Under What Circumstances Will Land Value Capture Work to Finance Public Transit?

Based on Case Studies of Hong Kong, Tokyo and New York City

A Thesis Presented to the Faculty of Architecture, Planning and Preservation

COLUMBIA UNIVERSITY

In Partial Fulfillment of the Requirements for the Degree

Master of Science in Urban Planning

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May 2015
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Chapter 1 Introduction

Public transportation is of great importance to urban development. A good public transit system can attract residents, business and tourists, and define the way a city grows. It is viewed as a top development priority in many cities across the world. However, public transportation systems are complicated and require large sunk investments. In almost every city, local government has to put into substantial subsidies to construct, maintain and operate the system. From existing experiences, it is neither equitable nor feasible for fare box revenues to cover all the expenses. At the same time, traditional funding methods are becoming increasingly inadequate to cover the gap between operating expenses and revenue.

For example, motor fuel taxes, a longtime funding source for public transport, are weakening because of the transition from fuel to environmentally-friendly energy. On the other hand, direct user charge for road use, such as congestion price, are facing political difficulties. Even in cities that already introduced the charging system, such as Oslo, Bergen and Trondheim, public are expressing low levels of support (Harsman & Quigley, 2010). Lastly, cities that have property tax rely on this to pay for general city service, including public transport systems. However, property taxes impact everyone in the city, which result in a location equity issue (Salon & Shewmake, 2011).

One alternative to finance public transit system is the land value capture mechanism, that is, to cover the transit development and operation cost by capturing part of the
value created by transit improvement (Smith & Gihring, 2014). This is based on the principle that land values in general reflect the accessibility of certain locations. Developers prefer a location with convenient access to services and activities, residents are in favor of short travel time for shopping and working, and business owners want a location that is easy to attract consumers. All these accessibilities are largely determined by the quality of public transportation, which makes some locations valuable and others not. Therefore, it is rational to capture a portion of the publicly created land value increment to finance transportation infrastructure.

Although in recent years there has been renewed discussion in using value capture to finance public transport, this idea is not new. For example, in the 1800s in the District of Columbia, people already had the concept that transportation improvements can increase land values. At that time, people decided to pave streets in order to make air cleaner and properties more accessible. Paving was expensive, and it made properties which fronted a paved street more valuable. Therefore, Congress enacted laws requiring private property owners to contribute 50% of the street paving cost through a special assessment (Rybeck, 2004).

In more recent years, there have been many successful examples of land value capture. Hui and Ho (2004) note that Hong Kong and Singapore significantly reduce government expenses by renting and taxing land in station areas. Specifically, Hong Kong’s railway system receives no subsidy from the government. Rybeck (2004) estimated the added value from Washington D.C’s Metro, and found surplus values were generated. Same results are found in London’s tube extension.
Many studies have shown that public transport systems generate sufficient values, and value capture mechanism can contribute substantially to financing these projects. However, when we look at individual cities, they each have different social, economic, and political background. Therefore, my research questions are: Is value capture a suitable method for funding public transportation in everywhere? Which value capture method works the best based on the specific local conditions?

With these questions, the thesis will examine under what circumstances value capture will work well to finance public transportation. It will look into three examples where value capture is applied. Cases will include successful examples such as Hong Kong’s “Rail+Property” model, Tokyo’s land readjustment scheme, and one in-dilemma example, which is the New York City’s No.7 Subway Extension Project, using the Tax Increment Financing funding method.

Each case will start by exploring the general local background, and figuring out the favorable prerequisites of value capture. Further, the thesis will look into the specific policy and practical tools used in each case, summarize the effective ways that can be used to capture value, and how they integrate with the specific background. At the end of each case, there will be a conclusion of its outstanding practices and a comparison with the other cases. The resulting recommendations aim to suggest how planners and public officials can fully utilize the value capture mechanism to solve the financial shortage in public transportation financing.
Chapter 2 Literature Review

Part 1 Effects of public transportation on urban growth

As public good, mass transit service is largely provided and operated by the public sector throughout the world. Public transportation investment can create great social and economic benefits, substantially affecting urban growth.

According to Salon and Shewmake (2011), public transportation increases the accessibility of locations, meaning the places become easier for people and businesses to reach. This in turn contributes to the land development and economic development in transportation station areas.

Litman (2004) finds that U.S. cities with better rail systems tend to have higher per capita transit ridership, lower vehicle ownership, less traffic congestion, lower traffic death rates, lower consumer expenditures on transportation, and higher fare-box recovery. If we monetize these benefits, they will exceed the railway cost several times over. This indicates that rail transit systems create significant economic, social and environmental benefits. As the system expands and matures, the benefits will increase accordingly.

Further, literatures have shown that public transport alone is not enough to create significant regional development. It should be the results of the combination of several factors. The first factor is the increase of accessibility in the area around the new transit station (Knight & Trygg, 1977). This is determined by the station’s ability to capture ridership in the surrounding area, as well as the level of congestion in the
existing transit system. Integrated land use policy is another factor which will increase the effect of public transportation on land development (Gospodini, 2005). Policies such as increasing floor area ratio (FAR) in station area, transferring air rights above stations, and encouraging integrated development with surrounding buildings will provide good opportunities for land development. The third factor is the physical characteristics of the station area (Cervero, 2009). Public transportation stations which are located in central areas with convenient pedestrian and bicycle access and car parking, will have a larger effect on surrounding land development than less central locations.

