

# Differences in High-Density Residential Development Rate along Bangkok's Rail Transit Corridors



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# Outline

- Introduction
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  - Bangkok and Its Rail Transit Systems
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- Conclusion



# Bangkok City & Metropolitan Region

- Capital of Thailand, center of government, service industry, education, and tourism, etc.
- Population/Area
  - City: 9,100,000/ 605.7 sq. mi.
  - Metro: 11,971,000/2,996.7 sq. mi.
- Bangkok Metropolitan Administration (BMA): Bangkok City's local government with its own elected governor and city council
- Bangkok Metropolitan Region (BMR): Bangkok City and five adjacent provinces

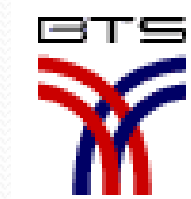


# Bangkok's Public Transportation

- Public Transportation
  - Three rapid transit systems: BTS elevated rail, MRT subway, and SRT Airport Rail Link
  - One BRT: BMA
  - One bus operator: BMTA (State Enterprise)
  - Numerous private bus and van operators
- For-hire services
  - Taxi
  - Tuk tuk

# Bangkok's Rail Transit Systems

- Bangkok Transit System (BTS)
  - Two elevated heavy-rail lines (Green Lines), 23.5 km long, with 24 stations
  - Operation began in December 1999.
  - Built, operated, and wholly owned by private company, under 30-year concession from BMA
  - Two new stations opened in 2009 and five additional stations scheduled to open in 2011



# Bangkok's Rail Transit Systems



- Mass Rapid Transit Authority (MRTA)
  - Underground heavy-rail line (Blue Line), 20 km long, with 20 stations
  - Operation began in July 2004.
  - Nat'l public enterprise in partnership with private joint venture: BOT model
  - Purple Line, 23 km long, 16 stations under construction and scheduled to open in 2014

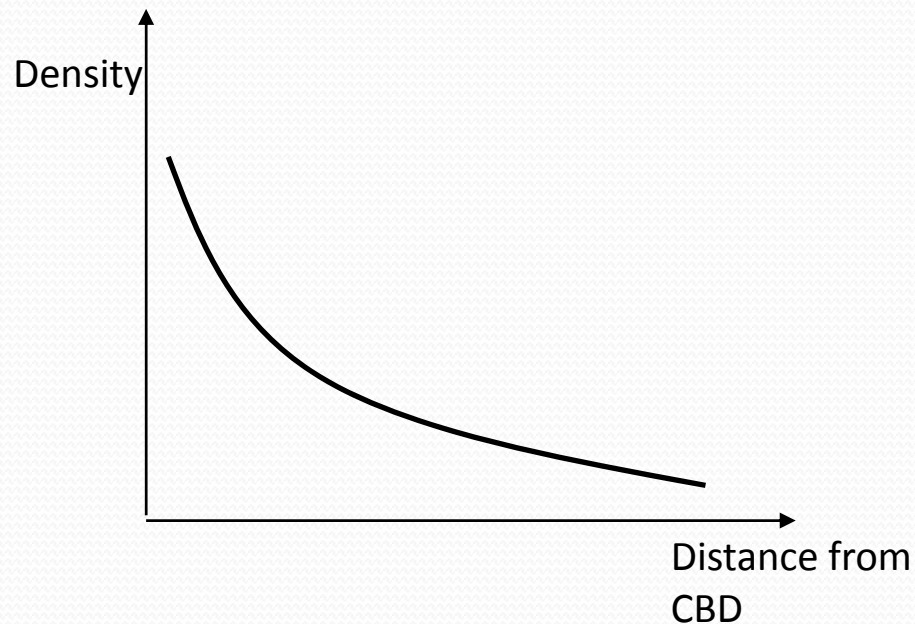


# Motivation

- Rapid but uneven development of high-density residential properties near transit stations
- Why greater intensity near certain stations but not others?
- What are the factors that cause such disparity?

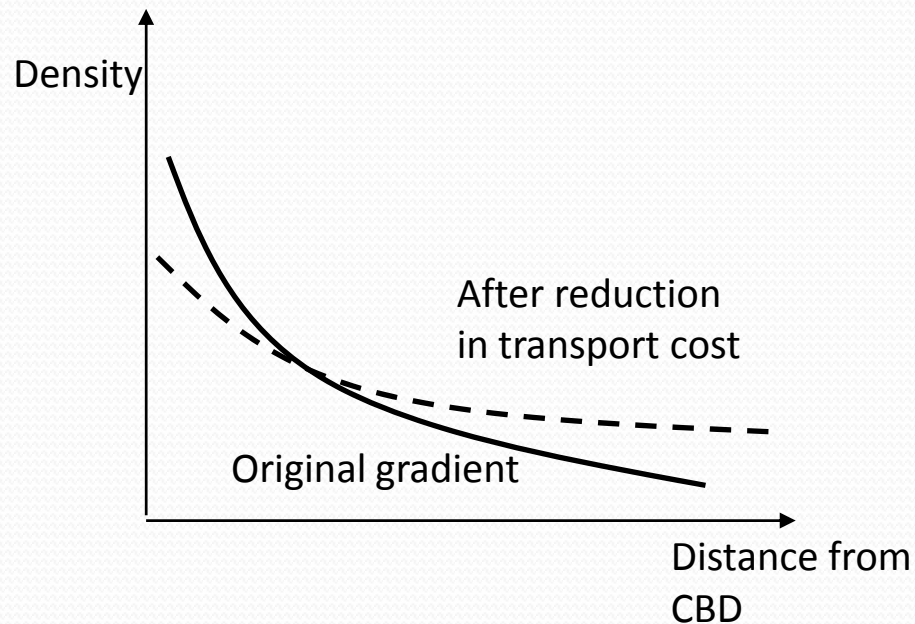
# Theory: Density & Rent Gradients

- Urban economics theory predicts that density of development and rent be highest near the CBD and gradually decrease with the distance. (Alonso, 1964)



