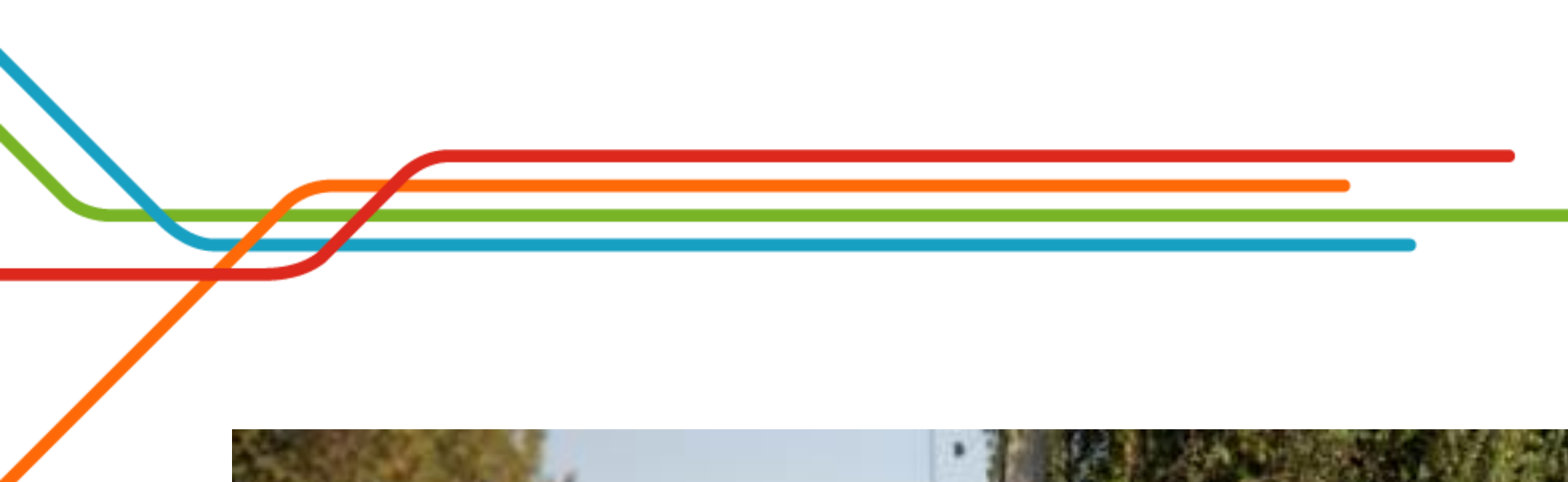
“Por necesidades entiendo no sólo las comodidades que son indispensables y necesarias para conservar la vida, sino todo aquello que las costumbres de cada país consideran inadmisibile no poseer para ser respetado, incluso en el escalafón más bajo de la sociedad”.

¿Qué Entendemos por Desigualdad?



Richard Wilkinson,
Sussex University

“La desigualdad genera ansiedad, y la ansiedad genera estrés. El estrés crónico, al igual que el envejecimiento, deteriora algunos sistemas biológicos. La ansiedad y la agresividad son adaptaciones a entornos sociales conflictivos”.



Alamys

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Alamy

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- Infraestructura Social: agua potable, luz, colegios públicos, viviendas sociales, hospitales, pavimentación, etc.
- Infraestructura Productiva: carreteras, autopistas, puertos, aeropuertos, telecomunicaciones, etc.

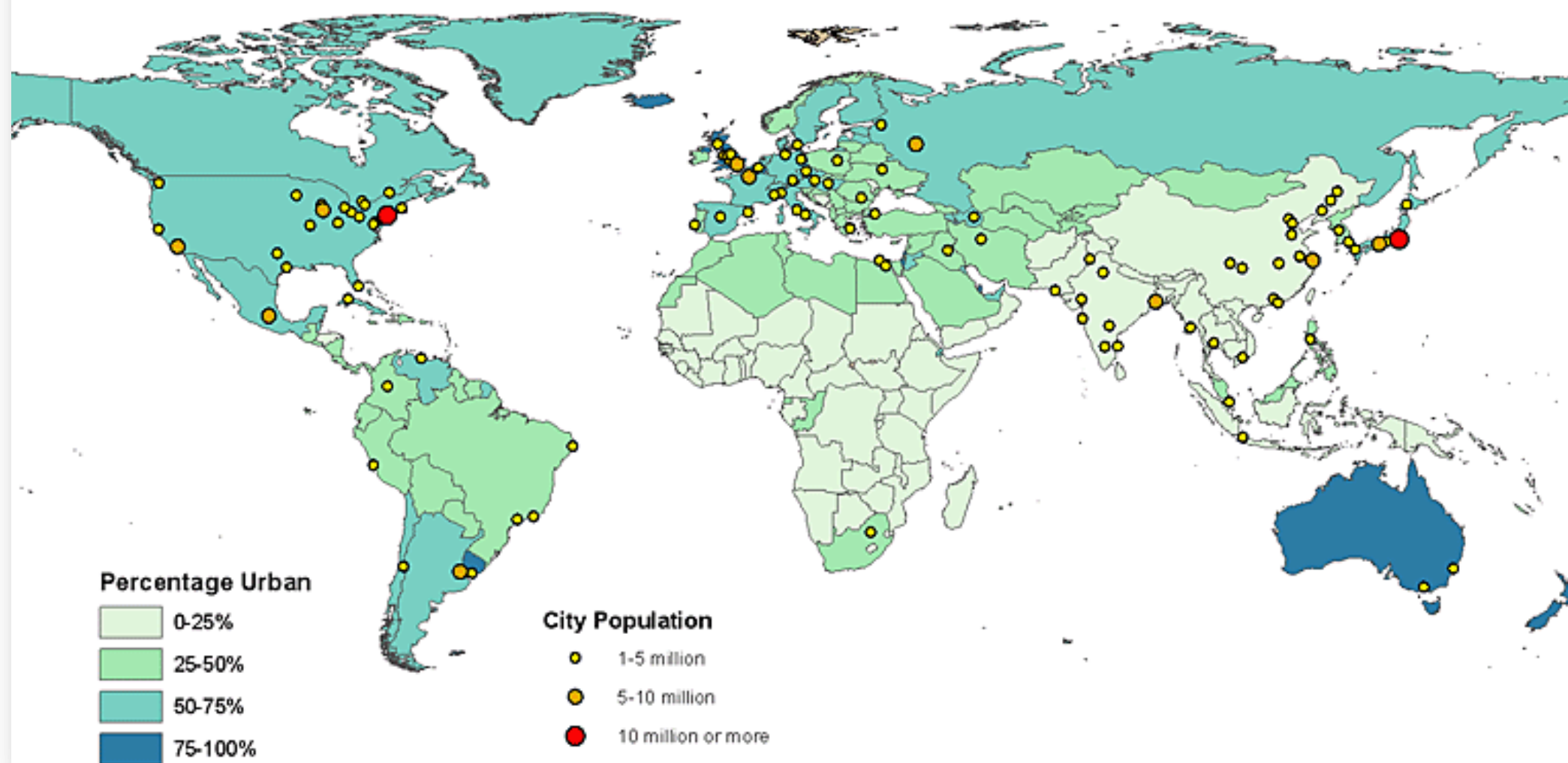
“La Infraestructura es el Motor”.



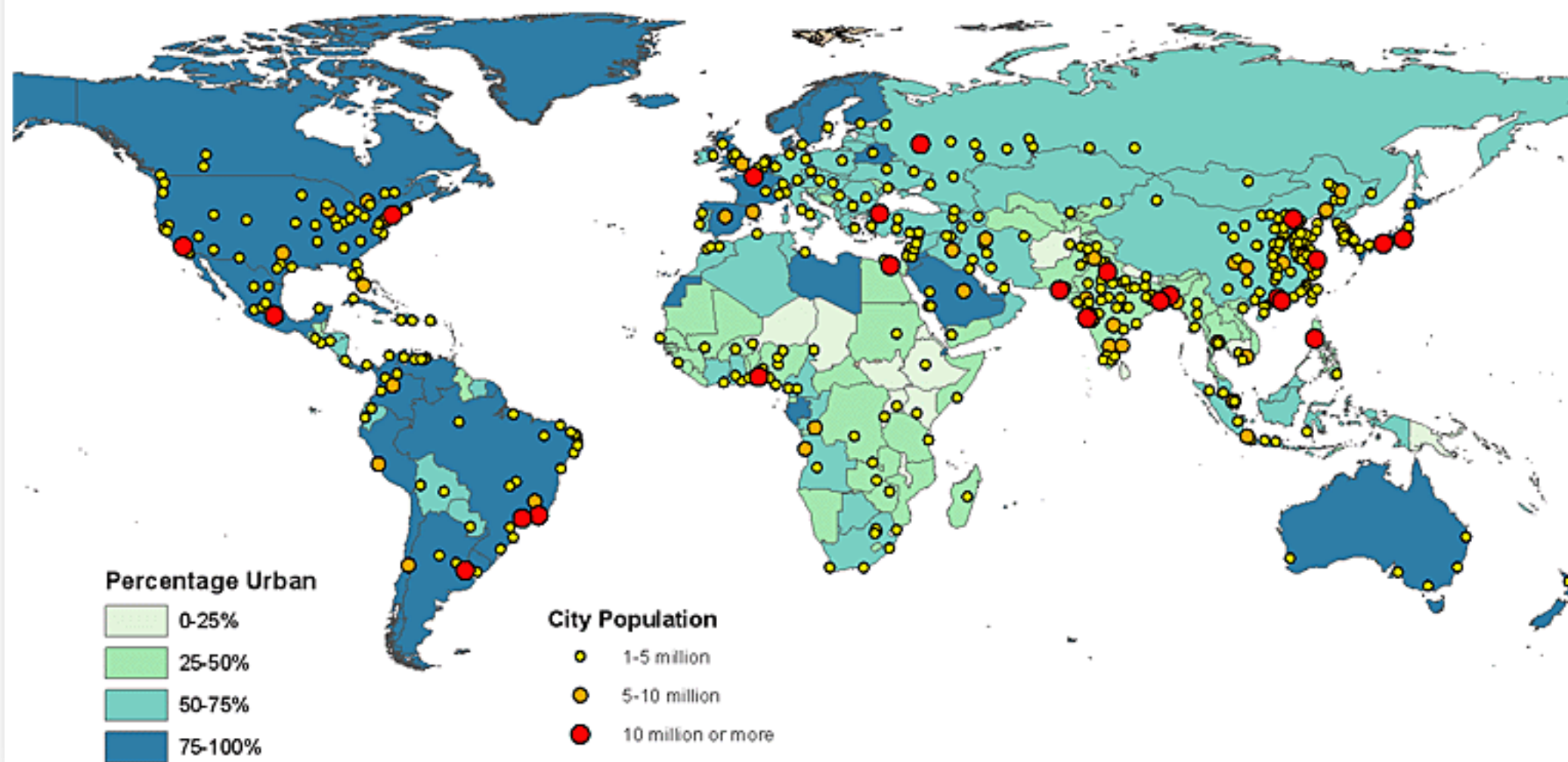
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Contexto Latinoamericano e Internacional

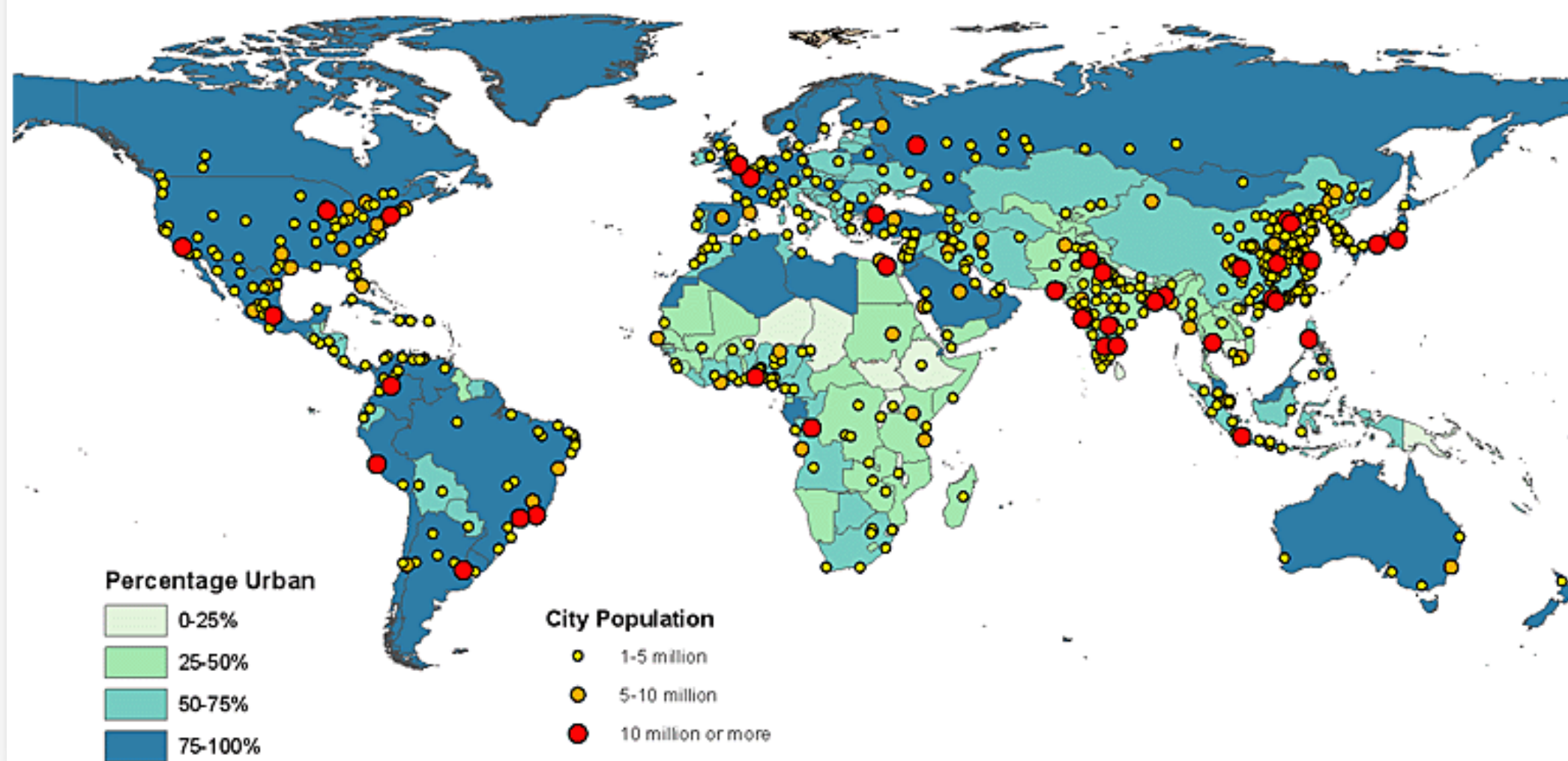
Map 1: Percentage of urban population and agglomerations by size class, 1960

