



Urban Mobility and Economic Shock

How Bangkok's Transportation System Weathered the 1997 Financial Crisis

David Leipziger

University of California, Los Angeles

Bangkok is a rising global city, home to nearly 20 million people and notorious traffic congestion. Constrained mobility and accessibility have long underscored the centrality of transportation issues to managing growth. Historically, Bangkok's transportation policy has expanded road capacity to alleviate traffic; however, major investments in the city's mass transit network began in the early 1990s, coinciding with massive economic growth and frenzied international investment. Growth halted in 1997, when a financial crisis centered in Thailand contaminated economies across the region and devastated economic growth in Bangkok. While many economic indicators confirm that the crisis was a troublesome era for the city, fortunes were varied across income groups and mobility profiles. This paper examines how the financial crisis impacted Bangkok's transportation system, tracking changes in urban accessibility before and after the crash. Lessons from the resilience and evolution of the city's mobility patterns are instructive in adjusting transportation planning efforts today.

1. Introduction

Transportation systems define a city's economic competitiveness and quality of life. People navigate cities based on their personal travel cost—an assessment of money, time, and comfort. Public policy decisions such as infrastructure investment, incentive structures, and direct and indirect subsidies dictate what modes of travel are cheapest and therefore most common. While private motorized vehicles are useful for freedom of mobility, they have poor performance according to equity, health, safety, and congestion. They are also expensive to own, operate, and maintain. Transportation experts agree that reliance on a single mode is risky; multi-modal travel options have significant efficiency benefits (VTPI, 2010). Urban transportation systems with substantial public transit networks, moreover, improve mobility and accessibility for lower-income and marginalized communities.

Bangkok, the capital of the Southeast Asian nation of Thailand, has long struggled with an over-burdened transportation network. Decades of worsening automobile congestion compelled the city to implement several mass transit projects in the 1990s. The advent of transit planning, however, coincided with a catastrophic economic crisis in 1997. Impacts of the crisis have been dissected with regard to demographics, market dynamics, and macroeconomic stability, but little attention has been paid to the everyday patterns of urban activity. This paper aims to analyze the effects of Bangkok's financial shock on urban transport patterns.

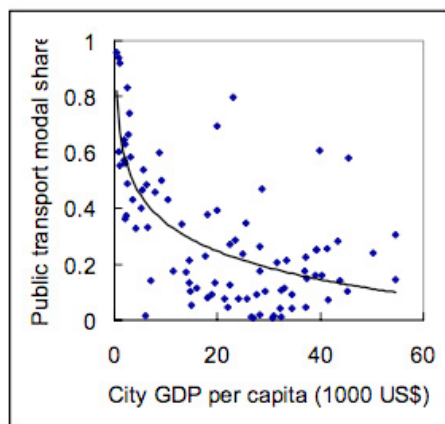


Figure 1. Urban wealth and public transit use. *Source:* Acharya 2005

Literature is sparse on the trends of urban mobility patterns in response to economic crisis. Understandably, it is difficult to parse out the precise impacts of a crisis and to control for a counterfactual scenario. It is more common, therefore, to evaluate the correlation between growth and transport mobility.

Travel demand and economic growth have consistently demonstrated a positive linear relationship, but there is evidence that mobility growth peaks once incomes

surpass a high threshold (Metz 2012; Millard-Ball and Schipper 2011). In rapidly urbanizing countries, high motorization rates tend to shift travel demand toward private vehicles and away from public transit (Gakenheimer 1999). Furthermore, as Figure 1 demonstrates, cities with higher GDP per capita tend to use less public transport.

Given these trends, it is conceivable that an economic crisis would correspond to a contraction in private vehicle use and a resurgence of public transit. Indeed, the International Association of Public Transport (2014) claims that transit is economically resilient, and that local areas with transit service are “less affected in the event of an economic downturn” (1). Evidence from Greece in the fallout of the recent financial crisis, however, belies such an assumption. There, an economic recession correlated with reduced car travel. However, public transit ridership did not increase because of reduced transit service, increased transit fares, and a spike in non-motorized transport mode share (Milioti 2014). In Harare, Zimbabwe, economic collapse has demonstrated similar outcomes. In the face of 200 percent average annual fare increases, bicycle use swelled while public transit ridership decreased (Godard 2002). Research from the Victoria Transport Policy Institute (VTPI; 2013) has demonstrated that transit demand is quite inelastic in the short term but relatively elastic in the long term.

While economic crises can be devastating, they offer silver linings. Schumpeterian theory, for example, describes crises as opportunities for structural reform. While a crisis may be a temporary and necessary condition, an economic lull can enable essential structural changes (Rothengatter 2011). In this way, the 1997 financial crisis can be seen as a possible inflection point—specifically, in this case, an opportunity for Bangkok to alter the course of its transportation policies.

This paper examines the trends of urban mobility in the megacity of Bangkok. First, I outline the scope and methods of the research and give context for the metropolis of Bangkok. Next, I discuss the history of transportation planning and infrastructure investment in Bangkok, the events of the crisis itself, and the changes to urban travel patterns post crisis. The following section discusses the implications of these changes.

2. Scope and Methods

In order to analyze the urban mobility outcomes of the 1997 financial crisis, I will first assess conditions of pre-crisis transportation planning. After I examine the events of the crisis, I will revisit the transportation sector to evaluate how conditions changed. Admittedly, it is difficult to draw strong causality from any data or observations based on conditions before and after the crash. There is no counterfactual scenario. But it is possible to use the effects of the crisis to speculate on the responsiveness of the transportation system.

Measuring or quantifying the geographic area of Bangkok is difficult as with most sprawling, amorphous cities. In this paper, I refer to “Bangkok” interchangeably with the Bangkok Metropolitan Region (BMR), which refers to the city proper and five surrounding provinces (further geographic definitions are given in the next section). This is the scale at which the city’s transportation decisions are made; it comprises the commute watershed for the metropolis.

Further, it is important to define “mobility” in Bangkok to measure and describe urban physical mobility within the BMR. I primarily look at commuter data as a proxy for more generalized mode share of movement. I am mostly concerned with movement of passengers—as opposed to goods—but some observations and analyses apply to both.

3. Bangkok Context

Bangkok is the capital and primary city of Thailand. As the sole metropolis in the nation, it is a center of government, business, culture, art, and education. The wider metropolitan area, or Bangkok Metropolitan Region (BMR), includes the provincial-level city of Bangkok and the provinces of Samat Prakan, Samut Sakhon, Pathum Thani, Nonthaburi, and Nakhon Pathom (see Figure 2). The BMR covers 7,760 square miles and is home to approximately 18 million people. It contains 27 percent of the country’s population and 68 percent of its GDP (UNESCAP 2013). The city proper, the Bangkok Municipal Area (BMA or “core” area), contains approximately 8 million people and 605 square miles of land. This density, approximately 13,000 people per square mile, is roughly equal to that of Madrid and is only a quarter of the density of Mumbai. Bangkok is currently growing at 2 percent annually, which is its slowest rate in decades. Indeed, the suburbs are growing faster, reflecting a hollowing-out pattern that

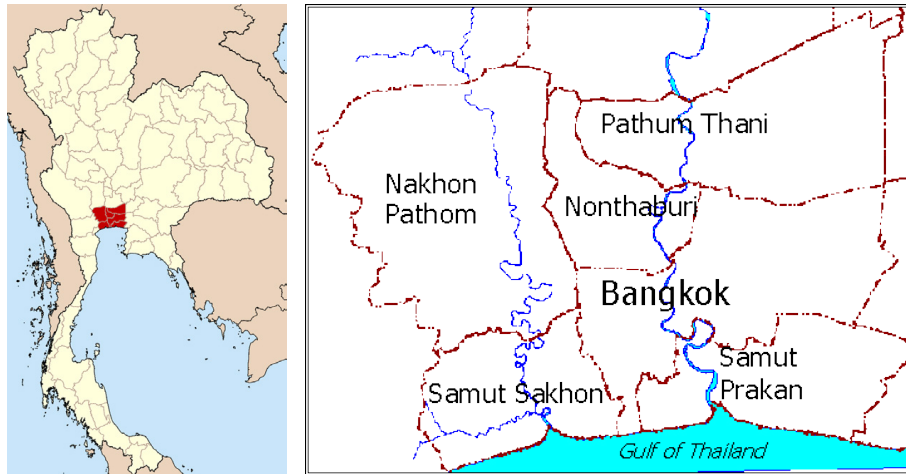


Figure 2. Situation of Bangkok metro area in Thailand. *Source:* Wikipedia

has been underway for the past fifteen years (Webster 2005). Such population deconcentration reduces the effectiveness of transit service, instead supporting private car use, income segregation, tax base erosion, and other problems.