These findings leads to the conclusion that when making new public transportation investments, planners should utilize as many as possible the above factors to support the new transport system. This is the concept of “Transit-Oriented Development” (TOD), which will improve the benefits from public transportation to the city, both in terms of land value and transport ridership (Nasri & Zhang, 2013).

**Part 2 Effects of public transportation on land value**

Two major components comprise the value of land: 1) the monetized value of accessibility to resources in the city, and 2) the monetized value of on-site improvement (Medda, 2012).

Public transportation increases accessibility by reducing distance and travel cost between areas. At the same time, willingness to pay for properties near transport stations should increase, especially those in central business districts. The increase in
property value is determined by the type of transport service, the distance between the property and the station, the quality of the service and transportation alternatives (Salon & Shewmake, 2011).

In 2002, The Royal Institute of Chartered Surveyors (RICS) and the Office of the Deputy Prime Minister (ODPM) carried out a study assessing the relationship between land use, land value and public transportation (RICS, 2002). The study shows that on the one hand, the impact of new public transportation is generally positive, but the extent is determined by policies in land use and automobile regulation. On the other hand, railway systems turn out to have larger positive effect on land values than bus systems. One possible reason is that unlike railways, bus routes can be easily changed. Therefore, developers are not willing to make large amount of investment along the bus routes (RICS, 2002).

Since then, there have been many other important studies. Debrezion (2007) finds out that public transport has a higher impact on commercial property values than residential. But for a given station, it will influence a smaller area when it is built in a commercial area. Based on the studies in Asian countries including China, Singapore and South Korea, public transportation generally has a positive impact on property values, and the impact is closely related with distance to the station. On average, property value will decrease by 1% if the distance from a transport station is increased by 10% (Cervero & Murakami, 2009).

Bartholomew and Ewing’s (2010) study indicates transit accessibility, walkability, and environment quality can be capitalized into real estate prices. The existence of
high walkability and mixed land use types are likely to increase land values independent of transit accessibility.

Studies show that in general, public transportation has a significant impact on land value. However, other factors should be considered which will affect the total amount of value generated by public transport. For instance, Zheng and Kahn’s study (2008) shows that the land values will differ based on where the land is located. In Beijing, the price premiums are much larger in urban areas than in suburban areas. Debrezion’s study (2007) also indicates that the impact of public transport on land values depends on the location of the land, as well as the property type (residential/commercial).

Other factors related to the value generated from public transportation include the service quality, the extent of network, and the ticket price. Andersson (2010) conducted a research about the high speed rail in Taiwan, and finds out that it has little impact on land values due to the high ticket price (A monthly ticket can take up to 70% of the median monthly wage in Taiwan). It is difficult to capitalize expensive services into land values.

In most studies, proximity to transport stations has a positive correlation to land value. They can generate property value premiums ranging from 3% to 40% in different conditions (Medda, 2012). However, public transportation can have negative effects on land value due to noise, pollution, congestion, and crime. In Atlanta, proximity to transport stations raised land values in poorer area of the city, but lowered them in richer areas; whereas there was a reverse situation in Miami (Diaz, 1999).
Part 3 Value capture as a way of public transportation financing

Value capture is a way to generate revenue by recouping a portion of the gains in the value of land that result from improvements of public transportation. Value capture approach requires two prerequisites. First, there should be sufficient value generated from public transport to be captured. Second, there should be favorable policy which enables local government to capture the value (Salon & Shewmake, 2011).

Traditional public transportation subsidy method uses municipal funds such as property tax. This targets everyone in the city, which leads to a location equity issue. Value capture generates funds from areas that directly benefit from public transport, and avoids the equity problem (Salon & Shewmake, 2011). Common value capture mechanisms include:

*Leasing development rights or selling land.* In both situations, government and public transportation agency acquire land adjacent to transit stations at the price before public transport is built. After the transport infrastructure is built, the government or agency can lease or sell the land to the open market at an after-development price and then capture the added value (Mathur & Smith, 2013).

*Land Value Tax.* This is the tax on the value of land that is near public transport stations. In some cases, it can be made in addition to existing property taxes, with the purpose of paying for the location benefits (Rybeck, 2004).

*Tax Increment Financing (TIF).* TIF uses future property tax gains to subsidize current public transport improvements within the designated district (Medda, 2012).

In real practice of value capture, Hong Kong’s Rail+Property model is a well-known
example. The Mass Transit Railway (MTR) Corporation obtains land from government at pre-development prices, and sells or leases the land at higher price. Hong Kong is a dense city and people depend on public transport to commute. Therefore, new rail stations add substantial value to surrounding area. Hong Kong’s strategy can be applied in cities where government owns the land, and favorable land use policies exist which entitle government the right to capture value (Tang & Lo, 2010).