# Theory: Reduction in Transport Costs

- If transportation becomes less costly, the gradients will flatten, as tenants trade longer travel distance with larger space. The city-wide introduction of rail transit, should result in flattened density gradients



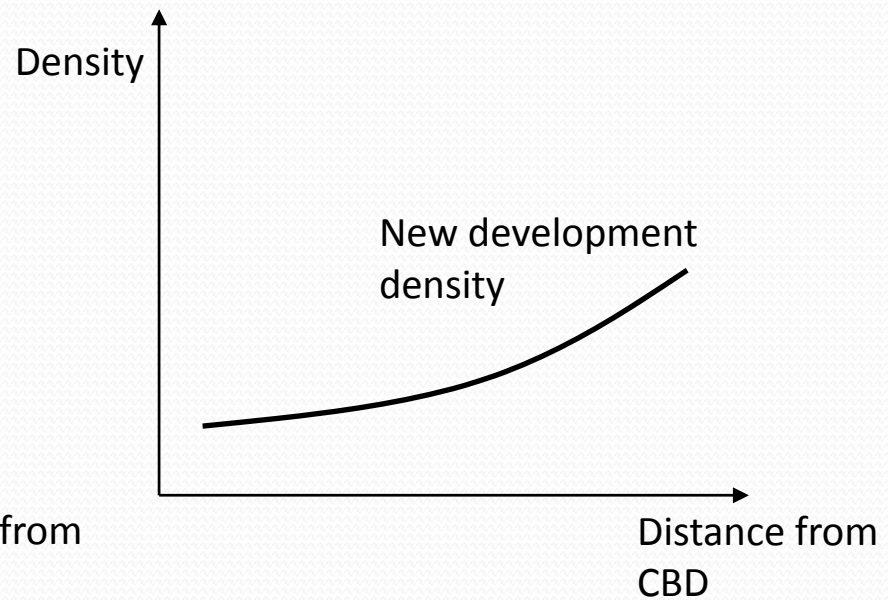
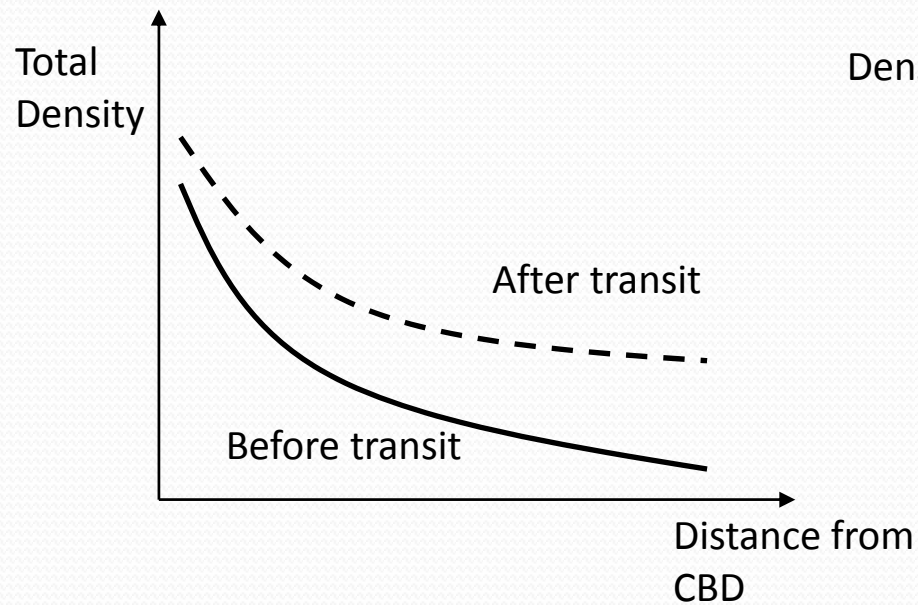


# Hypothesis

- After the introduction of rail transit systems,
  - Rent and density gradients *along transit corridors* should flatten, due to the reduction in transportation costs;
  - however, *throughout the city*, new developments may not follow the previous pattern, and the shift of new development from areas unserved by transit to the transit corridors can be expected.
- The results would be not only flattened rent and density gradients in transit corridors, but also the upward-shifted gradients for both variables.

# Hypothesis

- Transit corridors should become denser relative to other areas, but differentiation in price long the corridor should be less pronounced.





