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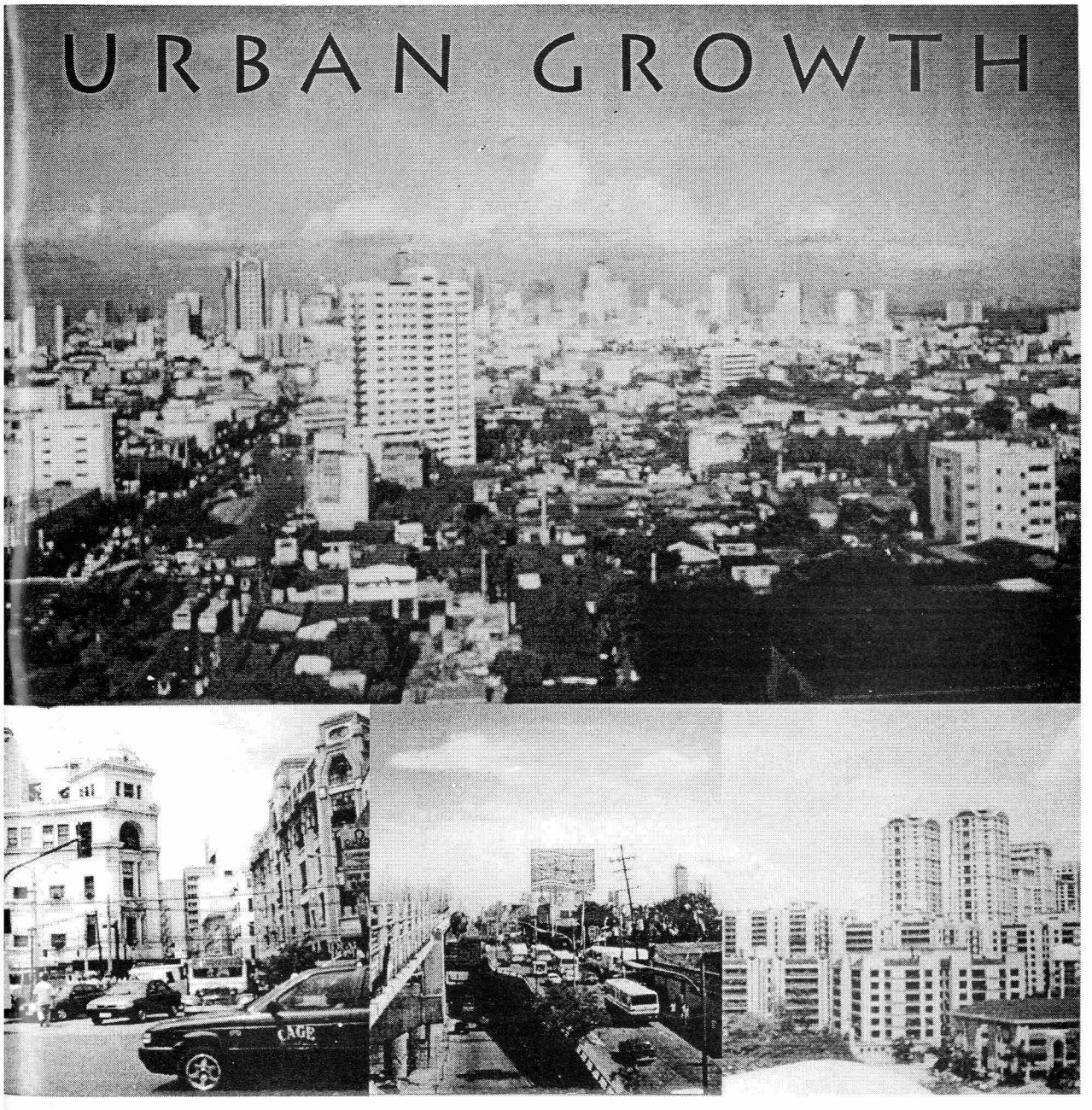

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TABLE OF CONTENTS

Spatial Structure of Metro Manila 1
Genesis, Growth and Development

- Marqueza C. L. Reyes

Demand for High-End Residential and Commercial Space 35
The Case of Makati City

- Krishna C. Viuya

The Impacts of Transportation on Urban Quality of Life 58
The Case of Metro Manila, Philippines

- Arleen Grace B. Ramirez-Villoria

City Size and City Efficiency of Selected Philippine Cities 71

- Bernardino A. Atienza Jr.

About the Contributors 90

SPATIAL STRUCTURE OF METRO MANILA

Genesis, Growth and Development

Marqueza C. L. Reyes

INTRODUCTION

This paper is divided into two major parts. The first part presents the evolution of Metro Manila from a colonial city built by the Spanish colonists and a satellite city during the American period to a modern-day polynodal metropolis. It describes the morphological changes Metro Manila experienced through centuries of contact with foreign cultures, and the metropolitanization process that followed decolonization. The impacts of wider socio-economic processes during different periods as well as the internal forces within the metropolis are likewise discussed.

The second part of the paper proffers an analysis of the resultant spatial structure of Metro Manila as it evolved towards a conurbation of cities and municipalities into a full-fledged megalopolis. The analytical framework follows the logic of structuralist and sociological approaches in explaining the overall spatial structure of the urban agglomeration.

ORIGIN AND GROWTH OF METRO MANILA

Maynilad: A Pre-Colonial Settlement

Tribes of various cultural-linguistic characteristics lived in small, discrete villages and hamlets scattered all over the archipelago. Lowland settlements, usually located along seashores and riverbanks, were independently dispersed, although local chiefdoms had emerged in such areas as Maynilad, Tondo, Cebu, and the sultanate of Jolo in the south. The *barangay*, the basic socio-political unit, was comprised of around 30 to 100 families. These semi-permanent folk societies subsisted on shifting cultivation and engaged in hunting, fishing, and food gathering.

Maynilad was a thriving agricultural settlement due to its highly advantageous location. Sitting on the alluvial plains at the mouth of the Pasig River, it was endowed with fertile agricultural lands and enjoyed access to both Manila Bay on the west and Laguna de Bay on the east. According to Doeppers (1972), Maynilad was the largest indigenous settlement in the archipelago, consisting of several *barangays* of more than 2000 inhabitants, including 40 Chinese and 20 Japanese. Cebu, the next largest settlement and port of call, had close to 2000 inhabitants.

So situated, Maynilad became the hub of importation for other large Tagalog (*taga-ilog* or by the river) settlements as well as for inland villages around Laguna Lake (Doeppers 1972), performing port, commercial, and trading functions as a key transshipment point for goods entering and leaving the islands. This high economic activity level was fostered by barter trade with local tribes and foreign junks coming from China, Brunei, Malacca, the Moluccas, and Japan (Reed 1977). As the foremost entrepot in the islands, Maynilad performed non-agricultural activities and serviced the needs of nearby villages. Some villagers had become merchants and goldsmiths, but they could have been farmers, fishers, or hunters at the same time.

Rajah Sulayman, the charismatic leader of Maynilad, had begun a supra-barangay confederation of villages along the Pasig River but

was nipped in the bud by the Spanish conquest (Reed 1977). Hence, indigenous settlements in the archipelago were socially, economically, and politically independent of one another on the eve of Spanish colonization.

Manila: A Colonial Capital

Early Colonial Urbanization

In a matrix of a highly fragmented settlement system, the Spaniards securely established Manila as their permanent urban base from where they commanded the colony. With its royal palaces, stately public buildings, beautiful plazas, expensive Spanish houses, and cobbled streets, Manila was a sight to behold for visitors and natives alike. By the end of the 16th century, *Intramuros* had been converted into an imposing colonial capital, a symbol of Spanish colonial power. (Figure 1)

Within the ramparts was a planned city influenced by Roman city planning and inspired by piazza planning of the Italian Renaissance (Figure 1). As the urban base of the colonial government, it was laid out according to the Laws of the Indies issued by King Phillip II on 3 July 1573, which detailed the rules in Spanish city planning.

In other Hispanized parts of the islands were widely dispersed regional urban centers called *ciudades* and *villas*, with populations ranging from 2500 to 5000. Spanish missionaries likewise founded many provincial religious and administrative hubs or *cabeceras*. The *cabeceras* or mission settlements were established around or nearby existing hamlets and villages as beachheads in order to subdue the natives and convert them to the Catholic faith. The church naturally formed the nucleus of these rural settlements. Many of these *cabeceras* eventually became *poblaciones* (towns) with populations ranging from 500 to 2000. By 1650, the *cabecera* or *poblacion* settlement system had spread in the lowlands with *visitas* or *barrios* surrounding each *poblacion.* These Hispanic settlements displayed the Spanish principles of urban design known as the church-plaza complex. By 1655, the urban settlement system was composed of four tiers: the capital city of Manila, several regional urban centers, 180 *cabeceras* or *poblaciones,* and a host of rural *barrios.*

Manila: The Primate City

The fortified city of Manila was the governmental, ecclesiastical, military, cultural, social, and economic nerve center of the Spanish colonial government in the archipelago for the subsequent three centuries. It eventually became the colonial entrepot of Spain in Southeast Asia, taking control of maritime trade in the region. On June 21, 1574, Philip II of Spain gave Manila the title "Distinguished and Ever Loyal City."

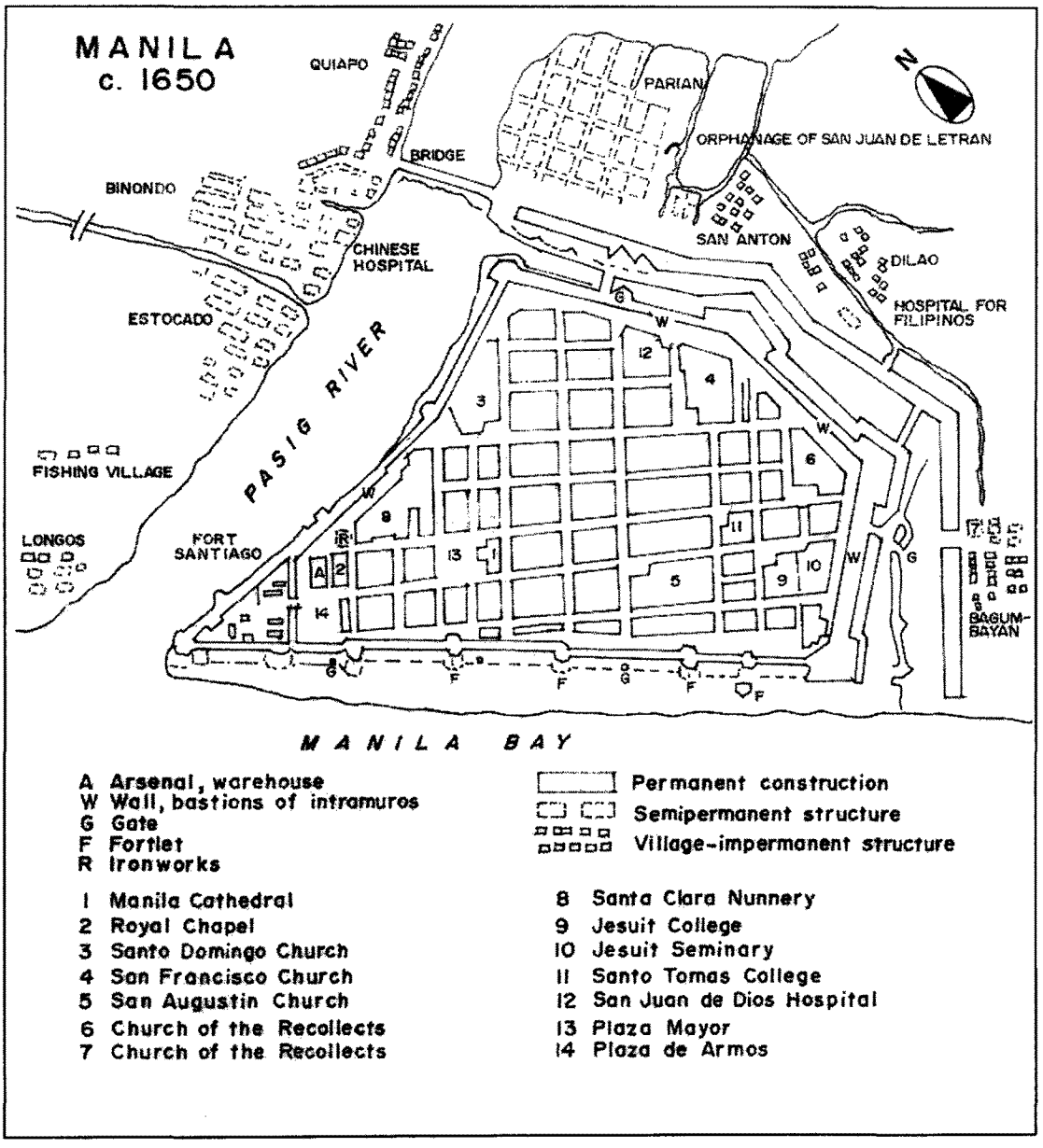
As the focal point of the entrepot economy, it served as a vital cog in the annual Manila-Acapulco galleon trade between Mexico (or Nueva España, another Spanish colony) and Spain. It became the hub of commerce in Southeast Asia, linking the region, Japan, Hispanic America, and China to the New World through the galleon trade from 1565 to 1815 (Leinbach 1993).

The highly centralized, urban-based administrative system of the colonial government had set the stage for Manila to become a primate city. Manila became the dominant growth center of the colonial economy as its regional maritime trade and economic role grew in size and importance, even as the colonial government sought to create a system of urban control points to consolidate its political and economic dominance. Nevertheless, some provincial centers or *poblaciones* managed to become secondary cities, though none came close to the stature of Manila.

Thus, not only was the primate city of Manila the control point for external trade, it was also used to control insular commerce and trade. It became the processing and transportation hub of the country. Servicing the needs of frontier regions further bolstered its growth and dominance. While Manila continued to gain physical, political, social, and economic importance, rural subservience engulfed the rest of the country. It provided the spatial locus necessary for the organization of predominantly rural space as well as for linking the regional and provincial centers and the hinterlands.

Figure 1

INTRAMUROS: THE WALLED CITY OF MANILA, ca. 1650



Source: Lifted from Reed 1977

Spanish Residential Decentralization

As the city grew more prosperous, urbanization spilled over the walls of *Intramuros* and engulfed the surrounding *arrabales*. The pre-urban hamlets and villages where Spanish friars founded their missions formed the nuclei of the *arrabales* (suburbs) and *pueblos* around *Intramuros*. Examples were the mission settlements of Tondo, Binondo, Sta. Cruz, and Quiapo.

Wealthy Spaniards built their country estates, complete with orchards, baths, and gardens in the suburbs, specifically along the banks of Pasig River (Reed 1977). By the 1650s, the immediate extramural areas around Intramuros were becoming urbanized while the outlying peripheral areas remained largely rural.

Thus, the spatial expansion of the affluent Spanish residential sector highly influenced the direction of city growth and urbanization. As a result of such residential growth, the *pueblos* of Bagumbayan, Ermita, Binondo, Quiapo, Santa Ana de Sapa, San Pedro Makati, and San Juan del Monte became the emerging major suburbs of Manila (Figure 2).

Spatial Differentiation Due to Socio-economic and Ethnic Diversity

Aside from the urban growth effected by the expansion of Spanish residential quarters in the extramural areas, the explicit colonial policy of ethnic segregation and the implicit socio-economic clustering of the urban and peri-urban population facilitated urban growth. Their spatial differentiation shaped the spatial structure of the colonial city to a large extent (Figure 3).

Intramuros was the exclusive residential enclave of the political and religious colonists and some 3,200 Spanish elite. North of the Pasig River, the suburban nodes of Tondo, Santa Cruz, and Quiapo were the most important. Being adjacent to the urban core, many residents became wage earners and engaged in non-farm activities. Tondo, Quiapo, and Sampaloc were home to Filipino rice farmers and market gardeners. These places were known as sources of cheap labor for construction work. Santa Cruz, in contrast, was home to prosperous Chinese mestizos. The Spaniards created San Miguel specifically to accommodate Filipinos who were displaced by marauding Chinese in 1603.

The ethnic Chinese preferred the environs of predominantly-Filipino Tondo before the Spanish authorities transferred them to Parian in 1583. The Manila Chinese were an enterprising lot; they engaged in commerce, trade, crafts, and provided urban services for Manila and its suburbs. Parian, thus, evolved into a commercial and marketing center. At the end of the 17th century, the Chinese population increased from 40 to a peak of around 30,000, forcing the Spaniards to officially restrict the Manila Chinese to the suburbs of Parian and Binondo. Binondo was particularly assigned to Christianized Chinese mestizos.

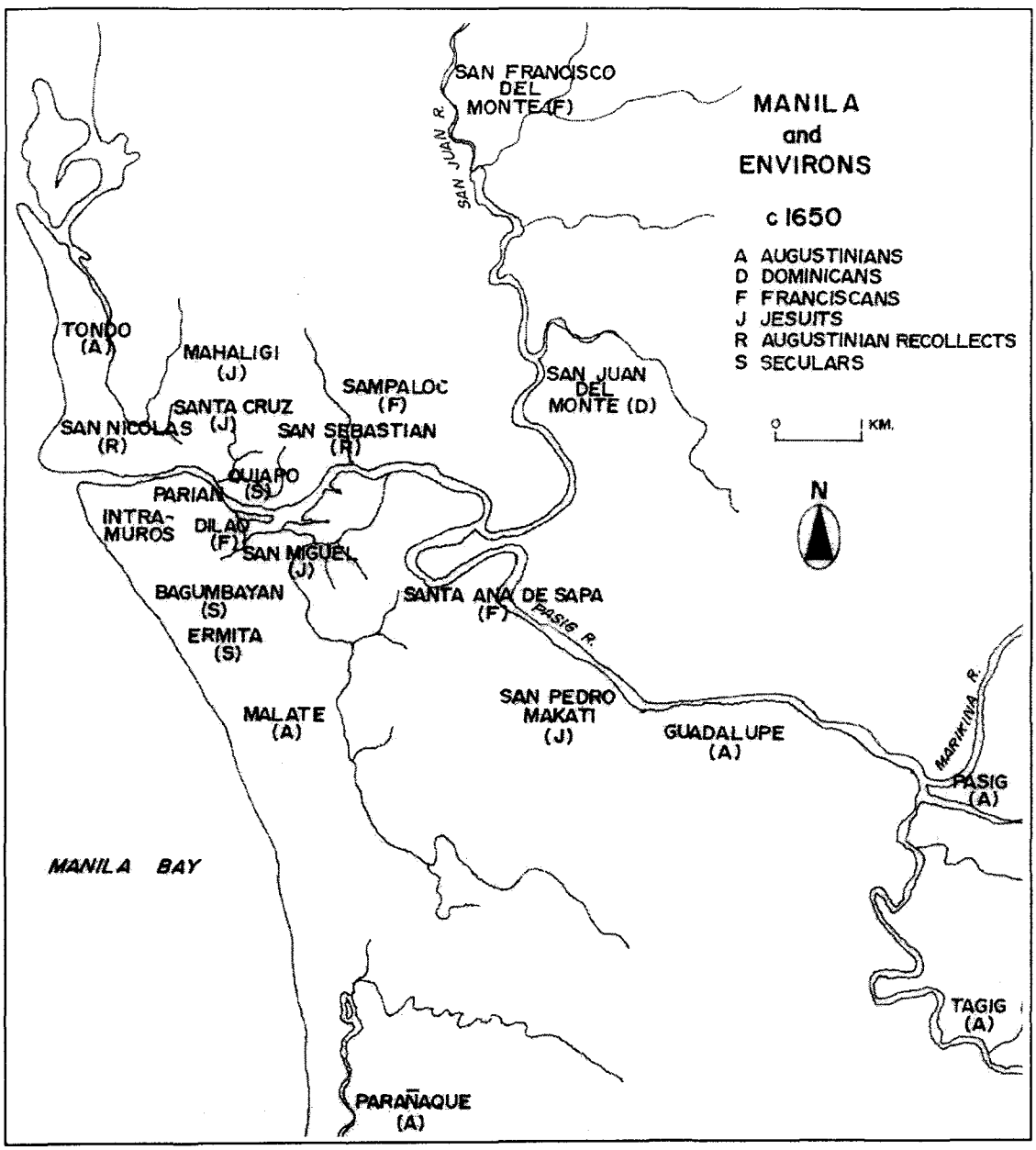
South of the Pasig River, Filipinos inhabited the extramural nodes of Ermita, Malate, and other peripheral pueblos. Ermita, founded in 1591, was a quiet residential district of Filipino fishers and traders. The displaced *maharlika* (noble) families of Maynilad resettled in Malate and became prosperous traders. Bagumbayan was a Spanish community right outside the walls of *Intramuros*. Some wealthy Spaniards started to settle there to avoid the overcrowded *Intramuros*. In 1585, the Japanese were physically restricted to Dilao. Their population swelled to 3,000 by the 1620s.

Farther south were the settlements of Santa Ana de Sapa, San Pedro Makati, Guadalupe, and Parañaque. In the upper areas north of the Pasig River were the religious retreats of San Francisco del Monte and San Juan del Monte. These rural settlements urbanized slowly compared to the settlements nearer the urban core. They remained small market towns surrounded by farmsteads, swamps, and forests and continuously supplied Manila with agricultural produce and handicrafts (Figure 4).

Manila's population and its surrounding suburbs grew to 40,000 in 1620. The population explosion of Manila was accompanied by increasing ethnic diversity with large communities of Spaniards, Filipinos, Chinese, and Japanese. Commercial, manufacturing, and other economic activities supporting the city located in Manila's suburbs, thus extending the

Figure 2

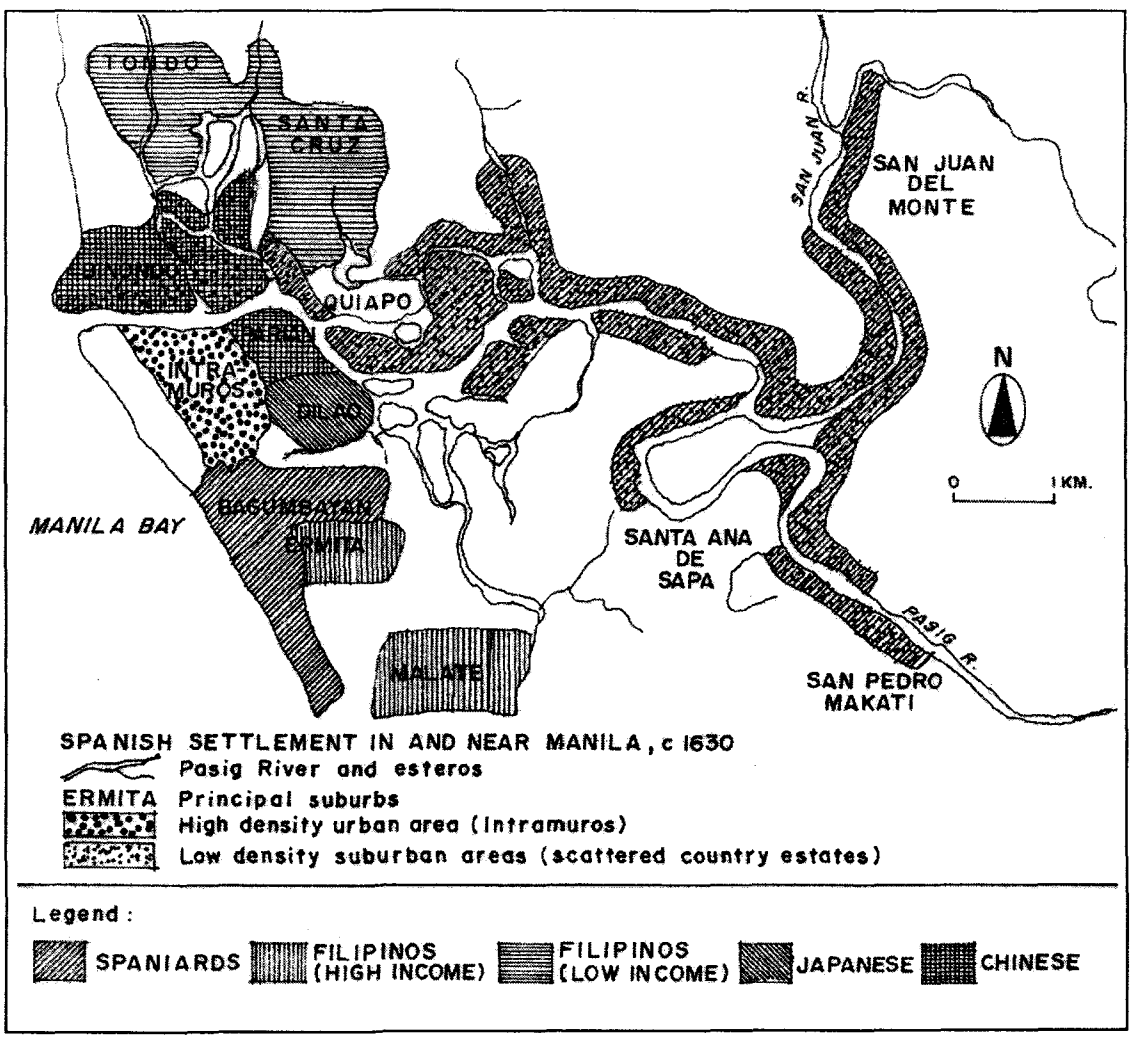
CITY OF MANILA AND ENVIRONS, ca. 1650



Source: Lifted from Reed 1977.