Tokyo is another successful example. Tokyo railway is operated by private companies. Except from the rail business, the companies also invest in real estate development around stations, department stores, construction business and education facilities. Besides, Japanese government provide favorable policies to increase ridership, including vehicle and fuel taxes, direct car ownership controls, and tax breaks for public transport users (Tang et al., 2004). Although Tokyo railway is receiving subsidy from government, the associated businesses significantly reduce the amount of subsidy and save government expenses.

Singapore’s model features on strong government policies which encourage public transit. The government built the public transportation system and maintains the ownership. High road tolls and vehicle ownership fees are used to pay for the debt of infrastructure investment and maintenance (Cervero & Murakami, 2008).

From these listed cases, we can find there is no standardized model of value capture that can be directly applied across cities; doing so will only result in ineffectiveness in value capture mechanism (Squires & Lord, 2012). Under different economic, social
and political circumstances, relevant stakeholders should assess available financing options and decide which instruments are most suitable in current context.

To conclude from the above literatures, value capture models are applicable to cities that have a good coordination of land use, city planning and economic development. In this way, a substantial amount of value can be generated from the improvement of public transportation. Besides, the ability of government will determine the actual amount of value that can be captured. First, the government should be capable of tracking the land value and levying land taxes as a form of return. Second, it should be able to acquire land at a favorable price, which will minimize the cost and maximize the profit from future land transition. Finally, in case of a joint development project, the government should be a smart business partner with the private sector in developing land.
Chapter 3 Methodology

The purpose of this study is to examine under what circumstances value capture will work to finance public transportation. The thesis is based on case studies. Specific methods for the thesis include documentary review and interview with scholars and officials.

This study carries out three case studies: 1) Hong Kong, the poster child for the use of value capture, which self-finances the transport system by successfully adapting the “Rail+Property” model; 2) Tokyo, where land readjustment and intense real estate development are integrated for capturing added value in transit areas; and 3) New York, where tax increment financing (TIF) is used to finance the No. 7 Subway Expansion Project.

The first two cases will serve as successful models for exploiting value capture, while the last one will serve as an opposite comparison. Through evaluation of the three cases, the thesis will finally come to the conclusion of how to efficiently utilize value capture to finance public transportation.

The primary data used in the study will be secondary data yielded from archival research. The sources include journal articles, government reports, conference publications, graduate theses, and news articles. They will provide background information of the three targeted places and their current value capture practices. This information will be transformed into its own logic in this thesis.

In addition, the study will explore qualitative data generated from interviews or
emails with scholars, public officials (MTA in New York), columnists, and subway & real estate managers (MTR in Hong Kong), mainly in the field of public transportation which is related to the three cases. They will be asked open-ended questions about the existing public transportation finance mechanisms in the city. Based on the data from documentary and interview, the thesis starts each case by exploring the general local background, and figuring out the favorable prerequisites of value capture. Further, the thesis will look into the specific policy and practical tools used in each case, summarize the effective ways that can be used to capture value, and how they integrate with the specific background. At the end of each case, there will be a conclusion of its outstanding practices and a comparison with the other cases. The resulting recommendations aim to suggest how planners and public officials can fully utilize the value capture mechanism to solve the financial shortage in public transportation financing.
Chapter 4  Rail Plus Property Program in Hong Kong

From this chapter, the thesis begins to explore the targeted value capture cases. The first case is Hong Kong’s public transit development method, which is well known as a distinctive example of transit value capture.

Hong Kong is one of the few cities in the world where public transport makes a profit. The transit sustains the city’s extremely high population density and intense economic activities. The success is due to the Rail Plus Property (“R+P” for short) mode, which integrates the city’s mass transit investment with urban development. The owner-operator of the city’s transit service, Mass Transit Railway (MTR) Corporation, applies the land value capture mechanism to cover railway construction, operation and maintenance by developing public-owned land.

This chapter examines Hong Kong’s successful Rail Plus Property mode. Part One provides Hong Kong’s general urban development context which supports this transit value capture mode, including population density and regulatory framework. Part Two introduces the Rail Plus Property mechanism and uses the Maritime Square as an example. Part Three summarizes the key elements of Hong Kong’s success in financing public transportation based on the above discussion.
Part 1 Urban Development Context

Population and Railway Service

Hong Kong is named as the “Pearl of Asia”. It has been a world-class economy and tourism center since the 1970s. Hong Kong is a small island city with an area of 1104 square kilometers. To date, the city has a population of 7.1 million, and is projected to reach 8.6 million by 2026 (HK Census and Statistics Department, 2014). With a careful urban planning and land resource management method, Hong Kong is one of the densest cities in the world. This forms a favorable condition to combine railway and property projects.

Hong Kong has a well-developed public transit system, forming the lifeblood of the city. About 12 million passenger journeys are made through the city’s public transportation every day, including railways, trams, buses, taxis and ferries (Suzuki, Murakami, Hong and Tamayose, 2015). More than 90 percent of all motorized trips are made by public transport, the highest market share in the world (Lam, 2003).