Bangkok is a regional hub for commerce and transportation. It has the most important airport in mainland Southeast Asia and hosts a large port. The city's economy is diverse, driven by wholesale and retail trade as well as real estate, financial services, and manufacturing. It is also the national hub for creative industries, services, and tourism. This economic productivity and quality of life suffer from world-renowned traffic congestion.

4. Pre-Crisis Transportation in Bangkok

Bangkok is anchored around the Chao Phraya River, with the city's downtown nestled about 15 miles north of the coast. Two central expressways run in three directions from downtown, and an oblong ring road, Motorway Route 9, circumnavigates the city. Mass transit includes four heavy rail lines, a commuter rail line, hundreds of (public and private) bus routes, and a bus rapid transit (BRT) line.¹ Figure 3 depicts the existing transit network.

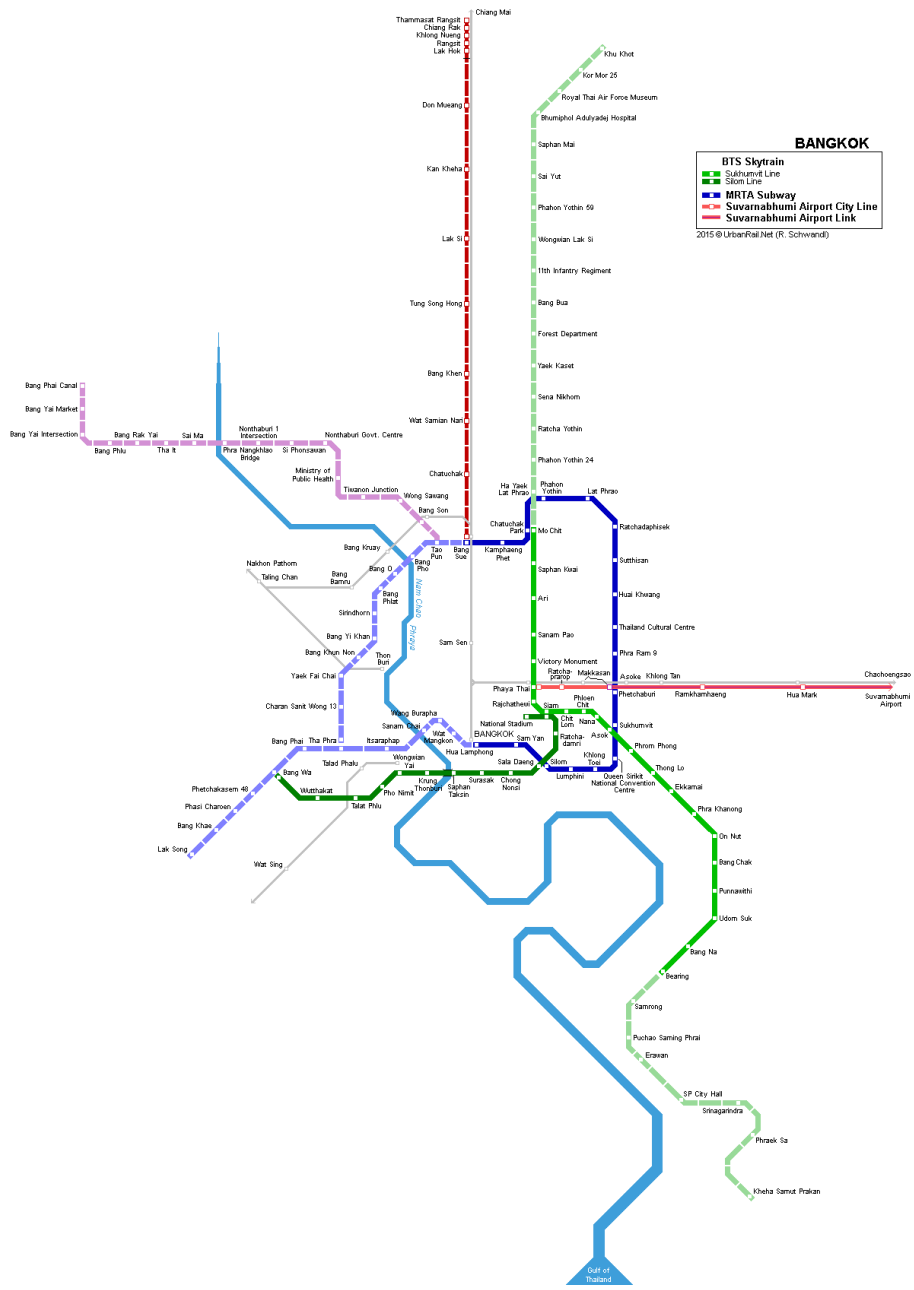


Figure 3. Transit network map of Bangkok. Source: www.urbanrail.net

Despite the existing transit infrastructure, the transportation network in Bangkok remains geared towards cars. Private motorized transport comprises the lion's share of mobility in the city. In 2008 (the most recent data available), cars and motorcycles represented 50 percent of the city's trips; metro and bus comprised just 16 percent. Still, overall car usage has come down in recent years. In some peer cities, like Kuala Lumpur and Ho Chi Minh City, private motorized transport accounts for 80 percent and 66 percent respectively, but Bangkok remains behind other regional comparators like Singapore and Hong Kong (SPAD 2013; ALMEC 2004).

A plethora of agencies oversees Bangkok's transportation network, making it hard to coordinate metropolitan planning. Federal, regional, and local government bodies intersect across sectors and jurisdictions. At the metropolitan level there are three main entities that own, and in most cases operate, Bangkok's mass transit systems. These include the Mass Rapid Transit Authority of Thailand (MRTA), the Bangkok Metropolitan Administration (BMA), and the State Railway of Thailand. Each system is operated by an entity that may or may not be the same as the owner.

Table 1: Transit system owners and operators in Bangkok. *Source:* Spicer 2006

| System | Owner | Operator | Operator full name |
|---------------|------------------|------------------|---|
| Metro | MRTA | BMCL | Bangkok Metro Public Co. Ltd. |
| BRT | BMA | BTSC | Bangkok Mass Transit System Public Co. Ltd. |
| Skytrain | BMA/MRTA | BTSC | Bangkok Mass Transit System Public Co. Ltd. |
| Bus transit | BMTA/ Various | BMTA/ Various | Bangkok Mass Transit Authority |
| Commuter rail | SRT | SRT | State Railway of Thailand |
| Airport link | SRT | SRT | State Railway of Thailand |

5. Historical Transportation Planning

Historically, Bangkok was known as the “Venice of the East” for its network of canals. Water transportation was central to urban life through the late nineteenth century. The first urban commercial roads were built in the 1860s; wealthy visitors from Singapore and Hong Kong in the 1880s brought rickshaws to navigate them (Hanaoka 2007). Bangkok’s populace became more familiar with land transport when the city’s first tramway opened in 1894 (Wasuntarasook and Hayashi 2013). A national railroad network started to appear at the turn of the century, while electric trams and motorcars first came to Bangkok in the first decade of the twentieth century. As the city grew in prominence, roads were widened and bridges were built, but no new canals were dug.