# Alternative Hypothesis

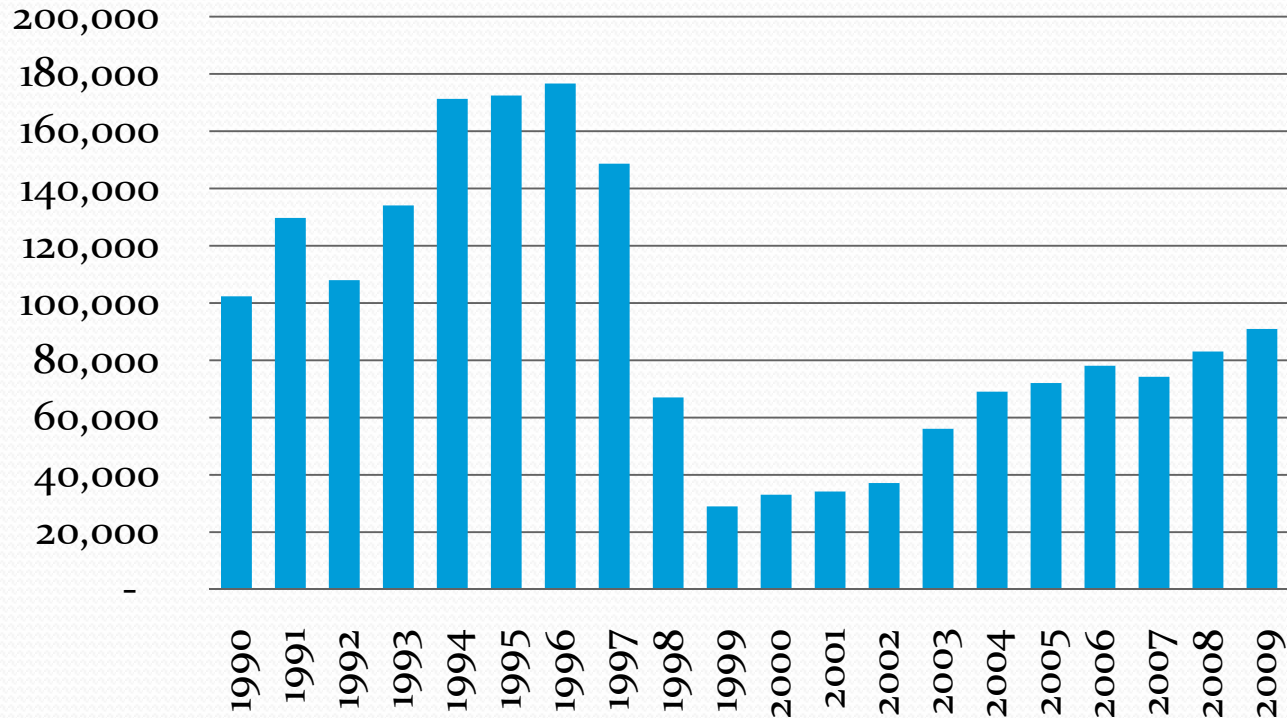
- Because of low cost of land ownership, land market has not been efficient.
  - Before the rail transit, large parcels of land held by hereditary landowners in the inner/older suburbs and development leap-frogged to outer/newer suburbs.
  - After rail system, land value increases sufficiently to prompt landowners in the older suburbs to put their properties into better use (high density development).
  - In the newer suburbs, previously developed in medium-density, small plot sizes made it difficult to amass sufficient amount of land to legally qualify for high-density development.



# Data

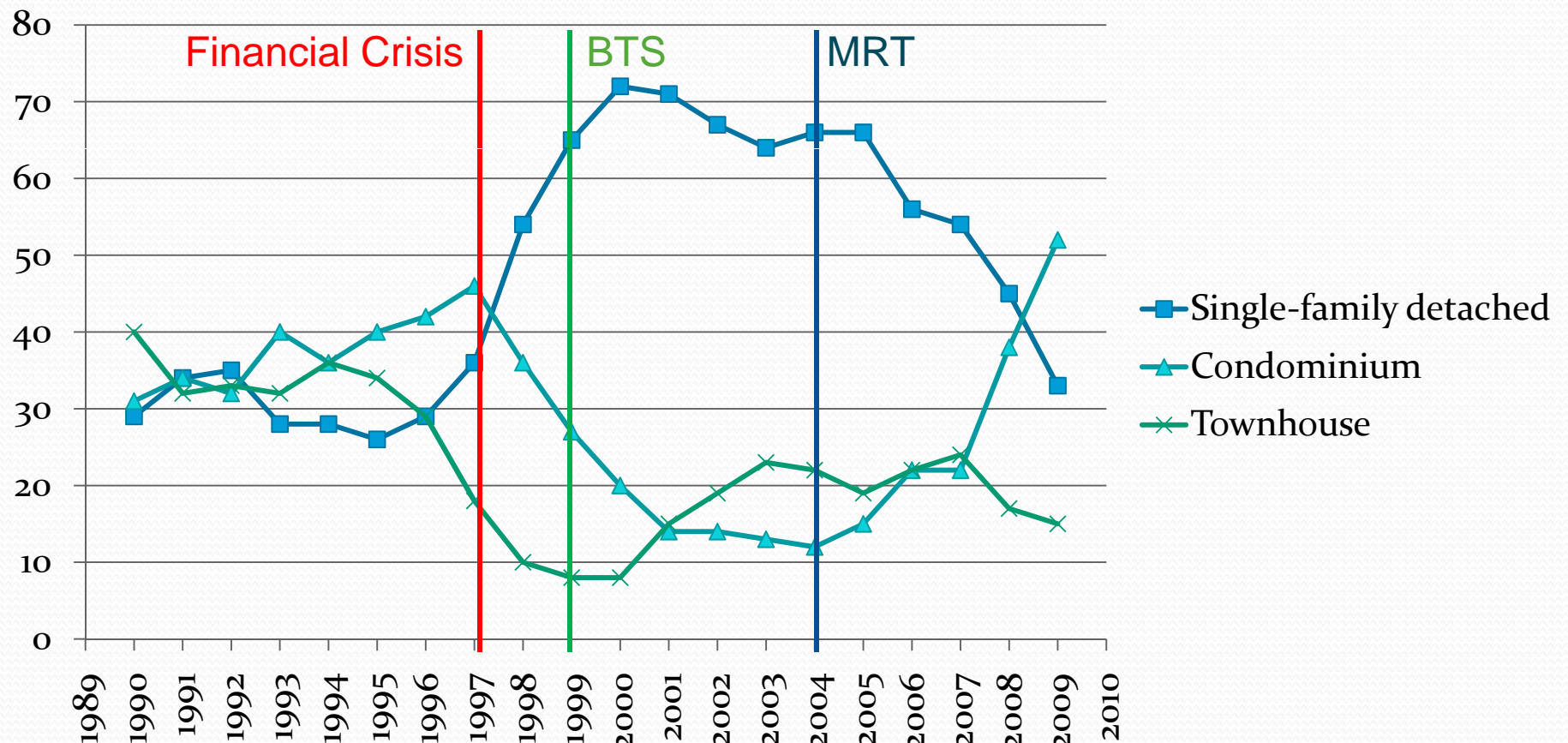
- Data on condominium projects gathered from several sources:
  - commercial real estate property web sites ([http://www.area.co.th/thai/head6\\_releases.php](http://www.area.co.th/thai/head6_releases.php))
  - Treasury Department's assessed property value portal (<http://www.treasury.go.th/internet/assessment/>)
  - Data include size of the project's land, number of units, number of floor, year of opening, unit price, etc.
  - Individual project data sorted by transit stations and distance to the transit stations