Figure 3

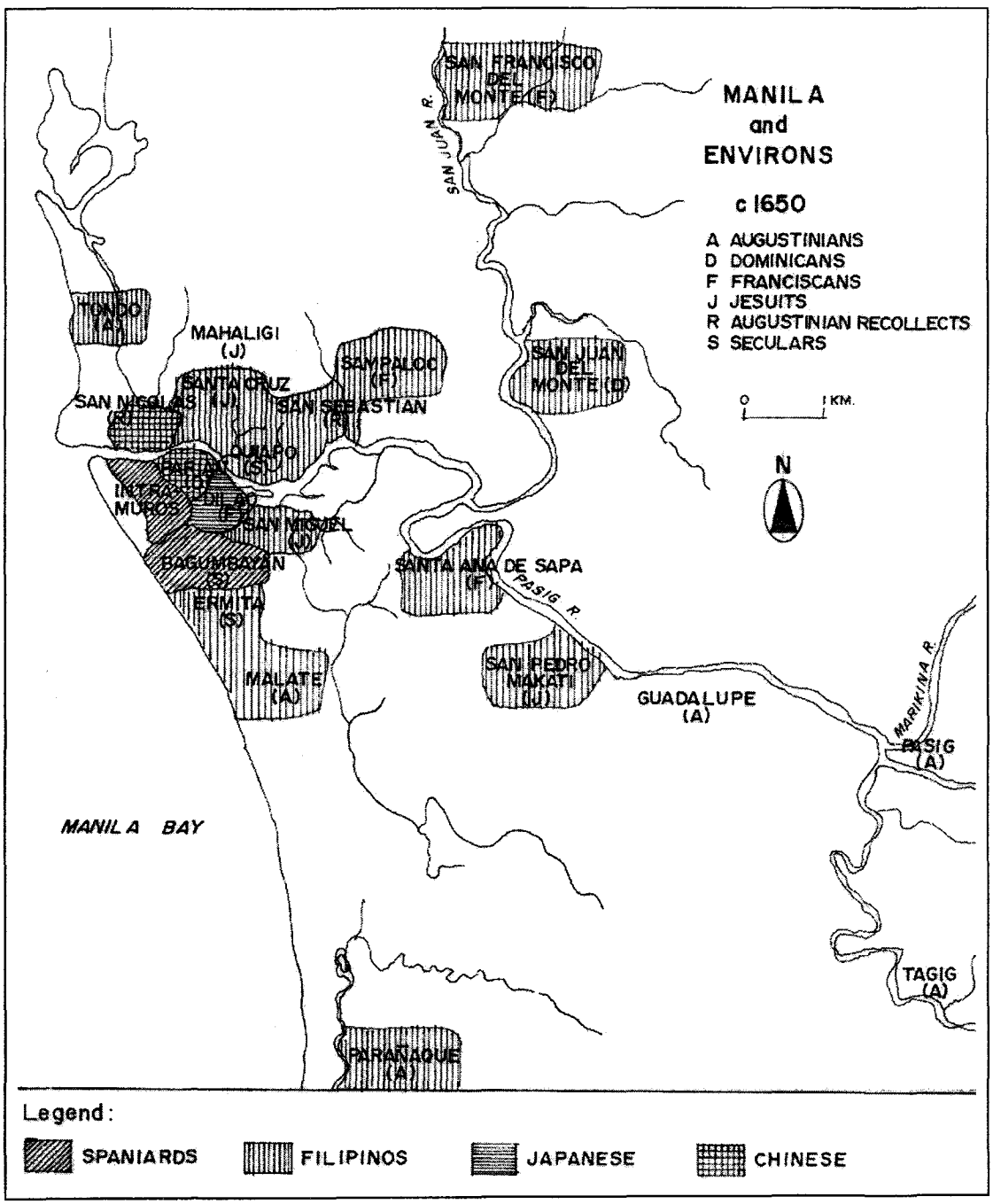
GROWTH OF SPANISH RESIDENTIAL QUARTERS IN MANILA, ca. 1630



Source: Modified from Reed 1977.

Figure 4

RESIDENTIAL SEGREGATION IN MANILA, 17TH CENTURY



Source: Modified from Reed 1977.

city's functional territory. By the end of the 17th century, from a small port and trading village, Manila became the first primate city in Southeast Asia—a prosperous multi-functional and multi-racial capital city and the hub of regional maritime commerce and insular trade.

The socio-economic and political hierarchy was reflected in the city's spatial structure. The residential land use pattern indicated a highly stratified nature of society. In the outermost periphery lay the rural hinterland that was economically connected to the urban core as a supplier of agricultural surplus.

Under the Spanish rule, the city became an instrument for colonial control and exploitation. Manila undoubtedly derived a great part of its growth and primacy from the emerging hierarchy of settlements and resource-rich hinterlands. The rest of the country, particularly the lowlands, was characterized by Hispanic settlements which formed the emerging urban system in a backdrop of a largely rural frontier (Reed 1977). This settlement system remained static throughout the 17th and 18th centuries.

Late Colonial Urbanization

With the official opening of the City of Manila to European and American vessels in the 1790s, the colony's economic transition from a colonial entrepot to a satellite economy began.

By this time, European interest in Southeast Asia had increased. Europe's Industrial Revolution brought about a huge demand for agricultural products and natural resources such as lumber, tin, and oil. Furthermore, the distance between Europe and Asia was lessened by improvements made in shipping. The opening of the Suez Canal further stimulated the exchange of goods between Western countries and their colonial territories. The industrializing countries of Western Europe required vast amounts of raw materials for their manufacturing industries and agricultural products. At the same time, they needed large market destinations for their products. The colonists indubitably looked at the colonies as both. Thus, the Philippine colonial economy shifted to large-scale, commercial agricultural production and systematic exploitation of its natural resources.

By the early 1800s, Manila's economy was already geared towards the export-import business. This stimulated the growing of *abaca* or Manila hemp in Bicol and sugar production in Panay and Negros, among others. The cessation of the Manila galleon trade in 1830 signaled the global impact of industrial capitalism.

Manila's urbanization continued apace with the arrival of industrialization. Manila started processing a portion of its exports, like cigars. For instance, cigar-processing factories for tobacco coming from Ilocos and hemp factories for abaca sprouted near the port of Tondo. By 1870, the city cornered 99 percent of imports. Some 226 foreign representatives from American and European export houses and manufacturers were based in Manila. Manufacturing activities attracted more migrants and intensified the city's urbanization.

The Spanish residential pattern became more decentralized. Symbolic of this was the building of the governor's summerhouse, Malacañang, in San Miguel. More and more Spaniards lived outside *Intramuros* (Doeppers 1972). Moreover, the Chinese no longer operated marginally but dominated the commercial and retail districts of Manila, such as Escolta in Binondo.

Movement of goods and people was still mostly by water, thus the necessity for ports. Manila's port and the Pasig River continued to aid city growth. Land transportation into the hinterlands further enhanced Manila's prominence as the premier economic center of the country. The Spaniards started building interior roads and bridges along postal routes in the 1850s. In the 1890s, a railroad was built to link Manila and Central Luzon to expedite the export of agricultural commodities. The railways hastened the exploitation of interior wealth and funneled primary products and natural resources towards Manila's seaport.

By the late 1800s, Manila's primacy was hardly challenged. Internal trade, which was largely supportive of the export economy, spurred urbanization in the countryside, resulting in a system of regional and provincial urban centers. Several relatively large provincial port towns, such as Cebu and Iloilo,

emerged even as more than 750 small *poblaciones* developed all over the country. Smaller urban nodes, such as railway junction towns in Central Luzon, port towns in other islands, and colonial administrative centers scattered in the lowlands completed the urban settlement system.

Worldwide economic changes, particularly the shift from mercantilism to industrial capitalism, clearly influenced the emerging hierarchical urban system in the Philippines. A spatial manifestation was the primacy of one port capital that dominated a mass of semi-urban and rural settlements. Manila became the link between the industrial capitalist world economy and its resource-rich hinterland.

Manila: The First Chartered City

The Americans took over in 1898. Although they tried to emphasize local autonomy, the need for efficiency and centralization was far greater. With Manila's continuing primacy, their extraction and consolidation of surplus and raw materials from the hinterlands were greatly facilitated.

On 31 July 1903, by virtue of Act No. 183, the City of Manila was incorporated—encompassing *Intramuros*, and 12 rapidly urbanizing towns of Binondo, Tondo, Santa Cruz, Quiapo, San Miguel, San Nicolas, Sampaloc, Santa Ana, Malate (including Bagumbayan), Ermita (including Parian), Paco (including Dilao), and Pandacan. Manila became the first chartered city in the Philippines.

The population in the city exceeded 190,000. By this time, Manila had 876 manufacturing establishments in marked contrast to the province with the next highest number of factories (128). In comparison, Iloilo's population was around 27,500 and Cebu, 20,000. Other port cities became regional urban centers because of the country's archipelagic nature but none rivaled Manila's stature (Doeppers 1972). The presence of a large service sector in Manila also spoke of its more diverse urban economic functions compared to the next ranked port towns of Iloilo and Cebu (see Table 1).

The Americans started developing the city and its suburbs through infrastructure improvements, such as sanitary and drainage facilities. More roads and railways were built and improved to facilitate the transport of goods to and from Manila.

The Philippines was introduced to modern town planning when the American colonial government commissioned Architect Daniel Burnham to prepare a plan for Manila as well as for the summer capital of Baguio. Burnham completed his plan in 1905 and work started in earnest. Burnham's plan mainly focused on the physical improvement and increased accessibility of Manila such as the following (Nierras n.d.):

1. Waterfront development and location of parks and parkways as a place for recreation for every quarter of the city.
2. Improved street system for secure and direct communication to and from every part of the city.

Table 1
1903 POPULATION CHARACTERISTICS

	Urban Population (est.)	Spaniards and Americans	Chinese	Professional Service Workers
Manila	191,091	6,365	21,083	3,308
Iloilo	27,500	346	1,366	329
Cebu	20,000	231	793	307

Source: Doeppers 1972

3. Development of waterways for transportation.
4. Location of building sites for various purposes.
5. Establishment of summer resorts.

However, not all these plans materialized due perhaps to external and internal factors like the outbreak of World War II and financial difficulties. However, a system of broad avenues and parks in Ermita and Malate was implemented.

Manila had retained its prominence as the primate city in the Philippines throughout the American colonial period. Using official census data, the population of Manila (termed as National Capital Region in census reports) more than quadrupled from 328,939 to 1,569,128 (NCSO 1995). Its economic and political roles grew in importance. It became a satellite economy and link between the West and the colonial territory (McGee 1967).

For almost four centuries, the Spaniards and the Americans used Manila as their administrative and economic center. Under the American colonial rule, the city became more connected with the outside world and entrenched in its role as a satellite in the emerging world of industrial capitalism.

THE METROPOLITANIZATION OF MANILA

After World War II and the independence of the Philippines from America, the population in and around Manila continued to increase, particularly in the rapidly urbanizing towns of Tondo, Sampaloc, Ermita, Malate, Paco, Pandacan, and Sta. Ana. A steady stream of migrants from the provinces was lured by the promise of a better life and better jobs in the city. The abnormal growth of the inner district of *Intramuros* can be attributed to the massive influx of squatters after it had been badly bombed during the Japanese occupation (McGee 1967).

On June 18, 1949, Republic Act (RA) No. 409 divided Manila into 14 districts, to wit: Tondo (including the North Port area), Binondo, San Nicolas, Santa Cruz, Quiapo, San Miguel, Sampaloc, Pandacan, Santa Ana, Paco, Malate, Ermita, *Intramuros*, and the South Port Area (Figure 5). It likewise revised the city charter by making the position of the mayor elective.

Urban Growth of Metro Manila

Three factors accounted for the growth of the city namely: natural population increase, positive net migration, and areal reclassification. All three components worked synergistically—as the urban population increased due to more births than deaths and as more people flocked to the city to seek better economic opportunities, the built-up areas grew apace, and eventually encroached into surrounding non-urban space.

By 1960, urbanization had spread to the emerging suburbs of Manila which were previously rural. With rapid population growth and expansion of economic activities in the cities and municipalities around Manila, the new city suburbs were now functionally and spatially integrated into the central city (Map 5).

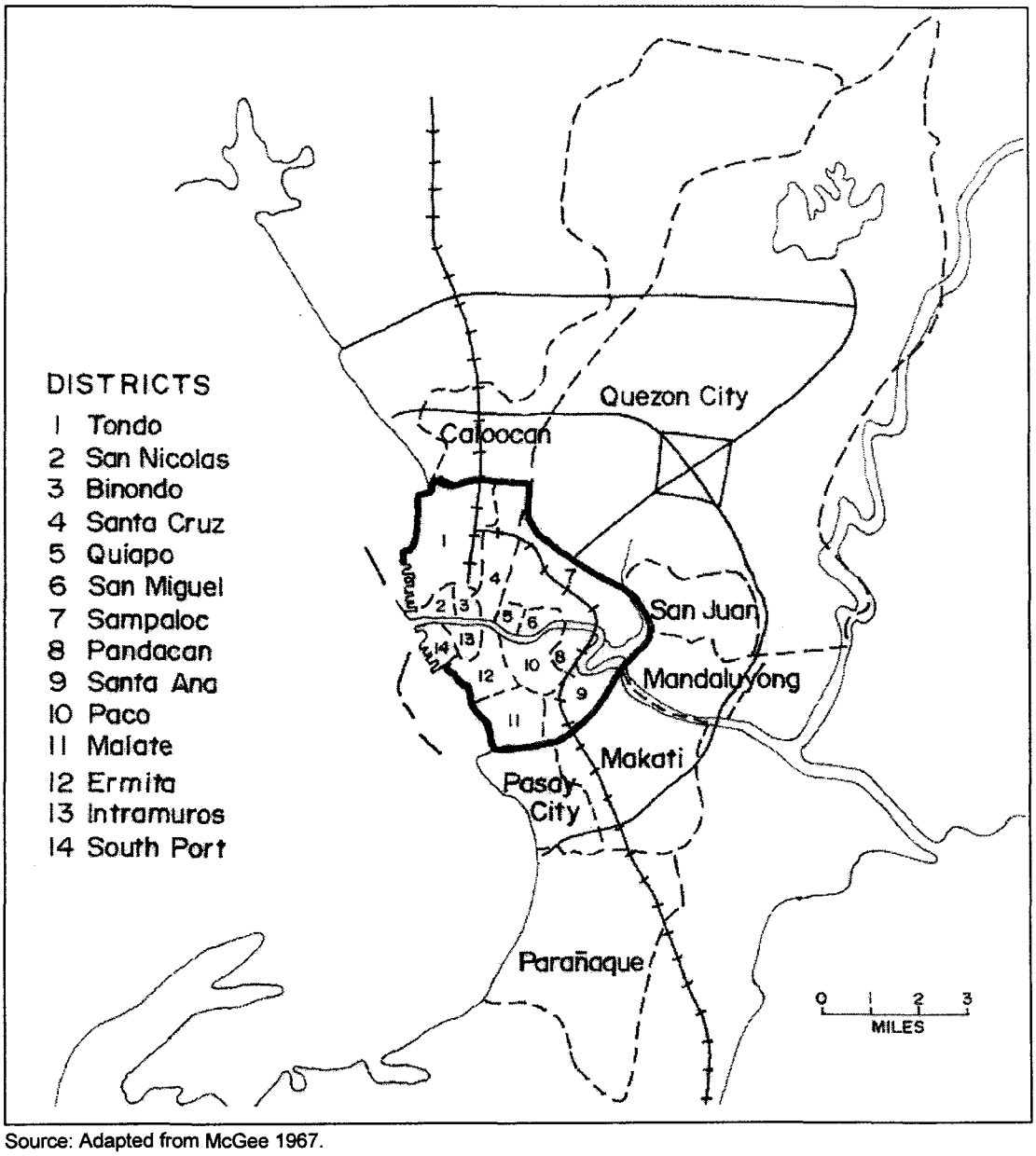
Table 2 shows the level of urbanization of Manila and the cities and towns around it. Urbanization tremendously increased through the years after World War II so that an urban agglomeration was emerging. By 1960, Metropolitan Manila was almost 100 percent urban. Based on various census reports, Metropolitan Manila was growing at a rate of 4.6 percent from 1948-1960 higher than Cebu's 4.1 percent, the second largest city in the country.

Spatial Accounting Framework

To track the urban expansion of the present Metro Manila, a spatial accounting framework was used. It begins with the establishment of metropolitan boundaries after the 1960 census. This paper will show how the city expanded its actual territorial coverage through areal reclassification and absorption of urbanizing municipalities into the metropolitan area. The addition of new cities and towns or "cohorts" to the metropolitan fringes has occurred since 1956 but was only officially recognized in the census of 1960 and thereafter. Metropolitanization, or the rise in the popu-

Figure 5

DISTRICTS OF THE CITY OF MANILA AND SUBURBS



Source: Adapted from McGee 1967.

Table 2

POPULATION OF METRO MANILA AND LEVELS OF URBANIZATION (enclosed), 1903-1960

Region	1903	1918	1939	1948	1960
Metropolitan Manila	328,939 (n.a.)	461,166 (n.a.)	993,889 (n.a.)	1,569,128 (97.3%)	2,462,488 (98.5%)
Philippines	7,635,426 (13.1%)	10,314,310 (12.6%)	16,000,303 (21.6%)	19,234,182 (27.0%)	27,087,685 (29.8%)

Source: Data from Cabegin and Arguillas 1997; Pernia 1976 and various censuses.

lation of the country that is metropolitan, occurs as the older central core expands and new urbanizing areas emerge, which in turn encroach into previously non-metropolitan territory (Nucci 1995). Areal reclassification of the metropolitan area thus explains the spatial expansion of the metropolitan territory.

Manila and Suburbs

The City of Manila was the core of the emerging conurbation. As the central city of an expanding metropolis, it was the population nucleus and adjacent areas that were socially and economically linked to it.

According to the 1960 census, Manila and its suburbs were composed of the following cities and towns:

1. City of Manila
2. Caloocan City
3. Pasay City
4. Quezon City
5. Makati, Rizal
6. Mandaluyong, Rizal
7. San Juan, Rizal
8. Parañaque, Rizal

It covered around 362.2 square kilometers and extended 14 kilometers away from the center of the City of Manila with a population of 2,462,488 up from the 1948 figure of 1,569,128. It should be noted that the City of Manila occupied only 38.3 square kilometers. The Economic Census in 1961 likewise used the same composition of Metro Manila in presenting metropolitan data (NCSO 1970).

Metro Manila, as defined in 1960, covered only 0.15 percent of the total area of the country, yet it contained 10 percent of the total population. Ninety out of the country's 100 corporations were based here, 56 of which were located in the City of Manila. A third of all manufacturing plants were concentrated in Metro Manila. All but one of the main Philippine banks located their head offices here. All major newspapers, most radio stations, and all of the commercial television stations were likewise based in the metropolis (Laquian 1972). Metro Manila's supreme position in the country's system of urban settlements remained unchallenged decades after the Spanish colonial era ended.

It must be noted though that the municipalities of Makati, Mandaluyong, San Juan, and Parañaque were politically and administratively a part of Rizal province. Quezon City, on the other hand, formerly part of Rizal Province, was created into an independent city by Commonwealth Act No. 502 on 12 October 1939 and briefly designated as the capital city. The municipality of Pasay broke away from Manila and rechristened as Rizal City on 21 June 1947 under RA 183 and renamed again as Pasay City on 7 June 1950 under RA 437. Caloocan became a city on 16 January 1962 under RA 3278.

As early as the sixties, urbanization had extended to six outer peripheral towns of the newly metropolitanized areas such as Malabon, Navotas, Marikina, Pasig, Pateros, and Las Piñas, all in the province of Rizal (Laquian 1972). But prior to the 1960 census of

population, statistical information for Metro Manila had already been published in the Labor Force Survey for 1956-1964 and in the Annual Survey of Manufactures for 1956-1966 using the same territorial coverage of Metro Manila in the 1960 census.

However, the term used in the Labor Force Survey beginning 1965 was *Manila and Suburbs* and included the following:

1. City of Manila
2. Caloocan City
3. Pasay City
4. Quezon City
5. Makati, Rizal
6. Mandaluyong, Rizal
7. San Juan, Rizal
8. Navotas, Rizal

The spatial coverage of Metro Manila included only cities and towns immediately contiguous to the City of Manila, which excluded Parañaque, Rizal Province (McGee 1967).

In the 1967 Economic Census, the two municipalities of Rizal, namely, Malabon and Parañaque, were added to *Manila and Suburbs*. The Annual Survey of Manufactures for 1968 and 1969 followed suit.

Based on these different censuses, even if there were some variations, it is clear that the territorial boundaries of Metro Manila already included all the municipalities of Makati, Mandaluyong, San Juan, Navotas, Parañaque, and Malabon, in addition to the four cities of Manila, Quezon, Caloocan, and Pasay.