Hong Kong’s rail service is implemented by the Mass Transit Railway (MTR) Corporation. In a dense, congested city like Hong Kong, access to efficient public transport is combined with a high premium. The land value near railway stations is generally higher than elsewhere. In this situation, MTR, the owner and operator of the city’s transit system, is able to capture the land value along railways and cover the investment, operation and maintenance, and even make a profit from property development.
In 1975, the Hong Kong government established MTR to build, operate and maintain the city’s railway system. The government was its sole owner until the 1990s. In 2000, 23 percent of its shares were offered to private investors on the Hong Kong Stock Exchange (MTR, 2015). With the government being the major stakeholder and the presence of the private investors, MTR is operating for the general public’s interest, and at the same time following a market discipline to ensure efficiency.

MTR’s major business is the city’s railway system. In 2012, its network carried about 4.12 million passengers a day. As a result of the high ridership and efficient operation, the company generated a net profit of equal to 869 million US dollars from its transit operation and a fare box recovery ratio of 1.85 (MTR, 2013). As shown in Table 1-1, Hong Kong has a relatively high fare box recovery ratio compared to other major cities in the world, demonstrating its world-class transit system performance.

Table 4-1 Fare box Recovery Ratio in Major Cities
(Data Source: Regional Plan Association, 2012)

<table>
<thead>
<tr>
<th>City</th>
<th>Year</th>
<th>Fare Box Recovery Ratio (Fares/Operating Expenses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong</td>
<td>2012</td>
<td>1.85</td>
</tr>
<tr>
<td>Tokyo</td>
<td>2012</td>
<td>1.8</td>
</tr>
<tr>
<td>London</td>
<td>2012</td>
<td>1.2</td>
</tr>
<tr>
<td>Montreal</td>
<td>2013</td>
<td>0.8</td>
</tr>
<tr>
<td>New York</td>
<td>2012</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Regulatory Framework

Hong Kong’s urban planning system and land administration system have provided solid support for the intense property development along with railways. Because of land scarcity, the Planning Department creates Hong Kong Planning Standards and Guidelines to ensure efficient land use that will promote social and economic development and provide public facilities. The Guidelines take into consideration residential densities, retail facilities, transportation facilities, community facilities, green space, environmental planning, and recreational facilities. In key districts with residential and mature transportation facilities such as railway stations, the highest density “R1” is allowed, with an FAR up to 10.0 (Suzuki, et al., 2015).

In terms of land attribute, all land in Hong Kong is state property and the only land tenure is leasehold. The government of Hong Kong is responsible for land management, development, and its lease to private entities, based on China’s Basic Law passed in 1990. Private developers bid to lease land with a general 50 years term. During the lease term, land owners should use the land in accordance with town planning, civil engineering, and urban development policies.

Land leasing accounts for 20 percent of government income, which is then used as funding source for public infrastructure and services. The state leasehold system captures value from four major aspects: initial land auction, lease modification, lease renewal, and land rent collection. Among the four, initial land auction has been the major source of lease revenue, accounting for about 75 percent of government’s total
Part 2 Land Value Capture: How it Works

Rail Plus Property Program

The core of MTR’s business model is Rail Plus Property (R+P) development, which enables the company to capture real estate income to finance railway infrastructure and also yield a net profit.

As mentioned earlier, land is owned by the state and private developers usually bid for the 50-year lease to develop the land. However, under the R+P program (Figure 4-1), Hong Kong government exclusively grants MTR the development rights of the land around station area at a “before-rail” market price, which allows MTR to acquire land at a low cost. Then MTR use these rights to partner with selected developers based on an “after-rail” market price (Cervero & Murakami, 2009). Because of the high premium placed on easy access to transit, the differences between the before and after-rail land value are huge. In this way, the government provides a large amount of indirect subsidy to MTR.

Figure 4-1 Rail Plus Property Mechanism (Relation Between Government, MTR, and Developers)

(Based on Cervero and Murakami, 2009)

MTR negotiates with developers to minimize risks. For example, developers must cover all development costs such as construction and sales expense, and bear the
project risks. Also, MTR shares a portion of private developers’ net profit from selling or leasing the properties.

In order to protect itself from business fluctuations, MTR has a variety of other projects. In addition to the railways and properties, MTR also participates in commercial and retail business, equity ownership, property management, advertising and consulting (Cervero & Murakami, 2009). Therefore, even if the real estate market softens, MTR is protected by other business activities. With a wide range of business and a shift of financial burden to private developers, MTR is less exposed to market risks and more attractive to investors.

Under this scheme, property development has been the major income source of the company (Figure 4-2). From 2000 to 2012, property development accounts for 38 percent of MTR’s net income, even more than transit operation which is 34 percent. Other income such as station retail and commercial accounts for 15 percent, and rental and management accounts for the rest 13 percent. MTR also shares its benefit with the society at large. From 1980 to 2005, the Hong Kong government received nearly 140 billion of direct financial returns from the company (Suzuki et al., 2015). Besides, MTR has great indirect benefits to the society such as reduced urban sprawl and air pollution, and transit-oriented development with higher ridership.
During the whole process, MTR is functioning as the master planner. It creates a development layout plan, monitors development quality, and manages the lease and sales of completed properties. It is a bridge between the government and developers. It sets clear rules to multiple stakeholders, making the partnership smooth and efficient.