# New Housing Units in Bangkok Metropolitan Region

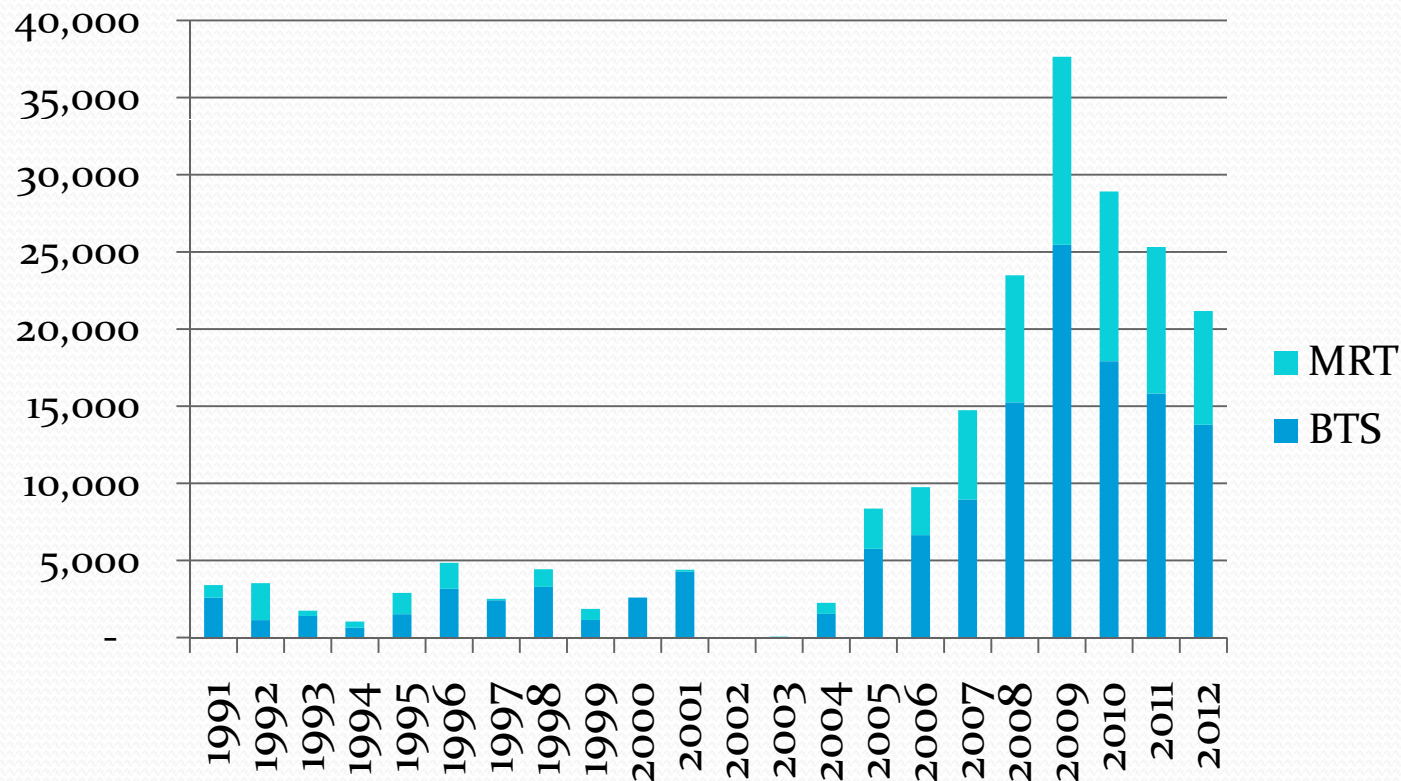


1997 Asian Financial Crisis

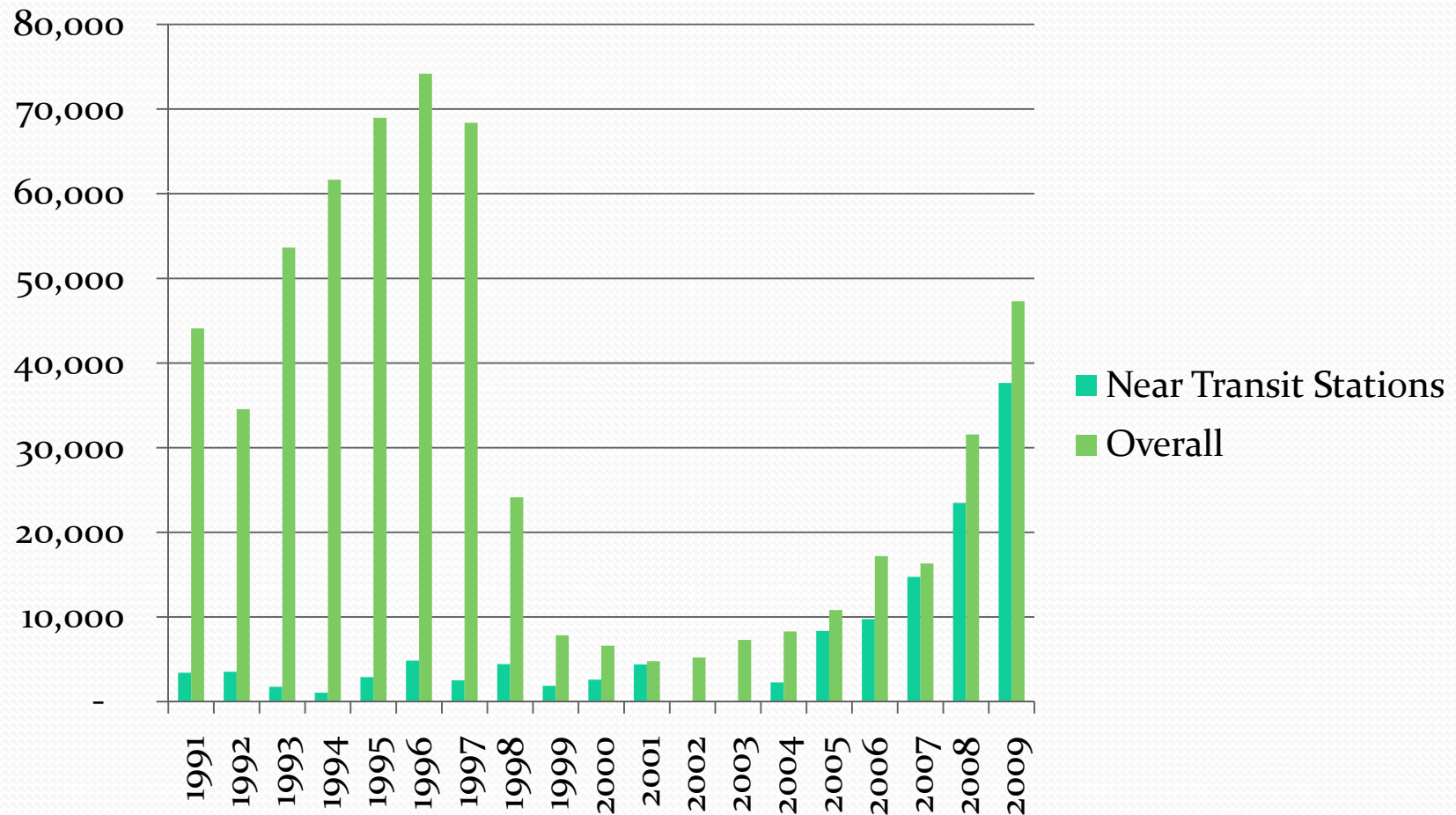
# Types of Housing Stock in Bangkok Metropolitan Region (% of New Units)



# New Condominium Units within 1000m of Transit Stations



# New Condominium Units within 1000m of Transit Stations vs. Overall





# Four Rail Corridors

- BTS East Line (Sukhumvit/9 stations)
  - CBD (Asok), old suburb (high-income), and outer suburb (medium- to low-income neighborhoods)