Manila Metropolitan Area

In 1970, the Special Report on Metropolitan Manila Area prepared by the National Census and Statistics Office officially recommended the term *Manila Metropolitan Area* to encompass the contiguous areas that comprised Manila and its suburbs (City of Manila, Caloocan City, Pasay City, Quezon City, Makati, Mandaluyong, San Juan, and Navotas) and 19 more cities and municipalities lying in the fringes (Figure 6), namely:

1. Bacoor, Cavite
2. Biñan, Laguna
3. Cainta, Rizal
4. Cavite City
5. Kawit Cavite
6. Las Piñas, Rizal
7. Malabon, Rizal
8. Marikina, Rizal
9. Meycauayan, Bulacan
10. Muntinlupa, Rizal
11. Noveleta, Cavite
12. Parañaque, Rizal
13. Pasig, Rizal
14. Pateros, Rizal
15. Rosario, Cavite
16. San Pedro, Laguna
17. Taguig, Rizal
18. Taytay, Rizal
19. Valenzuela, Bulacan

In recommending the boundaries of the Manila Metropolitan Area, the following criteria were applied:

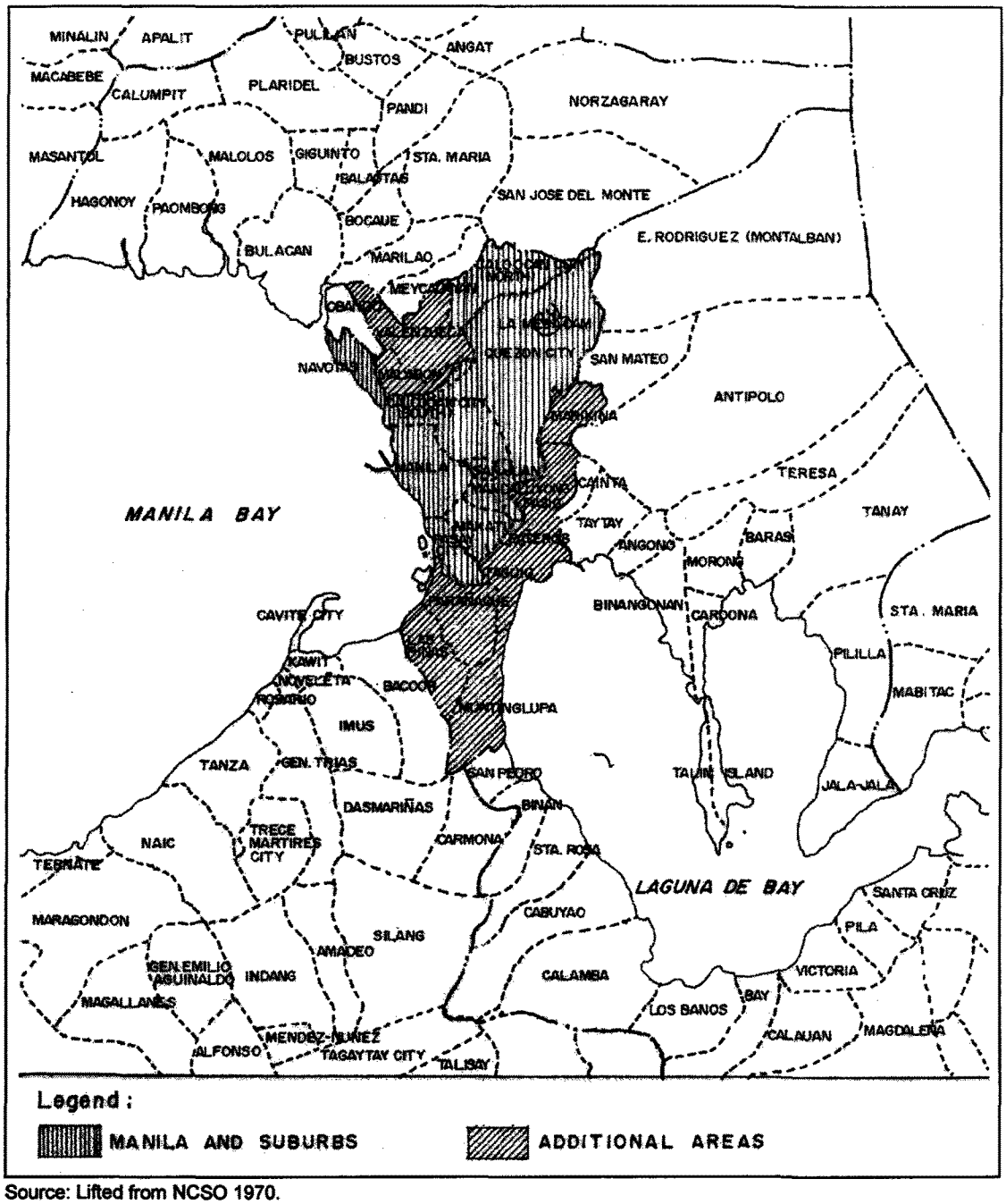
1. The city or municipality must be contiguous to Manila and its suburbs or adjoins an intermediate city or municipality of qualifying population density and must show evidence of strong integration, economically and socially.
2. The city or municipality must be urban in its entirety, in accordance to the definition of urban areas.
3. At least 75 percent of the labor force of the city or municipality must be in the non-agricultural occupations.

The 1960 census defined urban areas as follows:

1. In their entirety, all municipal jurisdictions which, whether designated as chartered cities, provincial capitals or not, have a population density of at least 1,000 persons per square kilometer.
2. For all other cities and municipalities with a population density of at least 500 persons per square kilometer, only the *poblacion* (regardless of population size) is to be considered; any *barrio* having at least 2,500 inhabitants and any *barrio*

Figure 6

RECOMMENDED POLITICAL TERRITORY FOR MANILA METROPOLITAN AREA



Source: Lifted from NCSO 1970.

contiguous to the *poblacion* with at least 1,000 inhabitants. For cities where the *poblacion* is not specified, the central district or the "city proper" shall be regarded as the *poblacion.*

3. For other cities and municipalities with a population of at least 20,000 persons, only the *poblacion* (regardless of population size) and all *barrios* having at least 2,500 inhabitants and contiguous to the *poblacion.*

4. All other *poblaciones* having a population of at least 2,500 persons.

The National Census and Statistics Office changed the definition of urban area in 1970 in terms of population density, population size, presence of urban physical elements, and occupation and included spatial considerations as well.

1. In their entirety, all cities and municipalities having a population density of at least 1,000 persons per square kilometer.

2. *Poblaciones* or central districts of municipalities and cities which have a population density of at least 500 persons per square kilometer.

3. *Poblaciones* or central districts (not included in 1 and 2), regardless of population size which have the following:

    a. Street pattern, i.e. network of streets in either parallel or right angle orientation;
    b. At least six establishments (commercial, manufacturing, recreational, and/ or personal services; and
    c. At least three of the following:
        i. A town hall, church, or chapel with religious services at least once a month.
        ii. A public plaza, park, or cemetery.
        iii. A market place or building where trading activities are carried on at least once a week.
        iv. A public building like school, hospital, puericulture, and health center or library.

4. *Barangays* having at least 1,000 inhabitants which meet the conditions set forth in 3 above, and where the occupation of the inhabitants is predominantly non-farming or non-fishing.

These criteria of urban area have been used since the census year of 1970. All areas that do not meet any of the above requirements are considered rural.

Focusing on the population covered by Manila and its suburbs, the metropolitan population rose from 2,135,705 (1960 census) to 3,168,105 in 1970. If the whole Manila Metropolitan Area (Manila and suburbs plus additional areas) is considered, the total metropolitan population would balloon to 4,363,387 (1970 Census).

Manila, with the highest population of 1,330,788, was the only city exceeding the one million mark. It made up 42 percent of the total population of Manila and its suburbs. A far second was Quezon City with 754,452 inhabitants making up 23.8 percent of the total followed by Caloocan City with the third largest population of 274,453 or 8.7 percent.

Manila was the most densely populated city with 34,746 persons/square kilometer, followed by Navotas, Rizal (32,017), Pasay City (14,841), and San Juan, Rizal (10,054).

The 1970 census reported that about 48 percent of the residents of Manila and its suburbs were born in the same municipality and 46.9 percent in other provinces. About 74.2 percent of the population 5 years old and over stayed in the same place of residence since 1965, migrants from other provinces accounted for 15.8 percent, while residents of other municipalities in the same province comprised 1.9 percent.

Manila and its suburbs by this time was 98 percent Filipino while the Chinese comprised 1.4 percent. Americans, 0.16 percent; and other nationalities made up the remaining portion. Since these figures were based on citizenship (a legal status) and not necessarily on ethnic roots, the number of alien population could be higher than these figures.

Majority or 73 percent of Chinese residents preferred to live in the City of Manila while Americans (60 percent) congregated in Makati. The next favored residential places of

the Chinese were Quezon City, Pasay City, Caloocan City, and San Juan del Monte. Within the City of Manila, the Chinese still preferred to stay in the contiguous districts of Tondo (23.6 percent), Sta. Cruz (22.7 percent), Binondo (16.5 percent) and San Nicolas (16.5 percent).

Based on employment data of experienced workers 10 years old and over, the economic base of Manila and its suburbs was the service sector which accounted for 449,715 or 43 percent of total employment. The second highest employer was the manufacturing sector with 205,256 or 19.6 percent of total employed workers followed by commerce and trade with 154,754 or 14.8 percent. The other economic sectors of lesser importance in terms of employment were the transport, communication and storage sector (10.4 percent); construction sector (6.3 percent); agriculture, hunting, forestry, and fishing (2.2 percent).

In terms of major occupations, 70 percent of the residents of Manila and its suburbs were classified as workers in the tertiary sector, particularly, in personal and community consumer services. These occupations were categorized as services, sports, and related workers (18 percent); professional, technical and related workers (12 percent); clerical workers (12 percent); sales workers (11.3 percent); workers in transport and communication (9.5 percent); stevedores and related freight handlers and laborers (4.2 percent); and administrative, executive, and managerial workers (3 percent). Only 24 percent of the population worked in the secondary activities as craftsmen, production process workers, and laborers. Clearly, the service sector was the metropolitan economic base.

However, Manila Metropolitan Area was soon officially replaced, perhaps because the integration of "additional areas" could have been premature. On hindsight, the boundaries of Manila Metropolitan Area would have been appropriate given the present rate of urbanization in the metropolitan fringes. Urbanization in the periphery and de facto metropolitanization proceeded rapidly, further pushing the metropolitan boundaries towards the surrounding provinces.

Metro Manila or National Capital Region (1975-present)

The tremendous growth of Metro Manila after 1960 is the most significant urban phenomenon to happen in the country. The whole metropolitan region has become the pivotal center of the country's economic, social, political, cultural, and educational life.

It was not until 1975 when the Philippine government seriously attempted to integrate the administratively discrete cities and municipalities of Metro Manila. This was undertaken to enable the local governments to cope with the complex problems of metropolitanization and become more efficient in the delivery of metro-wide basic services.

After the residents voted in a referendum to create a metropolitan authority, Metropolitan Manila was created on 7 November 1975 by virtue of Presidential Decree (PD) No. 824 with the status of a public corporation. The decree likewise created the Metropolitan Manila Commission (MMC) to assure the integrated and unified management of metropolitan services and functions in all member cities and towns. The MMC was headed by a governor as the chief executive, chair, and general manager and assisted by a vice-governor who also functioned as deputy general manager.

Metro Manila (to be renamed later as the National Capital Region) was composed of the following four cities and 13 municipalities:

1. City of Manila
2. Caloocan City
3. Pasay City
4. Quezon City
5. Las Piñas
6. Makati
7. Malabon
8. Mandaluyong
9. Marikina
10. Muntinlupa
11. Navotas
12. Parañaque
13. Pasig
14. Pateros
15. San Juan
16. Taguig
17. Valenzuela

Metro Manila was officially carved out of Manila and its suburbs, Rizal Province, and Bulacan Province. Valenzuela, taken from the former municipality of Polo, Bulacan, was created into a municipality on 21 July 1960 under Executive Order No. 401.

On 2 June 1978, PD 1396 was promulgated, establishing the Ministry of Human Settlements (MHS). Section 3 thereof renamed Metropolitan Manila as the National Capital Region placing it under the administration of the MHS.

Through the years, the metropolitan governing body has been changed twice due to the political changing of the guards. The first was on 9 January 1990 when the MMC was renamed Metropolitan Manila Authority or MMA as per Executive Order No. 392. The most recent was on 1 March 1995 when RA 7924 was enacted by the Congress creating the Metropolitan Manila Development Authority or MMDA.

Today, the National Capital Region's (NCR) territorial composition (Figure 7) remains the same as that of the original except for seven more towns which became cities, to wit:

1. City of Manila
2. Caloocan City
3. Pasay City
4. Quezon City
5. Las Piñas City
6. City of Makati
7. Malabon
8. Mandaluyong City
9. Marikina City
10. Muntinlupa City
11. Navotas
12. Parañaque City
13. Pasig City
14. Pateros
15. San Juan
16. Taguig
17. Valenzuela

Several municipalities, which were able to meet the legal requirements to become a city set forth in RA 7160 (Local Government Code of 1991), were converted into cities. Mandaluyong (San Felipe Neri in 1903 and 1948) was converted into a city on 10 April 1994 under RA 7675. It was followed by Pasig which became a city on 21 January 1995 under RA 7829 and 7854; Makati, (San Pedro Makati in 1948), on 4 February 1995 under RA 7854; and Muntinlupa on 8 May 1995 under RA 7926.

The land area of NCR and member local government units (LGUs) and population characteristics are given in Tables 3.

Employment data show that about 70 percent of the total employed population were engaged in the tertiary sector or in services such as trade, transport, business services, and personal services. Only 28 percent were employed in non-primary production of goods. Two percent of the productive population still engaged in agriculture and related activities. (Table 4)

Metro Manila's huge contribution to the national economy showed its economic importance and dominance over other regions and cities. From 1986 to 1990, Metro Manila contributed 40 percent to the country's total industrial production and 42 percent to the total service sector (Table 5).

The Gross Regional Domestic Product (GRDP) of Metro Manila grew at an average of 6.27 percent during the same period, higher than the country's average growth rate of 4.65 percent.

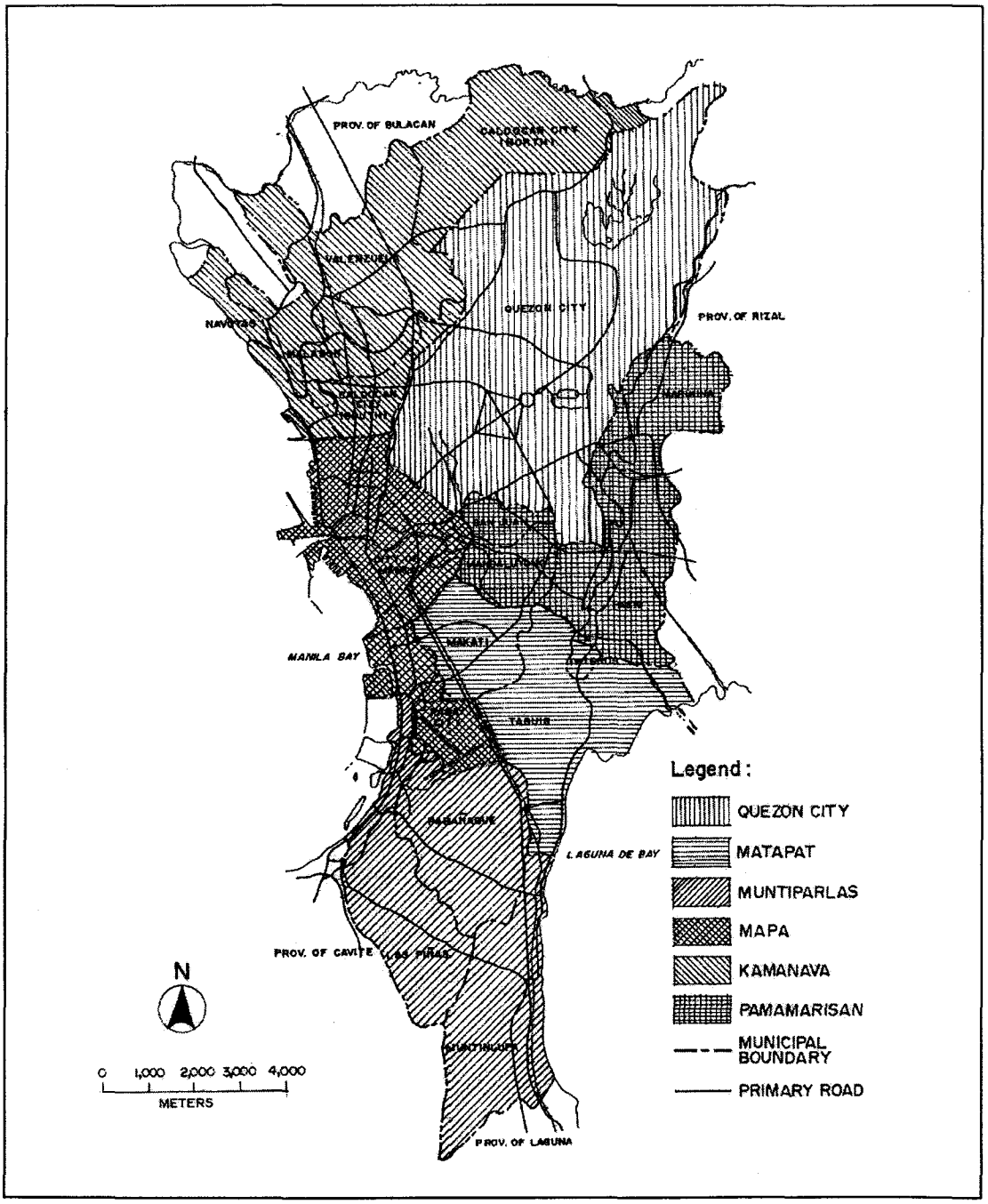
By 1995, the population characteristics of the member LGUs had changed. Among them, the largest population size was that of Quezon City. The city comprised about one-fourth of the total metropolitan population while Pateros had the least population or 0.6 percent of the total population (Table 6).

In terms of population growth rate, the city of Muntinlupa had the highest with an annual growth rate of 7.0 percent. Manila's population growth slowed down through the years and San Juan's population declined from the 1990 census with a negative growth rate of –0.4 percent.

The economic orientation of a city defines its urban function. That is, what are the major occupations? In terms of occupation, majority of the population 15 years old and over was engaged in services (57.7 percent), while those engaged in the manufacturing sector were the next largest with 16.7 percent, followed by people engaged in trade with 14.0 percent, in construction 7.9 percent, and electricity, gas, and water, 1.2 percent. Clearly, Metro Manila's economy was driven by the tertiary sector.

Figure 7

LGU COMPOSITION OF METRO MANILA OR NCR



Source: Adapted from MMDA 1996.

Table 3
POPULATION SIZE AND DENSITY OF NCR

	LAND AREA (sq. km)	POPULATION SIZE				POPULATION DENSITY			
		1960	1960	1970	1980	1990	1970	1980	1990
Philippines	300,000.00	27,088	27,088	36,684	48,098	90.3	122.3	160.3	202.3
NCR	636.00	2,462	2,462	3,967	5,926	3,871.8	6,236.9	9,317.4	12,467.0
Caloocan City	55.80	145	145	274	468	2,607.9	4,918.5	8,383.8	13,638.0
Manila City	38.30	1,139	1,139	1,331	1,630	29,728.7	34,746.4	42,571.4	41,749.3
Pasay City	13.90	133	133	206	288	9,544.8	14,840.5	20,702.9	26,402.9
Quezon City	166.20	398	398	754	1,166	2,394.6	4,539.4	7,014.8	10,030.1
Las Piñas City	41.50	16	16	46	136	387.8	1,102.0	3,289.5	7,156.6
Makati City	29.90	115	115	265	373	3,830.8	8,860.1	12,462.6	15,150.5
Malabon	23.40	76	76	142	191	3,266.6	6,047.6	8,162.4	11,880.3
Mandaluyong City	26.00	72	72	149	205	2,754.6	5,746.4	7,898.7	9,423.1
Marikina City	38.90	40	40	113	212	1,040.0	2,915.2	5,439.9	7,969.2
Muntinlupa City	46.70	22	22	65	137	468.8	1,393.1	2,926.7	5,931.5
Navotas	2.60	49	49	83	126	18,946.9	32,017.3	48,517.7	71,923.1
Parañaque City	38.30	62	62	97	209	1,616.1	2,538.2	5,445.2	8,041.8
Pasig	13.00	62	62	156	269	4,779.2	12,037.8	20,659.2	30,538.5
Pateros	10.40	13	13	25	40	1,266.6	2,448.8	3,873.8	4,903.8
San Juan	10.40	57	57	105	130	5,467.4	10,053.8	12,508.5	12,211.5
Taguig	33.70	22	22	55	134	648.5	1,693.7	3,980.3	7,893.2
Valenzuela	47.00	41	41	98	212	882.4	2,094.8	4,518.4	7,234.0

Source: Data from NSO various censuses

Table 4

EMPLOYED PERSONS BY MAJOR INDUSTRY (October 1990)
National Capital Region

INDUSTRY	EMPLOYED	
	NUMBER (000)	PERCENTAGE (%)
TOTAL	**2,718**	**100.0**
PRIMARY	**41**	**1.5**
Agriculture, Fishery and Forestry	39	1.4
Mining and Quarrying	2	0.1
SECONDARY	**759**	**27.9**
Manufacturing	550	20.2
Construction	186	6.8
Electricity, Gas and Water	23	0.8
TERTIARY	**1,918**	**70.6**
Wholesale and Rental Trade	556	20.5
Transport, Storage and Communication	237	8.7
Financing, Insurance, Real Estate and Business Services	201	7.4
Community, Social and Personal Services	924	34.0

Source: Data from NSCB 1998

Table 5

GROSS REGIONAL DOMESTIC PRODUCT
Philippines and NCR
(in billions, at constant 1985 prices)

	1986	1987	1988	1989	1990
Philippines, Gross Domestic Product	591.42	619.71	658.46	697.82	712.68
Agriculture	145.72	150.41	155.29	159.40	162.48
Industry	205.16	216.17	232.50	251.58	254.36
Services	240.53	253.12	270.67	286.84	295.84
NCR, Gross Domestic Product	175.18	187.20	204.31	222.87	225.45
Agriculture	0	0	0	0	0
Industry	81.94	86.82	94.66	105.56	102.78
Services	93.25	100.38	109.64	117.31	122.67
% Contribution of NCR GRDP to Philippine GDP					
Agriculture	0	0	0	0	0
Industry	39.9	40.2	40.7	42.0	40.4
Services	38.8	39.7	40.5	40.9	41.5
Growth Rates					
Philippines, Average	4.65%	4.78	6.25	5.98	2.13
NCR, Average	6.27%	6.25	9.14	9.09	1.16

Source: Data from NSCB 1998

Table 6
POPULATION AND AVERAGE ANNUAL GROWTH RATE BY CITY/MUNICIPALITY
National Capital Region, 1995

	1995 POPULATION		1990-1995 Average Annual Growth Rate (in percent)
	Number	Percent	
National Capital Region	9,454,040	100.0	3.3
Caloocan City	1,023,159	10.8	5.6
City of Manila	1,654,761	17.5	0.6
Pasay City	408,610	4.3	2.0
Quezon City	1,989,419	21.0	3.3
Las Piñas	413,086	4.4	6.4
City of Makati	484,176	5.1	1.2
Malabon	347,484	3.7	4.1
Mandaluyong	286,870	3.0	2.8
Marikina	357,231	3.8	2.7
City of Muntinlupa	399,846	4.2	7.0
Navotas	229,039	2.4	3.8
Parañaque	391,296	4.1	4.6
City of Pasig	471,075	5.0	3.2
Pateros	55,286	0.6	1.4
San Juan	124,187	1.3	-0.4
Taguig	381,350	4.0	6.9
Valenzuela	437,165	4.6	4.8

Source: Data from NSO 1990, 1995

Comparing the Gross Value Added (GVA) in the manufacturing and service sectors in 1995, the GVA of the service sector amounted to 140,931 million pesos at constant 1985 prices while manufacturing earned 76,212 million pesos. Looking at Table 7, Metro Manila's service sector steadily climbed up and increased its output in GVA compared to the lackluster performance of the manufacturing sector which had, at times, stagnated and even declined during some periods.

The economic orientation of Metro Manila has not changed. During its long colonial subjugation, the city's economic focus, like other colonial cities, was on commercial functions. Although Manila, in the waning years of Spanish rule and into the years of American colonization, was introduced to industrial capitalism and was in the process of industrializing to some degree, the industrialization of Manila did not peak. The city's industrial sector was too undeveloped to absorb surplus labor from the rural areas and the city's increasing labor force. This led to the enlargement of the tertiary sector where people found employment, particularly in personal and business services and trade. This was evidenced by the predominance of service occupations before and after decolonization and through the decades that followed up to the present. Today, it is presumed that the tertiary sector is even larger than what was captured by the census due to the existence of the urban informal service sector. In spite of the informal sector's low productivity and low income, its unrestricted entry (unlike the formal sector) and large market attract people to join it.