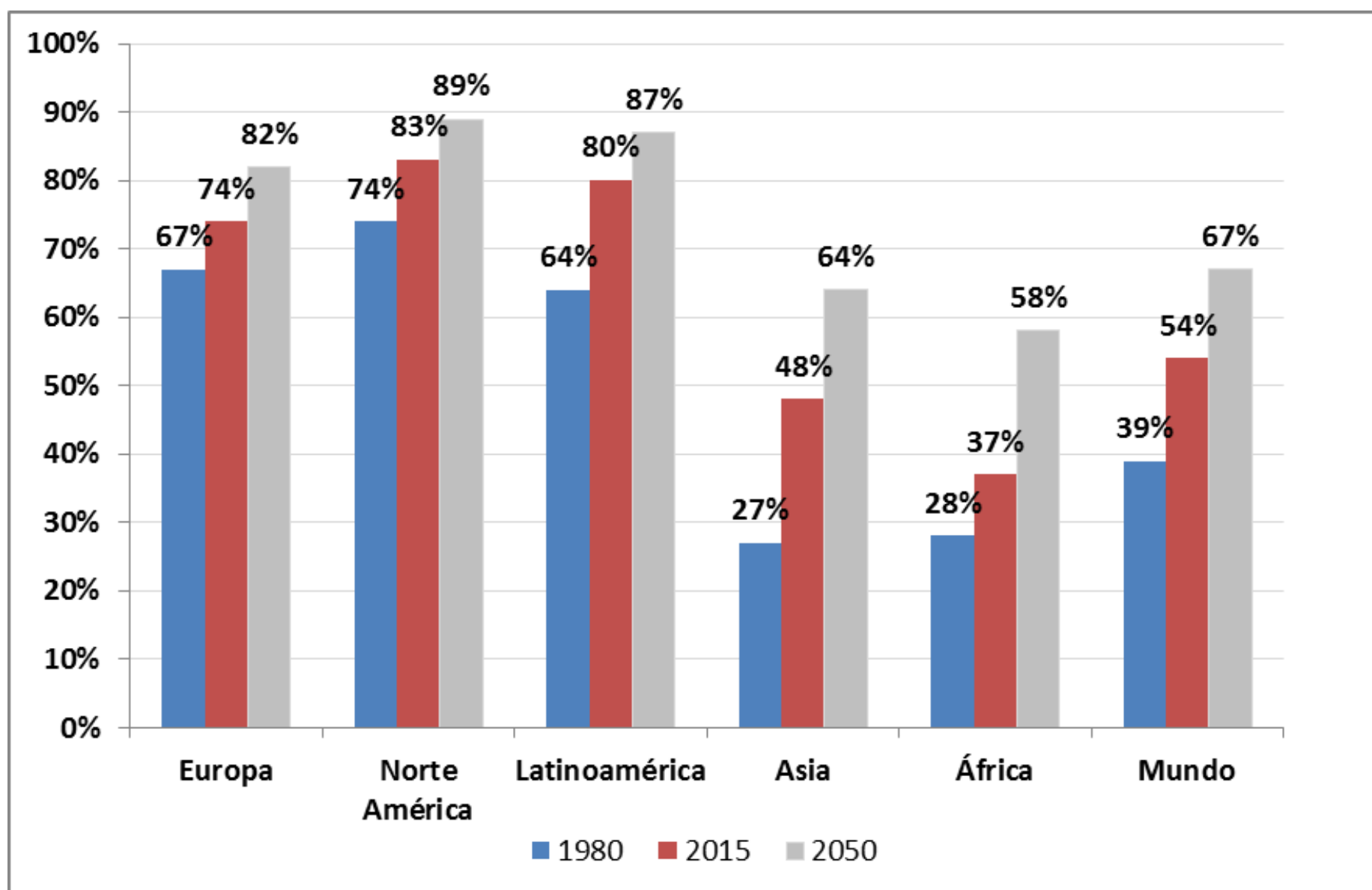


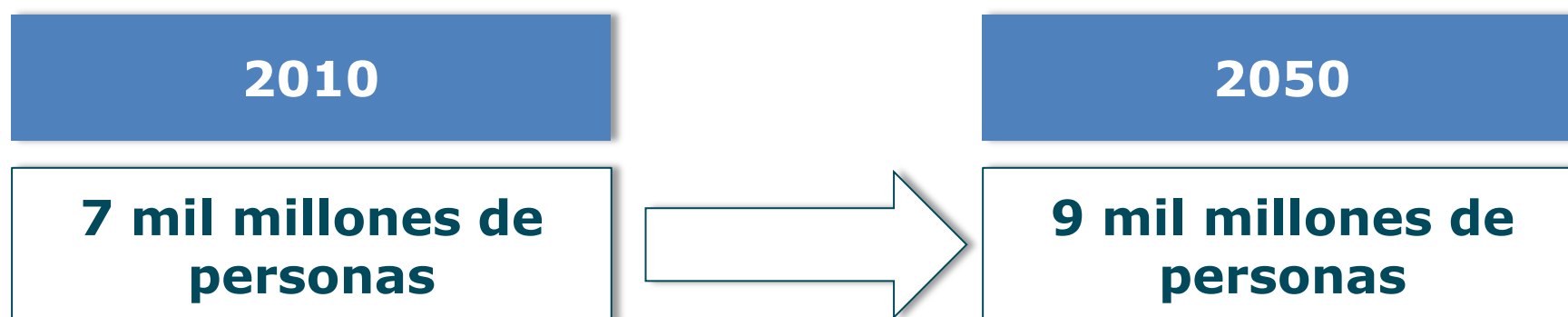
Map 3: Percentage of urban population and agglomerations by size class, 2011



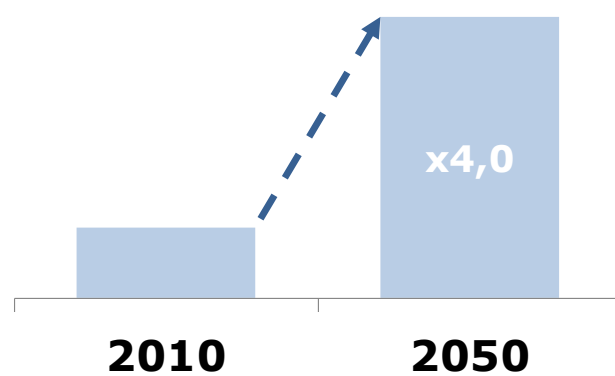
Map 4: Percentage of urban population and agglomerations by size class, 2025



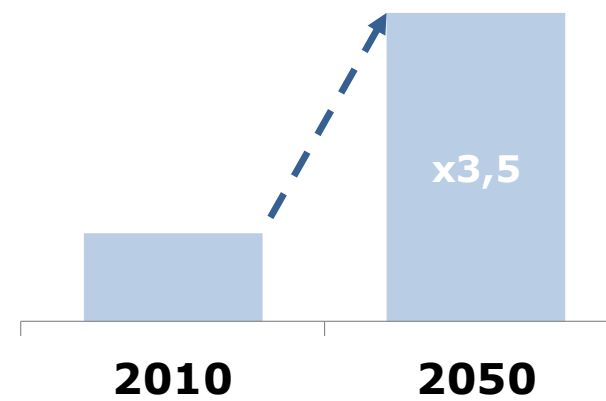




Pasajero-km
(base 100)



Tonelada-km
(base 100)



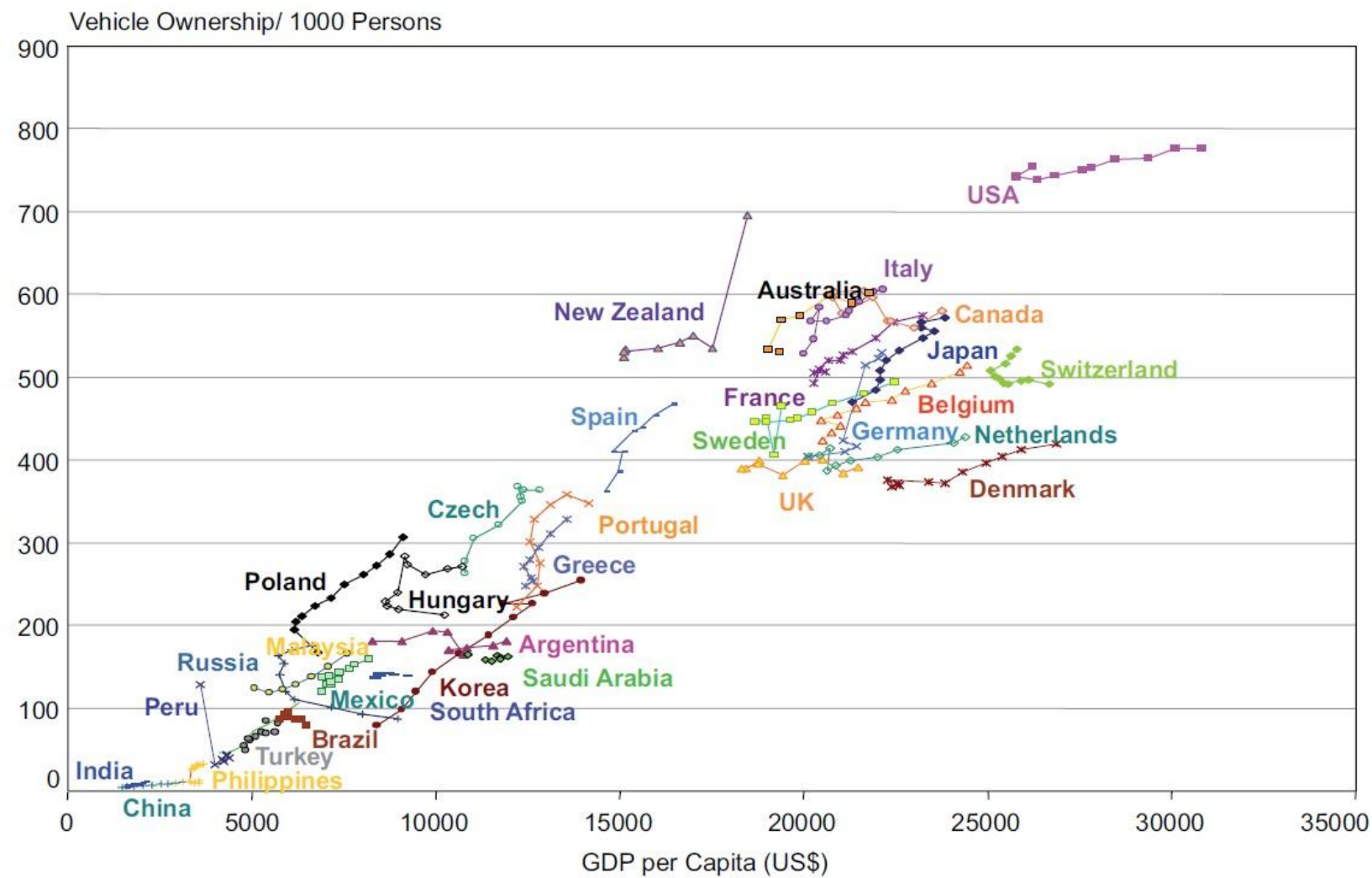
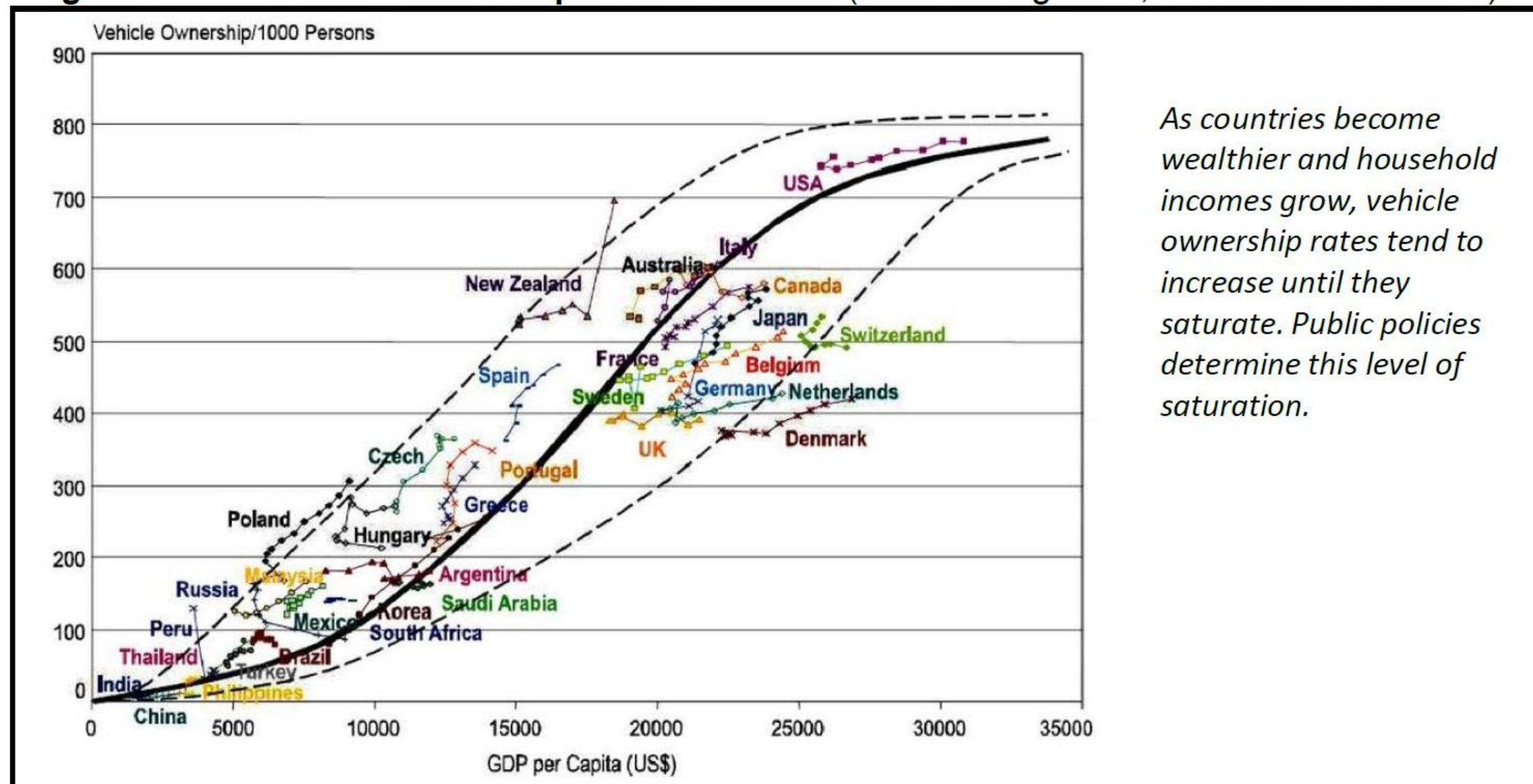
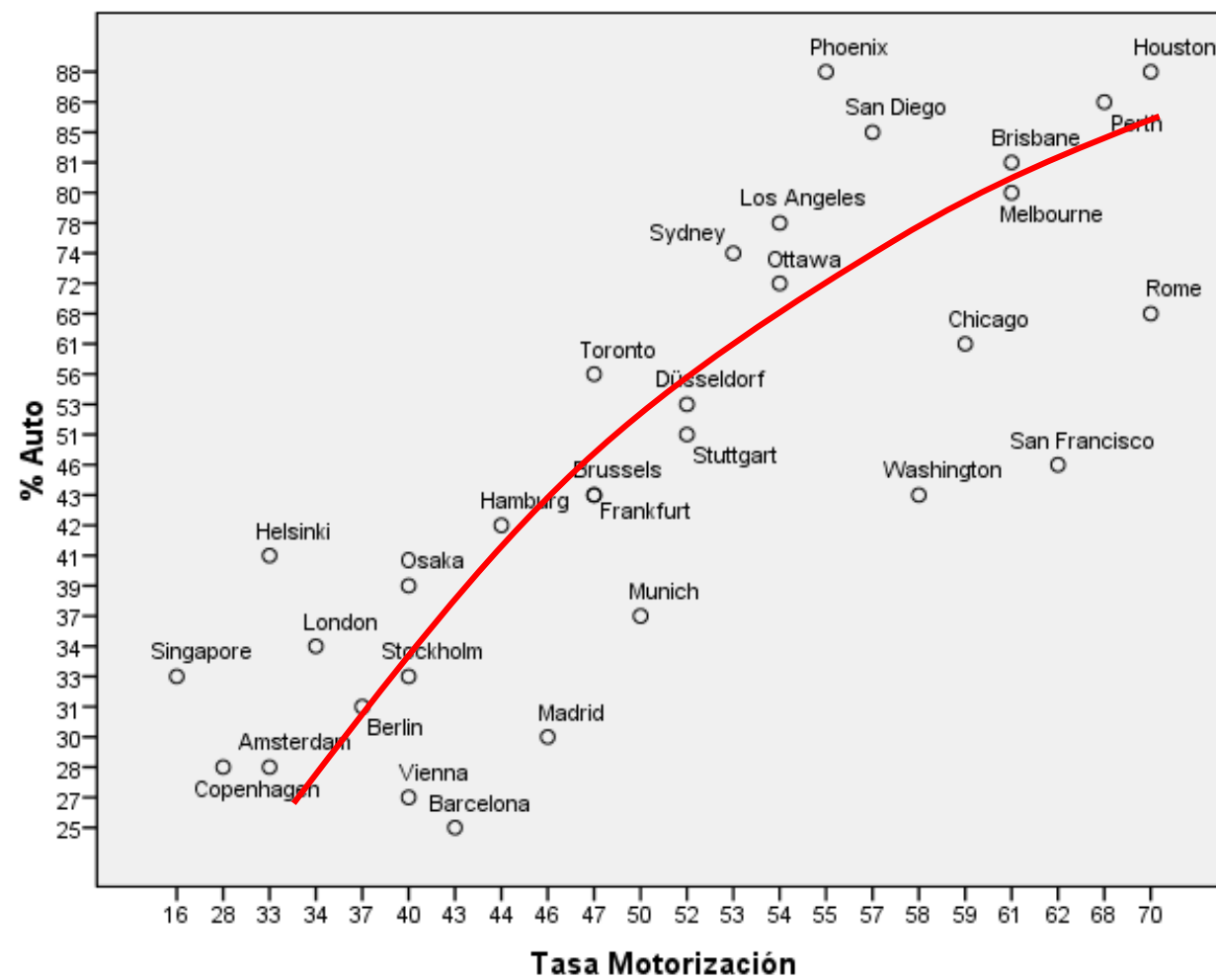