**Development Case: Tsing Yi Station**

Many properties above MTR stations are high-rise mixed-use towers with at least an FAR of 4.0. Since the late 1990s, the property development has applied modern planning principles (Suzuki, et al., 2015). On the one hand, instead of being the same pattern, properties have more design features based on regional planning and demands. On the other hand, importance is being placed on transit-oriented development to create mixed-use and pedestrian-friendly environment.

On example of R+P program is the Tsing Yi Station (Figure 4-3) on the Airport Express Line. MTR was granted the 50-year development rights for the site. It then sold the rights to developers and gathered substantial fund for building the station and part of the airport line. Construction was finished in 1999. The mixed-use project
represents an integration of railway station, shopping mall and residential towers. The station and shopping mall takes the first three floors; residential parking takes the fourth and fifth floor with a podium garden atop; above this are high-rise, luxury residential towers. In this complex, residents can directly enter the shopping mall from their apartments, and then into the railway station without going outdoors.

As MTR is the single entity to manage the joint development of railway station and the above property, it allows high integration in the planning and implementation stage. One reason that projects like Tsing Yi Station come into success is that the land use integration is evaluated at the master planning stage by MTR (Tang, Chiang, Baldwin & Yeung, 2004). This magnifies the interaction between railway and property development.

Figure 4-3 Tsing Yi Station

Part 3 Findings

The Rail Plus Property program implemented by MTR is recognized as an effective
way of value capture in public transit. Key findings of Hong Kong’s successful practice is summarized below:

- **Master plans** emphasize the importance of mass transit railway for regional development, providing policy support for developing high-quality transit service.

- **Zoning** regulations allow special FARs in key station areas to attract private investments and comprehensive development.

- Urban **density**, rapid life speed, along with booming **real estate market** place a high premium on easy access to transit. This ensures a high profit of real estate development around stations.

- High population density and little dependence on motor vehicles assured high public transit **ridership**. This contributed largely to the high farebox recovery ratio.

- MTR is granted the property development rights at before-rail price which effectively minimize **land acquisition costs**.

- Apart from rail road construction, MTR also has the right to decide **land use** around transit stations. With a market discipline, MTR can propose profitable projects and capture substantial value. R+P allows MTR to integrate rail and real estate projects, which ensures smooth project implementation and low transaction costs.

- With private developers covering development costs and a variety of branch businesses, MTR is protected from market **risks**.
Chapter 5 Land Readjustment Scheme in Tokyo

Similar to Hong Kong in global economic standing and geographical settings, Tokyo is another megacity known for its progressive approach to finance mass transit. Unlike Hong Kong’s public leasehold system, Tokyo’s financing schemes are under a market freehold system. Tokyo has the world’s largest railway network, made up by multiple public and private operators, along with huge real estate development around key stations. The core of Tokyo’s land value capture mechanism is to incentivize land readjustment and to maximize transit value added.

This chapter examines the land readjustment scheme in Tokyo. Part One introduces Tokyo’s urban development context, including high population density, a mixture of public and private transit agencies, and the regulatory framework which provide favorable environment for transit development. Part Two talks about the land readjustment mechanism along with the example of Kashiwanoha Campus Station. Finally, Part Three makes a conclusion based on the above discussion.
Part 1 Urban Development Context

Population and Railway Service

As the largest metropolis in the world, Tokyo is a global business, cultural and entertainment center. With an area of 2188 square kilometers, Tokyo supports a population of 13.3 million, including the Tokyo core and the 23 wards. (Tokyo Metropolitan Government, 2012).

The high population density and economic activity have sustained the world-class railway system in the city. Tokyo has the most intense railway network in the world, comprised of a mix of public and private operators. Tokyo’s core area is served by the Yamanote line of the East Japan Railway Company, with high-rise office buildings at major railway stations (Suzuki, et al., 2015). The suburban areas are served by several private rail lines connected to the Yamanote loop, providing easy access to the city center. With the existence of multiple rail lines, a competitive environment is set up which enables transit agencies to continuously improve service quality.

Because of the high density and lack of domestic resources, the government has placed strict controls on automobile ownership. High vehicle tax, gasoline tax, and highway tolls have contributed to the popularity of public transportation, thus assuring the high ridership and fare collection which recovers part of the railway operation and maintenance costs.
**Regulatory Framework**

Like Hong Kong, public policies have also played an important role in advancing transit development in Tokyo. The national government has carried out the Urban Renewal Program since 2002 (Cervero & Murakami, 2008). It emphasizes the effect of public infrastructure and a relaxing land use regulation, with the intent to increase economic growth and global competitiveness. 2500 hectares of land in Tokyo core has been designated for large-scale redevelopment, such as mixed-use projects near major railway stations along the Yamanote loop (Shima, Hiramoto, Seta, Katayama, Kim, Cho and Matsutanit, 2007). In these areas, the Japanese City Planning Law allows for a relaxing land use and special FAR. With the land deregulation, transit agencies can work with private developers to propose development according to specific sites, and government can concentrate public and private investments around key station areas.