The push toward motorization and the primacy of highways came in the middle of the twentieth century. After 1960, the Bangkok government made a concerted effort to prioritize automobile infrastructure in emulation of Western development trajectories. Bridges, overpasses, and expressways continued to be built throughout the 1970s, and successive national development plans prioritized the automobile over recommended transit projects. These accommodations served to further prioritize driving and suburbanization (Charoentrakulpeeti, Sajor, and Zimmermann 2006).

Bangkok’s traffic congestion became particularly acute during the economic and population growth of the 1980s. In this decade, a burgeoning economy drove a 50 percent population increase and automobile fleet growth of 35 percent annually (Spicer 2006). Figure 4 demonstrates how this period coincided with accelerated motorization in Bangkok and megacities around the region. Land utilization at the urban periphery intensified, putting a greater strain on transportation infrastructure. A crush of vehicles—a symptom of economic growth and new purchasing power—clogged the city’s streets. Average road speeds across the city would routinely average fewer than 7 miles per hour (Spicer 2006). Pollution became a national priority and researchers cited 10 percent losses in GDP due to traffic alone (Du Pont and Eagan 1997).

Diversifying mode share to reduce motorized vehicle use had been a planning priority for decades, but only during the 1980s did the city decide to invest in fixed-route transit (Rujopakarn 2002). Initially, the government turned to privatized toll highways to leverage the resources of the private sector. But eventually the Bangkok government reoriented planning imperatives to include mass transit to accommodate residents without cars.

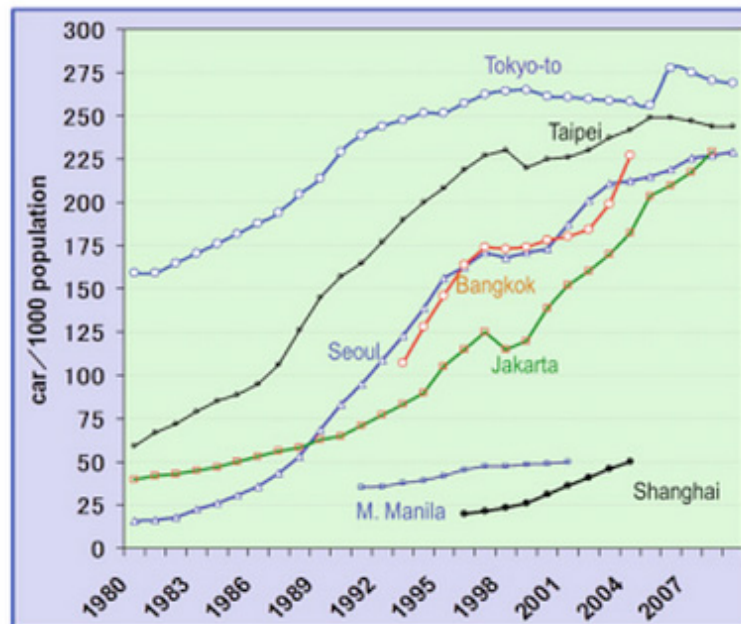


Figure 4. Motorization rates in East Asian megacities. *Source:* Feng and Sun 2013.

6. Transportation Planning in the 1990's

Thailand was in the throes of an economic boom in the early 1990s. Investment was flowing in and the economy was growing—when it peaked—at more than 17 percent. In Bangkok, growth was almost as strong: the economy grew by 10 percent per annum from 1987 to 1995 (Choiejit and Teungfung 2005a). Much of Bangkok's growth was in real estate, and its urban form had consequences for transport mode utilization. The creation of superblocks surrounded by wide arterials exemplified the planning decisions that dovetailed with motorization (Feng and Sun 2013).

The government leveraged this growth to implement dozens of megaprojects in the transportation sector. In Bangkok, the regional government and private partners spent more than \$8 billion on transportation infrastructure from 1989 to 2004. Table 2 provides a summary of the seven main projects. Overall, 68 percent of capital investment went to transit and 32 percent to highways. Given that these were the city's first transit investments, this constituted a significant reversal of priorities.

Table 2: Bangkok's 1990s transportation megaprojects

| Project | Operator | Summary | Length (km) | Funder | Start Date | End Date | Est. Cost (millions USD) |
|-------------------------------------|----------|---|-------------|-----------------|------------|----------|--------------------------|
| Don Muang Tollway | Private | 6-lane elevated tollway | 15* | Private capital | 1989 | 1994 | 407 |
| Ramintra-Atrarong Expressway | Public | 6-lane tollway | 12 | JICA loan | 1991 | 1998 | 740 |
| Bangkok-Chonburi Highway | Public | 4-lane tollway | 82 | JICA loan | 1990 | 1993 | 404 |
| Bangna-Bangpakong Expressway | Public | 6-lane elevated tollway | 55 | Private capital | 1995 | 2000 | 1,000 |
| Subway | Private | Heavy rail | 21 | JICA loan | 1997 | 2004 | 3,200 |
| Skytrain | Private | 2 elevated heavy rail lines | 23 | Private capital | 1992 | 1999 | 1,700 |
| Hopewell/BERTS | n/a | 2 lines of expressway, light rail, & heavy rail | 60 | Private capital | 1990 | 1997^ | 600 |

Sources: Brockman and Rogenhafer 2000; JICA 2008; JICA 2006; Brockmann and Rogenhofer 2000; Wasuntarasook and Hayashi 2013; World Bank n.d.; World Bank 2007.

*The Bangkok government later added another ~13km.

^Project terminated at about 10% completion.

The government leveraged this growth to implement dozens of megaprojects in the transportation sector. In Bangkok, the regional government and private partners spent more than \$8 billion on transportation infrastructure from 1989 to 2004. Table 2 provides a summary of the seven main projects. Overall, 68 percent of capital investment went to transit and 32 percent to highways. Given that these were the city's first transit investments, this constituted a significant reversal of priorities.

Private vehicles were well supported due to government subsidies of both vehicles and lane-miles. These policies led to a dramatic expansion of private auto use. A 50 percent drop in car import duties in 1991 also enabled more Thais to buy cars (Tanaboriboon 1993). The number of passenger cars in Bangkok, which had been stable at about 600,000 for several years, took off in 1993. Car ownership, which was stagnant between 1990 and 1993, grew by more than 70 percent over the next four years and continued to steadily increase throughout the decade (Charoentrakulpeeti et al. 2006). The city has largely viewed mobility challenges as a supply-side problem; the complimentary highway-building spree focused on toll roads that could leverage the resources of private financiers and operators. Major projects included the Don Muang Tollway, the Ramintra-Atnarong Expressway, the Bangkok-Chonburi Highway, parts of the Outer Ring Road, and the Bangna-Bangpakong Expressway. These investments expanded road capacity by more than 820 lane-kilometers over the timespan of a decade. Expanding road infrastructure did not help to alleviate congestion, however, because car ownership increased faster than capacity.

Mass transit investments received less support than private autos in the 1990s, but the Thai government and the Bangkok metropolitan government did launch three megaprojects in central Bangkok: the privately funded Skytrain; the privately-funded Bangkok Elevated Road and Train System (BERTS) project, also known as Hopewell; and a government-funded subterranean metro rail.

Skytrain

Bangkok first conceived of an elevated rail system in the 1970s, but a lack of public will and funding hamstrung the vision. The Skytrain was finally launched during the early 1990s. Designed as a privately funded turnkey contract, the system comprised two lines of heavy rail running 40 feet above two major thoroughfares: Silcom and Sukhumvit Roads. The concession was structured as a 30-year Build-Operate-Transfer (BOT) model. It was awarded in 1992 to the Bangkok Mass Transit System Company Ltd. (BTSC), a subsidiary of Tanayong Public Co. Ltd., a large Thai real estate company.



Figure 5. The Bangkok Skytrain. *Source:* Wasuntarasook and Hayashi 2013.