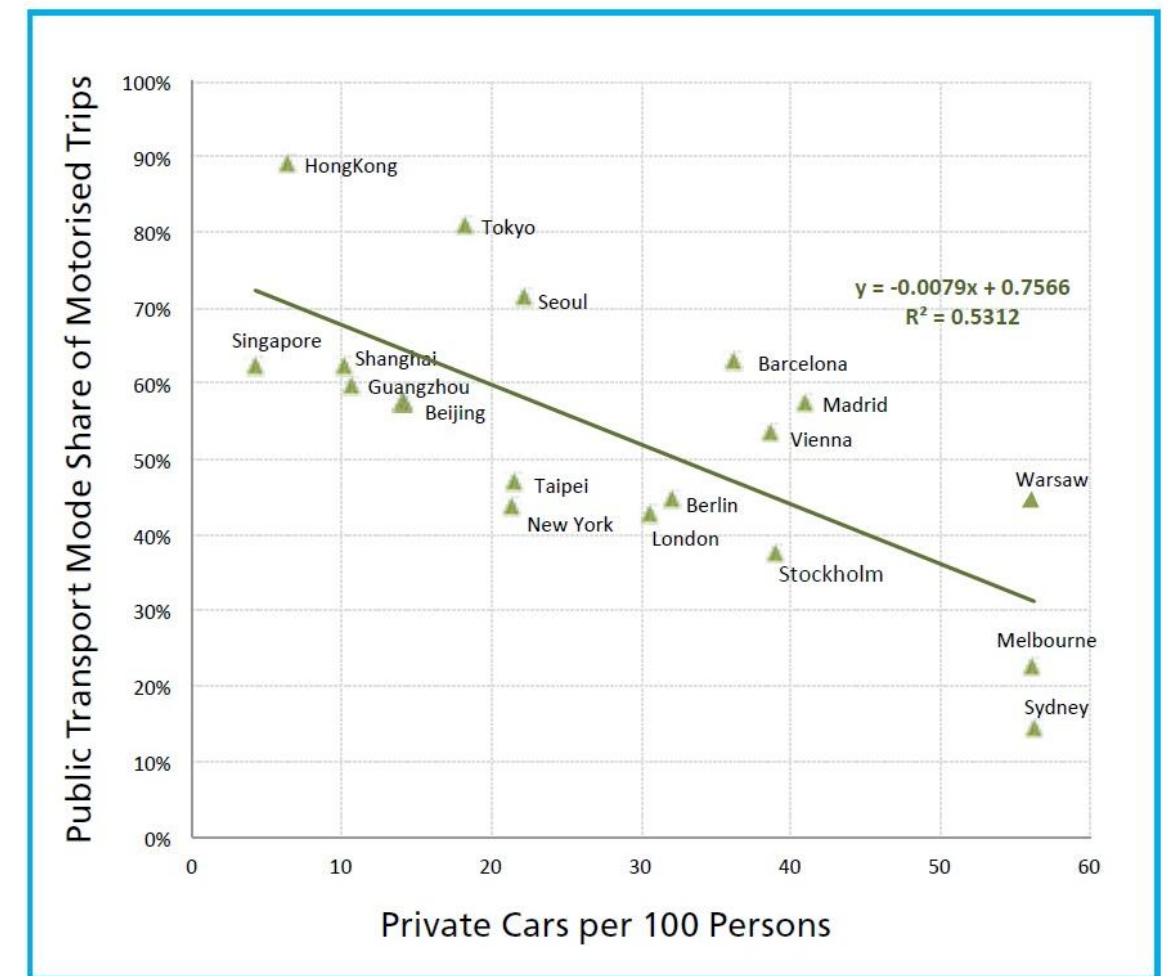
Figure 5.2: Vehicle ownership as a function of per capita income

Figure 5 Vehicle Ownership Versus Income (Goldemberg 2011, based on IPCC 2010)





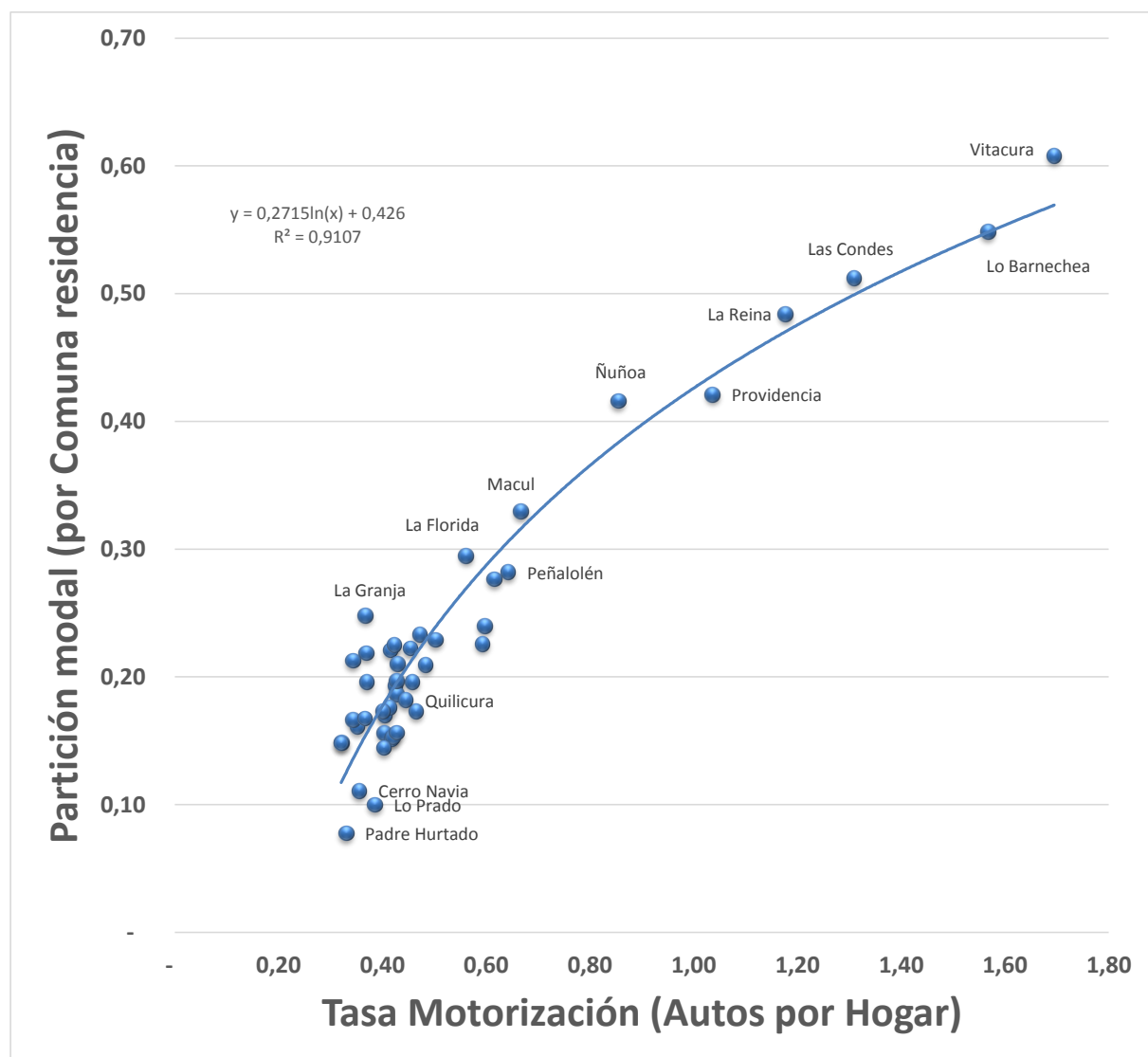
Fuente: Banco Mundial, 2013.



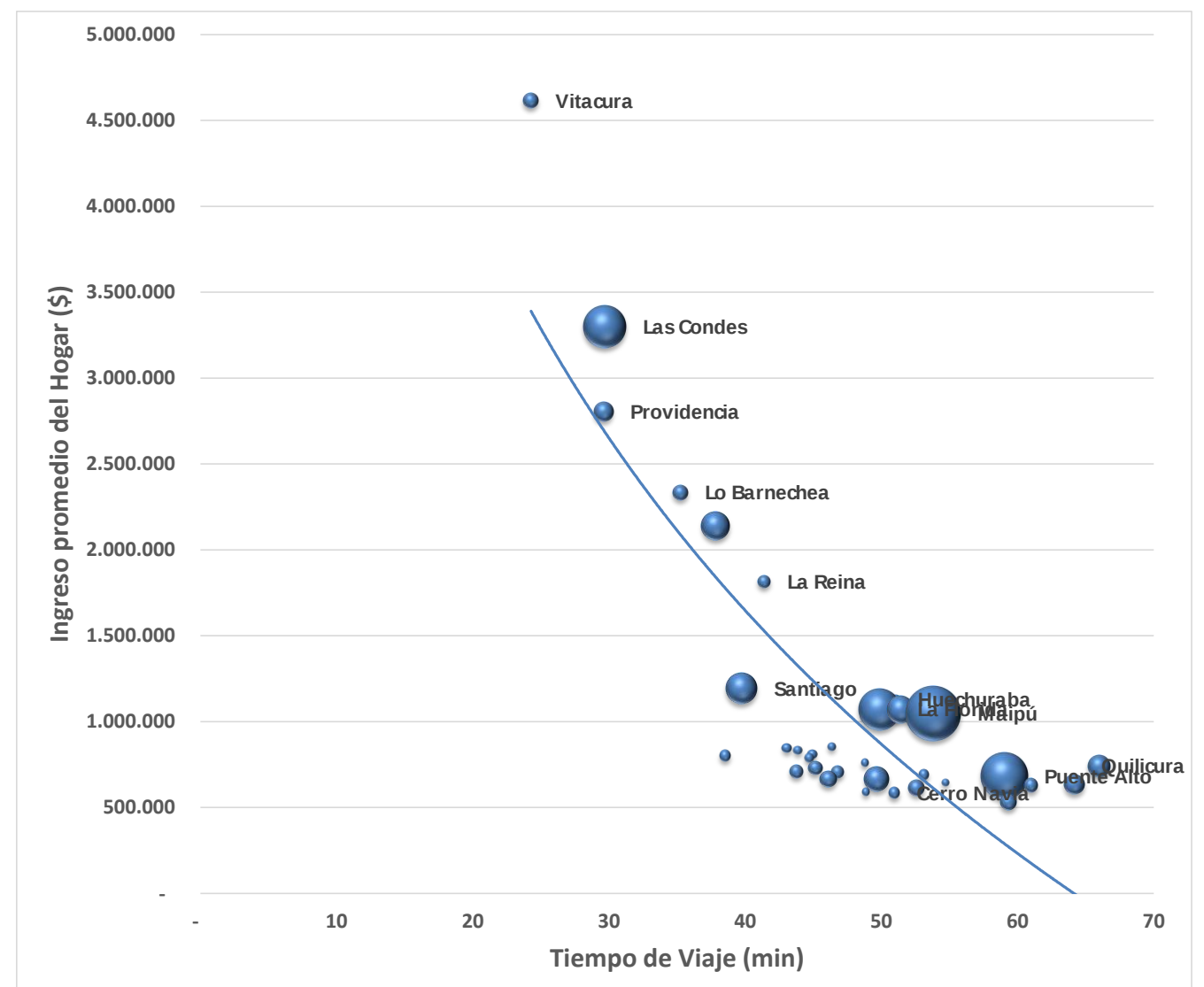
Fuente: Pan Di, 2013.



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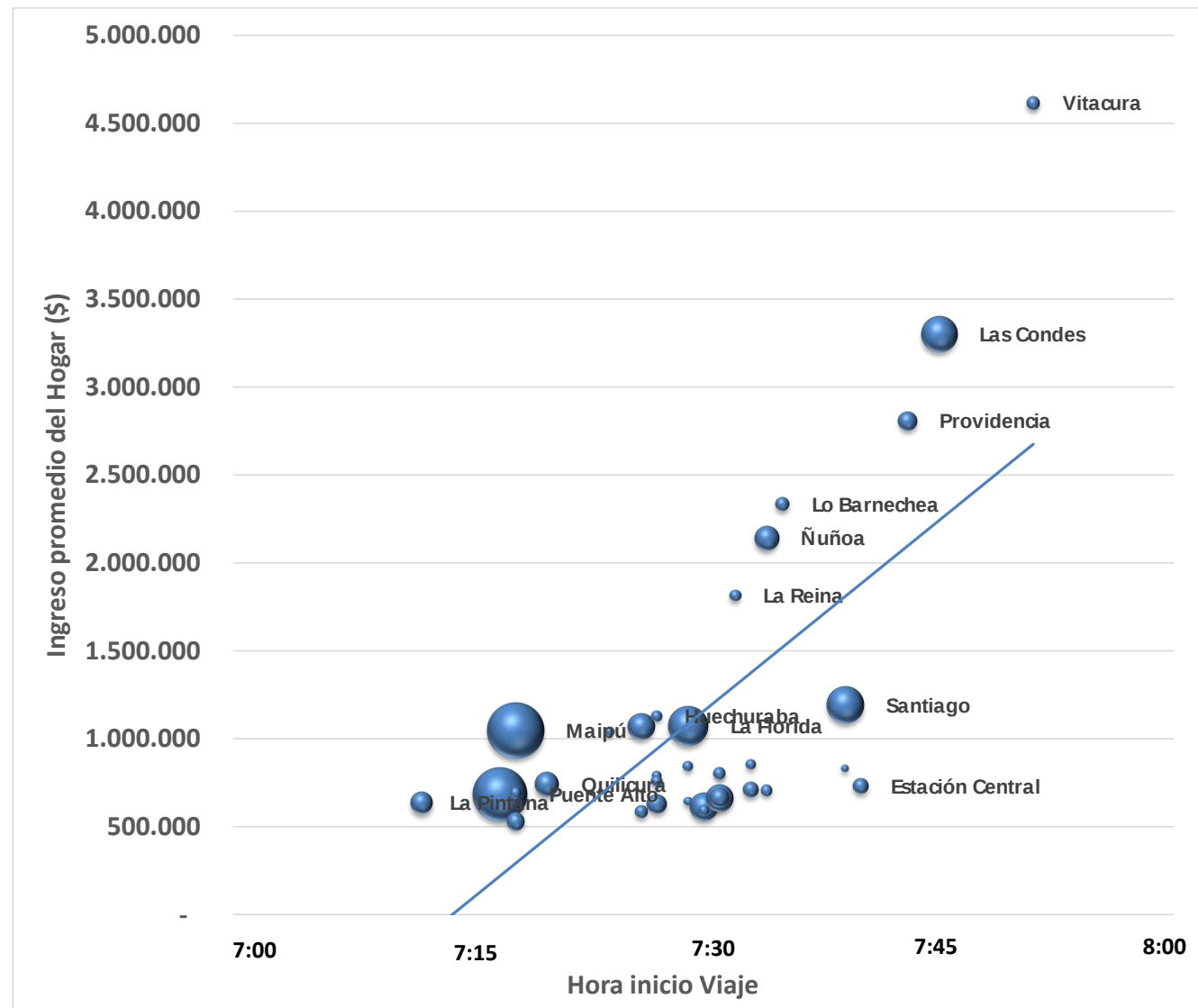


Fuente: EOD-2012, Santiago de Chile.