Table 7
GROSS VALUE ADDED BY SECTOR
(In million pesos: at constant 1985 prices)

Year	NCR		Philippines	
	Manufacturing	Service	Manufacturing	Service
1982	76,395	89,363	174,315	238,869
1983	78,160	96,623	173,756	252,143
1984	68,692	91,516	156,195	235,677
1985	60,818	88,813	143,851	230,782
1986	61,014	93,246	146,453	240,534
1987	63,867	100,383	154,604	253,121
1988	69,304	109,599	169,316	271,238
1989	75,538	118,123	179,152	290,310
1990	76,579	125,850	183,925	304,409
1991	75,555	126,230	183,111	304,866
1992	71,300	126,495	179,947	307,986
1993	73,588	128,033	181,289	315,643
1994	76,212	134,079	190,374	329,006
1995	76,212	140,931	190,374	345,232

Source: Data from NSCB 1998.

THE EVOLVING SPATIAL STRUCTURE OF METRO MANILA

Present-day Metro Manila is much a product of its long colonial history as it is of contemporary economic, social, cultural, and political processes. Persistent features of its colonial legacy are still visible. Another influential factor is the broader economic processes outside its national borders. These external economic forces have influenced Metro Manila's land use pattern and shaped its urban form. These economic forces started during the Spanish colonial era when Manila became a colonial primate city. Global economic forces continue to affect the metropolis in the postwar years until today as Metro Manila remains as a satellite in the world economy. The spatial impacts of this confluence of factors are manifested in the evolving spatial structure of the metropolis.

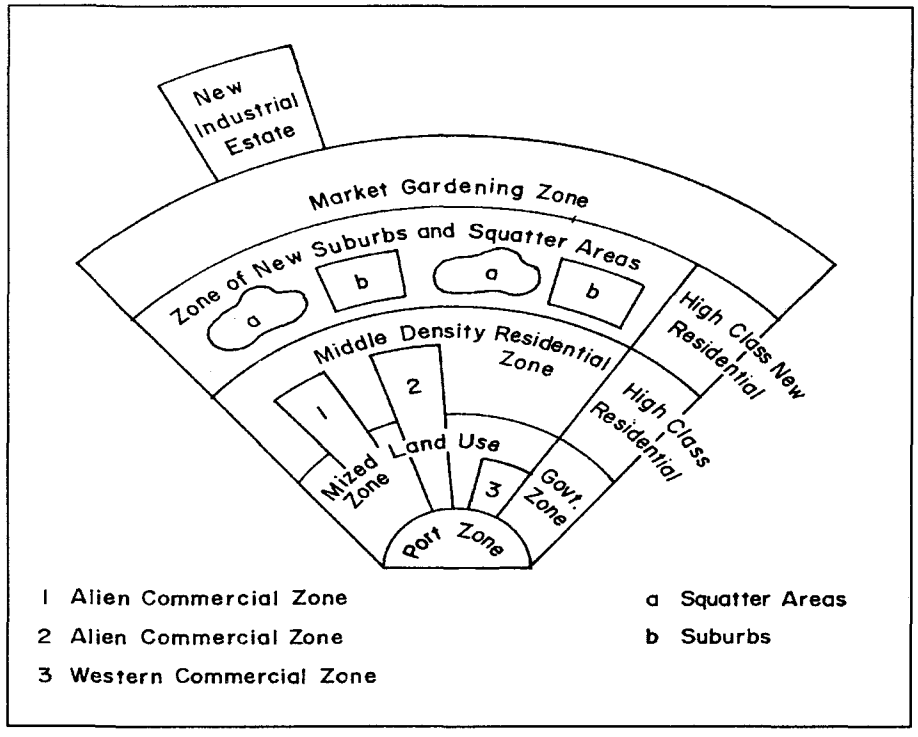
Metro Manila: A Typical Southeast Asian City

Many large cities in Asia and Africa were founded and developed by European colonists such as the British-built Nairobi and Harare in Africa and the French city of Saigon in Vietnam. Several authors have forwarded general spatial models of cities in developing countries. After the period of colonial urbanization and decolonization, Manila displayed the spatial structure of a typical Southeast Asian city as generalized by T.G. McGee (1967) (Figure 8). Metro Manila's spatial structure was a product of colonial historical antecedents, its enduring economic role as a satellite city, as well as its social and cultural diversity.

At the end of the colonial era, the spatial structure of Manila had several common features with other colonial primate cities like Rangoon, Saigon, Batavia, and Singapore (McGee 1967). First, all were located on or near the sea and on a river which allowed easy access to the sea. The Europeans needed access so that their ships could export primary products from the region and import secondary products from Europe. Development was thus encouraged on the coast. Second, it was founded on the site of indigenous settlements. Manila rose on the sites of the sultanates of Maynilad and Tondo. Third, they were all laid out in a gridiron pattern. Fourth, these cities witnessed an expansion of foreign populations. Certain areas in the city were intentionally set aside for various racial groups. In Manila, significant was the large number of migrant Chinese who worked and lived in the city's commercial areas. The Chinese have tradi-

Figure 8

GENERAL DIAGRAM OF THE MAIN LAND USE OF THE LARGE SOUTHEAST ASIAN CITY



Source: T.G. McGee 1967.

tionally lived in segregated residential area giving rise to Chinatowns which have endured until now. Fifth, the city population grew rapidly as a result of high rate of immigration, especially after decolonization. Many immigrants from rural areas came to the cities for jobs or business opportunities. Lowered death rates brought about by improved hygiene also increased natural population growth. And sixth, all colonial cities in Southeast Asia were characterized by multiple functions although most important were the economic and related port functions (McGee 1967).

As in other cities in Southeast Asia, the port played a significant role in the economic dominance of Metro Manila. Some 80 to 85 percent of all imports passed through the north and south ports of Manila. The bulkier goods were directly shipped to the regional ports of Cebu and Davao. The ports, warehouses, and wharf complex and their associated processing industries supported the primacy of Manila. The port capital remained oriented to the West and the world trade. It continued to act as the "middleman" in the newly independent economy. This symbolized capitalist economic development policies and ideology, which revolved around the strategy of industrialization (McGee 1967).

The national government center was located in the district of Ermita where the present Manila City Hall stands concentrated around government buildings. This area is the concentration of universities and colleges in the City of Manila. The Western-style or modern commercial shopping and business center in Ermita and Malate also developed near the government center.

Elements of Manila's earlier settlement forms persisted to give a distinctive character to the city. The districts of Sta. Cruz, Quiapo, and Binondo epitomized the "alien commercial zone," and Quiapo remained the center of the bazaar economy (as opposed to firm-based modern economy) and indigenous retail zone of the city. Up to now, this is where the shophouses of Chinese merchants are concentrated.

Residential land use pattern was still influenced by ethnicity to some degree. The Chinese still played a dominant role in the commercial activities of Manila even though their population has dwindled in the post-colonial era. The alien commercial zone located in the central business district or CBD, had the highest population density. Often entire Chinese families lived in shophouses or residences attached to businesses they operated. The existence of Chinatown in Sta. Cruz and the spatial concentration of ethnic Chinese in Binondo, Tondo, and Sta. Cruz support this.

The "mixed land use zone" contained residential, industrial, and indigenous commercial uses. Metro Manila continued to host durable economic institutions such as banks, agency houses, trading, shipping, and insurance companies. Industrial areas were located along the Pasig River. However, the 50-kilometer radius ban against industries in the 1970s checked the growth of the industrial area within Manila. Thus, new factories and plants located in the peripheral towns of Pasig, Cainta, Mandaluyong, Caloocan, Valenzuela, Parañaque, and Taguig.

As a typical Southeast Asian city, satellite towns and suburbs grew outside the central city boundary. Examples were the new housing development in Quezon City and the elite suburbs in Makati. Ringing the city were squatter colonies located side by side with new residential developments. Majority of the population was working in the central city of Manila.

The occupational structure of Manila was dominated by the tertiary sector, particularly, personal, social, and community service activities. This enduring economic structure was a carry over of its colonial role as an economic intermediary between the metropole and the colony, as a satellite city in the world economy.

Tertiary Urbanization: A Process of Accretion and Addition

Metro Manila's urbanization continued during the postwar years from 1960 to the 1990s. Population growth had been driven largely by natural increase and aided partly by rural-urban migration. Moreover, this period of urban growth is characterized by the processes of accretion and addition, which not only magnified the metropolitan population but also expanded its territory. This occurs through the spatial integration of previously non-metropolitan areas lying in the fringes of the metropolitan region. These are gradual, piecemeal changes without the attendant shifts in the sectoral and occupational structures of the metropolitan economy, which has been mainly service-oriented.

As previously discussed, the growth of the city began with the development of a central core, the City of Manila, and the consequent expansion of the core by adding the peripheral suburbs and towns—or "cohorts"—to its fringes. Metropolitanization has thus proceeded spatially from the central city of Manila towards its suburban periphery, which in turn subsequently incorporated new towns into the metropolitan area.

This type of urban growth can be regarded as largely cosmetic—a continual process of piecemeal change—and the underlying process of urbanization and the overall structure of the city remain largely unaltered. It does not signify any epochal transformation like the industrial urbanization of Western countries. Economic growth and the shift in the structure of the economy (from agricultural to industrial based) did not accompany the process of urbanization. Although there was an occupational shift from agricultural to non-agricultural employment, the labor shift was not from primary to secondary but to tertiary services, particularly to the informal service sector (Balisacan 1994).

A Polycentric Metro Manila

The existing urban internal structure of Metro Manila has inevitably changed from that

of a typical Southeast Asian city. However, some elements of its spatial pattern as a result of colonial urbanization and post- decolonization continue to be apparent. This spatial structure forms the backdrop for the evolving polycentered spatial configuration of Metro Manila.

Today, the metropolitan region exhibits several central business districts (CBDs) namely, Manila CBD, Makati CBD, Ortigas CBD (including Greenhills) in the cities of Pasig and Mandaluyong, and Cubao CBD in Quezon City. (Figure 9). Based on a report of MMDA, Metro Manila remains to be predominantly residential in land use. However, commercial land uses which accounted for 3.4 percent in 1990 have increased to almost eight percent. Commercial development has more than doubled in the last four years, concentrating along major thoroughfares. Commercial land occupied about 5.2 percent in 1990 and increased to 10.6 percent in 1994. New commercial centers have sprouted in the different parts of the metropolis such as in Pasig, Muntinlupa, Mandaluyong, and Las Piñas aside from the old central business districts of Manila, Cubao, and Makati (MMDA and JICA 1996).

Industrial land uses, on the other hand, accounted for 5.0 percent of the total metropolitan land area in 1992. Small and medium industries are scattered throughout the metropolis, particularly in Marikina, Las Piñas, Parañaque, Muntinlupa, Valenzuela, and Novaliches (MMDA 1996).

In 1980, highly urbanized portions of Metro Manila were within the area cordoned by C-4 (circumferential road 4) or Epifanio de los Santos Avenue (EDSA). The portions outside EDSA were then the suburbs. Today, this area forms the inner core of the extended metropolitan region, just as the City of Manila was the inner city core during and after the American colonial period. As urban development along EDSA took place, what used to be the suburban areas in the fringes of and outside EDSA tremendously urbanized through the years. To use traffic volume as an indicator of urbanization, the rapid increase since 1980 did not occur in the City of Manila (area within EDSA) but in areas along and outside of EDSA. EDSA, South Superhighway, and other radial corridors outside EDSA experienced rapid increase in traffic volume (MMUTIS 1997).

As Metro Manila continues to grow spatially, *de facto metropolitanization is already* occurring. Although the potential "cohorts" today are politically parts of their mother provinces, these adjoining cities and towns in Cavite, Laguna, Rizal, and Bulacan have already been functionally integrated into the expanding metropolitan region. The growth rates of the adjoining urbanized towns and cities were higher from 1985 to 1995 compared to Metro Manila's population growth rate of 1.0 percent per year (MMUTIS 1997).

The existing spatial structure manifests the locations of old (the port zone) and new (industrial estates) centers of economic activities as well as residential and commercial zones which have existed during colonial times or formed in the years after decolonization. Examples of new land uses are peripheral master-planned suburbs for the middle-class situated side by side with large industrial estates in the metropolitan fringes.

In terms of gross value added, the service sector remains to be the major economic base of the metropolis. In terms of occupation, more than three-fourths or 76.0 percent of the employed population were in the tertiary or service sector as of 1996. The secondary sector accounted for 22.9 percent of total employment while the primary sector, 1.1 percent (MMUTIS 1997).

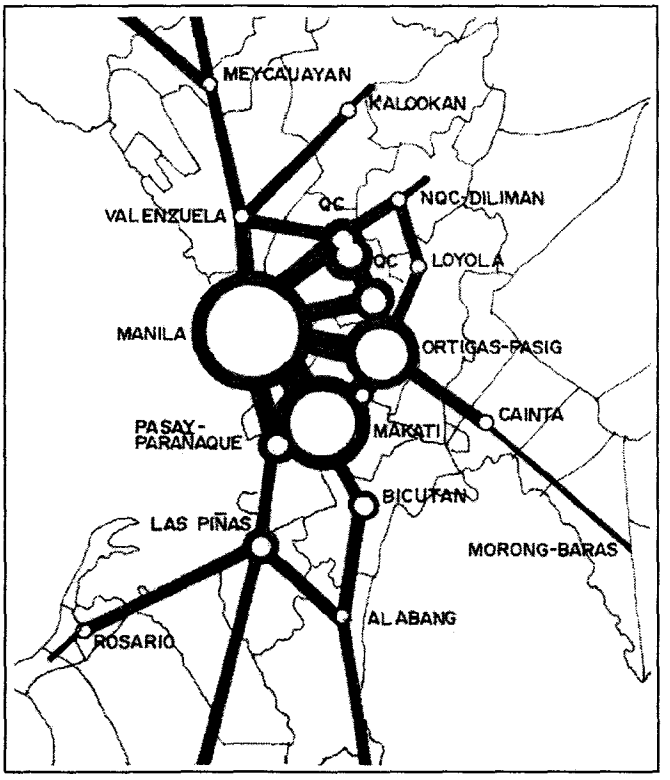
The central business district (CBD) has traditionally symbolized the socio-economic vitality of a city or conurbation of cities and towns. It usually contains prime metropolitan real estate, the high value of which necessitates very specialized uses. A large number of skyscrapers typically occupy its center. These features are displayed by the different CBDs of Metro Manila.

Manila CBD

Manila continues to be a center of business and commerce, a population nucleus, and the seat of the national government. Its important

Figure 9

EXISTING URBAN STRUCTURE OF METRO MANILA SHOWING THE DIFFERENT CBDs AND COMMERCIAL NODES



Source: MMUTIS 1997

port functions, assumed during the Spanish and American colonial eras, continue well into the 1990s. The Manila CBD typifies the historical CBD in that it evolved from a commercial-trade district during colonial times to a retail-office-commercial complex at mid-century, and most recently, to a convention-tourist-entertainment center. As such, it is located in the oldest part of the metropolis.

The Manila CBD is also a center of financial trading due to the Binondo financial and banking district. Roxas Boulevard and Malate form the modern commercial-convention-tourist-recreational hub with their first-rate hotels, restaurants, and convention centers.

Manila's CBD is fundamentally different from other CBDs in that its service sector is largely comprised of consumer and personal services and retail trade, a feature which has endured through time. With a multitude of small merchant stores and shophouses amid sporadic intrusions of modern retail stores and restaurants, its commercial districts have retained the character of a "bazaar economy" and indigenous trade and service center, a carry over feature of its colonial heritage. The church is a conspicuous urban element in these indigenous business and commercial zones. Its wholesale markets of Divisoria and Baclaran also serve to project an image of an indigenous trading center.

Manila is also a hawker's paradise with its narrow streets lined with ambulant vendors and rolling stores selling everything from cigarettes (sold per stick) to community tax certificates. The districts of Sta. Cruz, Quiapo, and Binondo are about the last places in Metro Manila where one will see horse-drawn carriages plying the streets. The Manila CBD is the heart of the urban informal sector.

Based on the land use map prepared by the Metropolitan Manila Development Authority (MMDA) and the Institut d' Aménagement et d' Urbanisme de la Région Ile-de-France or Greater Paris Regional Planning and Development Institute (IAURIF) using a 1995 SPOT satellite image, the Manila CBD is surrounded by high-density residential areas. Houses in this area are aged and blighted.

Makati CBD

The Makati CBD makes another unique CBD—a business, financial, commercial, convention, and recreational center of the metropolitan region as well as of the country. Begun by the Ayala conglomerate in 1948 with among the first suburban residential developments geared to the elite, the Makati CBD has grown tremendously, a showcase of the success of private sector led urban development. It covers an area of 979 hectares (MMDA and JICA 1996).

It is a successful mixed-use development of residential, business, and commerce. Two other private sector led developments are the Cubao CBD and the Ortigas CBD. The ownership of big tracts of land, which were acquired during the Spanish period, is a crucial success factor. Moreover, these developments are convenient to access because they are located at strategic intersections of EDSA and radial roads.

With the urban development strictly regulated by the Ayala Corporation in terms of building height, bulk, floor area ratio, and land use, the Makati CBD projects a polished image of a firm-type modern city. It is completely modernized with many skyscrapers, office and residential condominiums, world-class hotels and restaurants, air-conditioned malls, and shopping complexes—diametrical to the bazaar–type image of Manila.

The Makati CBD typifies the daytime-nighttime contrasts of modern CBDs. Middle- and upper-income citizens who come to the area by day leave for the suburbs and high-priced residential subdivisions in the city after office hours. Vehicular traffic is typically heavy both day and night but traffic at night is far lighter than the daytime traffic volume. In the evenings and weekends (except in restaurant and hotel rows), the streets are empty. The convergence of transportation lines and related economic activities has made the Makati CBD the center of action, wealth, and prestige.

The Makati CBD is also the national center of business and producer services. Around 1,295 corporations were listed in the Top 7000 Corporations from 1996 to 1997 which provided business and producer services and were classified by the government into banking institutions, deposit money banks, thrift banks, financial intermediaries/non-banks, financial services, insurance, real estate, business services, professional, and advertising services. Of these, some 700 are located in Makati City. Makati is also the base of almost all corporate headquarters of transnational corporations or TNCs (Table 8).

Producer services offer legal, financial, advertising, consultancy and accountancy services to companies which provide the needs of the business elite and TNCs. Producer services thrived in Makati since it is the modern financial center of the country as opposed to the Binondo financial district. It also provides an environment of highly sophisticated communication and infrastructure network, and a socio-cultural milieu that are conducive to producer service activities. This sector coordinates an internationally dispersed but increasingly interlinked global economy (Hall 1998).

Unfortunately, the service sector data at the regional level are not disaggregated into subsectors. No data on employment contribution nor gross value added could be cited to show how much the producer service or quaternary sector benefits the economy.

Table 8
LOCATIONS OF PRODUCER SERVICE COMPANIES

City	Number of Producer Service Corporation Locators (1996-1997)
Makati City	700
Manila	119
Binondo Area	69
Ermita Area	50
Pasig City	105
Quezon City	92
Mandaluyong	44
San Juan	35
Pasay City	27
Parañaque	20
Other cities, rest of the country	153
TOTAL	1,295

Source: Raw data from The Top 7000 Corporations 1996-1997

Ortigas CBD

The 600-hectare Ortigas Center in Pasig City is another business, financial, convention, shopping, and recreational node including its commercial extension, the Greenhills shopping complex. The Ortigas family conglomerate began developing the area in the 1950s, another example of a successful commercial-business-residential development of the private sector. Its present configuration, however, only took shape in the late 1980s until the 1990s. It is the site of the Philippine Stock Exchange, three mall complexes, office and residential towers, and first-rate hotels. It is surrounded by low-density master planned residential subdivisions.

Cubao CBD

In the late 1960s, the Araneta group started to develop a 37-hectare property in Cubao, Quezon City as an alternative commercial, recreational, and shopping node in the eastern part of the metropolis. With its small individual shops and throngs of hawkers and vendors, it eventually took on a complexion of another traditional shopping and retail district, which made it a poor cousin to Manila's vibrant bazaar economy. It is also surrounded by high-density residential areas.

The recent years have seen the sprucing up of Araneta Center to portray a more modernized retail and recreational center which appeals to the middle class with the building of malls and air-conditioned department stores. There is a plan to redevelop Cubao into a thoroughly modern commercial center by building hotels and housing complexes by the year 2000.

Emerging CBDs

Aside from the present CBDs, there are new developments in Metro Manila which may yet add a few more major economic nodes in the metropolis. These are the following:

Fort Bonifacio Global City

The "real estate deal of the century" will involve the development of the former military base into another city in the 21st century. The city is envisioned to be the first

intelligent and ecological city in the country covering around 500 hectares of prime real estate land in between the Makati CBD and Ortigas CBD.

Boulevard 2000

This is envisaged to usher in the Renaissance of the City of Manila. To be built under the auspices of the Philippine Estates Authority, the mixed use development will rise on the reclaimed 1,167-hectare area along the coast of Manila Bay to revive Manila as the center of commerce and tourism.

Filinvest Corporate City

Located in the southern margin of the metropolis, the Filinvest Corporate City is a joint venture of the government and the private sector. It would become another major center with the proposed development of a city center surrounded by residential areas and with high accessibility to nearby industrial estates and technoparks.

Theoretical Explanation of Metro Manila's Spatial Structure

Multiple Nuclei Model

The emergence of several major nodes and CBDs in Metro Manila as well as the complexity and distribution of its land uses can be partly explained by the multiple nuclei model developed by Chauncy Harris and Edward Ullman in 1945. This model counters the single-node concentric zone and sector models developed respectively by Ernest Burgess and Homer Hoyt. These two classic models of the internal structure of cities assume that urban growth and development radiate from a single central core, the site of the original urban settlement that later developed into the CBD (Fellman 1992). These two models may be applied to the formation of the Manila CBD, but only to this extent. These two models have other features which are not manifested by the evolution of Manila. Thus, the growth of Manila is more accurately captured by McGee's model.

However, the urban model of McGee for a typical Southeast Asian city is also limited when juxtaposed with the expanding metropolitan region. McGee's urban model is still useful as a backdrop for the changing metropolitan structure. The multiple nuclei theory is also instructive in explaining the emergence of the different CBDs.

According to the model, cities tend to grow around not one but several distinct nuclei. The number and functions of each nucleus vary from one another and depend on city size. Urban functions include the CBD, major retail and shopping center, university center, and suburban centers. Multiple nodes appear because of the differentiation of certain land uses. Certain highly specialized activities like manufacturing have certain needs such as ports and harbors which are site-specific. Certain related activities also tend to cluster together, while certain unrelated functions repel each other such as classy residential areas and heavy manufacturing areas. Lastly, certain activities which cannot pay high rents may be relegated to more inaccessible locations like smaller specialty shops (Fellman 1992).

This differentiation of urban functions took place in Metro Manila, as its economic base became larger and more diverse, resulting in a more diverse spatial use of land. Although the model explains the segregation of major land uses, it does not explain the emergence of several CBDs whose functions overlap in some respects. In the model, several nodes arise due to differences in economic functions. This is not the case for the CBDs in Metro Manila. For instance, the Makati CBD and Ortigas CBD generally serve the same modern economic functions, including quaternary services and an incipient quinary service sector (i.e. the "goldcollar" occupations). The Manila CBD and Cubao CBD likewise have very similar economic activities such as their "bazaar economy" with their focus on consumer and personal services and traditional retail trading.