At the local level, the Urban Renewal Program is accompanied by rail-oriented decentralization master plan. In order to solve congestion problems in Tokyo core, the municipal government is making efforts to attract public and private investments in new towns and create multiple satellite centers. The chief mechanism to achieve this goal is a highly-developed transportation network, including railways, roadways, and airports.
Part 2 Land Value Capture: How it works

Land Readjustment

For the past few decades, land readjustment (Figure 5-1) has been a typical instrument to assemble parcels for development and apply value capture to invest in transit. Under this approach, owners of scattered land parcels (usually agricultural land) form a cooperative entity and contribute part of their land for urban development, such as roads and transportation infrastructure. They combine their land into a large parcel and contribute a portion of the land (usually about 30 percent of the total) to provide space for public use. In the end, the original landowners receive smaller residential or commercial parcels with full service and higher property value. They are entitled to keep the property rights of the floor spaces in new buildings, which have the same value as their original land (Sorensen, 2000).

The property owner cooperative submit their proposal for redevelopment to the local planning department. After the plan is approved, the local planning department will change the zoning codes to mixed-use and increase FAR in the targeted redevelopment district where there is a high potential for real estate development. The surplus in floor area is sold for new public or private development. The revenue is then used to subsidize transit infrastructure such as railway terminals, street amenities, bike parking and green space (Sorensen, 2000).

With land readjustment approach, the private corporations and local governments are able to acquire land at relatively low cost and simultaneously promote real estate
Development Case: Kashiwanoha Campus Station of Tsukuba Express

The Tsukuba Express is a large-scale suburban railway project completed in 2005. It opened 20 stations in 58 kilometers which added connection from multiple satellite towns in the suburban area to the Tokyo center (Figure 5-2). The project was a reflection of the 1989 Housing-Railway Integration Law.
The railway project generated a roughly 7.5-billion finance through land readjustment projects with zero-interest loans, as well as public assistance programs. The local government reserved rights of way for development across 18 land readjustment districts around 13 stations, and transferred the parcels to the railway agency at an assessed price (Suzuki et al., 2015). The process saved a significant amount of cost for land acquisition.

The Kashiwanoha Campus Station is 32 kilometers northeast from Tokyo core. Before the development, the area was occupied by a golf course, small factories, and forests. During the readjustment process, the huge parcel has been converted into mixed-use for transit facilities, residential, commercial, industrial and open space (Figure 5-3) and the maximum FAR has been change from 2.0 to 4.0. With a full service to the land, the land value increased 42 percent from 2.2 billion to 3.1 billion. The reserved parcels were sold for 563 million, which largely covered the project costs of 891 million, with the rest covered by government subsidy (Suzuki et al.,
As an important element in the land readjustment process, local entities also contributed to increasing value of the station area. The original land owner of the golf course and now the developer of this area, invested in a new shopping mall and residential buildings to meet the demand of new population. Two universities also held urban design workshops with the developer and railway corporation, which helped to add value to the area in the long term.

**Part 3 Findings**

Under the market freehold system, Tokyo applied land readjustment together with urban redevelopment schemes for value capture, generating substantial capital for public transit. Key findings of Tokyo’s practice are summarized below:

- There are consistent national and local plans for multi-center regional development and railway extension, which place importance on railway projects as development instrument and provide favorable environment for financing public transit.
- **Restricted automobile** use and high population density contribute to high public transit ridership.

- The existence of private agencies enhances the effect of value capture around station areas. Railway agencies are entitled **ownership of properties** to generate revenues in the long term.

- **Major land owners** or developers can help land readjustment process. They participate in local investment to add value to the station area.

- Land readjustment is a way to generate right of way cost-effectively. This method functions best when the neighborhood is in need of transit access or extension. This will help to promote property development and achieve targeted ridership.

- Whether the land readjustment is initiated by landowners or government, at least a two-thirds consent is required for the proposal to pass. In Japan, people in a neighborhood are more **united** together and it will be easier to reach consensus of a land readjustment proposal. This together with adequate economic incentives will help land readjustment to proceed smoothly.
Chapter 6 Tax Increment Financing in New York

In the United States, funding for roads and transit is the joint responsibility of the federal, state and local governments. Traditional funding methods include taxation and user fees, as well as loans, bonds, and public-private partnerships. With increasing funding burden, the jurisdictions have been looking for adequate and sustainable transportation investment with the idea of “Value Capture”. Apart from the traditional funding methods, value capture techniques have been applied in the United States, including Land Value Tax, Tax Increment Financing, Special Assessment, Development Impact Fees, Joint Development, Air Rights Transfer, et al (Lari, Levinson, Zhao, Iacono, Aultman, Das, Junge, Larson, and Scharenbroich, 2009).