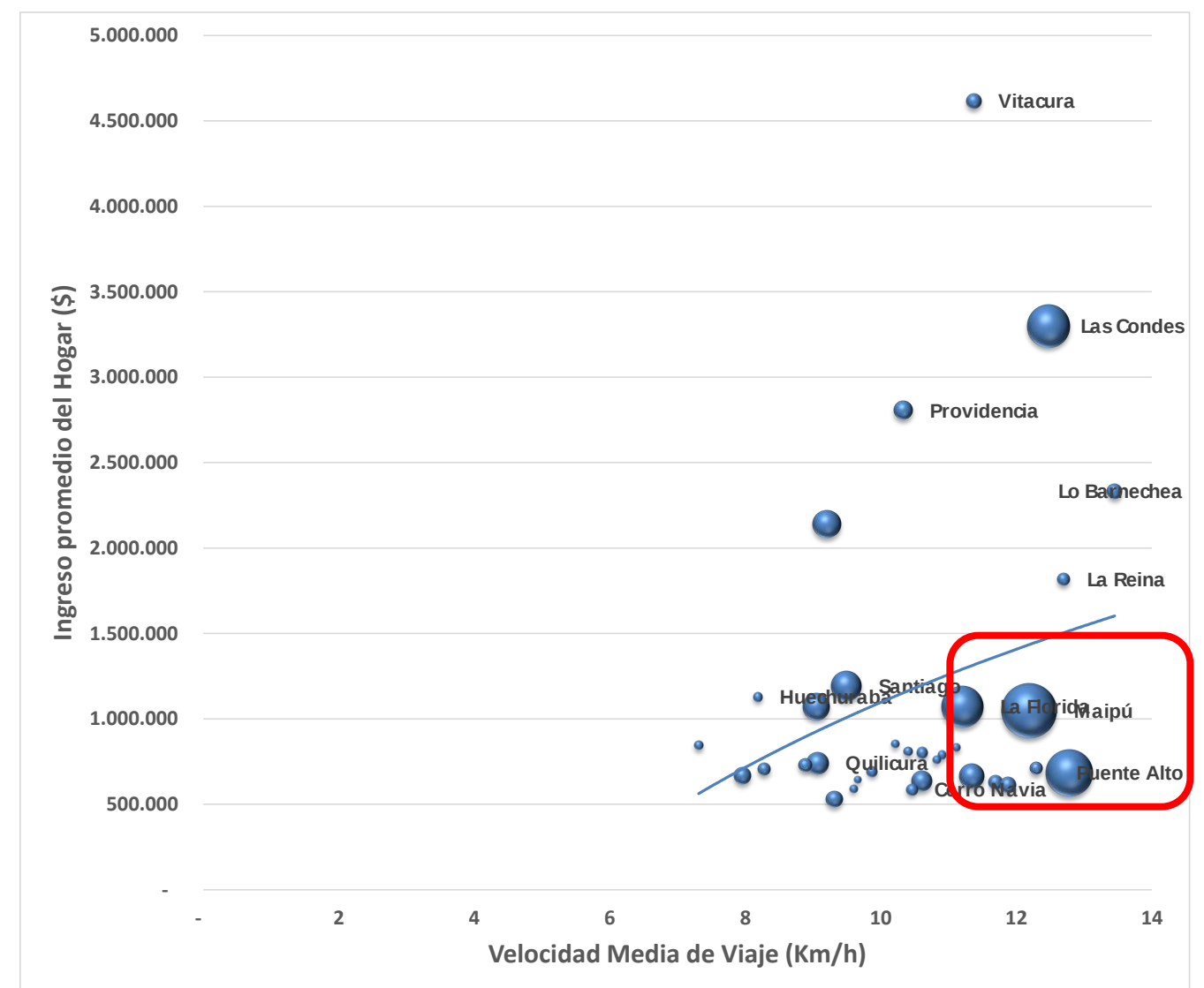




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Fuente: EOD-2012, Santiago de Chile.



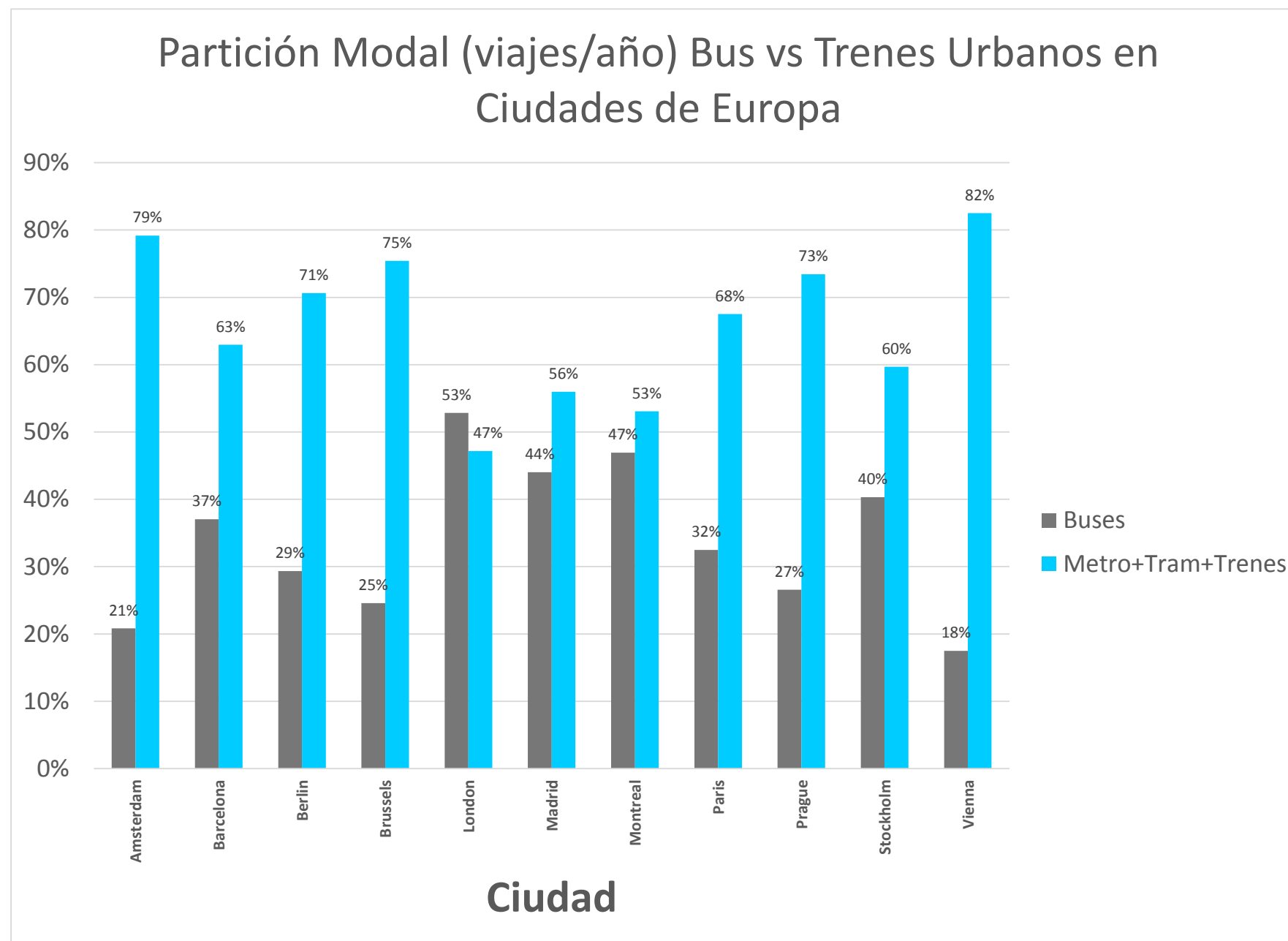


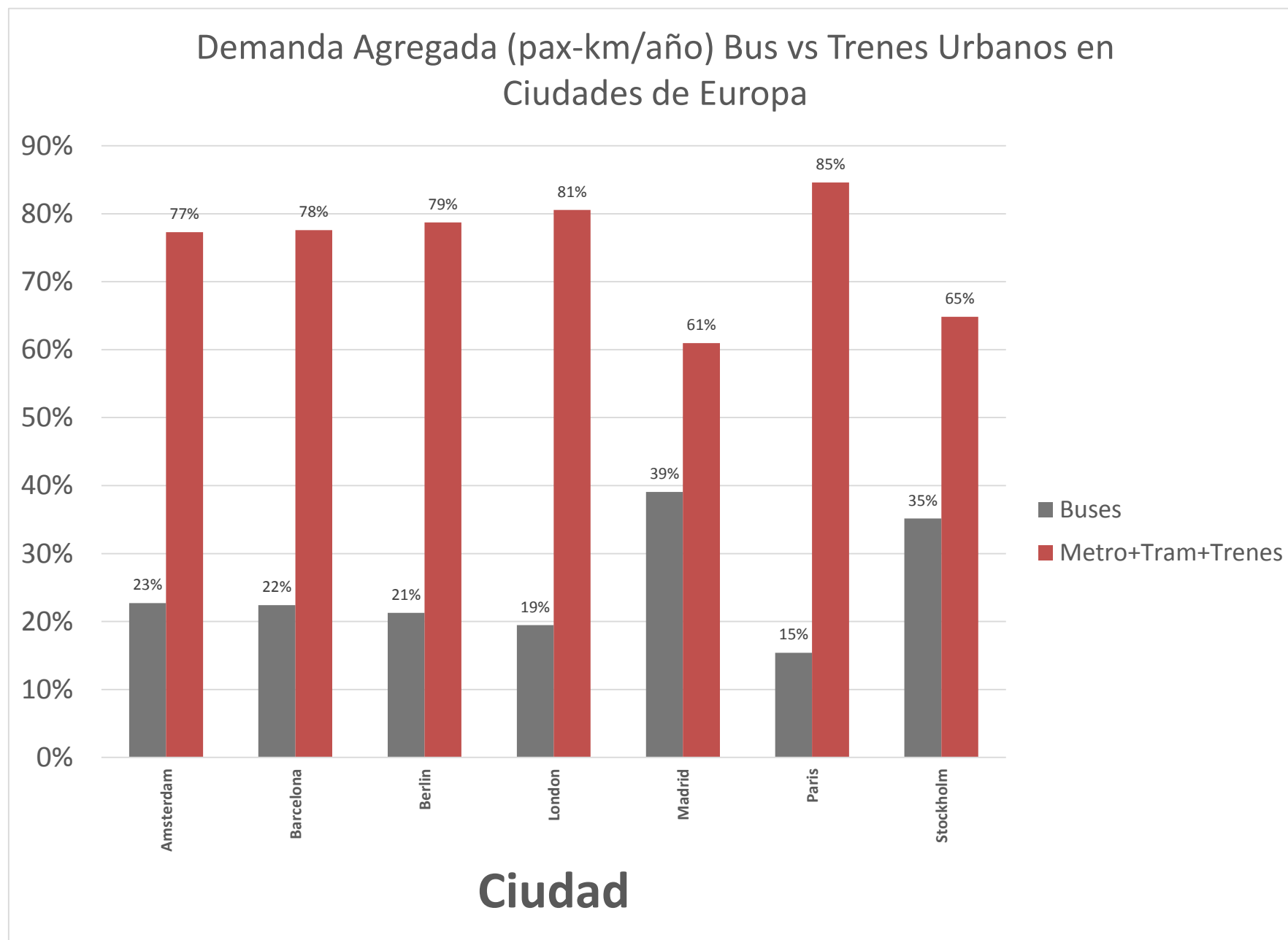
París:	2.100 buses	+300 km Metro
Washington:	1.520 buses	+185 km Metro
Madrid:	2.090 buses	+290 km Metro
Chicago:	1.890 buses	+180 km Metro
Barcelona:	1.090 buses	+120 km Metro
Tokio:	1.500 buses	+400 km Metro
New York:	4.340 buses	+1.000 km Metro
Santiago:	6.430 buses	103 km Metro
Bogotá:	17.000 buses (*)	0 km Metro
Lima:	37.000 buses (*)	35 km Metro

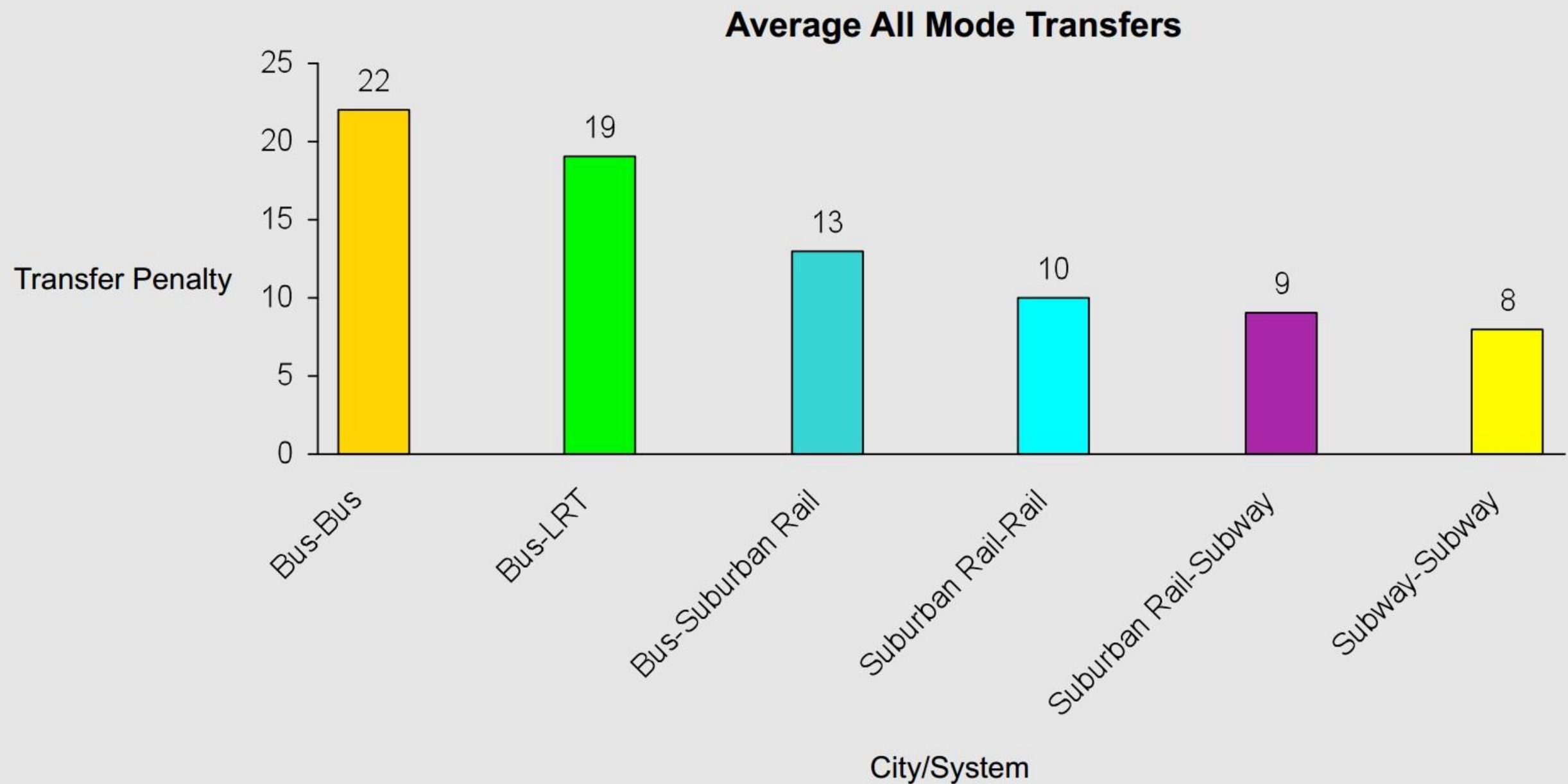


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Impacto del Metro: Antecedentes Internacionales