However, the model is still useful in explaining that the development of metropolitan regions is not structured from a single center in a sequence of circles (concentric zone model) or from a series of high-rent residential sectors (sector theory). It postulates that the metropolis spreads away from the several nodes of growth. Peripheral expansion

of the separate nuclei eventually leads to the coalescence of towns and cities into a socially and economically functional urban agglomeration. The multiple nuclei also applies to the new industrial estates forming in the metropolitan fringes.

To further illuminate the evolving spatial structure of Metro Manila, modern structuralist and sociological approaches in urban geography are adopted. These approaches seek to examine ways in which urban patterns and processes are the outcomes of the combination of processes of human choice and action and the broader socio-economic processes which provide a framework for this human action. Using these approaches, there are several economic, social, and political factors which are causing these changes in the spatial structure of the metropolis. Among them are the following:

Economic Liberalization

Among the things that kept the Philippines at the bottom of the international investor's list in the past was a policy framework that was conservative, full of restrictions, and inward-looking. Starting 1992, all that was changed with the passage of liberal foreign investment laws, even as foreign exchange restrictions were lifted. Because of the latter, the Philippines was granted Article VIII status under the International Monetary Fund by-laws which means that the country has been put on equal footing with many of the advanced economies which allow virtually untrammeled external movement of funds (Philippine Financial Almanac 1997).

Landmark reforms were also instituted in the trade and investment area. Among these was the establishment of a uniform tariff structure and greater participation of foreign investors in the economy by broadening the list of industries open to 100 percent foreign ownership such as the banking and telecommunications sectors.

The new policy of deregulation has allowed longer leases on land and crushed the monopolies in the communications and transport sectors. Key industries have been deregulated such as telecommunications, air transport, shipping, and the energy industry.

Metro Manila saw two construction booms, one in 1987-1991 and another, in 1994, with an upsurge in the construction of high-rise office buildings and condominiums especially in the Makati CBD and Ortigas CBD. Medium and low-cost housing have proliferated in the CALABARZON region as well as in other cities of the country.

The upward spiral of land prices and rents are highly related to the economic policies of liberalization, deregulation, and privatization. Underlying market forces brought to the fore by these government policies have contributed to the competitive bidding for real estate properties, jacking up the prices of land. The TNCs are known to have urban bias in the location of their corporate offices, locating only in environments with sophisticated technological infrastructure needed to coordinate their global activities. The new urban developments in existing CBDs and the massive investments being poured into the creation of new CBDs in the metropolis have caused the land values of surrounding areas to soar to dizzying heights. Hence, prime real estate lands in these areas can only be taken by the highest bidder, usually for commercial, business, and high-end residential land uses.

External Economic Forces

The emerging polynodal spatial structure of the metropolis can be explained by the increasing complexity and diversity of its economic base as well as the increasingly interdependent world economy of which it is a part.

Urban development and growth is influenced by a city's position in the world economy. Metro Manila has been a satellite city in the periphery of the world economy for such a long time and its deeper integration in the global capitalist village has shaped its spatial structure. The liberal economic policies of the government have served to further integrate the national economy through areas like Metro Manila. Metro Manila's role in the global urban system enables it to capture new functions and investments.

This increasing interconnection of the global economy is a result of a number of processes. One is the globalization of production, the main agents of which are the TNCs. The TNCs emerged as key players in the world economy since the mid-1970s. Although they are not new, their independence from national economies and the sheer extent to which they influence the world economy are. Some TNCs earn more revenues than some smaller national economies.

The decentralization of production from the industrialized countries to the developing world such as the Philippines is also brought about by TNCs through foreign direct investments. They locate their production units in the fringes of metropolitan areas where industrial enclaves are established and where there is a ready pool of cheap, non-unionized labor. These locations offer other incentives as well from national governments such as tax holidays and less bureaucratic controls. The policy of industrial dispersion of the government becomes instrumental in this regard.

Technology likewise plays a decisive factor in these macro-economic changes. The spatial fragmentation of the production process has been greatly facilitated by the technological innovations in production and process technologies. These technologies require lower level of skills and allow the spatial separation of the stages in the production process. This made possible the decentralization of production units to take advantage of cost differentials across space (Hall 1998).

The continual rise of the service economy, particularly the producer service or quaternary sector, explains in part the vibrancy of the Makati and Ortigas CBDs as the favored locations of the business elite, the TNCs, and in their wake, the producer service activities. This is the resultant spatial dimension of the change in the composition of employment.

Growth of the Middle Class

In a capitalist city like Metro Manila, the ability to pay determines where one would live. The city's residential areas thus become spatially segregated by economic class. The wealthy prefer to live in the desirable residential neighborhoods with high accessibility to the CBDs. Low-income residents cluster in blighted and overcrowded areas. Not surprisingly, low-income residential areas and squatter settlements also tend to locate near the CBDs and industrial areas in the city as transportation becomes more inadequate.

Declining densities away from the inner core (City of Manila) suggest residential deconcentration which can be explained by the growth of the middle class. The growth of the middle class has resulted in suburban communities in the fringes of the metropolis. The reaction of the middle class to high land prices and overcrowding within the metropolis is to live in affordable, safe, beautifully landscaped and master planned subdivisions in the periphery. The pressure of population growth on transportation and housing which have become completely inadequate has aided this process. This process has also displayed a pronounced social dimension with mainly the middle class residents moving to metropolitan suburbs and beyond, while the more disadvantaged groups who are far less mobile remain in the blighted city centers.

Industrial Decentralization

Alongside the new international division of labor, government policies that promote balanced regional growth and development aided the decentralization of industries to the periphery of Metro Manila, particularly in the CALABARZON growth center. Industries now move into master planned industrial enclaves variously called ecozones, science and technological parks, export processing zones, and industrial estates that are located in the fringes of Metro Manila. The metropolitan core has remained largely commercial, a land use that is able to outbid all others for expensive accessible land.

Presence of Informal Settlements

Squatter settlements are found around the different CBDs as well as in other cities and towns of Metro Manila. It would seem that it is a constant feature of all cities and municipalities of the metropolis. Most of the large squatter settlements are located near the CBD or industrial areas, side by side with low-

density residential villages of the upper class, or occupying government-owned lands.

Suburbanization

As movement away from the central area of the metropolis quickened and aided by transportation and road networks, a slight decentralization of population has occurred.

The past saw Makati, which used to be a suburb of Manila, break increasingly away from Manila and become an independent CBD itself. Several of Manila's once suburban settlements have now become self-sufficient cities in their own right with their respective CBDs and suburbs. The present metropolitan suburbs are located in the provinces of Cavite, Laguna, Bulacan, and Rizal. As de facto metropolitanization proceeds, these already urbanized areas have become functionally integrated with Metro Manila. As suburbs of Metro Manila, these bedroom communities are very much a part of the metropolis.

Motorization of Metro Manilans

The metropolis has become more internally linked by improved roads, transport facilities, communication networks coupled with an increase in car ownership. Indeed, it is these integrating networks that provide the primary stimulus to the formation of conurbations by connecting the metropolis with the peripheral towns and cities. An example of which is the soon-to-be finished Skyway, a physical link which will further unify Metro Manila with the southern portions of the CALABARZON Growth Network.

AREAS FOR FUTURE STUDIES, POLICY, AND PLANNING CONSIDERATION

Research Directions

The study employed the structuralist and sociological points of view in explaining the changing urban morphology of Metro Manila. A more quantitative approach or positivist approach is needed to complement this study in order to give more measurable indicators of the changes in the spatial structure of the metropolitan region.

The study likewise applied a spatial accounting framework to track Metro Manila's spatial expansion. A demographic accounting framework would be helpful in showing how natural increase and net migration have contributed to population change in the old and new metropolitan territories. These frameworks could also be applied in studying the metropolitanization of the country's two other metropolitan regions, Metro Cebu and Metro Davao.

A study of the growth of Metro Manila vis-a-vis the national urban system, particularly with the development of other metropolitan areas can further provide vital information in the analysis of metropolitanization in the country.

Policy Implications

Metro Manila has continually grown and evolved through the decades after decolonization. Thus it is now called Mega Manila, a metropolis of 10 million population and still growing. Since the creation of the NCR in 1975, no areal reclassification has been officially done. But Metro Manila has continuously expanded demographically and spatially through a de facto metropolitanization process. It has become imperative that the territorial delineation of Metro Manila be altered to reflect the actual functional territory of the expanding metropolis.

Institutional implications of these must also be addressed. The present organizational structure and powers of the MMDA are insufficient to govern such a dynamic organism. The MMDA should be strengthened and given taxing powers to cope with its gargantuan tasks.

In the area of national urban policy, the government must address the peculiar needs of inner cities like the inner city of Manila to prevent the formation of the "urban doughnut", a phenomenon which seems to be plaguing the City of Manila at present. Urban policies for larger cities and conurbations must also be drafted because these cities have peculiar needs compared to intermediate-size cities.

Planning Implications

How can urban and regional planners cope with the consequences of the continuing expansion and growth of the metropolitan region and the urbanization of its fringes? How should they plan for the needs of the peripheral areas being engulfed by the metropolis? How should planners anticipate the requirements of a megacity in the age of globalization? Questions such as these must be addressed by urban planners who must be pro-active in this situation in order to alleviate the worsening living and environmental conditions in the metropolis, i.e. air and water pollution, overcrowding, urban blight, traffic congestion, inadequate water supply, and unemployment.

Another planning challenge posed by metropolitanization is the increasing fragmentation of the society. Planners should strive to prevent the deterioration of Metro Manila to a socially fragmented city, a city divided by social status and occupations and characterized by a growing alienated and marginalized state of the society.

Lastly, planning for the inner city of Manila needs a reengineering of the old central city, without the pitfalls of traditional approaches to urban redevelopment such as planning for a convention center. Planners will do well to learn lessons from the experience of older, declining industrial cities in developed countries.

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DEMAND FOR HIGH-END RESIDENTIAL AND COMMERCIAL SPACE[1]

The Case of Makati City

Krishna C. Viuya

INTRODUCTION

For the past decade or so, the Philippines has been experiencing rapid urbanization leading to an expansion of its urban areas, particularly Metropolitan Manila.

This expansion of urban areas necessarily means increased demand for residential, industrial, and commercial land use. Since land is the essential ingredient in urban growth, land development and manage-ment become critical issues (Dowall 1989). The efficient development and management of land are possible through the establishment of more efficient land use patterns.

A report on land use planning and management states that, in the Philippines, a particular weakness of the land use planning process is that the output is basically a "supply" side plan (IEMSD 1997). This means that the plan often only entails the determination of land area available and the subsequent assignation of such area to various land uses. The report further claims that there is very little effort in "demand" analysis, i.e., the determination of land requirements of various processes and sectoral programs and projects.

OBJECTIVES OF THE STUDY

Planning for effective urban development and management, whether from a supply or demand side, relies on vast amounts of spatial information. But more often than not, whatever data are available are not organized enough to provide meaningful inputs for planning and decision-making. The lack of accurate and updated information about urban growth often hinders effective planning and promotion of urban development. This is a primary reason why most local governments cannot successfully cope with rapid urban population growth and its accompanying problems, especially those that relate to land use.

As an initial attempt to contribute to a comprehensive study on the demand for urban space, this study presents specific methodologies for estimating the amount of space required by an urban area for future growth, taking the case of Makati City as an example. The study provides information on the past, present, and projected patterns of high-end residential and commercial space in Makati, focusing on the demand and supply of land for urban development, and analyzes these trends based on alternative economic growth scenarios for the regional economy of the National Capital Region (NCR) as well as the Philippine economy.

SIGNIFICANCE OF THE STUDY

The study is intended to benefit both public and private sector planners and decision-makers by providing a quantitative framework for the analysis of the urban land market.

[1] This article is an abridged version of the author's thesis submitted to the University of the Philippines, Diliman in partial fulfillment of the requirements for the degree of Master of Arts in Urban and Regional Planning in 1998.

An estimate of future land requirements could help local governments in the formulation of a spatial strategy that can be translated into a land use plan, which, in turn, is the basis of legal instruments for implementation (Corpuz 1997). The results of this study may likewise provide the local government with baseline estimates of future land requirements for high-end residential and commercial space to guide land use planning policy formulation, infrastructure programming, and investment decisions.

Private developers, on the other hand, usually take great financial risks when they launch projects without the benefit of accurate and updated land use information. This study may help furnish information on the demand for high-end residential and commercial space and the corresponding price trends, thus providing them with a sound basis for investment and decision-making.

DEFINITION OF TERMS

Urban space requirement is a function of demand and supply. *Demand* is the ratio of population and density while supply is the amount of urban space available for future growth (Corpuz 1997).

Demand as used in this paper refers to the requirement for urban space, thus, the availability of urban space for future growth (the supply) is already considered.

The term *high-end* refers to those residential and commercial spaces with a selling price of more than or equal to P30,000 per square meter.

Residential buildings are buildings which, by the way they have been designed or constructed, are intended for abode such as single houses, multi-unit residential buildings and others (NSO 1994).

Commercial buildings are those built for transacting business or for rendering professional services, such as store, office, warehouse and the like. In this study, the term *commercial space* refers to the retail and office spaces.

METHODOLOGY

This section presents the general methodology employed in the study and lays out the framework for analysis, including the detailed procedure followed in the projections of population and space requirements for future urban growth.

The study made use of available secondary data to quantitatively establish the demand for and the supply of urban land. Available policy documents were reviewed and correlated with the observed movements in the distribution of population in the urban areas.

Analytical Framework

Determinants of a City's Population Size and Composition

An understanding of the forces of agglomeration and deglomeration is essential in the study of the growth of cities and urban areas. These forces lead to the concentration and deconcentration or dispersion of industrial activities and others. They partly explain the existence and perpetuation of the concentration of large masses of population.

Agglomeration benefits within the NCR are derived from both the industry size (localization economies) and the overall urban size (urban economies). The urban population serves as the most important source of agglomeration benefits. There are indications, however, that the failure of infrastructure development to cope with rapid population growth could create urban diseconomies in the future. The impact of these forces on population were analyzed utilizing shift-share analyses of inter-regional censal population data from 1948 to 1995.

Shift-share analysis is a technique based on a fundamental premise that a region (or any geographic unit) can only be understood in relation to other regions and to the country as a whole. Thus, population shifts can be analyzed by comparing actual population data for a particular period with the expected population for the same period. The expected population is computed based on the change in population in each region if each region has had gains (or losses) proportional to the experience of the country as a whole. The analyses in this study sought to establish the rate at which the NCR as a whole was gaining people relative to the whole nation.

Intra-Metropolis Migration

The movement of people within the component cities and municipalities of the NCR was also captured by shift-share analysis. The analysis established the rates and pattern at which the component municipalities and cities of the NCR were gaining or losing people relative to the whole metropolis.

EMPIRICAL ANALYSES

This section provides information on the past, present, and the projected patterns of residential and commercial space in the Philippines and in Makati, focusing on the demand and supply of land for urban development. Information on the past, present, and projected population of the Philippines and of Metropolitan Manila are also presented as a necessary indicator of the demand for urban space.

POPULATION ANALYSES

The procedure for deriving the projected population, as presented in Table 1, was adopted from the study conducted by Ramos (1997) on the U.P. Commonwealth Property.

National Level Population

The historical population and implied annual growth rates for the Philippines are shown in Table 2. To project the national-level population for the year 2000 to 2010, an equation using the following variables was used: a double exponential function estimated from World Bank figures of a stationary population level of 137 million to be achieved by 2042; a 1995 actual population of 68.6 million; and, a projected year 2000 population of 74 million. The derived equation is shown as Equation (1) below:

$$P_t = (137)\,(0.5007)^{(0.97704)^t} \quad \text{Equation (1)}$$

The double exponential model is based on the assumption that the rate of growth of the population is proportional to the population level in a manner that increases exponentially over time. This provides for a deceleration of the rate of growth towards a given limit for the population level. In this case, the limit is set at the stationary population level of 137 million.[2]

The projected Philippine population levels from 2000 to 2010 are presented in Table 3.

Population Projections for Metropolitan Manila/National Capital Region

To determine the projected population for the National Capital Region, the 1995 percentage share of NCR population to total Philippine population was multiplied to the projected Philippine population presented in Table 3. The projected decline in the share of the NCR to the total shift in the national population were considered to take inter-regional migration into account.

Utilizing censal data from the period 1948-1960 to 1990-1995, a regional shift-share analysis was conducted to determine the projected share of NCR population to the total population shift. The results of the analysis indicate that the total population shift as a percentage of the national population consistently declined from 6.60 percent during the period 1948-60 to 2.66 percent during the period 1990-95 as shown in Figure 1. Given this trend, it is estimated that the total population shift will be approaching an asymptotic value of 1.87 percent.[3]

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[2] A stationary population is one in which age- and sex-specific mortality rates have not changed over a long period, and during which fertility rates have remained at replacement level; that is, when the net reproduction rate (NRR) equals 1. In such a population, the birth rate is constant and equal to the death rate, the age structure is constant, and the growth rate is zero. See World Bank, ***World Development Report: 1992***, Table 26, p.268 and p. 297.

[3] This was arrived at by fitting a reciprocal function on the total percentage shift (TS) during each census period and time (t). The derived equation is shown below:

$$TS = 1.8744 + 4.9828\,(1/t)$$
$$(0.4230)\quad (0.7794)$$
$$R^2 = 0.9316 \qquad \text{F-statistic} = 40.8730$$

The numbers in parentheses represent the standard errors of the regression coefficients. The equation (based on the F-statistic) and its coefficients (based on the standard errors) are statistically significant at the 95% confidence level.

The intercept of 1.87 is an estimate of the asymptotic level for the total percentage shift. See Ramos, U.P. Commonwealth Property Study, p.2.6

Table 1
POPULATION PROJECTIONS

REQUIRED INFORMATION	BASIS/ASSUMPTION	DATA UTILIZED
Philippines: 1996-2010		
(a) Derived equation: $P_t = (137)(0.5007)^{(0.97704)^t}$	Assumption: The rate of growth of the population is proportional to the population level with a proportionality that increases exponentially over time.	Historical population and growth rates, 1903-1995; World Bank figures of a stationary population level of 137 million to be achieved by 2042; 1995 actual population of 68.6 million; projected year 2000 population of 74 million.
(b) Projected population	*(a)*	
NCR: 1996-2010		
(c) Projected total shift as a percent of total Philippine population	Decline in the share of total shift to total national population, estimated to approach an asymptotic value of 1.87 percent.	Population data for the censal years 1948, 1960, 1970, 1980, 1990, and 1995.
(d) Projected total shift, Philippines	*(b)* X *(c)*	
(e) Projected share of NCR population to total population shift	Regional shift-share analysis shows a decline in the share of NCR to total population shift.	
(f) Projected total shift, NCR	*(d)* X *(e)*	
(g) Constant 1995 NCR percent share in the national population	(NCR population) / (Philippine population)	1995 population data
(h) Projected population, NCR	[*(b)* x *(g)*] + *(f)*	
Makati: 1996-2010		
(i) Projected total shift as a percent of total NCR population	Decline in the share of total shift to total NCR population, estimated to approach an asymptotic value of 3.6 percent.	Population data for the censal years 1948, 1960, 1970, 1980, 1990, and 1995.
(j) Projected total shift, NCR	*(h)* X *(i)*	
(k) Projected share of Makati population to NCR population shift	Shift-share analysis within NCR shows a negative net shift for Makati.	
(l) Projected total shift, Makati	*(j)* X *(k)*	
(m) Constant 1995 Makati percent share in NCR population	(Makati population) / (NCR population)	1995 population data
(n) Projected population, Makati	[*(h)* X *(m)*] + *(l)*	

Table 2
HISTORICAL POPULATION AND GROWTH RATES
Philippines: 1903-1995

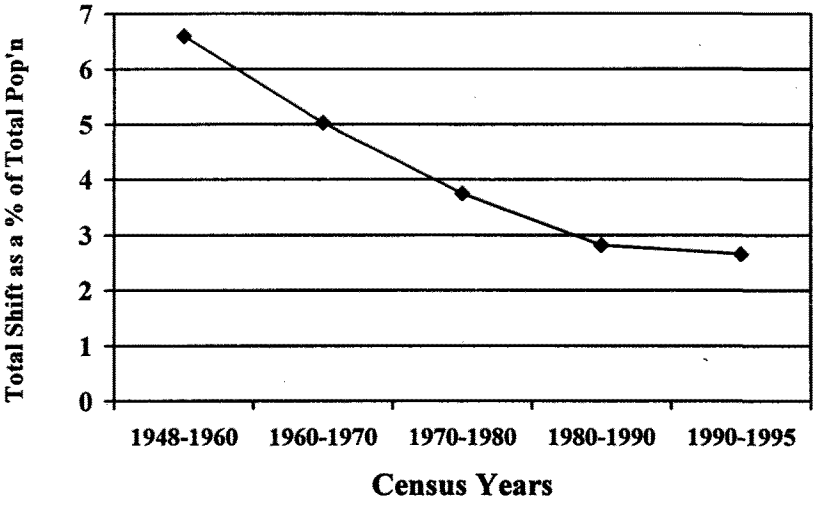
Year	Population	Annual Growth Rate (%)
1903	7,635,426	2.87
1918	10,314,310	2.03
1939	16,000,303	2.11
1948	19,234,182	2.07
1960	27,087,685	2.89
1970	36,684,486	3.08
1980	48,098,460	2.71
1990	60,703,206	2.35
1995	68,614,162	2.48

Source: National Statistics Office (NSO)

Table 3
PROJECTED POPULATION
Philippines: 2000-2010

Year	Population (in Thousands)
2000	74,001
2001	75,055
2002	76,099
2003	77,134
2004	78,158
2005	79,171
2006	80,174
2007	81,167
2008	82,148
2009	83,119
2010	84,078

Figure 1
REGIONAL POPULATION SHIFT
Philippines: 1948-1995



The share of the NCR to the national population shift exhibited a sharp decline from the 1970-1980 level of 40.2 percent to just 26.8 percent during the 1990-1995 period. It is estimated that the share of NCR to the total shift in population will go down further to 25.8 percent by the year 2000, 24.8 percent by 2005, and 23.8 percent by 2010.

The actual and projected population for the NCR including selected population characteristics are shown in Table 4.

City/Municipal Population Projections

Shift-share analysis was likewise done for NCR and its component cities and municipalities for the census periods 1948-1960 to 1990-1995. The results indicate that the total shift as a percentage of total regional population consistently went down from 17.10 percent from the period 1948-1960 to 3.75 percent from the period 1990-1995. The asymptotic total percentage shift for the NCR was estimated at 3.6 percent.[4]

The projected annual change in the share of each city and municipality in the total population shift within NCR, shown in Table 5, are based on the estimated annual changes between 1970 and 1995.

The projected shares of each city/municipality in the total percentage shift within NCR, based on the projected changes shown in Table 5, were utilized to project the individual city/municipal population from the total projected NCR population, taking intra-metropolitan migration into account. The projected city/municipal population is shown in Table 6.

(2.1222) (3.9099)

$R^2 = 0.8178$ F-statistic = 13.4657

The numbers in parentheses represent the standard errors of the regression coefficients. The equation (based on the F-statistic) and its coefficients (based on the standard errors) are statistically significant at the 95% confidence level.