- BTS North Line (Phahol Yothin/7 stations)
  - Government and military land, old suburb (medium-income), and outer suburb (medium- to low-income neighborhoods)
- BTS South Line (Silom/8 stations)
  - CBD (Silom), old suburb (high-income), and outer suburb (medium- to low-income neighborhoods)
- MRT Subway Line (17 stations)
  - Semi-circumferential, both CBDs, and outer suburb (medium- to low-income neighborhoods)

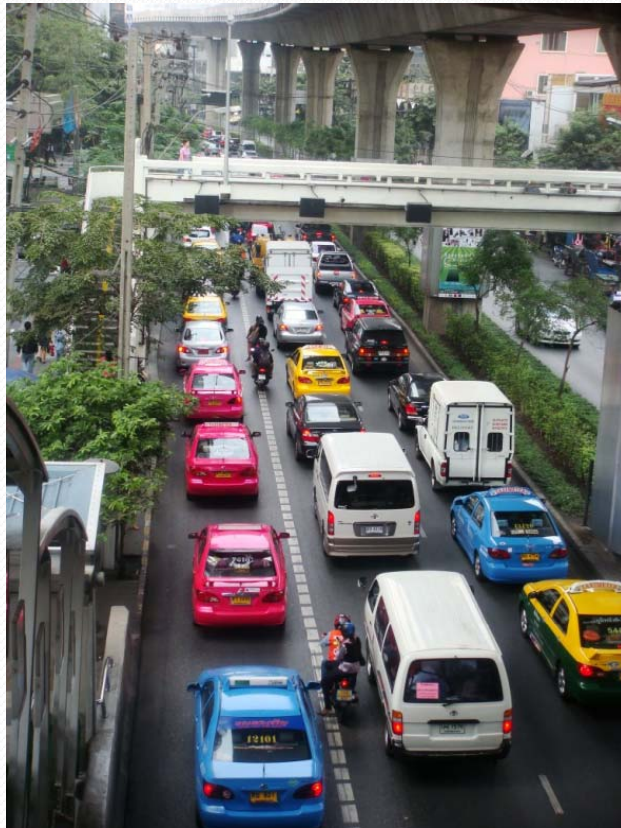


## BANGKOK Mass Transit

- MRTA Subway (2004)
- Sukhumvit Line
- Silom Line

2007 © UrbanRail.Net (R. Schwandl)