The project took on private domestic and public international financiers; BTSC received \$676 million in equity and \$1.6 billion in debt. About 50 percent of debt financing came from Thai banks, 40 percent from the German government's KfW development bank, and 10 percent from the International Finance Corporation (Cobb n.d.). Importantly, the Skytrain project depended little on real estate development. There was no need for widespread property acquisition because rights-of-way largely followed the medians below. The project was completed in 1999, after the financial crisis had passed.

BERTS/Hopewell

The Bangkok Elevated Road and Train System (BERTS) project was an unprecedentedly ambitious, complicated, and expensive solution to Bangkok congestion. The project was the brainchild of Japanese consultants, asked to offer proposed improvements to Bangkok's inadequate and slow light rail network. The suggestion was a three-story multi-modal infrastructure behemoth. BERTS



Figure 6. Vision for Bangkok's Hopewell project. *Source:* <http://2bangkok.com/2bangkok-masstransit-hopewellmain.html>

was to accommodate SRT's heavy rail, commuter rail, a six-lane expressway, and a series of shopping centers—all suspended above local traffic. The system would enter Bangkok from the north and turn east from the central core, stretching out to the Don Muang Airport. Figure 6 shows an early rendering. The project, to be built largely on land owned by SRT, was also a BOT model that conferred most risk onto a private concessionaire.

BERTS was put out for bid in 1990 but only one company came forward: Hopewell Thailand Limited (HTL), owned by Hong Kong millionaire Gordon Wu. Wu was a transportation, real estate, and energy infrastructure tycoon whose holding company, Hopewell Holding Limited (HHL), was known for tackling tough projects in the region. To satisfy the 30-year BERTS (also called Hopewell after the concessionaire) contract, Wu's company intended to raise capital through corporate bonds, foreign and Thai commercial loans, European export credit guarantees, and property development (Cobb n.d.). HTL retained development rights to 600 acres of SRT-owned land flanking the two BERTS lines (Wasuntarasook and Hayashi 2013).

The BERTS project was abandoned before the end of the financial crisis. By January 1997, HTL had spent hundreds of millions of dollars and had yet to put together the complete financing. Costs were out of control and the company was in financial trouble (Einhorn 1997). The Bangkok government terminated the BERTS contract in 1997.

MRTA

A metro rail system for Bangkok had also been planned since the 1970s, and the local government decided that the roaring 1990s was the right time to revive this project as well. A privately financed elevated, three-line system was designed and approved in 1990. A contract was awarded but quickly canceled. In 1992, Bangkok created the Metropolitan Rapid Transit Authority (MRTA) to oversee the relaunched rail project. In 1993, the project was rerouted to be 50 percent underground, awarded to a Thai company, and subsequently canceled a second time. At this point, the metropolitan government took over development of the project. The MRTA formed the Bangkok Metro Public Company Limited (BMCL) in 1996 to start work on the Blue Line. It was planned as 21km of underground heavy rail arcing through central Bangkok. The infrastructure, representing 80 percent of the cost, was financed with a loan from the Japanese development bank, while the rolling stock, switching, operations, and maintenance were awarded to a private company (Wasuntarasook and Hayashi 2013).

BMTA

Bus service is paramount in Bangkok's transit market. As in many cities around the world, Bangkok's buses started out as decentralized private enterprises in the early twentieth century. By 1975 there were twenty-four private and two public bus companies operating almost 4,000 vehicles (Hanaoka, 2007). As the economy grew, bus ridership and fares rose, and the MBTA consolidated routes under its direction. Still, by the boom years of the 1980s, buses fell victim to the same worsening congestion as all private vehicles.

During the 1990s, the primary bus service changes occurred in the private market. Starting in the late 1980s to serve demand in the expanding suburbs, Bangkok entrepreneurs developed air-conditioned vans and shuttles to facilitate commuting. The number of private buses grew from 400 in 1992 to 863 in 1996 (Kumar and Meakin 2005). Many of the drivers worked part time, running commuter service during peak work hours and ferrying students off peak (Hanaoka 2007). These services were technically illegal—operators would often pay bribes to continue service—but the city of Bangkok eventually legalized them (*ibid.*).

7. The 1997 Financial Crisis

To understand the impacts of the financial crisis on the transportation sector in Bangkok, it is helpful to understand the events and causes of the crisis itself. In the 1990s, Thailand's economy was at the helm of a regional economic boom. In 1997, though, a currency crisis began in Thailand and spread to Hong Kong, Indonesia, Malaysia, the Philippines, and South Korea.² The proximate causes were over-investment in an over-valued market; extremely high Thai interest rates and a currency (the baht) fixed to the dollar caused gross fixed investment to grow from 25 percent of GDP in 1980 to 44 percent in 1999 (IMF 2007). When the speculation bubble burst, debtors were unable to meet their credit obligations, the baht devalued, and the contagion spread.

The crisis, which decimated Thailand's GDP by almost 40 percent, took place over the course of less than a year. The Thai economy showed signs of weakening in late 1996. Growth forecasts were atypically low, housing supply had started to outpace demand, and the dollar (to which the baht was pegged) was appreciating. In February, a watershed event took place: Somprasang Land, a large Thai property developer, effectively defaulted on an \$80 billion loan payment (Hill n.d.). Thereafter, a series of financial institutions entered bankruptcy, including Thailand's largest financial company Finance One. Additionally, speculators realized that the baht was over-valued and started to sell.

Troubles deepened into the spring. In the face of defaulting financial giants, the Thai government suspended activity at dozens of financial institutions, nationalized others, and tried to force mergers of non-bank financial companies with commercial banks in order to protect against a lack of liquidity (Lauridsen 1998). Waves of attacks on the baht continued, but the central bank spent billions rabidly defending the currency, depleting its foreign currency reserves in the process (Hill n.d.).

By July, the inevitable happened. The central bank unpegged the baht from the dollar and allowed the exchange rate to float. The baht summarily devalued more than 25 percent in just two weeks. Private financial firms continued to succumb to massive foreign debt obligations, but the central bank lacked the reserves to act as a safety net. Finally, in late July 1997, Thailand approached the International Monetary Fund (IMF) for a bailout. The national stock exchange had lost 40 percent of its value in a year, and would lose an additional 30 percent before bottoming out (Hill n.d.). The government had suspended activity at fifty-eight financial institutions and spent more than \$8 billion dollars to rescue the institutions (Lauridsen 1998).

The crisis arose from poor policies, investments, and regulations. The specific causes for the crisis were five-fold (ibid). First, there was a currency mismatch. Because Thai interest rates were as high as 13 percent, corporate entities would borrow in foreign currency and lend domestically in baht—often to non-traded sectors with no foreign exchange receipts. Second, there was a loan term mismatch. Short-term loans were used to finance long-term projects like real estate and infrastructure. Third, there was a misallocation of investments. With more capital flowing into Thailand than productive projects to finance, an investment bubble supported a glut of vulnerable projects. Fourth, investors failed to appropriately hedge against foreign exchange risk. The tendency not to hedge foreign currency in countries with pegged exchange rates left borrowers exposed to devaluation of the baht. Finally, the Thai government inadequately monitored non-bank financial institutions. These firms suffered liquidity problems when the crisis hit because they were unregulated.

Legacies of the financial crisis affected Bangkok significantly. As the country's largest urban center, the site of rampant real estate speculation, and one of the region's largest financial centers, its economy suffered. In aggregate, the crisis sped up the process of deindustrialization, strangled a property boom, reduced incomes, and drove up the cost of imports. The shattered financial sector shed 100,000 jobs in the wake of the crisis (ibid). As financing dried up, unfinished real estate projects across the city stood abandoned. As construction projects failed, unemployment in Bangkok climbed to 5.1 percent in 1999 from 1.4 percent in 1996 (ibid.). In the wake of such economic hardship, however, many infrastructure projects continued. The next section discusses the impact of the crisis on these investments and on mobility in Bangkok more broadly.