The intercept of 3.5581 is an estimate of the asymptotic level for the total percentage shift. See Ramos, U.P. Commonwealth Property Study, p. 2.7

[4] This is based on the following equation:
TS = 3.5581 + 14.3477 (1/t)

Table 4
ACTUAL AND PROJECTED POPULATION
NCR: 1903-2010

Year	Population ('000)	Density (Per Sq. Km.)	Percentage Share to Philippine Population (%)	Annual Growth Rate (%)
1903	328	516	4.3	
1918	461	725	4.5	2.3
1939	993	1,561	6.2	3.7
1948	1,569	2,467	8.2	5.2
1960	2,462	3,871	9.1	3.8
1970	3,964	6,233	10.8	4.9
1975	4,970	7,814	11.8	4.6
1980	5,926	9,318	12.3	3.6
1990	7,948	12,497	13.1	3.0
1995	9,454	14,865	13.8	3.5
2000	10,684	16,799	14.4	2.5
2005	10,909	17,152	13.8	0.4
2010	11,585	18,215	13.8	1.2

Table 5
PROJECTED ANNUAL CHANGE IN THE CITY/MUNICIPAL SHARE TO THE TOTAL POPULATION SHIFT WITHIN NCR
1995-2010

City/Municipality	Percentage Net Shift (1990-95)	Annual Change in Net Shift (1995-2010)
Manila	-64.69%	1.060%
Caloocan	29.81%	0.830%
Pasay	-7.44%	-0.740%
Quezon	0.53%	-0.040%
Las Piñas	15.17%	-0.240%
Makati	-14.37%	0.540%
Malabon	4.13%	0.160%
Mandaluyong	-1.34%	0.220%
Marikina	-3.18%	-0.440%
Muntinlupa	17.90%	-0.010%
Navotas	1.57%	0.020%
Parañaque	6.20%	-0.510%
Pasig	-0.57%	-0.550%
Pateros	-1.42%	-0.070%
San Juan	-7.00%	0.010%
Taguig	16.52%	-0.190%
Valenzuela	8.18%	-0.050%
NCR	0.00%	0.000%

Table 6
ACTUAL AND PROJECTED CITY/MUNICIPAL-LEVEL POPULATION
NCR: 1995-2010

City/Municipality	Actual ('000)	Projected ('000)		
	1995	2000	2005	2010
Manila	1,655	1,619	1,676	1,804
Caloocan	1,023	1,300	1,345	1,448
Pasay	409	415	407	416
Quezon	1,989	2,250	2,296	2,437
Las Piñas	413	526	532	559
Makati	484	498	520	565
Malabon	347	414	426	456
Mandaluyong	287	323	335	361
Marikina	357	381	379	393
Muntinlupa	400	527	538	571
Navotas	229	266	272	289
Parañaque	391	458	456	473
Pasig	471	518	517	537
Pateros	55	55	55	56
San Juan	124	111	113	121
Taguig	381	497	503	530
Valenzuela	437	528	538	570
NCR	9,454	10,684	10,909	11,585

The results of the analyses, shown in Table 7, indicate that between 1995 and 2000, the highest population growth rates would be experienced by the peripheral areas in NCR, specifically, Muntinlupa, Taguig, Las Piñas, Caloocan, Valenzuela, Parañaque, Malabon, and Navotas.

The inner core of NCR (Manila, San Juan, Makati, and Pasay) would have the slowest growth rates and could even experience population declines. Nevertheless, the inner core cities/municipalities will still remain the most densely populated within the NCR.

DEMAND/SUPPLY ANALYSES FOR RESIDENTIAL SPACE

The housing industry, particularly the high-end housing sector, is highly vulnerable to the business cycle, with short-run activity virtually at the mercy of the prevailing credit, price, and income conditions.

Table 7
ACTUAL AND PROJECTED CITY/MUNICIPAL LEVEL POPULATION GROWTH RATES
NCR: 1995-2010

City/Municipality	Actual (%)	Projected		
	1995	2000 (%)	2005 (%)	2010 (%)
Manila	0.69	-0.44	0.69	1.48
Caloocan	6.10	4.90	0.69	1.48
Pasay	2.17	0.29	-0.35	0.40
Quezon	3.60	2.49	0.41	1.20
Las Piñas	6.82	4.95	0.22	1.01
Makati	1.34	0.56	0.87	1.66
Malabon	4.56	3.54	0.58	1.37
Mandaluyong	3.21	2.41	0.70	1.50
Marikina	2.88	1.30	-0.08	0.70
Muntinlupa	7.62	5.69	0.41	1.20
Navotas	4.14	3.03	0.45	1.24
Parañaque	4.90	3.18	-0.06	0.72
Pasig	3.48	1.93	-0.04	0.74
Pateros	1.63	-0.10	-0.13	0.64
San Juan	-0.45	-2.23	0.46	1.25
Taguig	7.47	5.43	0.25	1.04
Valenzuela	5.16	3.83	0.38	1.17
NCR	3.58	2.48	0.42	1.21

Shelter demand in the NCR has the following components: (1) new household formation, (2) replacement of depreciated stock, (3) maintenance of a proper reserve of vacant units, (4) provisions for expected second home ownership, and (5) pent-up demand which arises from the past housing backlog in the country (Ramos 1997).

In the high-end sector, the demand for new household formation, replacement of depreciated stock, and provision for expected second home ownership is mirrored in the new construction figures, which generally reflects a demand-supply balance. The delicate demand-supply balance could be related to the overall state of the economy as measured by the GNP. Introducing the appropriate lag structure to the model could capture differences in expectations.

The model for deriving the projected demand for residential space was adopted from the study conducted by Ramos (1997) on the U.P. Commonwealth Property. The procedure is outlined in Table 8.

Table 8
RESIDENTIAL SPACE PROJECTION

Assumption: The demand for new household formation, replacement of depreciating stock, and the provision for second home ownership are mirrored in the new construction figures that reflect a demand-supply balance. This demand-supply balance could be related to the overall state of the economy as measured by the GNP.

Required Information	Basis/Assumption	Data Utilized
Philippines: 1996-2002		
(a) Relationship of new residential construction (NRC), in thousand square meters, to the Gross National Product (GNP), in million pesos at constant 1985 prices.	Derived equation: $NRC_t = 0.015522\ GNP_t - 0.0102306\ GNP_{t-1}$	Time series data from 1981 to 1995.
(b) Projected required NRC (in thousand square meters) based on different (low, medium, high) economic growth scenarios.	Equation *(a)*	Projected GNP growth rates (NEDA's revised projections for 1997-1998 as of 10 Oct 97).
Makati: 1996-2002		
(c) Relationship of NRC in Makati (in thousand square meters) to the GNP (in million pesos at constant 1985 prices).	Derived equation: $LN\ NRC_t = 15.805071\ GNP_t - LN\ 15.484038\ GNP_{t-1}$	Available data from 1988 to 1995.
(d) Projected required NRC, (in thousand square meters) based on different (low, medium, high) economic growth scenarios.	Equation *(c)*	Projected GNP growth rates based on NEDA's revised projections for 1997-1998.
(e) Projected shares of each building type to NRC.	Trend: Decrease in the share of single residences and increase in the share of multi-unit residences in NRC.	Random sample of construction permit applications, 1990 and 1995.
(f) Projected required NRC by building type, in thousand square meters.	*(d)* X *(e)*	
(g) Projected required high-end NRC by building type, in thousand square meters.	*(f)* X (assumed high-end NRC %share) single – 95% duplex – 90% multi-unit – 80%	Random sampling of construction permit applications.
(h) Projected required high-end new residential units by building type.	*(g)* / (assumed high-end average floor area) single – 500 sq.m./unit duplex – 150 sq.m./unit multi-unit – 120 sq.m./unit	Average floor areas for high-end developments in Fort Bonifacio, Ecology Village area, Makati and Ortigas Center area.

The Case of the Philippines

A distributed lag analysis of the relationship of new residential construction in the Philippines in thousand square meters (NRC_t) to the country's Gross National Product (GNP) in million pesos (at constant 1985 prices) using the time series data from 1981 to 1995 yields the following model:[5]

$$\mathbf{NRC_t = 0.015522\ GNP_t - 0.0102306\ GNP_{t-1}} \quad \text{Equation (2)}$$

(p=0.03758) (p=0.1580)

$R^2 = 0.9706$

The numbers in parentheses represent the probabilities that the regression coefficients are insignificant. The equation is able to explain 97.06 percent of the total movements in NRC. The negative coefficient for GNP_{t-1} indicates that both developers and buyers generally base their plans on the current year's economic performance. In applying the model, an adjustment factor of 1.1514382 was applied on the projection results to calibrate the results to the actual 1995 figures. The projection results could be interpreted as the required residential construction necessary to support a given economic activity level.

The use of zero (0) intercept in the regression analysis assumes that without growth in the national economy, no new residential construction activities are possible.

It is important to note that the effective demand for land for residential purposes depends on the level of economic activity, which, simply, is a measure of the actual resources that an individual can devote to meeting his needs. Non-residential uses are particularly affected by the fluctuations of economic activity, while the long-run trends of steadily increasing GNP and per capita income have affected consumer investment in housing (United Nations 1977).

Utilizing Equation (2) and actual GNP figures from 1981 to 1995, the required levels of new residential construction were simulated and compared with actual levels. The historical tracking performance of the model is shown in Figure 2, which clearly shows that the model was able to simulate actual residential construction in the Philippines. The results also show that actual residential construction in the Philippines largely lagged behind the required volume.

It was estimated that between 1982 and 1995, the total required volume of new residential construction was about 52.608 million square meters. Actual new residential construction during the same period totaled 52.047 million. There was, therefore, a deficit of about 561 thousand square meters as of 1995.

To project the required new residential construction for 1996-2002 using Equation (2), data on the country's GNP growth was needed. The National Economic and Development Authority (NEDA) prepared revised growth targets for 1997-1998 as of 10 October 1997. The growth rates were revised following the initial depreciation of the Philippine peso, prior to the recent Asian economic crisis. Based on the NEDA's revised growth targets, the country's economic growth is expected to accelerate to the levels shown in Table 9. Given the recent development, however, it is believed that the country's growth path would be closer to the low growth scenario.

New residential construction required to meet such economic growth rates are presented in Table 10.

The Case of Makati City

The residential construction model for Makati City was formulated following the same approach and utilizing available data from 1988 to 1995. A double logarithmic form (using natural logarithms) was however used as it gave better statistical results.

$$\mathbf{LN\ NRC_t = 15.805071\ GNP_t - LN15.484038GNP_{t-1}} \quad \text{Equation (3)}$$

(p=0.04378) (p=0.04473)

$R^2 = 0.9875$

[5] All distributed lag analyses were done using the Time Series and Forecasting Module of STATISTICA, Release 4.5.

Figure 2
REQUIRED AND ACTUAL NEW RESIDENTIAL CONSTRUCTION
Philippines: 1982-1995

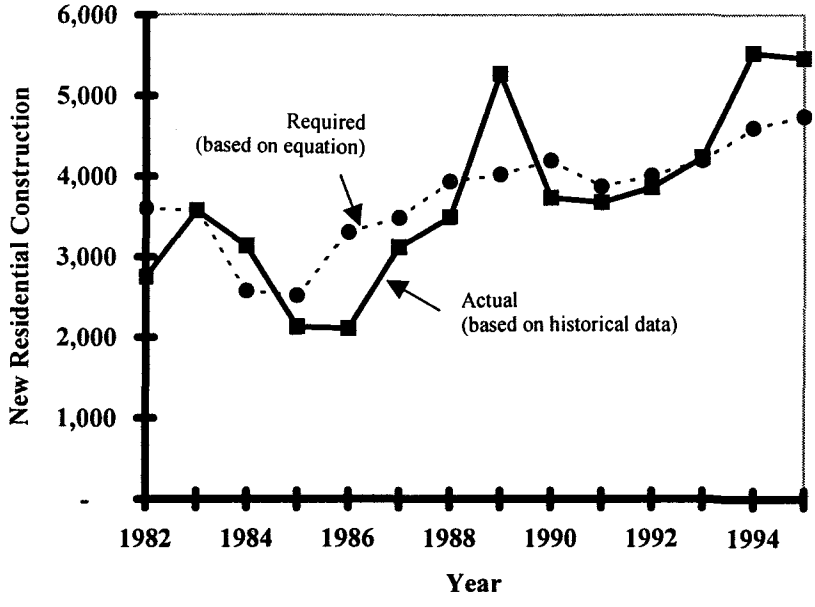


Table 9
PROJECTED GNP GROWTH RATES AT CONSTANT 1985 PRICES
Philippines, 1996-2002

Year	GNP Growth Rate (in percent)		
	Low	Medium	High
1996	5.5	5.5	5.5
1997	5.5	5.8	6.0
1998	6.5	7.0	7.5
1999	7.5	8.5	9.5
2000	8.5	10.0	11.5
2001	9.0	10.8	12.5
2002	9.3	11.1	13.0

Table 10
PROJECTED REQUIRED NEW RESIDENTIAL CONSTRUCTION
Philippines: 1996-2002 (in thousand square meters)

Year	GNP			Required New Residential Construction		
	Low	Medium	High	Low	Medium	High
1996	875,486	875,486	875,486	5,887	5,887	5,887
1997	923,638	925,827	928,016	6,211	6,250	6,289
1998	983,675	990,635	997,617	6,718	6,816	6,916
1999	1,057,450	1,074,839	1,092,390	7,331	7,560	7,792
2000	1,147,334	1,182,323	1,218,015	8,070	8,491	8,924
2001	1,250,594	1,309,422	1,370,267	8,859	9,499	10,168
2002	1,366,274	1,455,096	1,548,402	9,712	10,609	11,562
	Annual Growth Rate (in percent)			Annual Growth Rate (in percent)		
1996	5.5	5.5	5.5	7.7	7.7	7.7
1997	5.5	5.8	6.0	5.5	6.2	6.8
1998	6.5	7.0	7.5	8.2	9.1	10.0
1999	7.5	8.5	9.5	9.1	10.9	12.7
2000	8.5	10.0	11.5	10.1	12.3	14.5
2001	9.0	10.8	12.5	9.8	11.9	13.9
2002	9.3	11.1	13.0	9.6	11.7	13.7

Simulation results for the period 1988 to 1995 as in Figure 3 show that the model has been able to replicate the actual movement of new residential construction activity for the said period.

The results indicate that in Makati City, actual construction generally balanced the required number, except in 1995 when actual new construction of 886 thousand square meters resulted in a huge surplus of 731 thousand square meters. Between 1988 and 1995, required new residential construction totalled 1.185 million square meters while actual construction summed up to 1.606 million square meters or a total surplus of 421 thousand square meters. It was estimated that in 1996, the surplus new residential construction would further increase to 1.192 million square meters. Furthermore, it was estimated that about 85 to 90 percent of this new construction represent high-end residential units, based on a random sampling of construction permits in the City of Makati. Projections of required new residential construction in Makati from 1996 to 2000 under alternative economic growth scenarios are presented in Table 11.

Figure 3
REQUIRED AND ACTUAL NEW RESIDENTIAL CONSTRUCTION
Makati, 1988 –1995

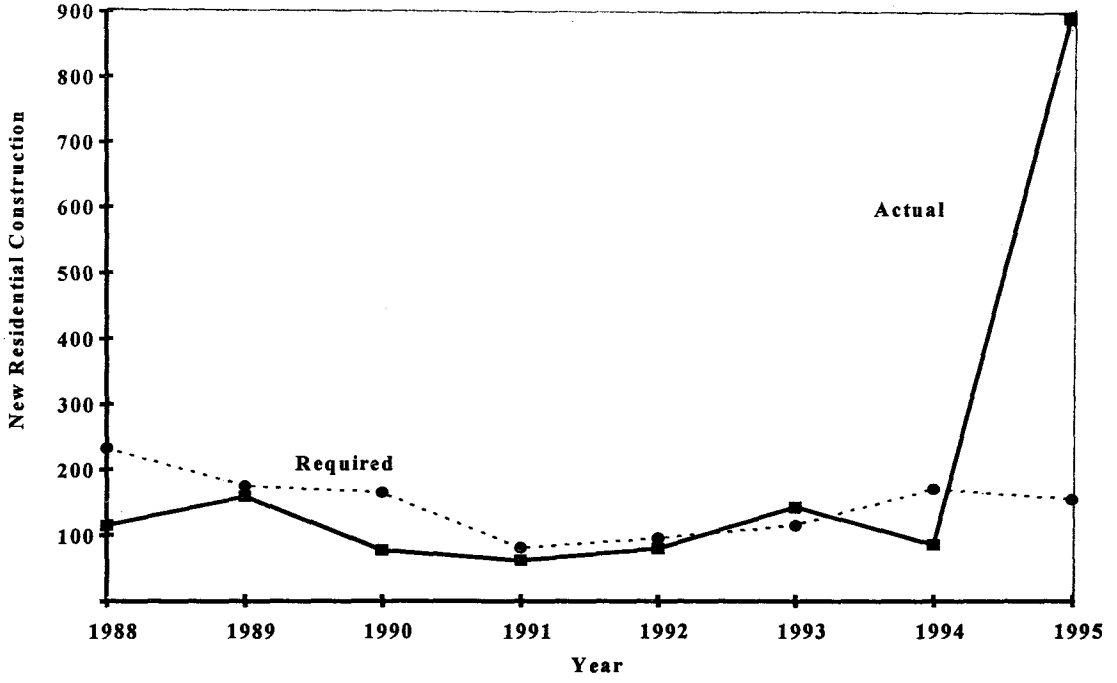


Table 11
PROJECTED REQUIRED NEW RESIDENTIAL CONSTRUCTION
Makati, 1996-2002 (in thousand square meters)

Year	GNP			Required New Residential Construction		
	Low	Medium	High	Low	Medium	High
1996	875,486	875,486	875,486	185	185	185
1997	923,638	925,827	928,016	188	196	203
1998	983,675	990,635	997,617	223	240	258
1999	1,057,450	1,074,839	1,092,390	263	305	354
2000	1,147,334	1,182,323	1,218,015	312	389	485
2001	1,250,594	1,309,422	1,370,267	344	447	578
2002	1,366,274	1,455,096	1,548,402	367	487	644
	Annual Growth Rate (in percent)			Annual Growth Rate (in percent)		
1996	5.5	5.5	5.5	-79.1	-79.1	-79.1
1997	5.5	5.8	6.0	1.7	5.6	9.6
1998	6.5	7.0	7.5	18.1	22.6	27.2
1999	7.5	8.5	9.5	18.3	27.3	37.0
2000	8.5	10.0	11.5	18.5	27.5	37.1
2001	9.0	10.8	12.5	10.4	14.8	19.3
2002	9.3	11.1	13.0	6.6	9.0	11.4

Random sampling of construction permits in the City of Makati in 1991 showed that single residences accounted for 59.6 percent of the total new residential construction, duplexes accounted for 9.9 percent while 30.5 percent were multi-unit types. By the fourth quarter of 1995, the share of single residences dropped to 48.3 percent, that of duplexes declined to 3.3 percent, and the share of multi-unit residences increased to 48.4 percent. Based on this trend, the projected shares of each residential building type from 1996 to 2002 are presented in Table 12.

Utilizing the projected shares of each building type, the breakdown of the required residential construction by type of building is shown in Table 13.

To determine the share of the high-end sector to the required new residential construction, a random sampling of construction permit applications in Makati City was conducted. The results of the random sampling indicate that in Makati City, about 95 percent of the new single residential construction were high-end, about 90 percent were duplexes and about 80 percent were multi-units. Based on these percentage shares, the projected required high-end new residential construction, by building type, can be computed, as presented in Table 14.

Table 12
PROJECTED SHARES OF EACH BUILDING TYPE TO NEW RESIDENTIAL CONSTRUCTION
Makati, 1996-2002 (in percent)

Year	Single	Duplex	Multi-Unit
1996	38.8	5.2	56.0
1997	35.7	4.8	59.5
1998	32.5	4.4	63.0
1999	29.4	4.1	66.5
2000	26.3	3.7	70.0
2001	23.1	3.4	73.5
2002	20.0	3.0	77.0

Table 13
PROJECTED REQUIRED NEW RESIDENTIAL CONSTRUCTION, BY TYPE OF BUILDING
Makati: 1996-2002 (in thousand square meters)

Year	Low			Medium			High		
	Single	Duplex	Multi-Unit	Single	Duplex	Multi-Unit	Single	Duplex	Multi-Unit
1996	72	10	104	72	10	104	72	10	104
1997	67	9	112	70	9	116	72	10	121
1998	72	10	140	78	11	151	84	11	163
1999	77	11	175	90	12	203	104	14	235
2000	82	12	218	102	14	273	127	18	340
2001	80	12	253	103	15	329	134	19	425
2002	73	11	283	97	15	375	129	19	496

Table 14
PROJECTED REQUIRED NEW HIGH-END RESIDENTIAL CONSTRUCTION BY TYPE OF BUILDING
Makati: 1996-2002 (in thousand square meters)

Year	Low			Medium			High		
	Single	Duplex	Multi-Unit	Single	Duplex	Multi-Unit	Single	Duplex	Multi-Unit
1996	68	9	83	68	9	83	68	9	83
1997	64	8	90	66	8	93	69	9	97
1998	69	9	112	74	10	121	80	10	130
1999	74	10	140	85	11	163	99	13	188
2000	78	10	175	97	13	218	121	16	272
2001	76	10	202	98	14	263	127	17	340
2002	70	10	226	93	13	300	122	17	397

The computed gross floor areas were translated into number of units based on average floor areas for high-end developments in Fort Bonifacio.

The average floor areas of high-end single residences in Makati ranged from 500 to 1,000 square meters. Considering the high cost of land, many landowners would probably divide their existing properties to accommodate their children. Thus, for high-end single residences, an average floor area of 500 square meter per unit was assumed.

For high-end duplexes, an average floor area of 150 square meter per unit was assumed as per the average in the Ecology Village area.

For multi-unit residences, a survey indicated an average floor area of 120 square meters for high-end residential condominiums in the Makati and Ortigas Center areas. Also, about 25 to 30 percent of the gross floor areas in such condominiums were accounted for by parking spaces and common areas like corridors, stairways, etc. The projected required number of units for new residences are shown in Table 15.

Table 15
PROJECTED REQUIRED NUMBER OF NEW HIGH-END RESIDENTIAL UNITS BY TYPE OF BUILDING
Makati: 1996-2002

Year	Low			Medium			High		
	Single	Duplex	Multi-Unit	Single	Duplex	Multi-Unit	Single	Duplex	Multi-Unit
1996	137	57	173	137	57	173	137	57	173
1997	128	54	187	133	56	194	138	58	201
1998	138	59	234	148	64	252	160	69	271
1999	147	64	292	171	75	339	198	87	392
2000	156	70	364	194	87	454	242	108	566
2001	151	69	422	197	90	548	254	117	708
2002	139	66	471	185	88	625	245	116	827

Table 16
PROJECTED CUMULATIVE SURPLUS/DEFICIT IN NEW RESIDENTIAL CONSTRUCTION
Makati: 1996-2002 (in thousand square meters)

Year	Cumulative Surplus/(Deficit)		
	Low	Medium	High
1996	1,191.92	1,191.92	1,191.92
1997	1,003.48	996.30	988.86
1998	780.96	756.49	730.52
1999	517.74	451.10	376.68
2000	205.88	61.63	(108.27)
2001	(138.38)	(385.47)	(686.59)
2002	(505.35)	(872.82)	(1,330.80)

The new residential construction surplus accumulated during the 1995 to 1996 period would gradually decline, and could be expected to disappear by 1999 (Table 16) if the Philippines achieves the target growth rates set by NEDA. Given this theoretical scenario, it could be implied that there would be no housing glut in the residential sector.

The demand for residences by the expected growth of expatriate managers, foreign businessmen, and other foreign professionals attracted to the area would further accelerate the growth of demand after 2000. Larger supply deficits after 2000 could occur if the already substantial delays in the 15 to 20 year development plan of Fort Bonifacio would worsen.

It is important to note, however, that the analyses were done prior to the onset of the Asian currency crisis. Given that the consensus is that the effects of the crisis will last for two years, the resolution of the glut would most likely be pushed forward to around 2001 to 2002.

DEMAND-SUPPLY ANALYSES FOR OFFICE AND RETAIL SPACE

An expanding economy will also be faced with increasing demand for space for commercial and business endeavors.