In this Chapter, we will examine the Tax Increment Financing (TIF) method in detail, which has been in use for more than 50 years in the United States. TIF was originally used for improving slums and blighted urban areas. Now it has been extended for financing new transit development. So far, the 7 Train Extension Project in New York has been the largest-scale TIF project in history. The Chapter will carry out a two-side discussion about this case.
Part 1 Urban Development Context

Population and Railway Service

New York is the world’s most recognized agglomeration of finance and business activities. As the most populous city in the United States, New York City also has the most extensive public transportation system in the country. The city distinguishes from other U.S. cities because of its low automobile ownership and high public transportation ridership. According to American Community Survey data (2006), while nearly 90 percent of Americans drive to work, 54.2 percent of New Yorkers commute to work by public transit.

The operator of New York City’s transit system is the Metropolitan Transportation Authority (MTA), a public benefit corporation. MTA stated that New York’s public transportation ridership in the past decade grew by 36 percent, faster than the city’s population growth at 7 percent, meaning more people are using mass transit (MTA, 2006). New York is home to one of the largest subway systems in the world, with 468 stations and a total track of 720 miles. In 2013, there was a total subway ridership of 1.7 billion, which was approximately 5.5 million rides each weekday (MTA, 2014).

In order to keep pace with the city’s rapid development and growing population, there are several transit expansion proposals. The No. 7 Subway Expansion Project is one of them. Despite from traditional funding methods which relies mostly on municipal general funds (such as property taxes), the city is applying Tax Increment Financing to fund the project. It intends to capture the future property tax increment as a funding
source for current investment.

History of Tax Increment Financing in the United States

Tax Increment Financing is a tool for funding current development with future revenues. It is not new in the United States and has been use for more than 50 years. As of 2005, there is legislation enabling TIF in all 50 states as well as the District of Columbia (Lari et al., 2009).

When TIF was first introduced in the 1950s, it was used as a funding method to improve slums and blighted urban area. It started to become popular in the 1970s when federal funds for urban renewal was limited. TIF was used for financing urban redevelopment, particularly in the central business districts which have the highest potential of creating tax increment after development. In the 1980s, many states passed new TIF-related legislations that gave a broader definition of “blight” or adopted general economic development as one goal of TIF. As a result, TIF has been increasingly used on a wider variety of properties (Carlson, 1992).

TIF projects can be divided into two categories. The first is project-specific TIF which is targeted at the development of a single project. As there are fewer parties involved in the process, this category is less complicated. The incremented taxes are used to make the project feasible such as basic road connection and drainage systems. The second type is district-level TIF which includes multiple properties and stakeholders. This is applied to the development of a neighborhood. The revenues from this process is used for infrastructure such as road system or public parks.
(Council of Development Finance Agencies, 2007).

Part 2 Land Value Capture: How it Works

Tax Increment Financing

Generally, Tax Increment Financing works in the following process: initiation, formulation, adoption, implementation and termination (National Association of Realtors, 2002).

The first stage is initiating the development. Usually the public sector initiates the TIF project, and various private and non-profit agencies participate in the process. The public and private decision makers will discuss issues such as the eligibility of the project area, the needs of the neighborhood, and expected economic outcome of the project.

After initiation, the next step is to form the redevelopment/development plan, including land development planning and project financing. First of all, the land plan determines the boundaries of the TIF project. This district is usually larger than the actual area of new construction. In many cases, TIF projects will benefit communities outside the designated area, so it is justified that the overlapping government should contribute the cost of the project. However, this is controversy because it is usually difficult to foresee what effects the project will have.

As for project financing, taxpayers should be provided with estimated project costs and a timeline. If debt is used to finance the project, detailed information such as the
amount of debt to be issued should be provided. Considerations towards to community should also be included in the development plan. For instances, the provision of affordable housing and environmental protections.

After the plans come into place, it will be presented to the public for evaluation and adoption. Usually it involves public hearings for key stakeholders. For example, the local taxing districts and school districts, whose property tax revenue are affected will raise their opinions to help determine the development plan. Once the plan is adopted and financing proposal established, then the project will be carried out.

During the implementation stage, the key components are securing the financing method and beginning the construction process. The most common method used for funding is through bonds, which will be repaid by tax increments. Also, TIF has often been accused of exploiting tax revenue from other public expenditures such as school districts. Many states therefore carry out regulations that exclude school district property taxes from TIF districts.

In the construction process, it is important to follow proposed timeline, as the success of TIF districts is easily effected by the delays or increases in construction costs. Also, after the construction is completed, the district management will help to ensure its health and function, and tax increments can be captured to effectively pay back the debts.
The last stage is **termination**. To ensure that TIF project are relevant, many states have annual report to keep track of the projects. TIF projects usually last 25 years to generate net benefits for local governments.

**Development Case: No.7 Subway Extension**

The No. 7 Subway Extension in New York is part of the Hudson Yards Redevelopment Project. The subway currently terminates in Times Square. With the extension, there will be a new station two miles further at 34th Street and 11th Avenue. The construction began in late 2007. After being postponed for several times, the new station is scheduled to come into service in the middle of 2015 (MTA, 2015).

As part of the redevelopment project, the subway extension will help to create a transit-oriented and mixed-use district in the far West Side of Midtown Manhattan. The subway extension will provide access to the proposed office buildings, housing, entertainment and retail spaces in Hudson Yards.