8. Post-Crisis Transportation in Bangkok

Economic Outcomes

For Bangkok residents, economic fortunes of the crisis were diverse depending on socio-economic and spatial position. In fact, in the face of a 50 percent drop in city GDP, Webster (2005) argues that the city became a more livable place. In order to provide context for the mobility impacts of the crisis, I examine the consequences for employment, real estate, and transportation costs.³

The financial crisis increased joblessness in the urban core of Bangkok more than in the periphery. Citywide, unemployment increased from 1.4 percent in 1996

to 5.1 percent in 1999 (ibid). In the urban core, about 120,000 manufacturing jobs and 100,000 finance jobs disappeared (ibid.). Employment actually *increased*, however, in the city's peri-urban areas (ibid.). The impacts of the crisis on business growth were also mixed. Japanese and American automobile companies, for example, postponed the expansion of their Bangkok plants; however, a lower cost of living made Bangkok more attractive for other types of international firms from the Southeast Asia region (ibid). Citywide, wages fell 3.7 percent, but a devalued baht increased the cost of imported goods and caused the middle class to consume less (ibid.).

The crisis burst a housing bubble, burdening property owners much more than renters. Many buildings were left abandoned and housing was no longer in scarce supply. Vacancy rates reached 30 percent for residential buildings and 14 percent for offices (ibid), causing rent prices to drop considerably. Higher-income residents, more likely to receive than pay rents, were the most adversely affected.

Bangkok residents bought fewer new cars, but the city's private motorized fleet remained constant (Hanaoka 2007). Growth in auto manufacturing slowed: Japanese producers closed plants, and American producers (Ford, GM, and Chrysler) postponed expansion plans (Webster 2005). Due to falling incomes and the rising cost of imports such as fuel, new car purchases also subsided; vehicle registrations, however, increased (Figure 7). Bangkok residents invested less in new automobiles immediately after the crisis, instead opting to purchase used vehicles or to bring existing ones into daily use. Therefore, the city's vehicle fleet stayed perfectly flat during the crisis. The relatively unbroken trend of registrations through the crisis years suggests that cars remained necessary.

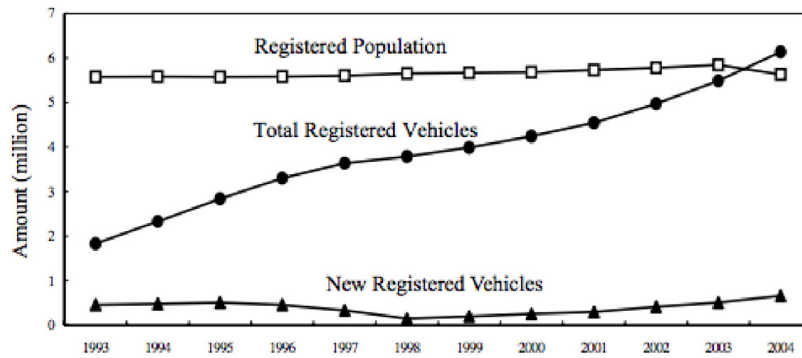


Figure 7. Registered vehicles and population in Bangkok.
Source: Hanaoka 2007

Public transit service became more expensive immediately after the crisis. In fact, transit fares grew disproportionately quickly. The real increase in the typical BMTA bus fare rose almost 50 percent (from 4.68 baht to 6.95 baht) from 1997 to 2003 (Kumar and Meakin 2005), almost double the concurrent increase in Thailand's Consumer Price Index (Trading Economics 2015).

At the household level, the crisis was not universally detrimental. Only the slight majority of city residents were worse off: about 55 percent of the central business district households and 53 percent for the poorer outer areas (Webster 2005). Between 1996 and 1999, the poverty rate in Bangkok actually declined from 1.3 percent to 0.5 percent (ibid). The drop was likely due to low-wage peri-urban workers emigrating to the countryside .

Mode Share

The financial crisis changed the way that Bangkok residents navigate their city. In 1996, transportation mode share was skewed heavily towards private motorized vehicles—that is, cars, motorcycles, and trucks accounted for more than half of trips; public transit comprised one-third and non-motorized (biking or walking) comprised 13 percent. Figure 8 shows the change in mode share in 1996, 1999,

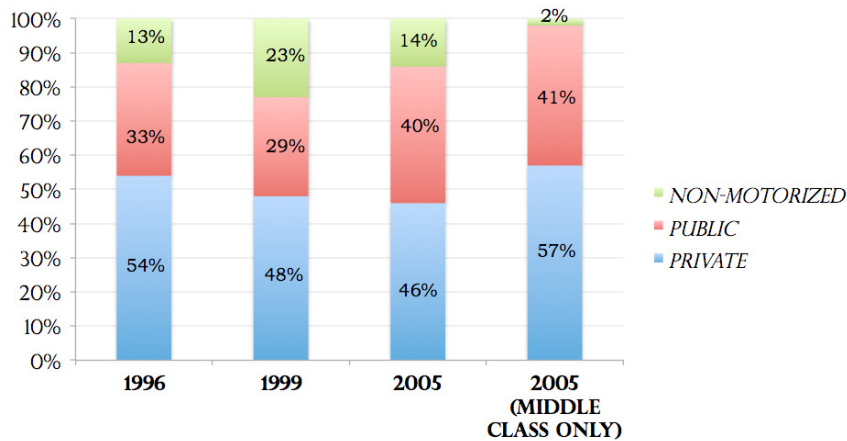


Figure 8. Transportation mode share in Bangkok: 1996, 1999, and 2005. Sources: Anurakamonkul et al. 1997; Choiejit and Teungfun 2005b; World Bank 2007; Charoentrakulpeeti et al. 2006.

and 2005. It also includes a 2005 figure for only middle-class residents (i.e., employed in the formal sector, college-educated, and/or earning at least 7,000 baht per month) to demonstrate modal differences across income groups. After the crash, in 1999, transit ridership fell to 29 percent and non-motorized transport surged to nearly one-quarter of all trips. By 2005, however, transit use surged back to exceed pre-crisis levels and driving hit its nadir.

While Figure 8 suggests a linear storyline, the reality is much more complicated. Between 1999 and 2005, while the share of transit ridership rebounded, total ridership actually declined (Figure 9). There were fewer transit riders, but a larger share of trips were made on transit. There are two possible explanations for these counter-intuitive phenomena.

First, it is possible that there were dramatically fewer trips citywide. But, given that Bangkok's growth rebounded strongly in the early 2000s, this seems unlikely. Moreover, utilization of Bangkok's highways and tollways, shown in Figure 10, increased from 1999 to 2005. The comparative share of transit must have grown, too. The more likely explanation lies in the definition of "public" transport.

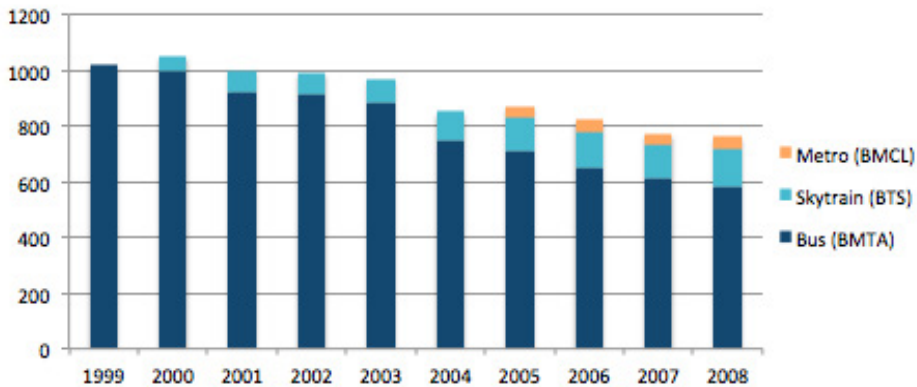


Figure 9. Transit ridership in Bangkok. *Source:* TRIS Rating 2009.