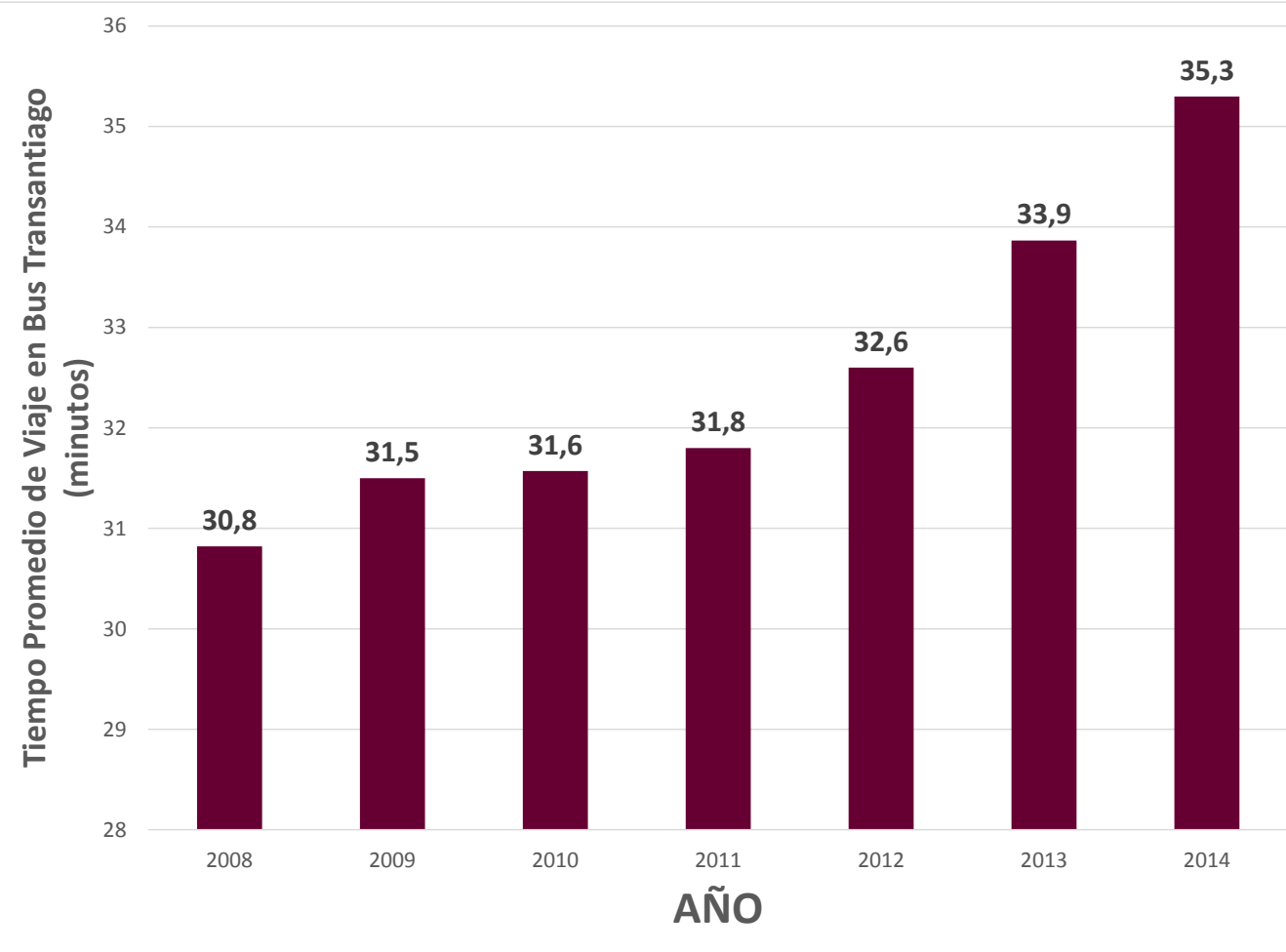
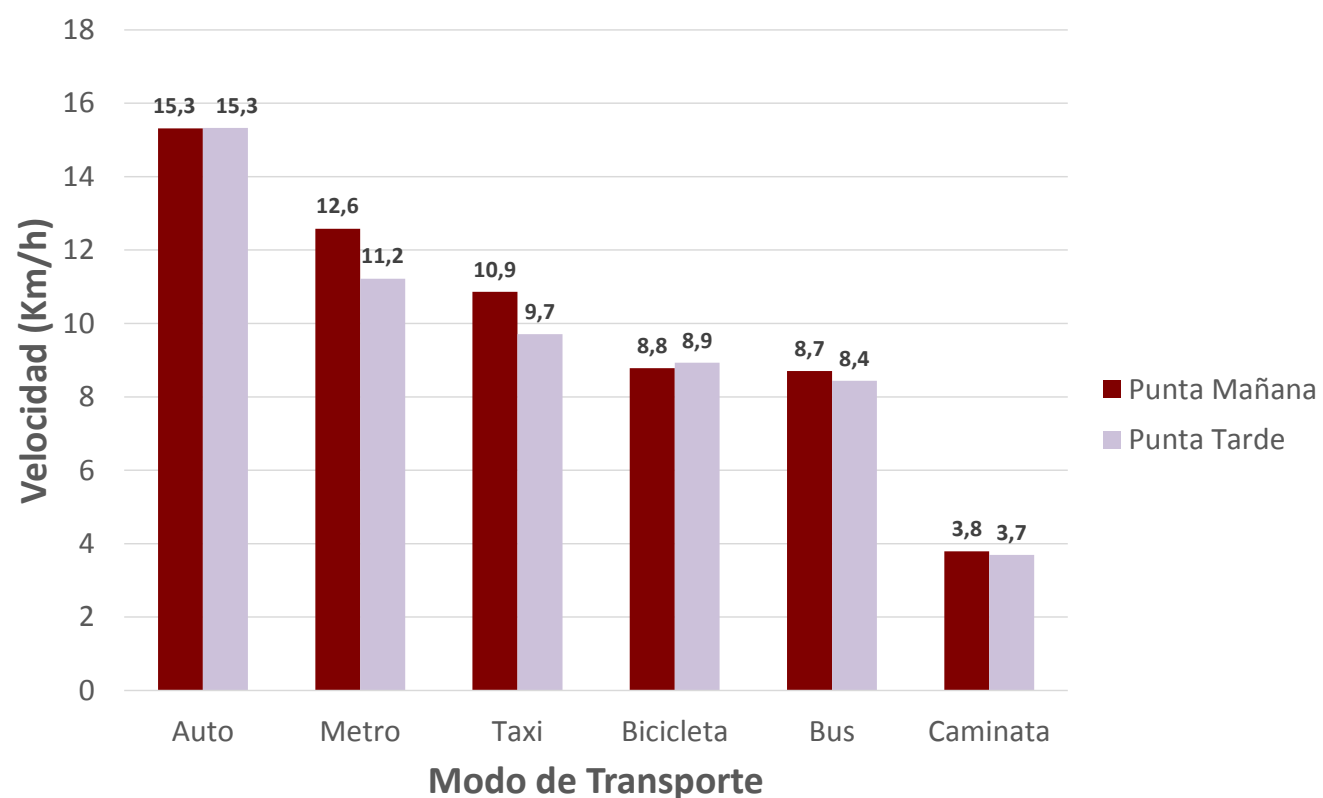




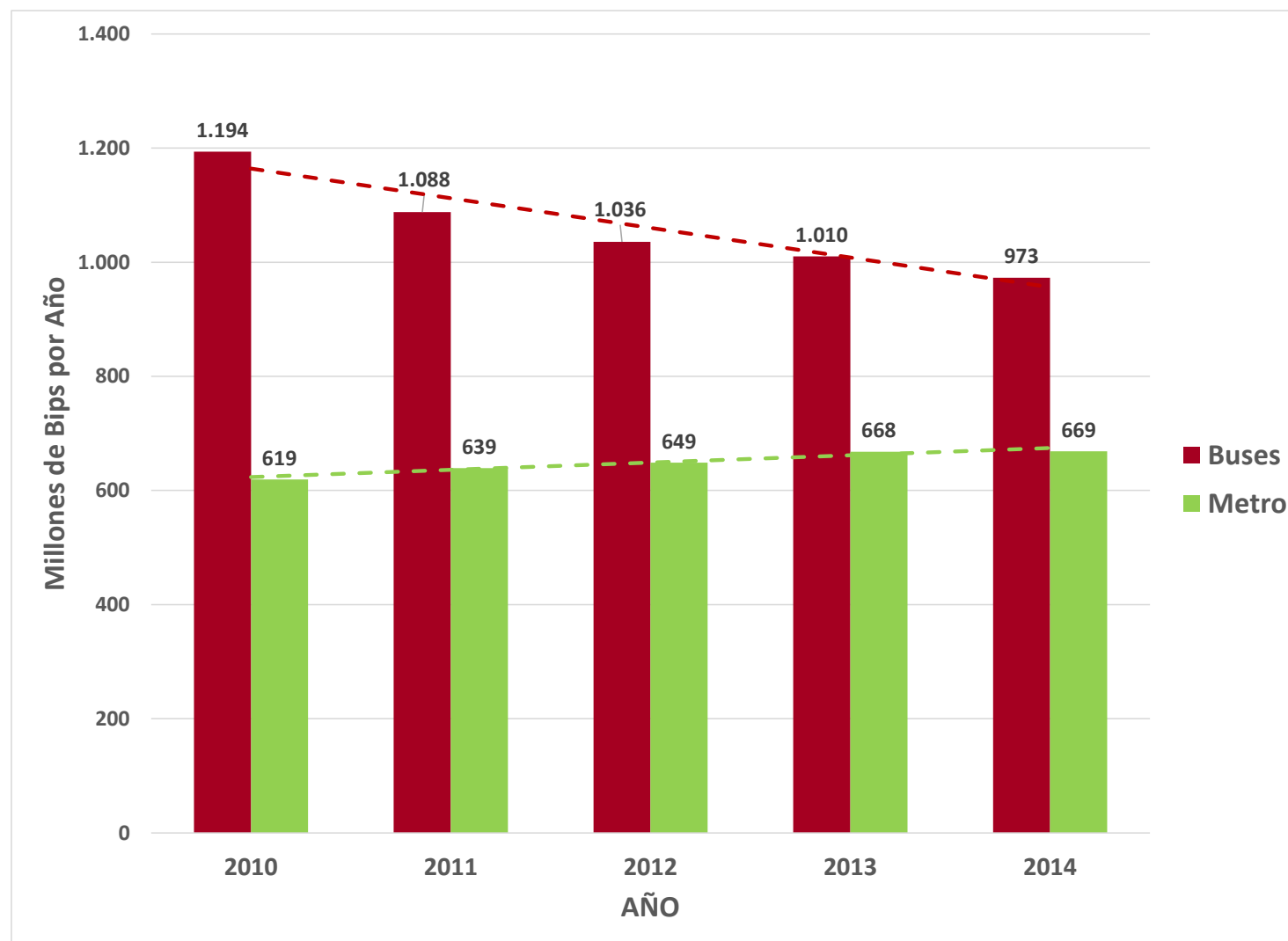


El Caso de Transantiago (Chile)

Velocidad Promedio por Modo de Transporte
(EOD-2012)



El Caso de Transantiago (Chile)



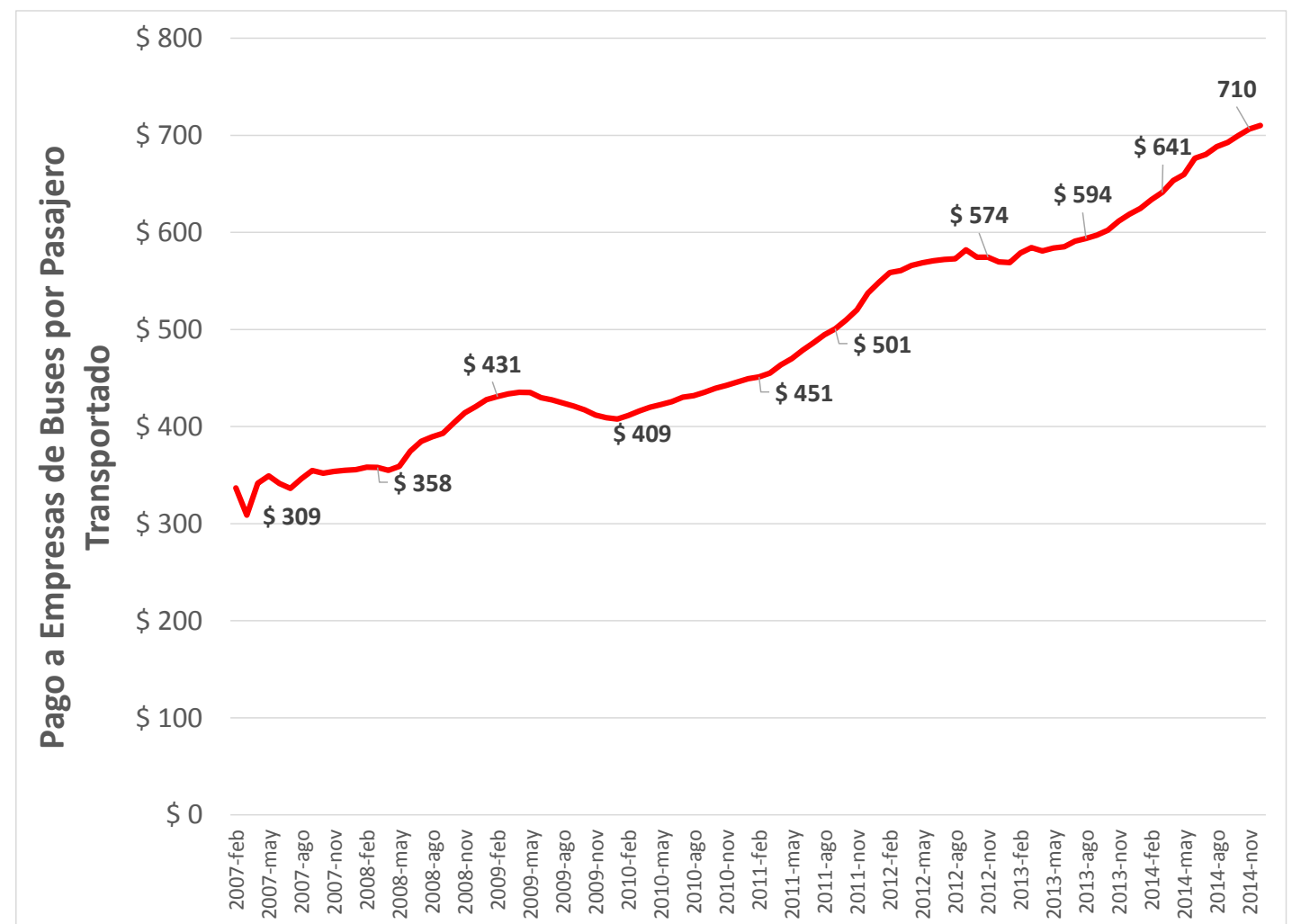
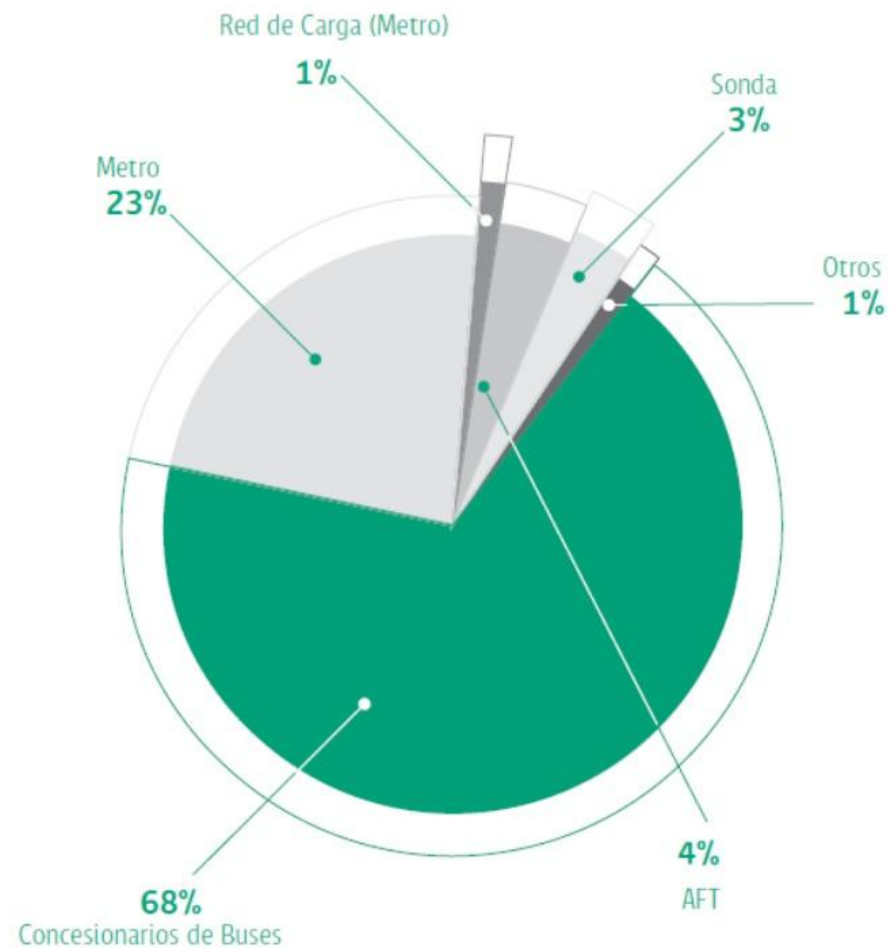
Variación 2010-2014