# BTS East Line (Sukhumvit)



# BTS North Line (Phahol Yothin)



# BTS South Line (Silom)



# MRT Subway Line





# Findings

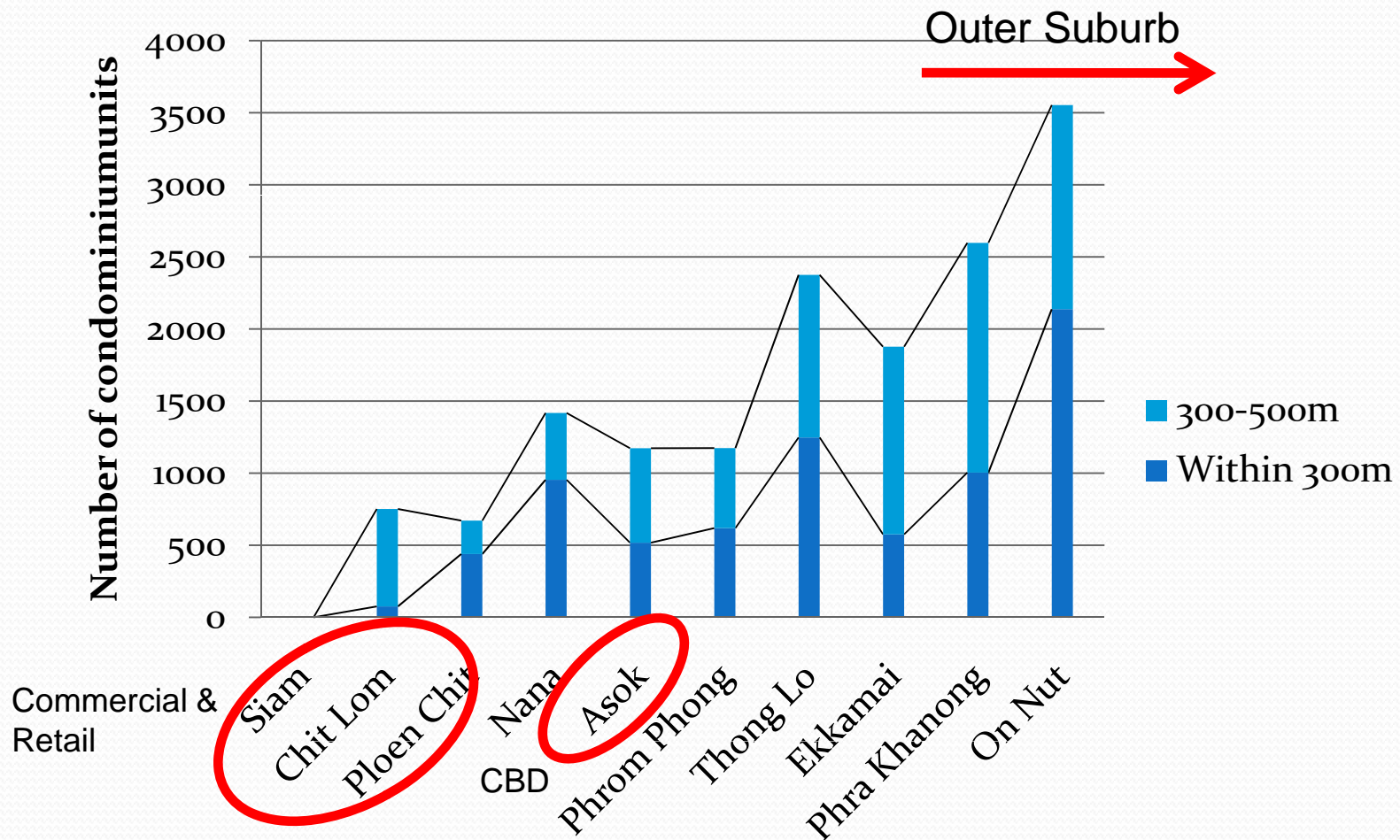
- Total number of new condo units within *500m* of train stations and completed after 1999:
  - BTS East: 15,590
  - BTS North: 10,283
  - BTS South: 13,971
  - MRT Subway: 17,959
- The number of new units at each station does not closely follow any particular density gradient.



# Findings: BTS East (Sukhumvit)

- Along BTS East (Sukhumvit) corridor, new development seems to follow more closely to the new development density gradient as predicted by the theory.
  - The numbers of new condominium units near certain stations in prime areas (Chit Lom, Nana, and Thong Lo) are greater than what they should be according to the trend.