Economic activity has usually been classified into primary (agriculture, forestry, fishery), secondary (manufacturing), and tertiary (services) sectors. There is, however, an additional and rapidly growing sphere of economic activity that does not nearly fit into this classification, what Jean Gottman has called the quaternary sector (Goddard 1975). This sector includes the professions (accountants, management consultants, etc.) and finance (banking and insurance), which all provide non-physical services to the public at large, specifically to the business community. This sector also includes public services like central and local government, universities, research institutes, and the like.

Retailing, on the other hand, is the business activity that sells goods and services to

ultimate consumers. The basic work of retailing is to satisfy the wants of the ultimate consumer in terms of the availability of goods and services. Generally, retailers also provide a place where customers shop and find other various service units to assist them in obtaining goods (Duncan 1983). This study was limited to the determination of the additional space needed by consumers for shopping purposes. The procedures are shown on Tables 17 and 18.

The Case of the Philippines

The government's thrust toward economic liberalization and deregulation has facilitated increasing openness to and integration with the international community. The NCR and the major urban centers like Metro Cebu and Metro Davao have started to become international business centers. The central location of the NCR in the Asia-Pacific region and the relatviely cheap real estate prices and labor give the Philippines a potential advantage. The increase in population and income in the major urban centers would mean an increase in the number and expansion of commercial establishments operating in these areas. These commercial establishments cater to all levels of society and the growing population of its more affluent Asian neighbors.

Table 17
COMMERCIAL/RETAIL SPACE PROJECTION

Assumption: At present, there is a demand-supply balance in retail space.

Required Information	Basis/Assumption	Data utilized
Philippines		
(a) Projected total population	Refer to Table 3	
(b) Retail space requirement per capita, in sq.m.	Assumed constant value: 0.25 sq.m./capita	Existing data indicate a 0.25 sq.m./capita supply in Metro Manila
(c) Projected total retail space requirement, in sq.m.	*(a)* X *(b)*	
Makati		
(d) Projected NCR population	Refer to Table 4	
(e) Retail space requirement per capita, in sq.m.	Assumed constant value: 0.25 sq.m./capita	Existing data indicate a 0.25 sq.m./capita supply in Metro Manila
(f) NCR population shopping in Makati	Assumed value: 1995 – 0.40 2000 – 0.35 2002 – 0.33	Trend based on NSO Integrated Survey of Households Bulletin, unpublished data
(g) Projected total retail space requirement, in sq.m.	*(d)* X *(e)* X *(f)*	

Table 18
COMMERCIAL/OFFICE SPACE PROJECTION

Assumption: Present occupancy rate of office space is 100%.

Required Information	Basis/Assumption	Data utilized
Philippines: 1995-2002		
(a) Projected total population	Refer to Table 3	
(b) Employment ratio	(total employed) / *(a)*	1995 labor statistics and projected using the trend between 1990-1995.
(c) Projected number of employed	*(a)* X *(b)*	
(d) Office employment ratio	(employed in offices) / (total employed)	1995 labor statistics and projected using the trend between 1990-1995.
(e) Projected number of office employees	*(c)* X *(d)*	
(f) Office space requirement per employee, in sq.m.	Assumed value: 20 sq.m./employee	Time Saver standards place the space requirement at 10-30 sq.m./employee.
(g) Projected total office space requirement, in sq.m.	*(e)* X *(f)*	
Makati: 1995-2002		
(h) Projected NCR population	Refer to Table 4	
(i) NCR employment ratio	(total employed) / *(h)*	1995 labor statistics and projected using the trend between 1990-1995.
(j) NCR office employment holding office in Makati	Assumed value: 1995 – 0.35 2000 – 0.325 2002 – 0.315	Trend based on NSO Integrated Survey of Households Bulletin, unpublished data.
(k) Estimated employment in Makati	*(h)* X *(i)* X *(j)*	
(l) Office employment ratio	(employed in offices) / (total employed)	1995 labor statistics and projected using the trend between 1990-1995.
(m) Projected number of office employees	*(k)* X *(l)*	
(n) Office space requirement per employee, in sq.m.	Assumed value: 10 sq.m./employee	Time Saver standards place the space requirement at 10-30 sq.m./employee but in Makati, the minimum space requirement is assumed.
(o) Projected total office space requirement, in sq.m.	*(m)* X *(n)*	

There is, therefore, a need to determine the additional space needed for further development in the commercial and business sectors. The procedure (Tables 17 and 18) for deriving office and retail space requirements follows the approach developed by Corpuz (1997).

As shown in Table 19, the total office space requirement in the whole country is expected to increase from 84.2 million square meters in 1995 to 96.1 million square meters by the year 2000, and 101 million square meters by the year 2002.

Retail space requirement, on the other hand, is expected to increase from the estimated 1995 level of 17.2 million square meters to 18.5 million square meters by 2000 and to about 19.0 million square meters by the year 2002. Although possible growing economic affluence and widening variety of available goods in the market due to trade liberalization could double per capita demand for retail space, the existing 0.25 square meter per capita supply of retail space in Metro Manila was adopted in the study's projections from 1995 to 2002.

Another source of potential demand for commercial space are the required tourist facilities (i.e. hotel facilities, golf courses, and other recreational facilities) that would cater to international and domestic visitors as well as multinational officers and employees.

The Case of Makati City

Makati City serves as the premier business and commercial center in the Philippines and of Metro Manila, in particular. As described by Duldulao (1993), it is in Makati city where "rubbing shoulders with the centers of finance capitalism are the neo-technic offices – the headquarters of oil and gold and public utilities. Nine out of ten of the country's top 1000 corporations hold fort in Makati... scores of large foreign companies run their operations from [Makati] as well, dealing in all sorts of products, from electronics to chemicals to pharmaceuticals to industrial equipment. [In Makati] are the best and the biggest firms in market research, advertising, public relations, sales, management, consultancy, law, and all the other handmaidens of corporate structures."

Table 19
PROJECTED DEMAND FOR COMMERCIAL AND BUSINESS SPACE
Philippines: 1995-2002

Item	1995	2000	2002
1. Population	68,614,162	74,001,000	76,099,000
2. Employment Ratio[6]	0.590	0.596	0.598
3. Estimated Employment	40,475,769	44,097,492	45,499,896
4. Office Employment Ratio[7]	0.104	0.109	0.111
5. Estimated Office Employment	4,209,480	4,806,627	5,050,489
6. Space Requirement/Employee (sq. m.)[8]	20	20	20
7. Estimated Office Requirement (sq. m.)	84,189,599	96,132,532	101,009,770
8. Per Capita Retail Space Requirement (sq.m.)[9]	0.25	0.25	0.25
9. Retail Space Requirement (sq. m.)	17,153,541	18,500,250	19,024,750

[6] Based on 1995 labor statistics and projected using the trend between 1990 and 1995.
[7] Based on 1995 labor statistics and projected using the trend between 1990 and 1995.
[8] Time Saver standards place the space requirements at 10 to 30 sq. m. per employee.
[9] Existing data indicate a 0.25 sq. m. per capita supply in Metro Manila.

As of 1995, there were about 250 office condominiums in Makati, 30 residential condominiums, 70 office/residential condominiums, and about 15 institutional buildings (MACEA 1995). About 35 percent of the total employment in the NCR are located in the Makati area, almost four percent of the employment in the industry sector, and 6.5 percent of the employment in the service sector (NSO 1997).

About 40 percent of NCR's population shopped in the Makati area.

The percentage of NCR employees holding office in Makati is expected to slightly decline from 35 percent to about 33 percent by 2000 and 32 percent by 2002 based on 1995 labor statistics and projected using the trend between 1990 and 1995. The opening up of additional alternative business and financial centers in Mandaluyong, Pasig, and Quezon City was also considered in the projections.

The office employment ratio is expected to go up from 10.4 percent in 1995 to about 11.1 percent by 2002 as higher-level employment increases. This was based on 1995 labor statistics and projected using the trend between 1990 and 1995. The estimated office employment in Makati is thus expected to reach and level off at around 227 thousand.

Time Saver standards place the office space requirement at 10 to 30 square meters per employee. In Makati City, the minimum space requirement was assumed due to the high cost of doing business in the area. Office space demand in Makati is thus expected to reach about 2.27 million square meters by 2002 from 2.04 million square meters in 1995.

Table 19 shows that the estimated 1995 office space demand in Makati was about 2.04 million square meters. With a 5 percent vacancy reserve allowance to facilitate orderly sales and rental transaction as well as repair and refurbishing, the effective demand in 1995 would be about 2.145 million square meters or just about balancing the existing 2.2 million square meters supply of office space in Makati.

The percentage of the population of NCR shopping in Makati was assumed to decline from 40 percent in 1995 to about 33 percent by 2002 as alternative commercial centers in other places open up. Existing supply of 0.25 square meters per capita was assumed to be sufficient until the year 2002. The projection results are also presented in Table 20.

Table 20
PROJECTED DEMAND FOR COMMERCIAL AND BUSINESS SPACE
Makati: 1995-2002

	Item	1995	2000	2002
1.	Population	9,454,040	10,684,000	10,773,000
2.	Employment Ratio[10]	0.594	0.600	0.602
3.	Estimated Percentage Holding Office In Makati	35.0%	32.5%	31.5%
4.	Estimated Employment In Makati	1,964,793	2,082,644	2,043,522
5.	Office Employment Ratio[11]	0.104	0.109	0.111
6.	Estimated Office Employment	204,339	227,008	226,831
7.	Space Requirement/Employee (sq. m.)[12]	10	10	10
8.	Estimated Office Requirement (sq. m.)	2,043,385	2,270,082	2,268,309
9.	Per Capita Retail Space Requirement (sq. m.)[13]	0.25	0.25	0.25
0.	% Of Population Shopping In Makati	40%	35%	33%
1.	Retail Space Requirement (sq. m.)	945,404	934,850	888,773

[10] Based on 1995 labor statistics and projected using the trend between 1990 and 1995
[11] Based on 1995 labor statistics and projected using the trend between 1990 and 1995
[12] Time saver standards place the space requirements at 10 to 30 sq. m. per employee.
[13] Existing data indicate a 0.25 sq. m. per capita supply in Metro-Manila.

Retail space requirement in 1995 was estimated at around 0.94 million square meters as against an estimated supply of 0.84 million square meters.[14] Based on the projected decline in the percentage of NCR population shopping in Makati, it is estimated that by the year 2002, retail space requirements would total about 0.89 million square meters.

SUMMARY AND CONCLUSIONS

This study attempted to present specific methodologies for estimating the amount of space required by an urban area for future growth, taking the case of Makati City as an example. The study focused on analyzing the trends in residential and commercial space in Makati City, based on alternative economic growth scenarios for the Philippines and the regional economy (NCR). These methodologies could be used as input to a land use planning process.

The information generated from this study could benefit both the public and private sector decision-makers by providing a qualitative framework with which urban land markets can be analyzed.

Although partial and mainly indicative, the findings of this study could help the local government of Makati in the formulation of a spatial strategy that can be translated into a land use plan.

The results of the study could also provide the local government with baseline estimates of future land requirements, even if those requirements only pertain to high-end residential and commercial space, to serve as a guideline for the development of land use planning policies, infrastructure programming, and investment decisions. The study likewise presented information on the past, present, and projected trends in high-end residential and commercial space in Makati, including the corresponding price trends which private property developers may use as basis for investment and decision-making. The methodologies could be used by the private sector in matching the demand for urban space with the existing supply.

FURTHER DIRECTIONS OF THE STUDY

As an input to the land use planning process, estimates of the required space for urban growth are intended to be indicative rather than precise measures of anticipated urban growth. This is mainly because estimates of the requirements for urban space are approximations of future market (demand and supply) conditions that are difficult to predict, especially in the long term (Corpuz 1997).

The methodologies presented in this study utilized inputs that were based on different, sometimes conflicting, sources. Moreover, some of the inputs required further estimates that were not available at the time of the study, therefore, assumed values were adopted instead.

A similar study utilizing more realistic economic growth rates as inputs in the projection of required residential construction may be more valuable for land use and policy planning purposes. The use of different percentage shares in the residential building type or in the share of the high-end sector in new residential construction activities (based on more recent data) may provide a more varied range of estimates for various decision-making requirements.

Using the basic methodology presented in this study, different estimates of office and commercial space requirements may also be produced by utilizing a different set of estimates for the following: employment ratio, office employment ratio, office space requirement per capita, ratio of population shopping in a particular urban area, and retail space requirement per capita.

Moreover, the study mainly focused on the macro-economic component of the demand for urban space. Further studies probably need to focus on the micro-economic components of the requirements of urban growth.

The importance of financial markets in the demand for urban space may be analyzed

[14] This is about 60% of the existing retail space of 1.4 million square meters in the NCR, located in Makati.

closely, taking into account their effects on the housing markets in particular. Low mortgage rates on housing and a long repayment period, as well as a high percentage of lending by financial institutions, encourages housing construction activities; thus, the demand for land. Conversely, high mortgage rates and restricted lending policies may restrain the demand for land. At the same time, high interest rates coupled with a lack of liquidity may encourage the supply of vacant land to the market, as a result of the need of developers and landowners to translate the assets held in land into liquid capital in order to pay high interest rates (UN 1977).

One of the relevant findings of the United Nations study on land for human settlements is that the rentable value of housing and office space also influences the demand for land in the market. High rents from housing lead to a higher demand for land for housing purposes, while rent control, which limits the rate of profit on investment in housing, reduces the demand for land. Moreover, the more speculative demand for land for commercial services is related to the rentability of the structures; thus, to the turnover of financial and other commercial firms that occupy the space. The development of tourism and international economic activity is increasing the demand and the payment possibilities of such desirable commercial sites, while at the same time leading to increased speculation and reduced supply.

These are but a few of the factors influencing the demand for and the supply of land for urban purposes. Further studies focusing on these factors may provide a more comprehensive analysis of the effective demand for urban space.

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THE IMPACTS OF TRANSPORTATION ON URBAN QUALITY OF LIFE

The Case of Metro Manila, Philippines

Arleen Grace B. Ramirez-Villoria

INTRODUCTION

It is in Asia where one can find the fastest-growing economies in the world today. Therefore, it is not surprising that as the year 2000 approaches, more mega-cities are emerging in this region than in any other part of the world. Residents in these cities may boast of rising incomes, greater access to a wider range of goods and services, and an enhanced feeling of affluence and prosperity. But along with such a staggering pace of urban development comes a host of economic, social, and environmental problems which have direct and indirect impacts on quality of life. They are a much lamented but inevitable by-product of rapid urbanization and short-sighted urban planning.

Metro Manila is fast joining the ranks of these mega-cities. Despite unmistakable signs of urban decay, it is still *the* foremost center of economic, political, cultural, and social activities in the country. It is also becoming one of the world's most congested and polluted cities. The heavy concentration of land use for residential, industrial, and commercial purposes within Metro Manila puts extreme pressures on the city's transportation system which must address the growing need for greater, faster, and safer mobility. The issue of preserving urban quality of life has never been more critical.

Economic inefficiencies arise out of severe traffic congestion, not to mention the emotional and physical stress to individuals. High levels of vehicular emissions, increasing rates of traffic accidents, and the prevalence of transport-related crimes causing injury, loss of lives, and damage to property have direct and indirect effects on urban quality of life.

The main objective of this paper is to look into the effects of major transport policies initiated by the government on urban quality of life. The economic, social, and environmental impacts of transportation system performance on urban quality of life are identified. Moreover, policy interventions made by the current administration are identified and evaluated in terms of their effects on urban quality of life.

METROPOLITAN MANILA and the TRANSPORT SECTOR

Metro Manila is composed of 10 cities and seven municipalities, covering an area of 636 square kilometers or a mere 0.2 percent of the total land area of the Philippines. With about 9.3 million residents, it houses 13 percent of the total Philippine population of 72 million as of 1996 (Table 1). While the national population grew by 2.6 percent from 1980 to 1990, population in Metro Manila alone expanded by 3.4 percent, which indicates heavy in-migration from other parts of the country. There appears to be no sign of slowing down as projections show that population in Metro Manila will reach 10 million in the year 2000. In census year 1990, population density in Metro Manila was a high 12,465 persons per square kilometer, which was 60 times the national average. Clearly, these figures indicate overcrowding, which exacts a

heavy toll on the provision of basic services such as housing, education, health, security, recreation, garbage disposal, water, electricity, and transport services.

Table 2 shows the number of motor vehicles registered from 1985 to 1995 in Metro Manila. Of the total 2 million motor vehicles in the entire country, a disproportionately large number (42 percent total) ply the streets of Metro Manila.

TABLE 1

NATIONAL AND METRO MANILA POPULATION AND POPULATION DENSITY, SELECTED CENSUS YEARS[1]

GEOGRAPHICAL AREA	LAND AREA (sq.km.)	POPULATION ('000)				POPULATION DENSITY (persons/square kilometer)			
		1975	1980	1990[2]	1995	1975	1980	1990[2]	1995
Philippines	300,000	42,071	48,098	60,703	68,617	140.2	160.3	202.3	228.7
Metro Manila	636.0	4,970	5,926	7,928	9,454	7,814.5	9,317.4	12,465.4	14,864.8
Manila	38.3	1,479	1,630	1,599	1,655	38,619.2	42,571.4	41,749.3	43,205.2
Caloocan City	55.8	397	468	761	1,023	7,118.3	8,383.8	13,638.0	18,336.2
Pasay City	13.9	255	288	367	409	18,345.3	20,702.9	26,402.9	29,396.4
Quezon City	166.2	957	1,166	1,667	1,989	7,014.8	5,757.3	10,030.1	11,970.0
Las Piñas	41.5	82	136	297	413	1,966.5	3,289.5	7,156.6	9,953.9
Makati	29.9	334	373	453	484	11,185.6	12,462.6	15,150.5	16,193.2
Malabon	23.4	175	191	278	347	7,473.4	8,162.4	11,880.3	14,849.7
Mandaluyong	26.0	182	205	245	287	7,010.3	7,898.7	9,423.1	11,033.5
Marikina	38.9	168	212	310	357	4,330.4	5,439.9	7,969.2	9,183.3
Muntinlupa	46.7	95	137	277	391	2,024.9	2,926.7	5,931.5	8,562.0
Navotas	2.6	97	126	187	400	37,345.4	48,517.7	71,923.1	88,091.9
Parañaque	38.3	159	209	308	229	4,150.7	5,445.2	8,041.8	10,216.6
Pasig	13.0	210	269	397	471	16,147.3	20,659.2	30,538.5	36,236.5
Pateros	10.4	33	40	51	55	3,155.9	3,873.8	4,903.8	5,316.0
San Juan	10.4	122	130	127	124	11,778.1	12,508.5	12,211.5	11,941.1
Taguig	33.7	74	134	266	381	2,187.0	3,980.3	7,893.2	11,316.0
Valenzuela	47.0	151	212	340	437	3,204.4	4,518.4	7,234.0	9,301.4

Source: 1995 Statistical Yearbook, National Statistics Office

[1] The latest population census was conducted in 1995

[2] 1990 data include 2,876 homeless population and 2,336 Filipinos in Philippine Embassies/Consulates and Missions abroad, as of 1 May 1990

TABLE 2

MOTOR VEHICLE REGISTRATION IN METRO MANILA, 1985-1995

TYPE	1985	1990	1995
Private			
Cars	336,162	500,753	763,757
Trucks[1]	28,858	46,857	73,620
Motorcycles	36,594	48,413	71,596
Bus	667	746	438
For Hire			
Taxi and Rental	5,419	9,865	27,303
Jeepney	31,235	27,659	53,362
Bus	3,718	4,329	7,824
Tricycle	123	16,418	34,478
Trucks	3,064	3,009	4,344
Others[2]			
Car	14,982	22,524	14,689
Bus	148	172	53
Truck	1,919	4,494	2,440
Motorcycle	914	1,746	1,418
TOTAL	**463,813**	**686,985**	**1,055,322**

Source: Land Transportation Office, DOTC
[1] Includes trailers
[2] For government and diplomatic use

The road network of Metro Manila is composed mainly of 10 radial and five circumferential roads (C-5 is nearing completion). Road network expansion was not very aggressive during the 1970s up to the mid-1980s, primarily due to lack of infrastructure funds and the prioritization of the needs and demands of other sectors of the economy. But, from 1986 to 1990, the Department of Public Works and Highways (DPWH) was tasked with the building of several grade separations and interchanges on intersections that were notorious for traffic congestion. Among these interchanges made operational since 1990 are the EDSA-Ortigas Interchange, Nagtahan Interchange, EDSA-Buendia Flyover, EDSA-Kamias/ Kamuning Flyover, Roxas Boulevard-EDSA Flyover, and the Commonwealth Avenue-Tandang Sora Flyover.

The public transport system in the Philippines is composed of the Light Rail Transit (LRT), Philippine National Railways (PNR) commuter train, buses, taxi cabs, jeepneys, tricycles, and pedicabs. The LRT Line 1 started operations in 1984. Patronage is high, with an average daily ridership of 377,000 in 1995. At subsidized rates, commuters need only pay a flat rate of P6.00 for the entire journey from one end of the line to the other, and no fare hikes have been imposed since 1991. The LRT operations are now impaired by an aging fleet of light rail trains. Because of diminished train availability, overloading is common, especially during peak periods of the day.

The PNR operates a commuter train called the Metro Tren, which provides service from Meycauayan, Bulacan in the north to Calamba, Laguna and Carmona, Cavite in the south. The PNR train has deteriorated to such a deplorable state that only about 4 million passengers availed of its services in 1995. Attempts to

upgrade the level of service have not been very successful. The train moves at an average speed of only 25 kilometers per hour due to shoddy maintenance, poor track condition, and the presence of squatters living near the tracks.

In 1995, there were some 100 private bus operators, with a combined fleet of about 7,800 buses plying the primary and secondary streets of Metro Manila. On the average, a regular busload is 60 passengers but this may expand to 100 during rush hours. From 1975 onwards, the government-owned bus company, Metro Manila Transit Corporation dominated the bus service industry until it was dissolved and sold to the private sector in 1994.

Jeepney routes are confined to secondary roads such as radial and arterial roads. No jeepneys may pass through such major roads as EDSA, Roxas Boulevard, and South Superhighway. Normal passenger seating capacity is 15. In 1995, there were some 53,000 registered jeepneys in Metro Manila.

Table 3 shows travel demand by transport mode in Metro Manila. It is estimated that total travel demand, measured in person trips per day, amounts to as much as 18 million. Transport service provided by jeepneys accounted for 44 percent of total transport demand in 1990, indicating a high level of ridership, compared to the other transport modes. However, this share was down from 57 percent in 1985, with buses and private vehicles increasing their shares in 1990.

IMPACTS OF TRANSPORTATION ON URBAN QUALITY OF LIFE

Economic Impacts

Access to Job Opportunities and Markets

As city dwellers continue to lead increasingly more sophisticated lifestyles, their demand for efficient and reliable transport service also grows. They have come to expect a certain level of mobility to serve their needs, in particular, those that pertain to income generation and expenditures. First, they must be allowed to choose from a variety of transport modes that are adequate and affordable to aid them in finding gainful employment. It should be noted that traveling to and from work itself imposes costs which can limit one's opportunities for employment. Once suitable work is found, easy, safe, and reliable access to transport systems is crucial in maintaining employment.

A person's choice of transport mode is a direct function of one's income. For the poor members of society, transportation costs incurred in acquiring the most basic of services such as health services, education, and other social services could translate into large out-of-pocket expenditures. For those living in the

TABLE 3

TRAVEL DEMAND BY MODE OF TRANSPORTATION

	1980	1985	1990
Daily Person trips (in millions)	10.97	13.08	17.65
Mode Share (in percent)			
Private Vehicle	25.6	27.5	30.4
Jeepney	58.5	56.5	44.1
Bus	15.8	15.6	23.6
PNR Commuter Train	0.1	Nil	Nil
Light Rail Transit	--	0.4	1.9
TOTAL	**100.0**	**100.0**	**100.0**

Source: DOTC Planning Service

outskirts of cities and those with limited access to information on employment opportunities, these costs could easily multiply.