Buses: -18,5%

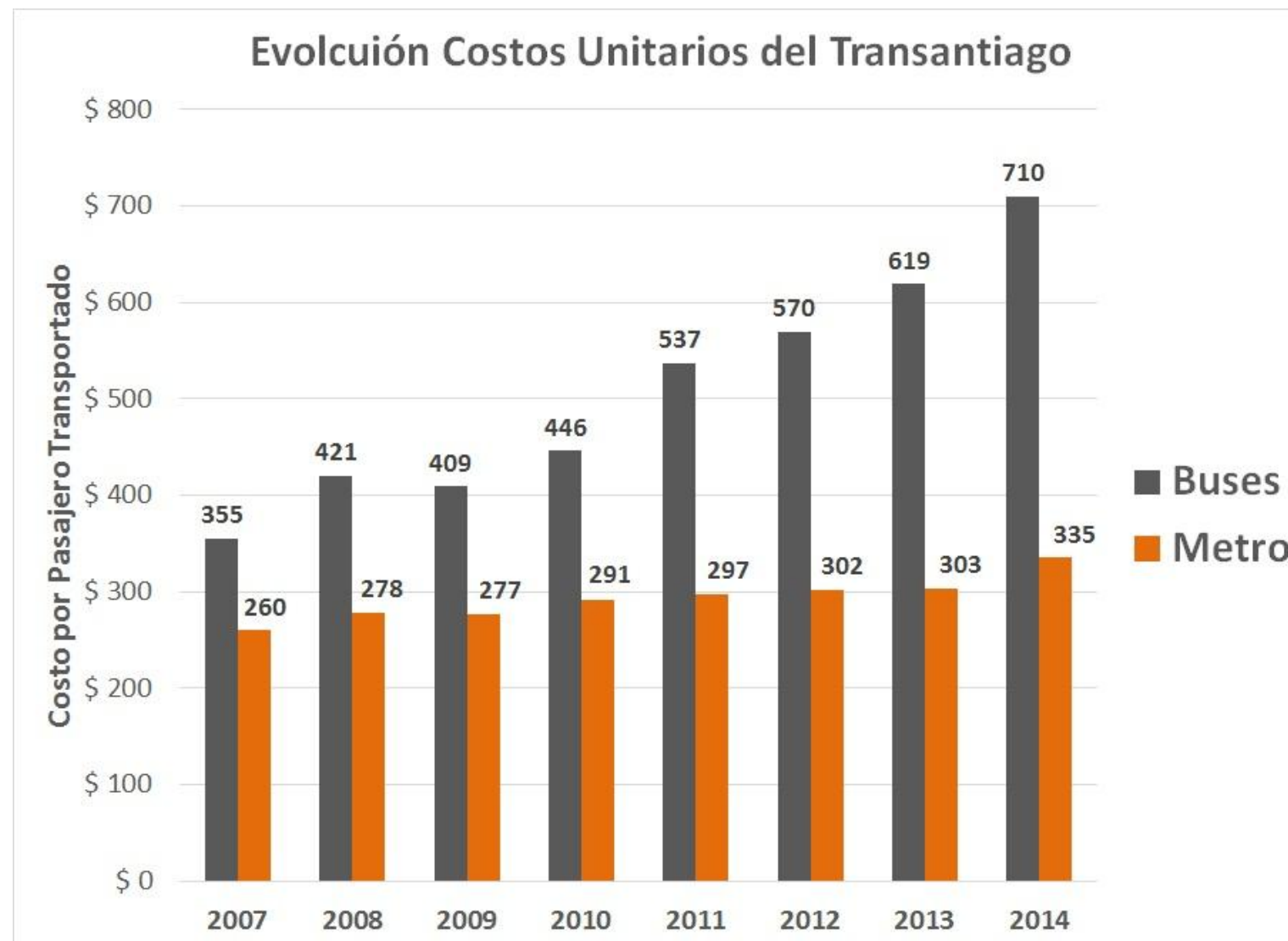
Metro: +8,0 %

El Caso de Transantiago (Chile)

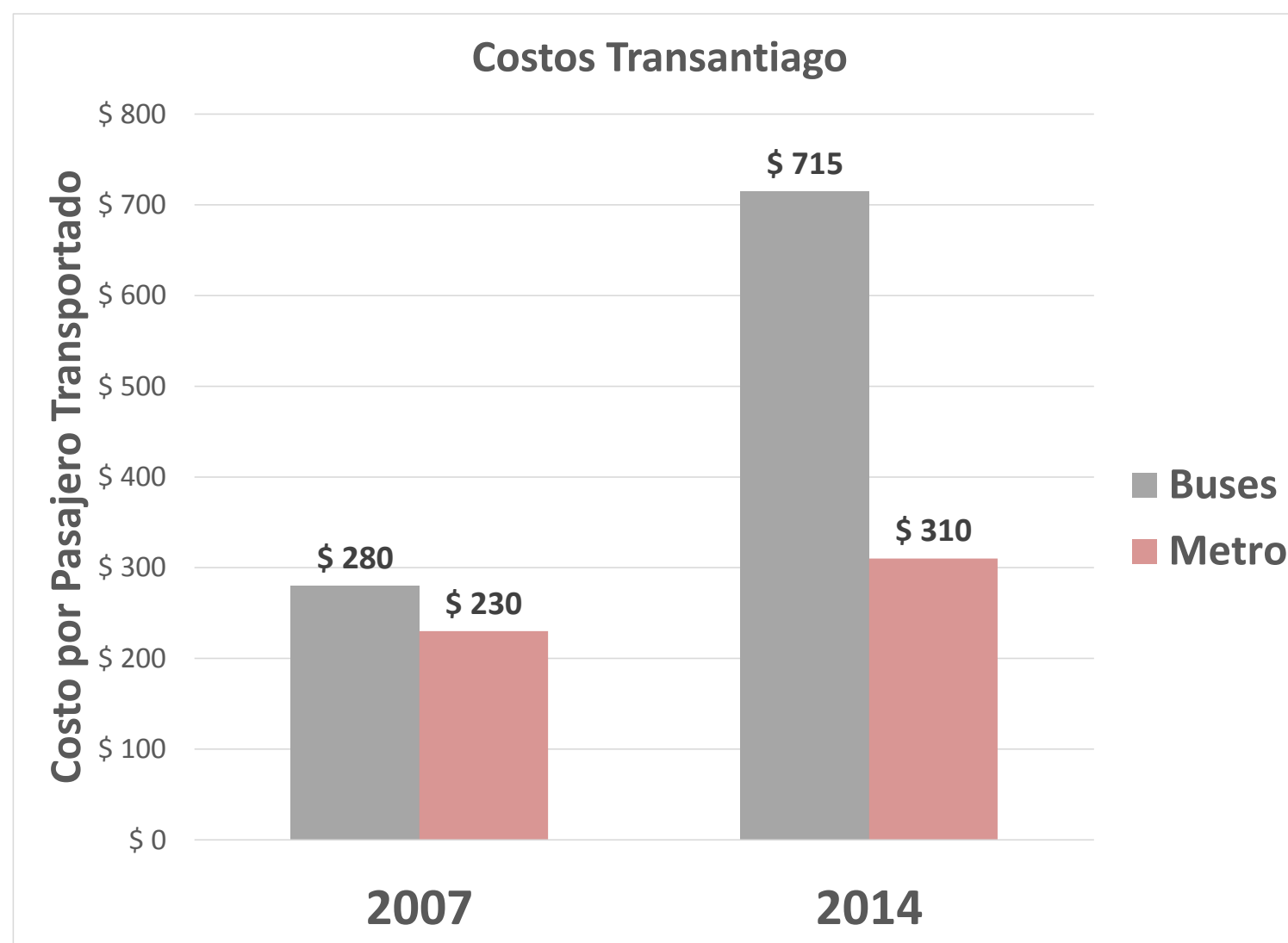
Egresos 2013 según prestador de servicio



El Caso de Transantiago (Chile)



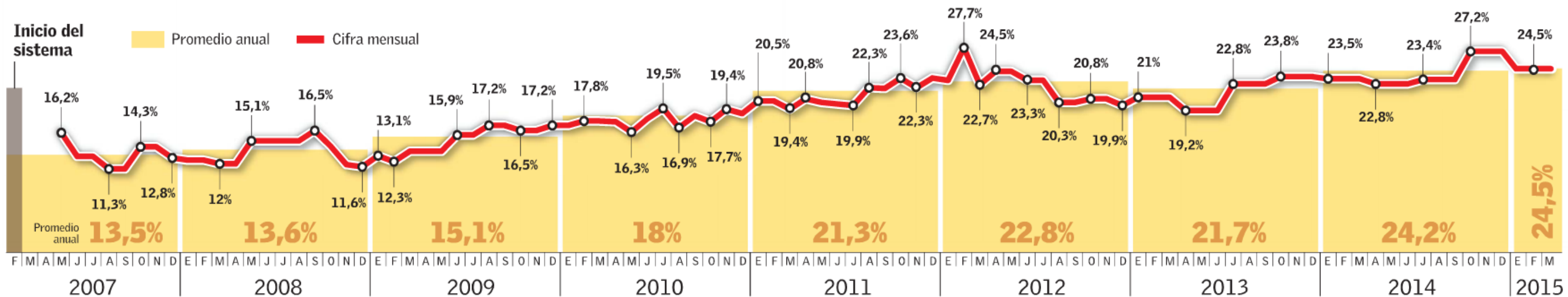
El Caso de Transantiago (Chile)



El Caso de Transantiago (Chile)

Las variaciones de los pasajes impagos

Desde 2007, cuando debutó el Transantiago, la evasión ha aumentado cerca de 10 puntos. Hoy, uno de cada cuatro pasajeros viaja gratis en bus.



El Caso de Transmilenio (Colombia)



El Caso de Transmilenio (Colombia)





El Metropolitano (Lima)



Massive bus traffic jam in Brisbane, Australia illustrate problem of fitting "BRT" into a high-capacity application.

Photo: James Saunders.

BRT Brisbane, Australia

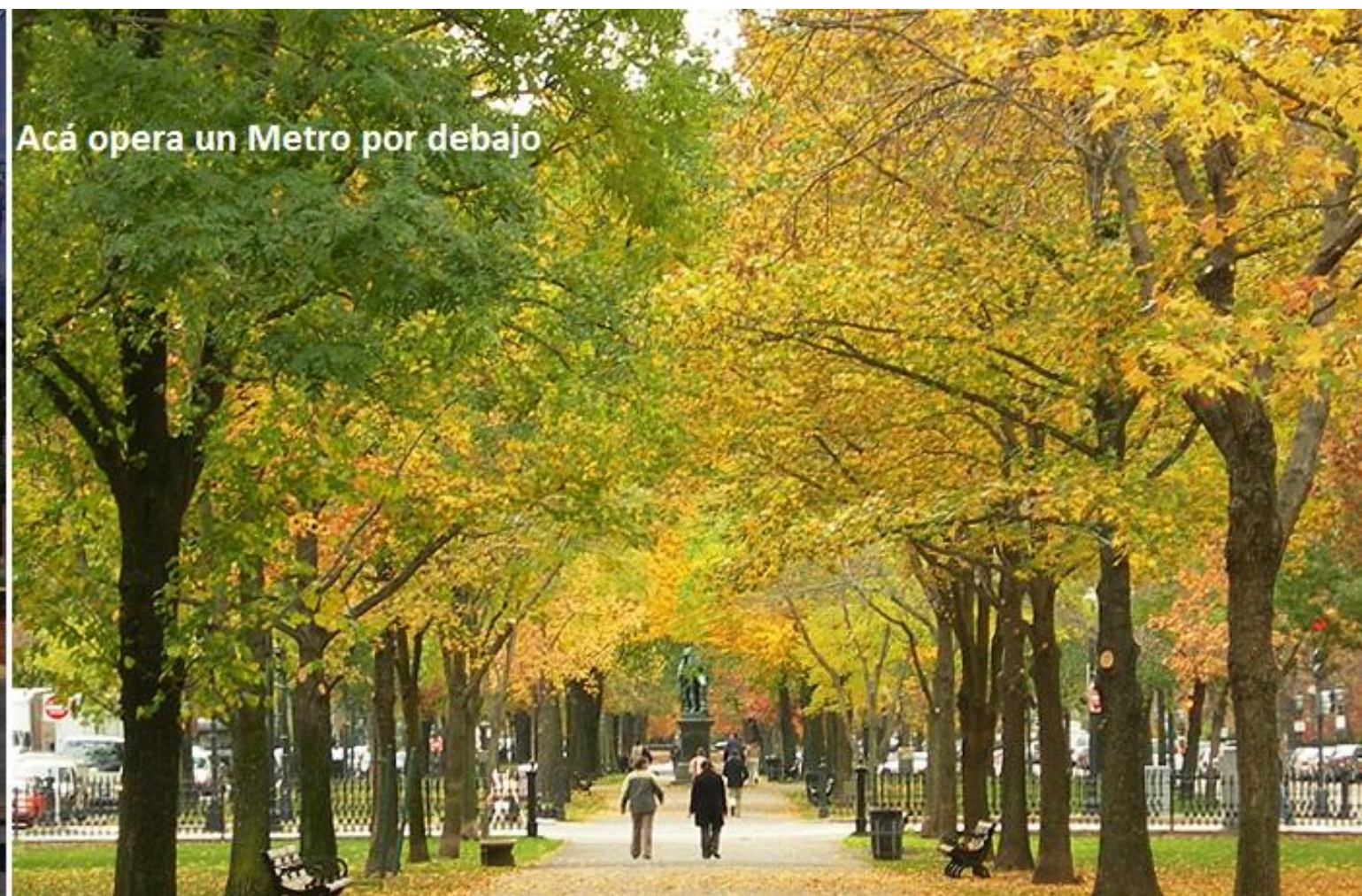


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Acá opera un Corredor Segregado de Buses