To fund the 2.4 billion extension project, one of the major sources is Tax Increment Financing (TIF). TIF has been used throughout the United States in cities like Los Angeles, Chicago, Washington, D.C. for small to middle sized projects. The No. 7 Subway Extension Project is so far the largest TIF project in the country, as well as the first TIF practice in New York City.

Under this mechanism, a TIF area is designated for capturing future revenue. The city then issues bonds and the proceeds are used to pay for the construction. The completed project will attract private developers to the area and property value will be
increased, resulting in higher property tax revenue. Finally, the tax revenue difference before and after the area improvement will be used to pay the debt.

**Part 3 Findings**

Tax Increment Financing has enabled the city to pay for the construction of the subway extension, as well as a large platform on top of the rail yard which will support future residential and commercial towers. For now, it is not yet clear whether the practice will be a net gain or loss for the city and MTA. However, based on the extensive use of TIF in other cities, some comments can be made for this method.

First of all, the ideal situation is that the expansion project will generate future revenues to cover the cost of current construction, and is considered to be self-financing. Also, the project facilitates the development the far westside of Midtown Manhattan. With the subway extension and construction of residential and commercial buildings, additional jobs will be created in the area, along with economic development. All these will help to generate a significant amount of revenues to fund the project, and other development in accordance with the area’s specific needs.

However, there are also some disadvantages. The success of the project is highly dependent on the project’s future tax increment. The accuracy of financial projection and the condition of real estate market will affect TIF’s function. For example, in Arvada, California, the city was unable to cover its debt service and turned to use municipal general funds to pay back the debt, which harmed the needs of other public expenditures (Weber, 2010). In the case of New York, the 2.4-billion project becomes
the largest-scale TIF project in the United States. It is risky to depend on future revenue to pay back the huge amount debt, as it is difficult to predict the market changes during the 20 to 30 years.

Another controversy is the financial pressures on overlapping jurisdictions. During the TIF designation period which can last around 25 years, overlapping jurisdictions such as school districts are prevented from tax increments.
Chapter 7 Conclusion

The three cases highlight the unique context and challenges of capturing land values for financing public transportation. Value capture integrates land use development and transportation infrastructure, and has been successfully applied to build transit systems around the world. The idea of “value capture” is simple and straightforward. However, the insights from the three cases show that policy implementation should be based on various local conditions. From these lessons, we can discover the key factors that enable the success of land value capture.

Demographic and economic condition is the macro fundamental of applying land value capture. Both Hong Kong and Tokyo have high population density and strong economic growth. This generates high demand for land and property value will increase, which makes real estate development around station areas profitable. Also, Hong Kong and Tokyo have no strong dependence on private car usage, which results in high ridership in public transit and high fare box recovery ratio.

Secondly, both Hong Kong and Tokyo provide systematic master plan for long-term development, which identify public transportation especially railway system as the backbone for urban development. Integrated with the master plan is a flexible zoning regulation. For example, in Hong Kong, the government allow a higher FAR around key station areas for mix-use development, which enables the Rail Plus Property program to generate sufficient revenue.

Thirdly, the planning of public transportation requires multiple levels of government
and agencies to work together. It is important to form a good collaboration between the different development stages, including land acquisition, planning, construction, operation, and property management. In Hong Kong, for example, MTR as a single agency is responsible for the whole development cycle. The process is more efficient, because it saves additional administrative cost, and there is only one principle from beginning to end. For New York, however, as MTA is only responsible for railway construction and operation, and it has no right of land use, the capability of capturing land value is to some extent undermined.

Lastly, institutional settings also play an important role. In the two Asian cases, the railway companies run in a much more conservative way. Their mission is to self-supply. They will not expand their railway system if they will lose money. At first, they only regarded their mode as co-development, which is to capture overall value for overall expense. “Value capture” is actually a mechanism pointed out by later western scholars. On the other side, for MTA in New York, it is not set for profit, but to rely on subsidies. Though expanding the system will make MTA worse off, it has to because of the City’s interest. However, the City is not concerned about MTA’s operation. Tax Increment Financing is only paying for the capital cost, rather than the operational cost, while developers taking advantage of the low TIF district interest rate, making the revenue even less. Also, running TIF is reducing the city’s general fund which could come from the TIF district’s property taxes. For New York City and other U.S. cities, it should be considered that if the 2.4 billion if available for expanding the system, is it a first priority?
To sum up, value capture is not a panacea. Before starting the mechanism, a whole set of plans and institutional framework should be designed in order to protect the public as well as the railway company’s interest.
Bibliography

1. American Community Survey, 2006


36. Salon, Deborah and Sharon Shewmake. 2011. Opportunities for value capture to fund public transport: A comprehensive review of the literature with a focus on East Asia. Transportation and Development Policy.


46. Weber, Rachel. “Selling City Futures: The Financialization of Urban

47. Wikipedia—Tierra Verde. Retrieved April 11, 2015, from
http://zh.wikipedia.org/wiki/%E7%9B%88%E7%BF%A0%E5%8D%8A%E5%B3%B6

a booming economy: New evidence from Beijing. Journal of Urban Economics,
63(2), 743-757.

Transportation research record: Journal of the Transportation Research Board,
2038, 120-127.