# Number of New Condominium Units from 1999 to 2010 along BTS East Corridor (Sukhumvit)

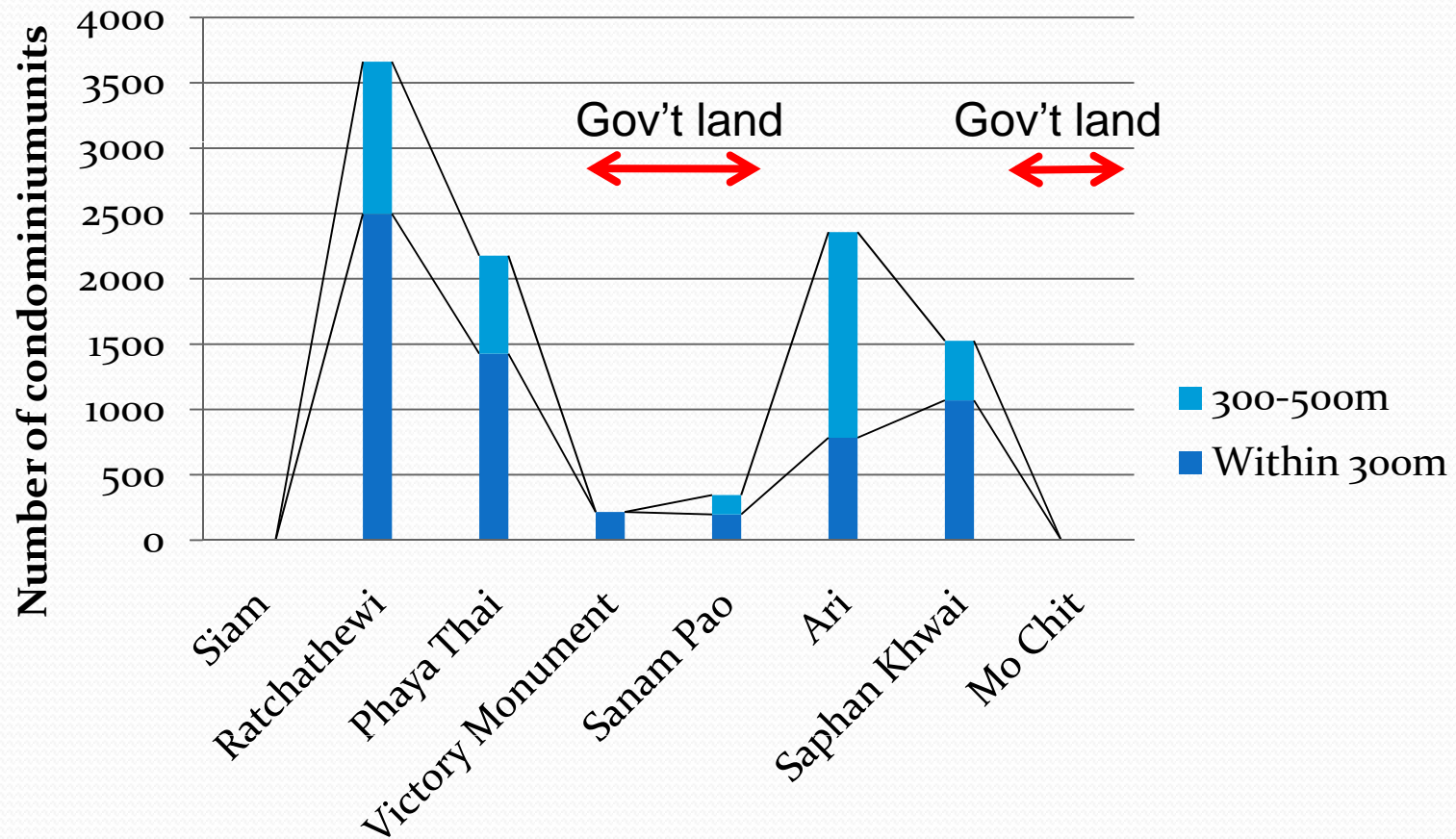




# Findings: BTS North (Phahol Yothin)

- The pattern of new development along BTS North corridor (Phahol Yothin) is quite unexpected.
  - Large numbers of new units can be observed near stations closer to the city, whereas the most distant stations have smaller number of new units.
  - There seems to be a downward-sloping gradient of new development density with the exception of certain stations, including Victory Monument and Sanam Pao.

# Number of New Condominium Units from 1999 to 2010 along BTS North Corridor (Phahol Yothin)

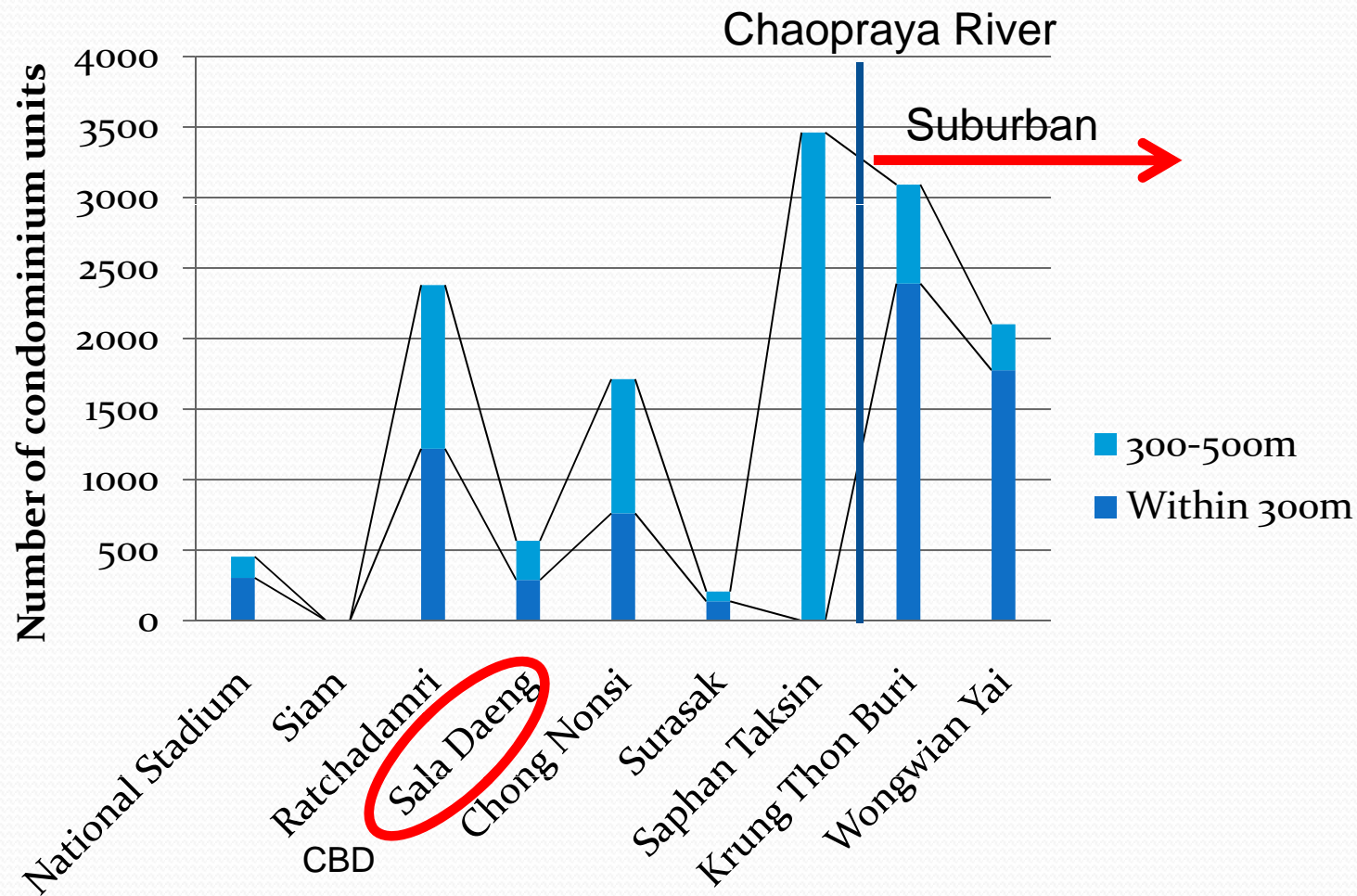




# Findings: BTS South (Silom)

- Along BTS South corridor (Silom), the new development pattern is somewhat mixed.
  - The largest numbers of new units are observed around stations at the far end of the line (Saphan Taksin, Krung Thon Buri, and Wonwian Yai ).
  - However, there are also spikes of new development at stations near the CBD (Ratchadamri and Chong Nonsi).
  - Saladaeng, one of the main CBD stations have a small number of new units, but Surasak station, which is located in the old suburb has even fewer units.