Acá opera un Metro por debajo





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El Valor del Espacio Público





Metro de Bilbao, España



Estación de Metro Bockenheimer, en Frankfurt



Estaciones de Metro Estocolmo



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Bund Sightseeing Tunnel, Metro de Shanghai,



Estación Toledo, Metro de Nápoles



Estación U de Chile, Metro de Santiago



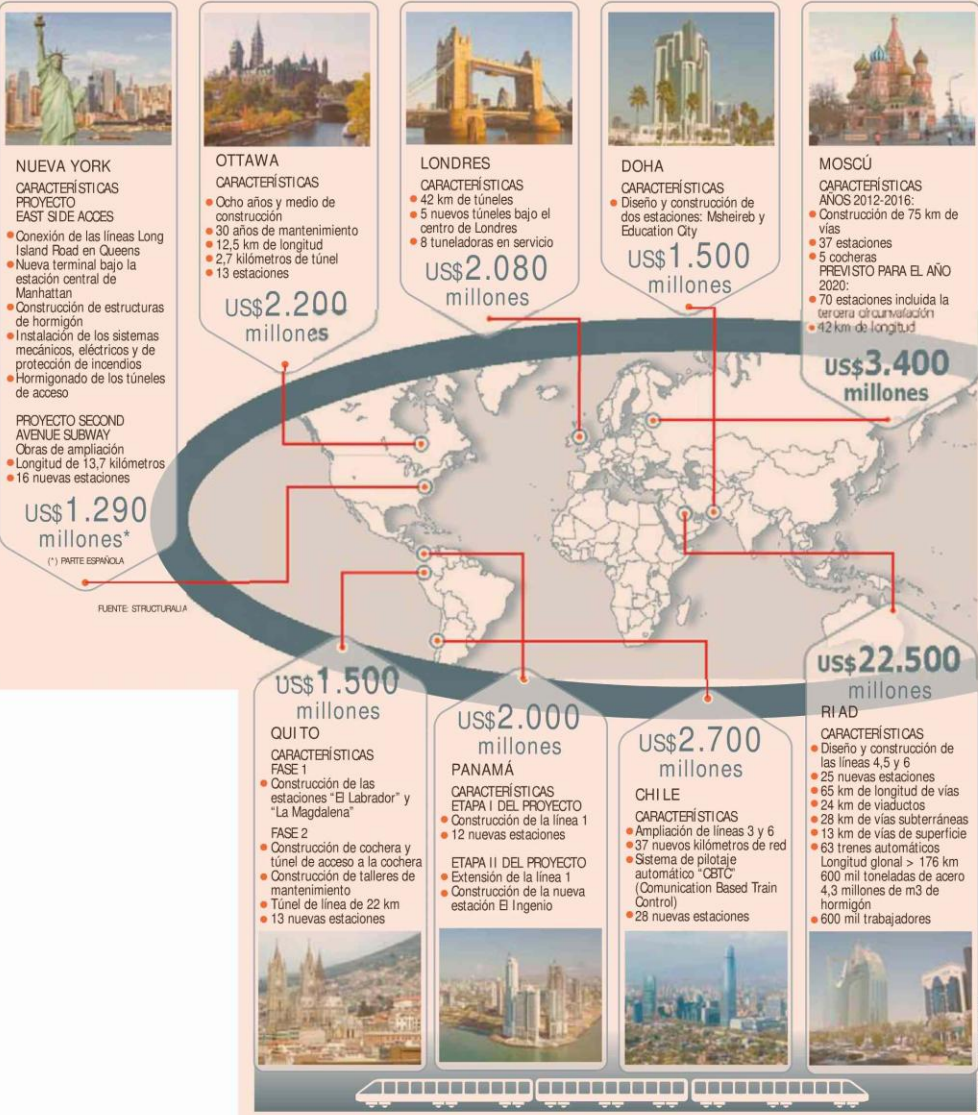
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Déficit de Metro en Latinoamérica

Las grandes ciudades del mundo se rinden a la “urgencia” de extender el metro

Inversiones cercanas a los US\$ 40.000 millones están en marcha en la actualidad en distintos continentes con el fin de mejorar el sistema de transporte urbano.

Principales proyectos del metro en el mundo



Metro systems under construction [edit]

The following is an incomplete list of worldwide metro systems currently *under construction*:

Location	Country	Name	Start of construction	Planned opening
Changchun	 China	Changchun Rail Transit	2011	2020
Dongguan	 China	Dongguan Rail Transit	2010	2015
Fuzhou	 China	Fuzhou Metro	2012	2015
Guiyang	 China	Guiyang Urban Rail Transit	2013	2017
Hefei	 China	Hefei Metro	2009	2016
Jinan	 China	Jinan Metro	2013	2018
Lanzhou	 China	Lanzhou Metro	2012	2016 ^[UC 1]
Macau	 China	Macau Light Rail Transit	2012	2016
Nanchang	 China	Nanchang Metro	2009	2015
Nanning	 China	Nanning Rail Transit	2011	2016
Qingdao	 China	Qingdao Metro	2009	2015
Shijiazhuang	 China	Shijiazhuang Metro	2012	2017
Ürümqi	 China	Ürümqi Metro	2014	2018
Xiamen	 China	Xiamen Metro	2013	2017
Xuzhou	 China	Xuzhou Metro ^[UC 2] ^[UC 3]	2014	2017
Chennai	 India	Chennai Metro	2010	2015
Hyderabad	 India	Hyderabad Metro Rail	2012	2015
Jaipur	 India	Jaipur Metro	2010	2014
Kochi	 India	Kochi Metro	2013	2016
Lucknow	 India	Lucknow Metro	2014 ^[UC 5]	2017
Navi Mumbai	 India	Navi Mumbai Metro	2011	2017
Jakarta	 Indonesia	Jakarta Mass Rapid Transit	2013	2018
Ahvaz	 Iran	Ahvaz Metro	2004	2014
Isfahan	 Iran	Isfahan Metro ^[UC 6] ^[UC 7]	2001	2014
Qom	 Iran	Qom Metro ^[UC 8] ^[UC 9]	2010	2015
Tabriz	 Iran	Tabriz Metro ^[UC 10] ^[UC 11] ^[UC 12]	2003	2015
Doha	 Qatar	Doha Metro	2013	2019
Chelyabinsk	 Russia	Chelyabinsk Metro	1992	2019
Omsk	 Russia	Omsk Metro	1992	2016
Riyadh	 Saudi Arabia	Riyadh Metro	2014	2019
Taichung	 Taiwan	Taichung Mass Rail Transit System	2009	2017
Taoyuan	 Taiwan	Taoyuan Metro	2006	2015
Hanoi	 Vietnam	Hanoi Metro	2009	2016
Ho Chi Minh City	 Vietnam	Ho Chi Minh City Metro	2010	2018

Rio de Janeiro, 1993



Xangai, 1993

(sem metrô)

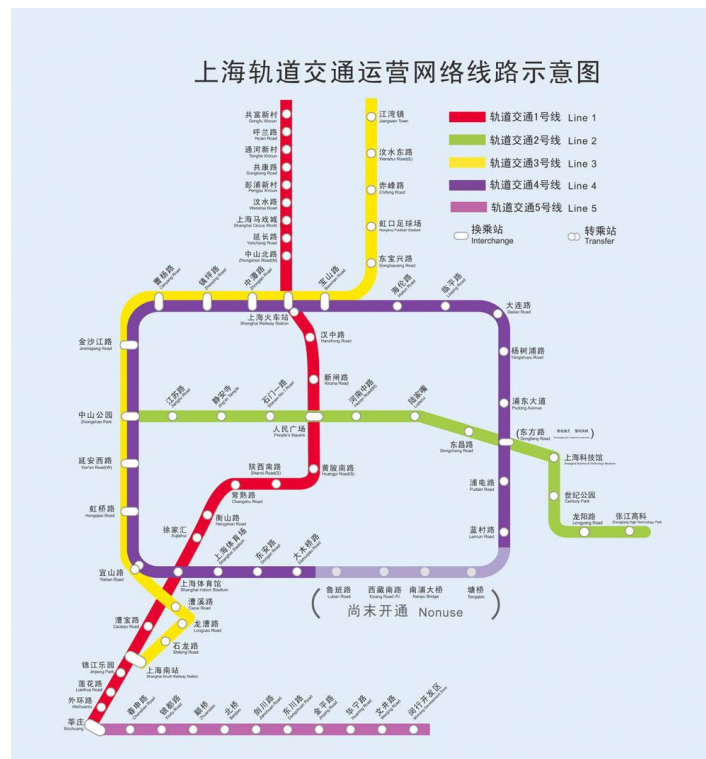
Rio de Janeiro, 2013



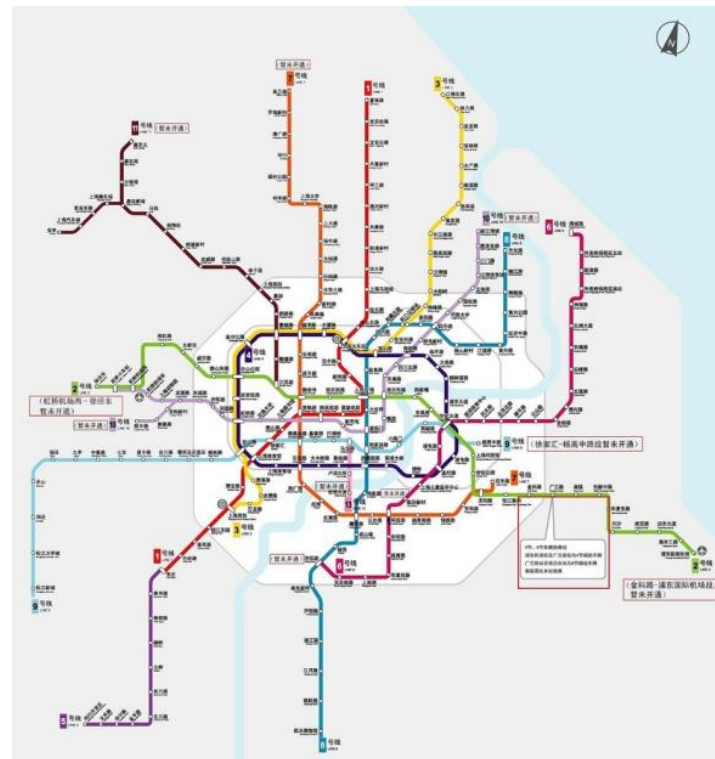
Xangai, 2013



Evolución del Metro de Shanghai (US\$9.000 ingreso per cápita):



2002: 98 km



2010: 434 km



2018: 870 km

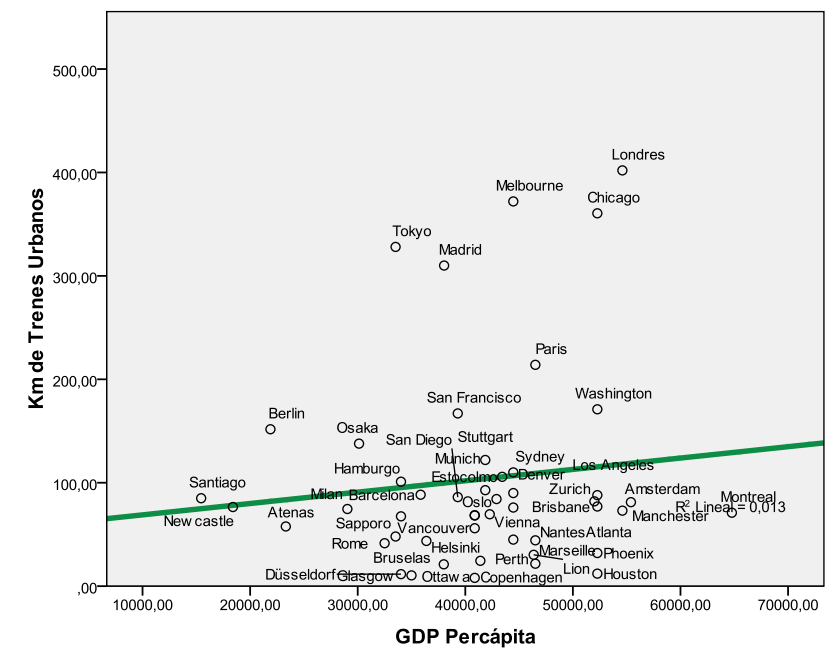
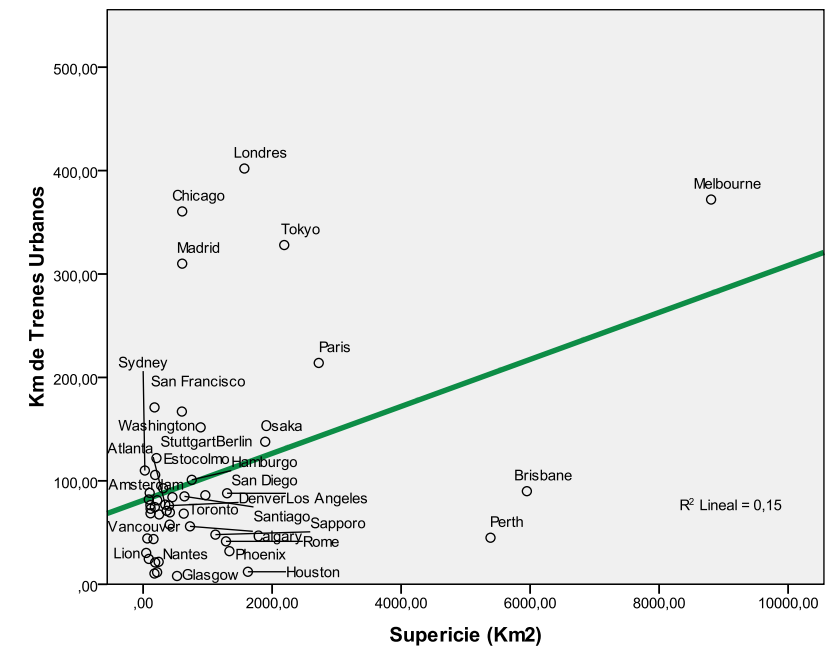
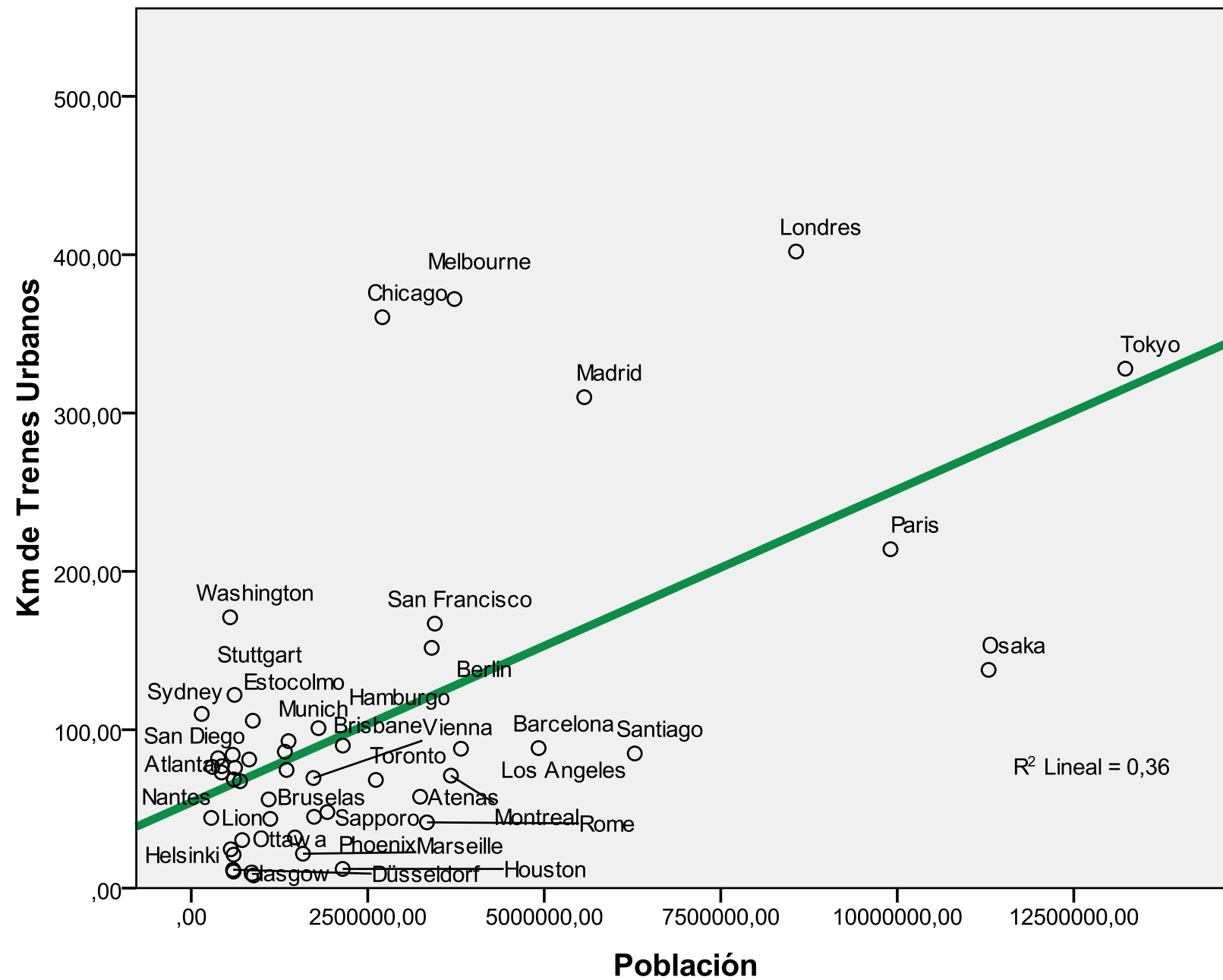
Metro systems under construction ^[edit]