Note: BMCL is metro; BTS is Skytrain; BMTA is bus.

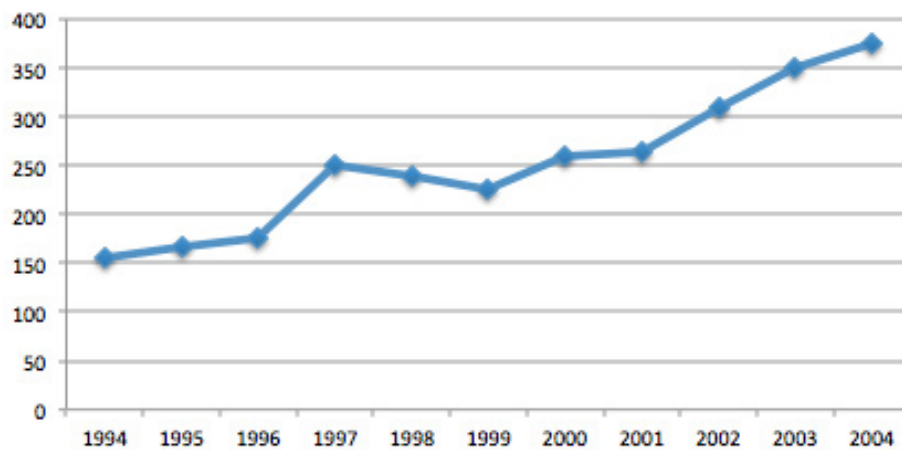


Figure 10. Annual utilization of Bangkok's expressways, 1994-2004.
Source: Choiejit and Teungfung 2005b.

Since the early 1990s, city bus services were increasingly supplied by private operators. These operators offered a higher-priced, air-conditioned service that quickly garnered market share. As Figure 11 depicts, bus service provided by the city's bus transit authority (BMTA) had been in decline as the market shifted toward more expensive air-conditioned buses. Whereas publicly owned (not air-conditioned) BMTA buses were the norm pre-crisis, by 2004 the majority of buses were air-conditioned and only 10 percent were operated by the BMTA and its joint service operators (Kumar and Meakin 2005). From 1999 to 2008, BMTA ridership fell by nearly 50 percent. The air-conditioned private bus services catered to a higher-income clientele, but are still counted as "public" when compared to personal automobiles.

The shift to higher-cost bus service underscores how poorer communities faced the brunt of transportation trade-offs during the crisis. Extrapolating from the middle-class survey, we can assume that non-motorized trips are common among poorer residents. Figure 11 shows that the modal transition from 1996 to 1999 was relatively more substantial for non-motorized trips than other modes: a 60 percent increase as opposed to decreases of about 10 percent. Lower-income users were therefore more likely to have switched modes. Economic theory supports this notion, as the price elasticity of demand (responsiveness of passengers to prices) should be higher for those users.

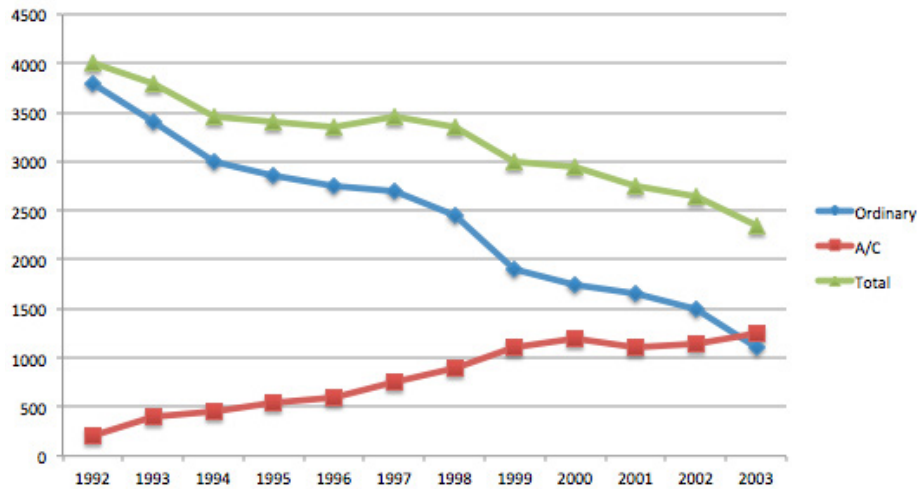


Figure 11. Number of bus passengers served by BMTA, 1992-2003.
Source: Choiejit and Teungfung 2005b.

Mass Transit Investment

The financial crisis likely made completion of the city's major transit investments more difficult, but is not entirely to blame for their limited success. Delayed project completions and poor ridership are more directly attributable to poor urban policy. This section explains the causes of the underperforming Skytrain, the abandoned BRTS/Hopewell, and the delayed MRTA.

The Skytrain was completed in 1999—behind schedule and over budget, but not uncommonly so. All transport projects in Bangkok, before and after the Skytrain, followed a similar pattern. Of all the transportation megaprojects undertaken in the 1990s (those in Table 2), the completion speeds range from 1.7 km/year to 21 km/year. The Skytrain was completed at 3.1 km/year. That outpaces the MRTA subway that was completed before the crisis. Therefore, the crisis was not necessarily to blame for the Skytrain's slow completion.

It is hard to determine what impact the crisis had on the system's low performance. The Skytrain project was the first mass transit system in Thailand, but ridership has never met planners' forecasts (Cobb n.d.). In its opening year, the system carried less than one-third of the predicted 600,000 riders (as shown in Figure 12). Some blame this poor performance on the preceding economic cri-

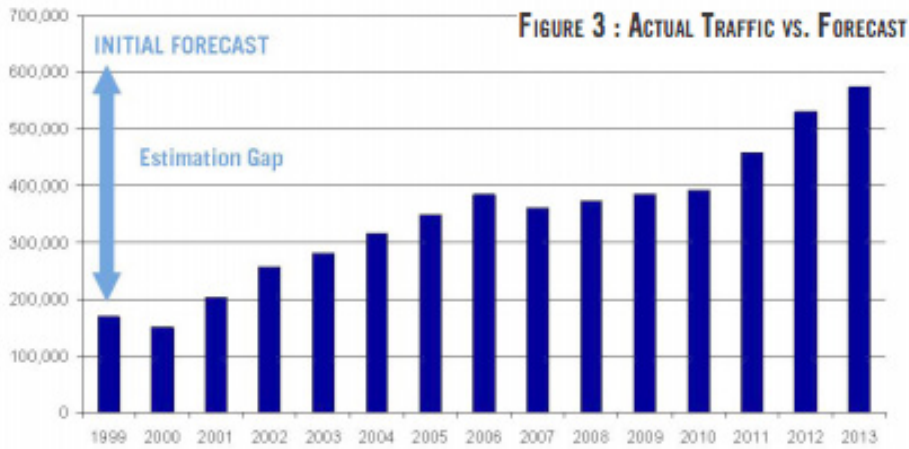


Figure 12. Skytrain ridership. *Source:* Verougstraete and Enders 2014.

sis. Even fifteen years after its opening, however, the Skytrain has yet to attain its original forecast. Ridership did slip during the 2007-2008 global financial crisis, but we cannot assume that the impacts of two different crises were congruent.

The financial crisis played a role in the termination of the BERTS project, but it should not be overstated. To be certain, the bursting real estate bubble deprived the development of a substantial revenue source, devaluation of the baht raised costs by up to 15 percent, and the crisis may have spooked investors. Still, the fact remains that the project was struggling well before the crisis.

Hopewell suffered from a litany of internal and external failures. From the outset, there had been no feasibility study, and construction began before the difficult process of evicting tenants to redevelop BERTS-adjacent property (Wasuntarasook and Hayashi 2013).⁴ Additionally, the planned route involved serious structural complications and competing rights-of-way (2Bangkok.com 2005). Furthermore, a new government came into power in the early 1990s, changing the politics of the project and causing further delay.