# Number of new condominium units from 1999 to 2010 along BTS Silom Corridor

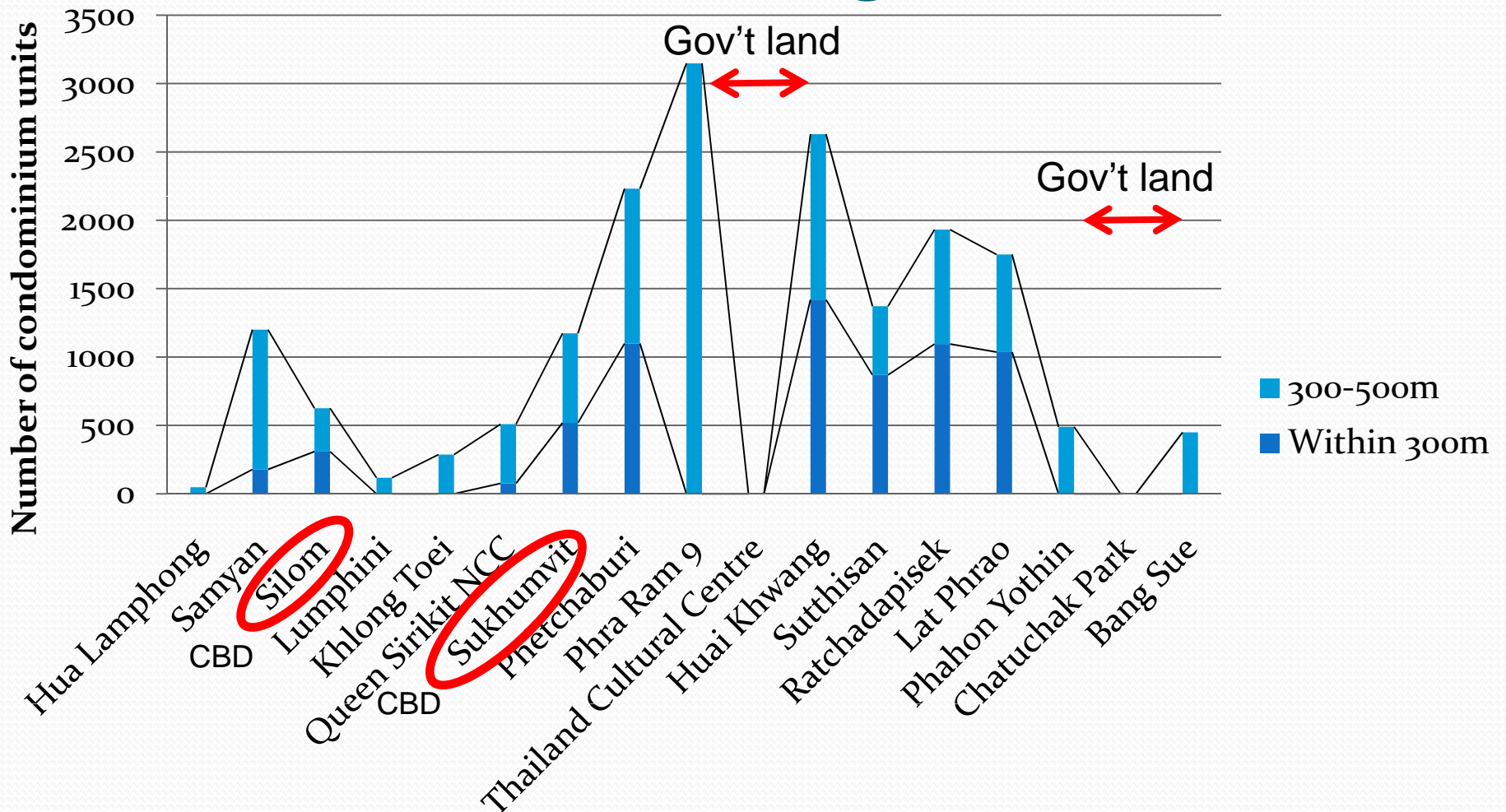




# Findings: MRT

- The MRT subway's semi-circular alignment means that the density gradient along this line might be irregular.
  - Certain stations near the end of the line (Chatuchak Park and Bangsue), are slightly nearer to the CBD than stations that came before them.
  - At the beginning, the pattern of new development along the subway line seems to follow the upward-sloping density gradient, but the density decline toward the end of the line.

# Number of new condominium units from 1999 to 2010 along MRT Corridor





## Conclusion: Factors Affecting New High-Density Residential Development

- Land ownership
  - Limited development occurred where land is owned by government. (Victory Monument, Sanam Pao, and Chatuchak)
- Land value
  - Areas where land is expensive tend to attract development. (Thong Lo, Ratchathewi)
  - But areas where land is plentiful and/or cheap can also be attractive. (Saphan Taksin, Phra Khanong)
- Developable land and plot size
  - Easier to develop large projects in locations where plot sizes are relatively large. (Onnut, Krung Thon Buri)



# Future Research

- Questions to be answered:
  - Without the transit systems, would redensification in old suburb occur?
  - Why high density near some inner-city stations but not others?
  - What prevents higher density of development in certain middle stations?

# Thank you for your attention!



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