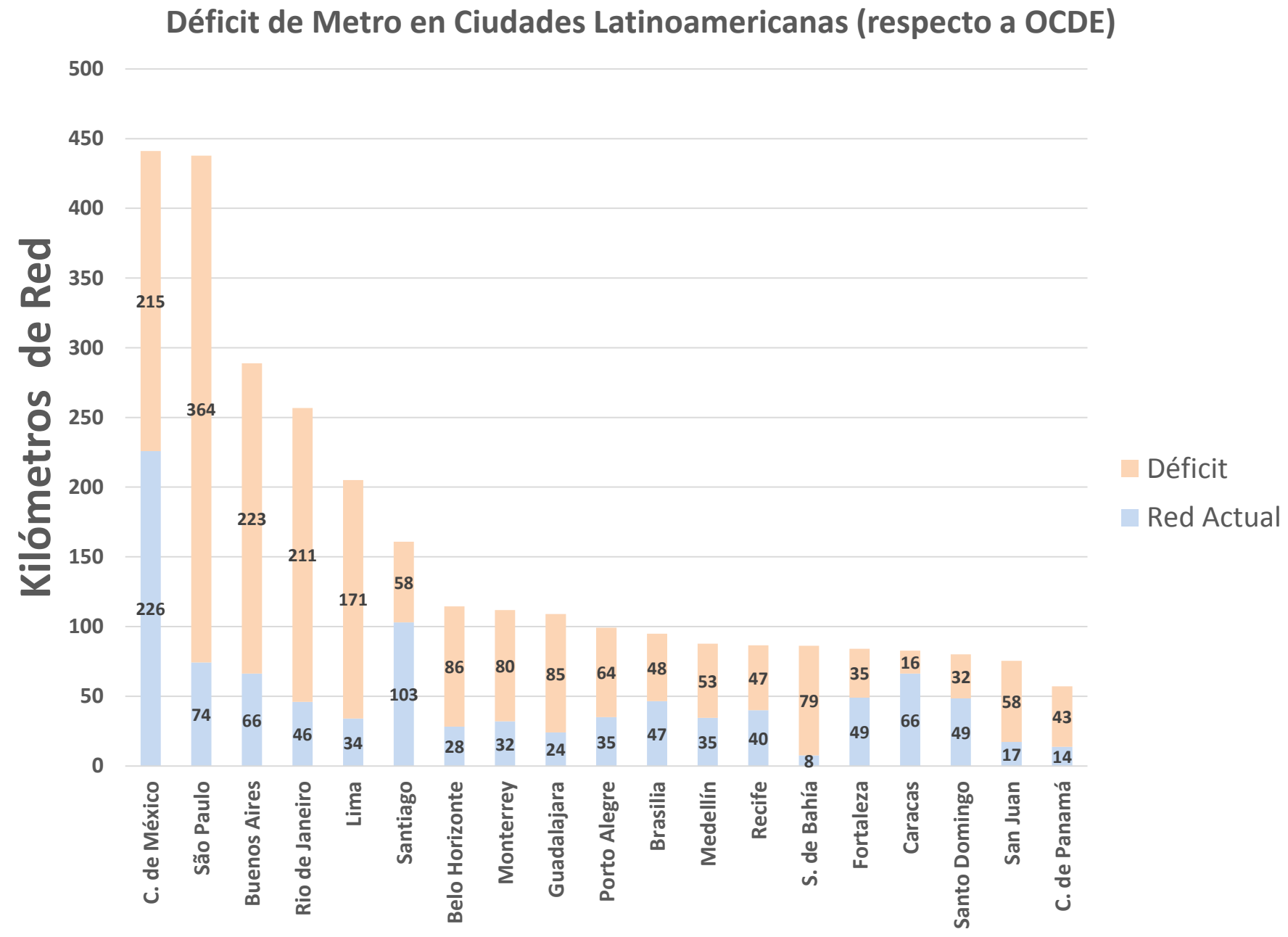
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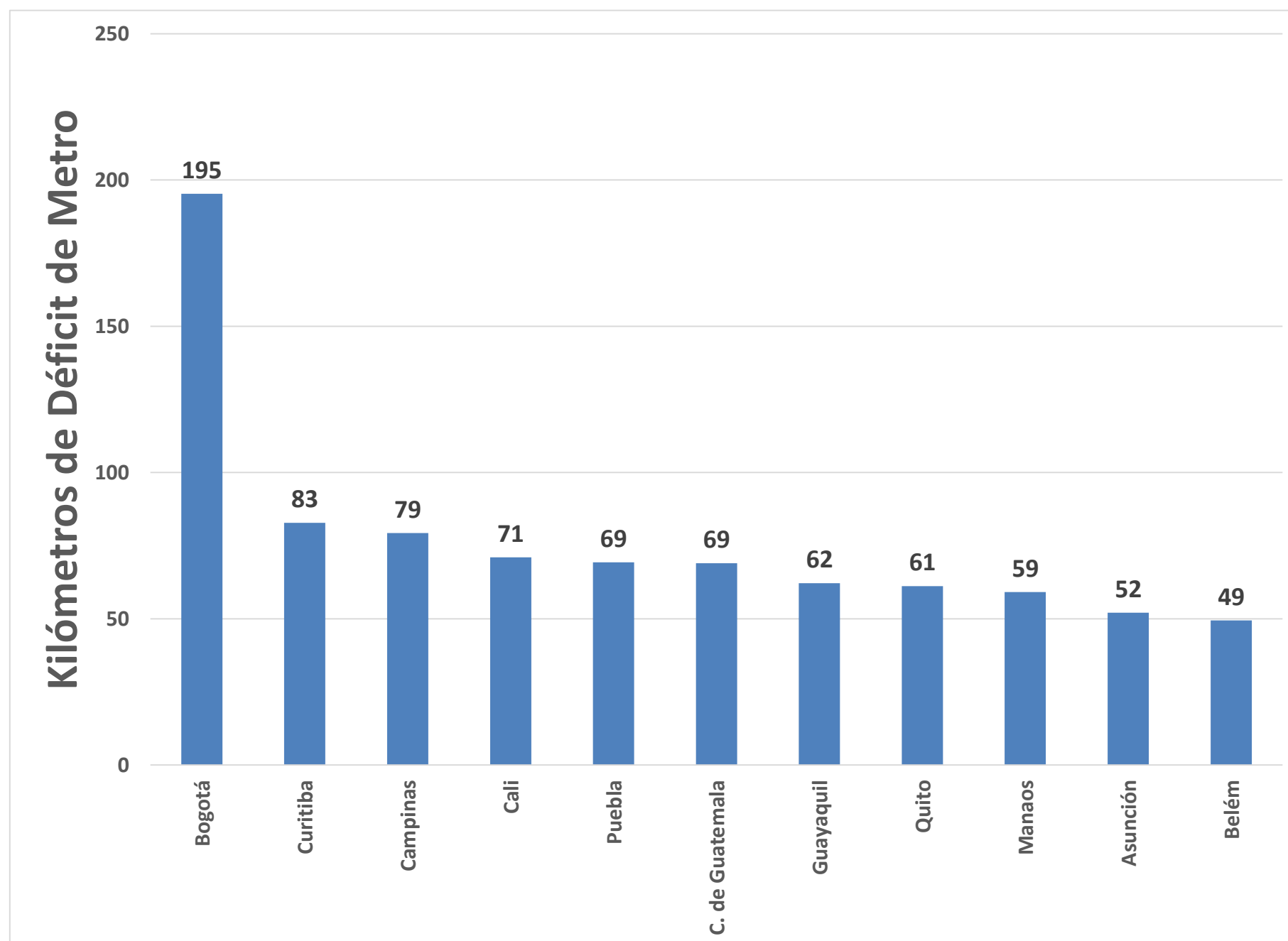
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Ürümqi	 China	Ürümqi Metro	2014	2018
Xiamen	 China	Xiamen Metro	2013	2017
Xuzhou	 China	Xuzhou Metro ^{[UC 2][UC 3]}	2014	2017
Chennai	 India	Chennai Metro	2010	2015
Hyderabad	 India	Hyderabad Metro Rail	2012	2015
Jaipur	 India	Jaipur Metro	2010	2014
Kochi	 India	Kochi Metro	2013	2016
Lucknow	 India	Lucknow Metro	2014 ^[UC 5]	2017
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Qom	 Iran	Qom Metro ^{[UC 8][UC 9]}	2010	2015
Tabriz	 Iran	Tabriz Metro ^{[UC 10][UC 11][UC 12]}	2003	2015
Doha	 Qatar	Doha Metro	2013	2019
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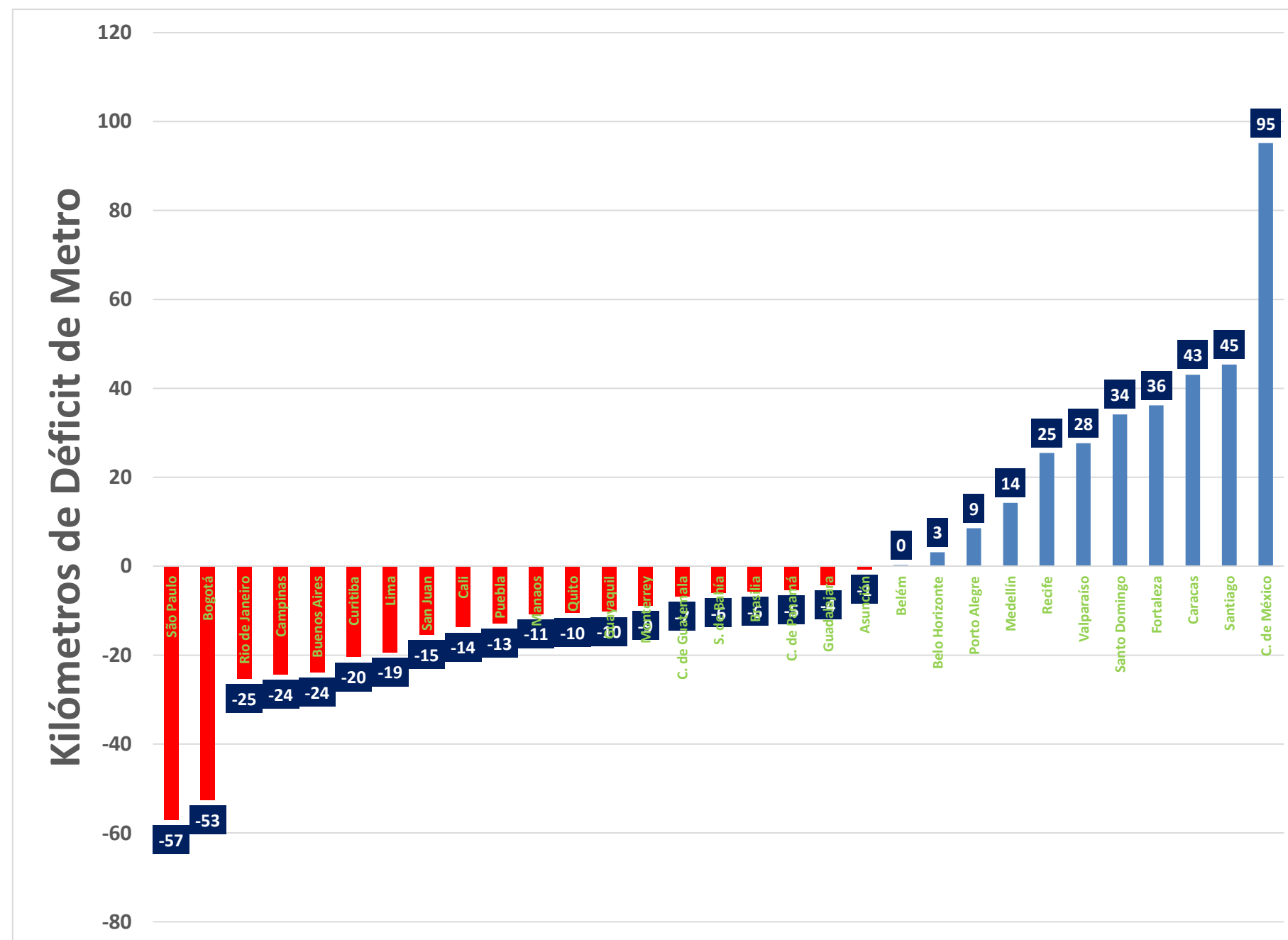


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Discusión

Bus Transit

Flexibility. Bus routes can change and expand when needed, for example, if a roadway is closed, or if destinations or demand changes.

Requires no special facilities. Buses can use existing roadways, and general traffic lanes can be converted into a busway.

More suitable for dispersed land use, and so can serve a greater rider catchment area.

Several routes can converge onto one busway, reducing the need for transfers. For example, buses that start at several suburban communities can all use a busway to a city center.

Lower capital costs.

Is used more by transit dependent people, so bus service improvements provide greater equity benefits.

Rail Transit

Greater demand. Rail tends to attract more discretionary riders than buses.

Greater comfort, including larger seats with more legroom, more space per passenger, and smother and quieter ride.

More voter support for rail than for bus improvements.

Greater maximum capacity. Rail requires less space and is more cost effective on high volume routes.

Greater travel speed and reliability, where rail transit is grade separated.

More positive land use impacts. Rail tends to be a catalyst for more accessible development patterns.

Increased property values near transit stations.

Less air and noise pollution, particularly if electric powered.

Rails stations tend to be more pleasant than bus stations, so rail is more appropriate where many transit vehicles congregate.



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Muchas Gracias