The crisis did not help BERTS, but industry insiders were already talking about alternative concessionaires before the economic downturn. As early as 1995, before the crisis was imminent, industry experts observed that HHL had too much debt and had already begun to liquidate assets (Fletcher 1995). News

media accused HHL of being spread too thin financially, and called the project “far too expensive to be feasible” (Engardio 1995, 1). Indeed, the market noted HHL’s cash flow problem well in advance of any Thai monetary struggles: the company’s stock price fell over 30 percent from 1993 to 1996. It is unlikely the project would have resolved itself in the absence of the crisis.

The MRTA was a publicly financed project, so economic and political upheavals were likely major impediments. From the start of construction to operation, the 20-km MRTA line took just under seven years; by comparison, the 29-km Airport Link rail line that started the same year took just four years (Wasuntara-sook and Hayashi 2013). The crisis certainly delayed the MRTA. In particular, the tight fiscal restrictions of bailout assistance could not have made it easy to continue with large capital outlays. But ridership on the metro rail remains extremely low. The MRTA carries less than half the riders that the Skytrain does, even though it operates over roughly the same length of track.

9. Discussion

How does the financial crisis help to explain these complicated mobility trends? First, rising prices during the crisis made motorized modes more expensive. Given that registered vehicles increased, the downward trend in private vehicle trip share suggests that residents were making fewer driving trips. At the same time, the cost of transit service grew while service declined. These cost increases explain the 1999 switch to non-motorized travel modes.

Transit had been in decline for a long while, and the resurgence of public transportation use in 2005 is a deception of modal definitions. Public transit actually declined significantly in 2005 due to poor performance of new transit megaprojects. Private providers picked up the slack with a more expensive service. Indeed, the 2005 middle-class mode share indicates that the wealthy were as likely to use transit as to drive.

Histories of three transit infrastructure investments reveal that the crisis is not directly to blame for poor transit utilization. Two key indicators of mode choice in Bangkok underscore this conclusion: the fact that car ownership did not fall during the crisis and the ongoing decrease in transit ridership post crisis. These are related phenomena. Both suggest a constant value to car-oriented travel. Partially this is because there has been little to no investment in the city’s bus service: in 2006, the BMR allocated almost 20 times more to roads than to bus

service (Charoentrakulpeeti et al. 2006). But even in the face of new transit megaprojects, cars are the preferable mode. For Bangkok residents with means, the car is the most common transportation mode. The 2005 mode share for private vehicles is lower than in 1996, but transit ridership fell about 10 percent between 1996 and 2008. But there are other explanations as well.

First, the city has failed to stand by sound policies designed to make driving accurately reflect its full costs. Cost of ownership remains low, as fuel subsidies and parking regulations stay untouched. Survey research indicates that car ownership per household is higher in the center of Bangkok—where land is most expensive and traffic most congested—than in the suburbs (Charoentrakulpeeti et al. 2006). Traffic congestion will persist if even dense communities face incentives favoring cars. Toll road charges, meant to follow cost of living, have largely remained the same while the population, traffic, and prices have risen (JICA 2008). The BMR seems resigned to short-term, misguided, and placatory policies focused more on moving vehicles than moving—or helping—people.

Second, highway investment continues to outpace transit. Bangkok's planners continue to build highways in an attempt to drive their usage down. This approach, however, ignores the concept of induced demand and sets a precedent for long-term physical development around the automobile. The BMR has made strides in designing transit, which is headed for an explosion of growth in the next decade. However, the city continues to underserve the poorest populations, who are disproportionately likely to travel by non-motorized modes.

10. Conclusion

Bangkok's transportation sector has always been a top policy priority, given that it causes widespread congestion, pollution, delay, and economic stagnation. Even after the crisis, though, when a clean slate of sorts emerged for urban policymakers, smart recommendations to alleviate transportation ills were met with political weakness, doomed by lack of coordination, and sidelined by seemingly more urgent solutions.

Fortunately, the local government is investing heavily in dozens of new transit lines, including metro, BRT, and commuter rail. As the impact of the crisis showed, however, there is also a need to make driving less attractive and more efficient. There must be a stick alongside the carrot.

Without such policies, we must consider the equity implications of a city prioritizing private motorized transit. Given the spatialized socioeconomic disparities in Bangkok, further research should analyze exactly how wealth and location are correlated, and how those correlations map to accessibility. Transportation systems are simply a matching of residential and commercial land uses. The city should take into consideration how its land use policies and incentives implicitly (or explicitly) articulate transportation policies. Changing travel behavior is as much a question of where people live and work as of modal options.

For instructive examples, Bangkok can learn from its peers. High-mobility cities make walking and biking possible for all citizens, and there are leaders in the region. If Bangkok has aspirations of global city status it should emulate compact, transit-rich Singapore, not car-choked Kuala Lumpur. It is possible for Bangkok to ride a new wave of transit enthusiasm to improve mobility for all modes and all people.

Notes

¹ While elaborating on the differences between these types of transit is beyond the scope of this paper, Chapter 5 of Wolfgang S. Homburger's 1967 *Urban Mass Transit Planning* offers a good review.

² To a lesser extent, Brunei, Cambodia, China, Japan, Lao DPR, Singapore, and Vietnam were also affected.

³ Webster's 2005 *Bangkok Beyond the Crisis* is the sole source for the "Economic Outcomes" section, unless otherwise noted.

⁴ It is true that construction started on the Skytrain before any property rights were secured, but in that project there were many fewer properties to acquire and the financial stability of the investment was not so dependent on real estate development.

References

- 2Bangkok.com. 2005. "The Hopewell Project—A Defunct Mass Transit Project." Accessed December 1, 2014. <http://2bangkok.com/2bangkok-masstransit-hopewellmain.html>.
- Acharya, S. R. 2005. "Motorization and Urban Mobility in Developing Countries: Exploring Policy Options Through Dynamic Simulation." *Journal of the Eastern Asia Society for Transportation Studies* 6: 4113-4128. https://www.jstage.jst.go.jp/article/easts/6/0/6_0_4113/_pdf.
- ALMEC Corporation. 2004. "The Study of Transportation Modes and Feasibility Study on HCM Metropolitan Area (HOURTRANS)," Volume 1. ALMEC Publications.
- Anurakamonkul, K., Y. Hayahi, H. Nakamura, and O. Osman. 1997. "Effect of Transport Attributes on Urban Congestion and the Environment: The Case of Bangkok." Berkshire, UK: TRL.
- Brockmann, C., and H. Rogenhofer. 2000. "Bang Na Expressway, Bangkok, Thailand—World's Longest Bridge and Largest Precasting Operation." *PCI Journal* 45 (1): 26-38.
- Charoentrakulpeeti, W., E. Sajor, and W. Zimmermann. 2006. "Middle-Class Travel Patterns, Predispositions and Attitudes, and Present-Day Transport Policy in Bangkok, Thailand." *Transport Reviews* 26 (6): 693-712. <http://www.tandfonline.com/doi/pdf/10.1080/01441640600746927>.
- Choiejit, R., and R. Teungfung. 2005a. "Urban Growth and Commuting Patterns of the Poor in Bangkok." Washington, DC: World Bank. <http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1269364699096/6892630-1269364758309/choejit.pdf>.
- Choiejit, R., and R. Teungfung. 2005b. "Influence of Employment Density on Commuting Patterns in Bangkok: A Case Study of Non-Motorized Modes." Paper presented at the International Conference on Walking in the 21st Century, September 22-23, Zurich, Switzerland. <http://www.walk21.com/papers/Zurich%2005%20Choiejit%20The%20influence%20of%20Employment%20density%20%20on%20c.pdf>.
- Cobb, M. n.d. "Bangkok's Mass Transit: The 'Mega Projects' Update: 2002-2007." Accessed December 5, 2014. <http://www.idcworld.com/citidesign/bangkok.htm>.

- DuPont, P., and K. Egan 1997. "Solving Bangkok's Transport Woes: The Need to Ask the Right Questions." *World Transport Policy & Practice* 3 (1): 25-37.
- Engardio, P. 1995 "Is Gordon Wu Stretched Too Thin?" *Bloomberg Businessweek*. Accessed December 5 2014. <http://www.businessweek.com/stories/1995-10-08/is-gordon-wu-stretched-too-thin>.
- Einhorn, B. 1997. "How Severe are the Woes of Gordon Wu?" *Bloomberg Businessweek*. Accessed December 5, 2014. <http://www.businessweek.com/stories/1997-08-03/how-severe-are-the-woes-of-gordon-wu-intl-edition>.
- Feng, C., and J. Sun. 2013. "Developing Urban Roads and Managing Motorization." In *Transport Development in Asian Megacities: A New Perspective*, edited by Surya Raj Acharya and Shigeru Morichi. Berlin: Springer-Verlag.
- Fletcher, M. 1995. "Hanging on at Hopewell: Asia Watches as Wu Acts to Shore Up His Infrastructure Empire." *Asiaweek.com Magazine*. <http://edition.cnn.com/ASIANOW/asiaweek/95/1201/biz1.html>.
- Gakenheimer, R. 1999. "Urban Mobility in the Developing World." *Transportation Research Part A: Policy and Practice* 33 (1): 671-689.
- Godard, X. 2003. "Public Transport in Developing Cities in the Face of Globalization." *Public Transport International* 51 (1): 26-28.
- Hanaoka, S. 2007. "Review of Urban Transport Policy and its Impact on Bangkok." *Proceedings of the Eastern Asia Society for Transportation Studies* 6: 27-38.
- Hill, C. n.d. "The Asian Financial Crisis." Fairborn, OH: Wright State University. <http://www.wright.edu/~tdung/asiancrisis-hill.htm>.
- International Monetary Fund (IMF). 2007. "Thailand: Selected Issues." *Staff Country Reports* 07 (231). Washington, DC: International Monetary Fund.
- International Association of Public Transport (UITP). 2014. "Public Transport, a Lever for Local Economic Development and Wealth Creation." Frame of the EU Transport Business Summit on March 27. Brussels, Belgium.
- Japanese International Cooperation Agency (JICA). 2006. "Bangkok-Chonburi Highway Construction Project (2)." Accessed December 3, 2014. http://www.jica.go.jp/english/our_work/evaluation/oda_loan/post/2006/pdf/project05_full.pdf.

- JICA. 2008. "Ex-Post Monitoring for ODA Loan Project: Metropolitan Highway Construction Project—Ramintra-Artnarong Lin (I) & (II)." http://www.jica.go.jp/english/our_work/evaluation/oda_loan/monitoring/c8h0vm000001rdlp-att/tha2007_01.pdf.
- Kumar, A. and R. Meakin. 2005. "A Study of Urban Transport Conditions in Bangkok: Draft Report." Public Private Infrastructure Advisory Facility and World Bank. http://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/UrbanBusToolkit/assets/CaseStudies/summy/sum_bankok.html.
- Lauridsen, L. 1998. "The Financial Crisis in Thailand: Causes, Conduct, and Consequences?" *World Development* 26 (8): 1575-1591.
- Metz, D. 2012. "Demographic Determinants of Travel Demand." *Transport Policy* 21: 20-25.
- Milioti, C. 2014. "Mobility Patterns, User Behavior and Financial Crisis: An Explanatory and Revealed Preference Analysis." Association for European Transport. Accessed January 28, 2015. <http://abstracts.aetransport.org/paper/index/id/4183/confid/19>.
- Millard-Ball, A., and L. Schipper. 2011. "Are We Reaching Peak Travel? Trends in Passenger Transport in Eight Countries." *Transport Reviews: A Transnational Transdisciplinary Journal* 3 (31): 357-378. <http://www.tandfonline.com/doi/pdf/10.1080/01441647.2010.518291>.
- Rothengatter, W. 2011. "Economic Crisis and Consequences for the Transport Sector." In *Transport Moving to Climate Intelligence*, edited by Werner Rothengatter, Yoshitsugu Hayashi, and Wolfgang Schade. New York: Springer.
- Rujopakarn, W. 2002. "Bangkok Transport System Development: What Went Wrong?" Bangkok: Kastsart University.
- SPAD (Land Public Transport Commission). 2013. "Public Transport Master Plan: Greater Kuala Lumpur/Klang Valley." Presentation, November 7, 2013. Accessed December 2, 2014. http://eps.mbj.gov.my/SlideTod/MBPJ_GKLV_Nov2013_SPAD.pdf.
- Spicer, M. 2006. "BTS Skytrain Case Study: The Experience of Bangkok's First Private Mass Transit Concession." Presentation, World Bank Transport Learning Week 2006. <http://siteresources.worldbank.org/INTTRANSPORT/Resources/336291-1152796664200/2749337-1153152935396/spicer-c4-btsc-case-study.pdf>.

- Tanaboriboon, Y. 1993. "Bangkok Traffic." *Current Research Topics from Asia, IATSS* 17 (1). <https://iatss.or.jp/english/research/17-1/pdf/17-1-02.pdf>.
- Trading Economics. 2015. "Thailand Consumer Price Index." Accessed May 4, 2015. www.TradingEconomics.com.
- TRIS Rating. 2009. "Bangkok Mass Transit System Public Company Limited." *Credit News*, Announcement No. 639, July 17, 2009. http://capital.sec.or.th/webapp/corp_fin/datafile/dsf/1076122009-07-28TD104L02083.PDF.
- UNESCAP. 2013. "Thailand's Experience on Emission Measurement and Mitigation Policies." Presentation, September 26, 2013. <http://www.unece.org/fileadmin/DAM/trans/doc/themes/ForFITS/3.9.Thailand.pdf>.
- Verougstraete, M., and I. Enders. 2014. "Traffic Demand Risk: The Case of Bangkok's Skytrain." Public-Private Partnerships Case Study, ESCAP. http://www.unescap.org/sites/default/files/Case%201%20-%20Traffic%20Demand%20-%20Bangkok%20BTS_0.pdf.
- Victoria Transport Policy Institute (VTPI). 2010. "Transportation Cost and Benefit Analysis II – Transportation Diversity." Accessed December 8, 2014. <http://www.vtpi.org/tca/tca0509.pdf>.
- VTPI. 2013. "Understanding Transport Demands and Elasticities." Accessed January 29, 2015. <http://www.vtpi.org/elasticities.pdf>.
- Wasuntarasook, V., and Y. Hayashi. 2013. "A Historic Review on Consequences of Critical Events Leading Revolution in Mass Transit in Bangkok." *Proceedings of the Eastern Asia Society for Transportation Studies*, Vol. 9. <http://east.info/online/proceedings/vol9/PDF/P50.pdf>.
- Webster, D. 2005. "Urbanization: New Drivers, New Outcomes." In *Thailand Beyond the Crisis* edited by Peter Warr, 285-314. New York: Routledge.
- World Bank. 2007. "Strategic Urban Policy Directions for Bangkok." Urban Transport Development Partnership. Washington, DC: World Bank. http://siteresources.worldbank.org/INTTHAILAND/Resources/333200-1177475763598/2007june_bkk-urban-transport-directions.pdf.
- World Bank. n.d. "Breakdown of Co-ordination between Public and Private Sector Construction Programmes in Bangkok." Accessed December 3, 2014. http://www.worldbank.org/transport/roads/tr_docs/annex7.pdf.

Lead Photograph

Bangkok, Thailand. Infrastructure, congestion, and air conditioned commercial spaces coalesce in Siam Square. Popular for shopping and entertainment, the area is constantly alive with people. Nearby Chulalongkorn University and the National Stadium draw visitors from the wider City. Massive, sculptural transportation infrastructure heightens the spatial effects of congestion and overlapping use. Photograph by LuLu Saleh