As income rises, transportation is also needed to link the buyers of goods and services to their sellers. Indeed, the level of service of these transport systems plays an important role in a person's ability to successfully find work, maintain employment, and spend his or her income accordingly. From the point of view of the producer, an efficient transport system is likewise crucial in keeping production and marketing costs to a minimum.

Opportunity Cost of Time

Household out-of-pocket costs are relatively easy to identify and monetize. Examples of this type of transport cost are vehicle operating costs (i.e. purchases of gasoline, car maintenance costs) and fares on public transport systems. However, a less tangible but nonetheless important cost is the opportunity cost of time spent being idle due to traffic congestion. While opportunity costs vary across different individuals, the fact remains that huge losses in terms of aggregate output result from traffic congestion. Hence, aggregate productivity level is reduced, which could mean higher production costs.

Moreover, frequent incidents of tardiness and high rates of absenteeism among workers make for high employee turnover rates. Individual labor productivity is likewise lowered as workers are exposed to stress due to traveling under tight traffic conditions.

Resource Wastage

Inefficient transport services also result in the actual wastage of scarce productive resources other than labor. Fuel consumption increases dramatically under situations of severe traffic congestion, but the problem with this type of expenditure is that it is unproductive and unrecoverable. The wear and tear or the depreciation cost on the use of motor vehicles also constitutes resource utilization of the worst kind because nothing is being produced in the economic sense.

Effects of the Informal Sector

The encroachment of roadsides, footpaths, bus stops, and sidewalks by informal activities is a reality of urban living. For example, sidewalk vendors, hawkers, and others who are engaged in informal sector activities such as eateries and fruit or vegetable stands enjoy brisk business in areas where foot and vehicular traffic are high. Illegal parking in these areas is rampant and often tolerated, depending on the level of police enforcement. While these informal activities serve a purpose, the traffic efficiency and safety functions of the roads are severely compromised.

Economic Dislocation

Future road projects may require the use of land that is privately owned. Roads that bypass certain neighborhoods can ease traffic congestion. When voluntary sale is not possible, the government may resort to expropriation, which by its very nature is economically and socially disruptive. There is a common notion that the diversion of traffic will result in business losses. Economic costs can be immense, as in the loss of a house or dwelling place (legally owned or otherwise), diminished property values, business slowdown or closure from the loss of clientele, and relocation. However, some activities may simply relocate to the new route, thereby altering land use designs and perhaps undermining the objective of reducing traffic on the new route.

Accompanying social and psychological costs, though difficult to quantify, can even be more devastating. These types of dislocation can find individual manifestations in health problems and psychological disorders.

Social Impacts

Inequity in Mobility

Inequity in mobility among city dwellers is a common feature of urban living. A person's level of mobility is a function of the social class where one belongs. Studies show that poverty and the absence of transport facilities have a

mutual cause and effect relationship (Tolley and Turton 1995). People are faced with barriers to mobility such as little or no access to transport services or high cost of travel. Money is needed to successfully hurdle these barriers, but this may not be possible because of low income.

Another source of immobility is physical disability, exacerbated by financial incapacity. Unfortunately, many parts of Metro Manila are still not planned with the specific needs of the disabled in mind. Provision of well-designed and maintained pedestrian lanes and ramps, and handicapped seating in public transport vehicles can surely enhance urban living for the disabled.

Children and the elderly likewise have special transport needs. For obvious reasons, the very young or the very old cannot travel alone. This can translate to considerable transport costs. In general, as one gets older, health conditions decline and the need for health services is all the more emphasized. Frequency of visits to the doctor or the hospital rises, so the need for reliable transport services is highlighted. Furthermore, the elderly and the young are exceptionally vulnerable to crime and vehicular danger; so transport services must not only be reliable, they must be safe as well.

Where transport is concerned, women can also be placed at a disadvantage. The travel patterns of women have a lot to do with their traditional roles in the home (escorting children to and from school, shopping for groceries) as well as new roles dictated by the needs of modern times (part-time or full-time work). A drawback of these multiple roles among many women is the fragmentation of time. Compared to men, in any given day, women tend to make several localized trips outside the home. Besides, in a one-car household, it is more likely that the man of the house uses the car, usually to get to and from work. Therefore, women's reliance on public transport or private non-motorized transport can further limit the range of activities that can be accomplished during the course of the day. Women are also more vulnerable to crime and traffic danger while on the road.

In any kind of road construction, equity-efficiency trade-offs are always highlighted. While greater access to roads results in greater mobility for motorized transport users, those who have no access to motorization are unduly disadvantaged.

Livability of Communities

In terms of transport services, a community is said to be livable when vehicular traffic is kept to a minimum (Ewing 1995). Motor vehicle traffic volume is not only low; speeds are likewise reduced. Corollary to this, other modes of transportation, especially those which are non-motorized, are encouraged through the provision of exclusive lanes (i.e. bicycle lanes, pedestrian lanes) and other forms of enhancements (i.e. wide sidewalks to encourage walking, provision of trees to provide shade and enhance aesthetics, provision of parking space for bicycles and pedicabs, provision of ramps for easy access by the disabled).

Livability in a certain community also means that residents should be allowed to have easy access to public transportation as much as they are able to use their private vehicles, such that these modes of transportation are deemed to be close, if not perfect substitutes. Many people in Metro Manila refuse to use public transportation mainly because of the poor quality of service. Among the desirable attributes of public transportation are reliability, accessibility, safety, comfort, and convenience. The absence of one or more of these characteristics can greatly influence one's demand for public transportation.

While ease of movement by car is one quality valued by residents, it is not necessarily the most important (Ewing 1995). Other criteria for livability of the neighborhood are protection from heavy traffic, peace and quiet, attractive appearance, and street life, among others.

Community Severance

Roads are built to contribute gains to the public in the form of better access, reduced transport expenses, and wider markets for

local products and services. However, effects on community life may go beyond the direct impacts of road construction. For example, community severance occurs when roads cut through conventional avenues of movements or communication (The World Bank 1996). This is especially true when new paths are created, or existing lanes are widened with the objective of raising traffic speeds and accommodating more traffic flow. Traditional patterns of everyday living and business are disrupted and could be particularly detrimental in thickly populated regions. Another downside of such a development is that substitute routes for localized travel are made significantly longer, directly affecting people engaged in commerce and trade as well as pedestrians. Operators and patrons of non-motorized public or private transport are also disadvantaged. Unfortunately, these are the same people who usually belong to the lower economic echelons of society.

Community severance can also take the form of displacement of traditional modes of transportation. Informal public transport vehicles commonly used in Metro Manila such as (unregistered) jeepneys, pedicabs, and tricycles are affected to a greater degree than their formal counterparts. Restrictions on parking or access to new roads may reduce the attractiveness of these modes, thereby displacing operators. Their patrons are likewise inconvenienced since their choices of transportation modes are restricted.

Lastly, road improvements in most cases raise the value of land in a particular area. This brings to light certain distributional and equity issues that are tied to community severance, as lower-income tenants may be forced out of their rented homes.

Impacts on Public Health and Safety

Poor Ride Quality and Exposure to Crime and Accidents

In Metro Manila, there is a mismatch between demand and supply of transport facilities. A cursory observation of rush hour traffic can give one an indication of the size of this gap. The volume of people needing rides to get home from work and the level of service of public transport could be so removed from each other. When this happens, the public transport user is at the mercy of the provider. Often, in one's desire to get to a destination at a reasonable time, one is forced to endure deplorable ride quality. For example, buses could be packed more than their capacity and poor ventilation is made worse by air pollutants emitted by poorly maintained engines. As an offshoot of buses running at over-capacity, riders are unduly exposed to theft, harassment, and sexual offense.

Perhaps, an even more serious problem arising from this situation is the safety issue. It could be argued that bus companies who allow overloading of passengers are more likely to sidestep other safety precautions. For example, shortcuts in vehicle maintenance could be resorted to in their bid to cut down on costs, making these buses unsafe for public ridership. Bus drivers could tend to be less aware of passenger safety especially during loading and unloading. They could also have a greater propensity to disobey traffic rules and regulations, thus putting people's lives at risk.

Road accidents cause loss of lives, physical injury, and damage to property. They can be a major public health issue especially in developing economies where the road structure, travel speeds, and degree of motorization are rapidly evolving. Exposure to accident risks is greatest for pedestrians as well as non-motorized road users such as cyclists and pedicab drivers and their riders.

Air Pollution

Exposure to polluted air in urban areas is now almost inescapable. Many forms of human activity continue to discharge vast amounts of trace gases and chemicals into the earth's atmosphere. Air pollution due to vehicular emissions has long been recognized as exceptionally hazardous to all living creatures. Despite this knowledge, motor vehicles continue to pollute the earth's atmosphere.

Different types of vehicles emit different types of pollutants. The most common ones are nitrogen oxide, carbon monoxide, sulfur dioxide, suspended particulate matter and

lead. Exposure to these pollutants may have serious health consequences.

Noise Pollution

Traffic noise can be broadly classified into three: *(a)* vehicle noise arising from the engine (usually poorly maintained), transmission, exhaust, or suspension; *(b)* rolling noise as tires create friction with the road; and *(c)* noise generated by drivers, especially the honking of horns. Vehicle noise is loudest during acceleration or engine braking, on upgrades, and on rough roads. Rolling noise occurs when vehicles are at high speeds or during quick braking (The World Bank 1994).

Noise is a spill-over effect that can be a constant source of irritation to those who live near streets or roads undergoing construction. It can also be particularly distressful to those who live near airports. Furthermore, how one perceives noise is affected by the background noise level. The noise created by a single passing truck in the middle of the night could be more irritating than that which is normally created by many motor vehicles in a busy commercial district during the day.

The physical discomforts arising from noise are difficult to measure and evaluate, for different noise levels can have varying effects on individuals. Usually though, noise may cause auditory fatigue and temporary hearing impairment.

Effects on Stress

Traffic congestion can have different effects on human behavior. Some are able to adapt to it with hardly any difficulty, posing little or no threat at all to their well-being. Some are able to successfully adapt by changing their work patterns. Whenever possible, they avoid being caught on the road during rush hours. Streets that are known to be clogged at certain hours of the day are also shunned. With modern telecommunications and electronic equipment, some are even able to do work while stuck in traffic.

However, more and more people who live in rapidly evolving cities are more likely to feel the negative effects of traffic congestion. Studies have shown that there is a significant interdependence between traffic congestion and rapid heart rates, high blood pressure, and electrocardiogram irregularities. Moreover, chronic exposure to traffic congestion tends to increase negative mood states, lower tolerance for frustration, and lead to more impatient driving habits (USGAO 1989).

Based on these findings, it would be easy to postulate that there is a strong correlation between the severity of traffic conditions and aggressive behavior. There have been many reports of driver altercations, ranging from minor injuries to more violent and sometimes fatal consequences. However, there has been no definitive study that shows the relationship between traffic congestion and aggressive behavior. While there might be studies linking stress and aggression, there is little to suggest what the effects of constant exposure to transport-related problems might be on human stress.

Impacts on the Physical Environment

Visual Intrusion

Preserving the visual attractiveness of the surroundings must be an important consideration when planning and designing road developments. Roads should enhance the natural beauty of the environment. A good road design should satisfy the criteria for functionality without sacrificing aesthetics. Some cities have been successful in this regard, creating so-called "scenic routes" which attract visitors by making the journey as much a tourist attraction as the destination (The World Bank 1994).

Road systems alter the natural and visual equilibrium of the environment. For example, a road which does not follow the natural relief and morphology of the land can have a very jarring, sometimes unsightly effect on the surroundings. This could mean massive cut-and-fill earthworks that would clash with the intrinsic topography of the area. Other negative impacts of road construction on the environment are the rerouting of water channels, deforestation, and the destruction of greenways or shrubbery. Therefore, the negative effects of a poorly designed road can range from simply blocking

w to more serious or irreparable damage as of historical, archaeological, and l interests.

s on Flora and Fauna

ıe effects of road construction on plant ıimal life are both direct and indirect. The self is a direct disturbance to the natural ıment. In other cases, roads can be an ıtive factor in the environment, particuhen they increase accessibility to areas ısly untouched by human activity. For ːe, roads can bring people closer to flora and fauna especially when natural ıre preserved right within the heart of an ənvironment.

direct impacts, however, can be more ing than helpful. Due to modifications in systems, plants and animals, especially life, may not thrive in their new envi- ıts. Diseases that kill vegetation and s may easily come from vehicles and (The World Bank 1994).

discussed earlier, motor vehicle emis- damage the earth's atmosphere. Global ıg, a result of the destruction of the ozone layer, is raising sea levels and ıg vegetation the world over. Agricultural ields are reduced, arable lands coastal ıundated, and forests destroyed. Lastly, a more acidic precipitation, the balance ənjoyed in aquatic ecosystems is now ıpset.

Modification and Soil Erosion

ɔpe stability can be affected as a result d construction. Road construction can deemed as an intrusion because water ıre often modified, which results in poor- nage, water pollution, loss of water for and farming purposes, and damage to d wildlife (The World Bank 1994). Indi- plant growth can also be harmed in the s, which in turn increases susceptibility ling and landslides. Furthermore, metals s chromium, lead, and zinc emitted by s over time can contaminate soil and e roadside soil and plants.

TRANSPORT POLICIES IMPLEMENTED BY THE RAMOS ADMINISTRATION

Increase Investment in Transport Infrastructure

One cause of traffic congestion is the imbalance between demand for and supply of transport facilities. In Metro Manila, the expansion of road capacities to levels that are economically and environmentally sustainable is a major concern of the government. However, transport projects are characterized by high up-front costs and uncertain revenue streams, which can render the project financially not viable. Infrastructure funds are almost always not enough to finance proposed projects and the required maintenance of completed public works (Nemoto and Villoria 1995). There are many long-term, well-designed infrastructure plans waiting to be implemented, but the funds are not forthcoming. This is especially true for countries with low tax revenues like the Philippines.

Therefore, it is worthwhile to look into possible public-private cooperation in infrastructure building. One such project is the ongoing EDSA-MRT (Mass Rapid Transit), financed through the Build-Operate-Transfer (BOT) scheme. The private sector was enjoined to participate in infrastructure building and no government funds are being spent. This frees up government resources for other productive uses.

However, BOT projects, are not without disadvantages. Negotiations with potential investors in such joint ventures can be an involved process and are susceptible to political controversies (Villoria 1996). Also, based on past experience on the LRT Line 1, mass transit projects like the EDSA-MRT may not be financially viable. While revenues might be sufficient to cover operating and depreciation costs, they are not able to cover financing charges or debt-servicing fees. This is because of heavy subsidies or failure of fares to capture the true cost of transportation. Due to the long-term nature of mass transit projects, financial non-viability can pose serious threats to its sustainability. This could backfire on the government when the time to transfer the management of the MRT comes.

Enhance Transport System Management

In the field of traffic engineering, Transportation System Management (TSM) measures may be used to ease traffic flow. These measures include: *(a)* widening of roadways and intersections, *(b)* on-street parking prohibitions, *(c)* synchronization of traffic signal operations, *(d)* implementation of one-way street systems, *(e)* installation of reversible lanes, *(f)* turning movement prohibitions, *(g)* designation of exclusive lanes for buses and other high-occupancy vehicles, and *(h)* designation of truck routes (Villoria 1996).

All of the above measures were, at some point in the past, wholly or partly implemented. Some are on-going but they have exhibited varying degrees of success. For example, a truck ban is strictly imposed along EDSA from 6:00 a.m. to 9:00 p.m. during weekdays. This ban is likewise imposed along other major roads during rush hours or from 6:00 a.m. to 9:00 a.m., and 5:00 p.m. to 9:00 p.m. Reversible lanes are also in place to address the imbalance in traffic on some two-way roads during certain periods of the day. For instance, outbound traffic from residential areas could be very heavy during morning peak hours while in-bound lanes are virtually empty. To alleviate congestion, in-bound lanes can partly be used by outbound traffic during this period. The reverse scheme can be executed during afternoon and evening peak hours. Safety becomes an issue in these schemes, thus proper warnings and dissemination of information are very important. Examples of these reversible lanes are Commonwealth Avenue in Quezon City, Magsaysay Boulevard in Manila and Arnaiz Road in Makati.

For a more efficient flow of traffic, some roads have been converted to one-way systems. An example is the Elliptical Road around the Quezon City Memorial Circle. Many two-way streets in the business districts of Makati, Manila, and Pasig have been converted to one-way streets. A natural consequence of this scheme is that, distance-wise, longer travel is expected from one point to another. However, the savings in time can compensate for the increase in distance traveled.

The use of designated lanes by buses and jeepneys has been implemented, especially along EDSA. However, execution has been less than successful. Strict enforcement is crucial in order to derive the greatest benefits from this scheme.

Reduce Travel Demand

While supply-side measures such as building more roads, flyovers, and mass transit systems are important, these measures are insufficient and, sometimes, shortsighted. It is likewise necessary to study the demand side of traffic congestion. Transportation Demand Management (TDM) measures are potent tools in alleviating traffic congestion. Among the TDM policies implemented by the Ramos administration are: *(a)* encouragement of flexible activity scheduling through the use of staggered work hours, and *(b)* restraints on vehicle usage through traffic restriction by vehicle type.

Many private companies in Metro Manila have adopted flexible working hours so workers need not come in and leave all at the same time. Factories operate on staggered schedules whose start and end times do not coincide with rush hours. There is also some effort among schools to implement different opening and closing times. Some have even opted to hold classes based on a five-day week instead of the usual six-day week. For instance, the University of the Philippines Diliman Campus does not hold classes on Wednesdays. Miriam College does the same on Fridays. This somewhat alleviates traffic congestion along Katipunan Road during these days.

An example of the restraint imposed on vehicle usage is the Unified Vehicular Volume Reduction Program. The current form of this scheme is a product of two earlier vehicular volume reduction policies, namely, the color-coding and the odd-even schemes. The color-coding scheme called for the issuance of colored stickers to signify compliance to the once-a-week carless day restriction. However, this was met with opposition due to the compulsory purchase of these stickers. Under the odd-even scheme, vehicles with license plates

ending in odd numbers were banned from certain high traffic volume roads on Tuesdays, Thursdays, and Saturdays during rush hours. The same restrictions applied to those with car plates ending in even numbers on Mondays, Wednesdays, and Fridays.

Implemented in mid-June of 1996, the current program curtails usage of motor vehicles on all streets of Metro Manila from 7:00 a.m. to 7:00 p.m. on designated days. Currently, a ban is imposed on vehicles whose license plates end in 1 and 2 on Mondays, 3 and 4 on Tuesdays, 5 and 6 on Wednesdays, 7 and 8 on Thursday, and 9 and 0 on Fridays. There are no restrictions during Saturdays and Sundays. Effectively, no vehicle will be allowed on the streets one day a week from 7:00 a.m. to 7:00 p.m.

Enhance Public Transport Services

Public transport must be viewed as a safe and comfortable mode of transportation. A good bus service must have the following elements:

- Dense service headways to reduce waiting and transfer times.
- Express bus services to achieve short journey times over longer distances.
- Modern vehicles with adequate seating, sufficient engine performance, and design and arrangement of doors to allow rapid boarding and alighting.
- Reliable service through high standards of maintenance and repair.
- Passenger information system concerning route network, timetables, and fares.
- Distinctive arrangement of stops with shelters, seating, and passenger information.

When conventional public transport systems do not meet the above criteria, there is a need to raise quality as well as quantity. New forms of transport services have evolved as an answer to the insufficient supply of public transport services. This can be observed through the proliferation of informal carpooling or vanpooling services such as the "Tamaraw FX." Though not all service providers register with the Land Transportation Franchising and Regulatory Board (LTFRB), traffic law enforcers tend to turn a blind eye on them. Commuters are often willing to pay a price higher than ordinary bus fares in exchange for the safety and comfort these alternative modes provide. They could also avoid the stress and worries of driving through congested streets and of finding a suitable parking space.

RECOMMENDATIONS

Policies implemented by the Ramos Administration in the transport sector have been geared towards the alleviation of traffic. Efforts are directed towards travel demand management (improving traffic flow, reducing travel demand) and the like. However, certain policies which are directed specifically towards improving quality of urban life should also be looked into.

Control Vehicular Emissions

To arrest the continuing damage that transport-related pollution has wreaked on the environment, the use of less pollutive fuels must be encouraged. A differential tax structure that favors unleaded gasoline over the leaded variety can be an effective means of promoting the use of cleaner fuels. Surcharges based on the concentration of lead in gasoline or sulfur in diesel may also be slapped on consumers (Villoria 1996). When the user bears the tax burden, as in the case of these consumption taxes, user demand for gasoline is more likely to be elastic. These policies, therefore, have great success potentials in shifting people's consumption patterns.

In their efforts to lower vehicle emissions, some developed economies have studied the feasibility of using alternative fuels such as reformulated gasoline and diesel, methanol, ethanol, vegetable oils, compressed natural gas, liquefied petroleum gas, and synthetic liquid fuels. Unfortunately, the cost of using these alternative fuels is still too prohibitive.

Cleaner vehicles refer to those which are equipped with exhaust treatment devices such as catalysts and traps or those which have been retrofited with emission control devices. It is ordinary among developing countries to see old and poorly maintained vehicles still plying the streets of metropolitan cities. The importation of second-hand trucks

and buses is also common; this therefore warrants the need to modernize an aging vehicle fleet by discouraging importation of substandard vehicles. The government can also redirect its policies toward promoting the use of less pollutive modes of transport such as electric-powered rail transit systems, cars or buses, and non-motorized travel modes.

Instead of imposing taxes, an equally powerful tool towards pollution control could be the use of incentives. Tax deductions may be enjoyed by those who retrofit their vehicles with emission control devices. From the enforcement side, the government can pass more stringent vehicle emission legislation and adapt a more vigilant stance against violators.

Integrate Land Use and Transport Policies

One way to improve accessibility within the urban area is by ensuring that land use and transport policies are not conflicting. Strategic land use and transport planning need to be implemented. Specific areas of integration can be determined such as the issue of parking. For instance, the provision of private parking could be made compulsory for newly built residential structures to avoid street parking. The local government can also restrain central city growth and guide the location of traffic-generating land uses in another area of the city. For example, it is desirable to reduce one's need to travel by ensuring that one's home, place of work, church, and other social facilities are within reasonable reach. The promotion of non-motorized travel such as cycling and walking, or by public transport must also be welcomed and kept in mind when drawing up land use plans.

Implement Other Travel Demand Management Policies

Other TDM policies worth looking into are: *(a)* restraints on private vehicle ownership through vehicle quota systems, registration fees, license fees, and purchase taxes; *(b)* restraints on vehicle usage through parking restrictions, gasoline tax, road congestion pricing, parking fees, road tolls, and carbon tax; *(c)* promotion of use of high occupancy transport modes through public transport service improvements, traffic priority for public transport, use of high occupancy vehicle (HOV) lanes, park and ride facilities, carpooling, and reduced transit fares; and *(d)* promotion of non-motorized transport through the use of bicycle and pedestrian lanes.

It should be noted though that any policy hinged on the curtailment of private vehicular ownership or usage can be unpopular because it imposes restrictions on individual freedom. Such policies can only be truly effective if the substitute, which is public transportation, is acceptable. Otherwise, the resistance is justified.

It is very clear that traffic management policies which give preferential treatment to public transport modes over private ones are essential to the abatement of traffic congestion. More should be done to promote the use of public transport. In connection with this, adequate pedestrian and station facilities must also be provided. The grave inadequacy of such facilities attest to the secondary and casual attention bestowed on pedestrians and public transport users.

CONCLUSION

Transportation is an essential part of urban living. It affects all people, regardless of social class. In this paper, there was an effort to look into the different transport-related impacts on the quality of life in cities and urban areas. These impacts were classified according to who or what might be affected the most such as those affecting people's economic and social well-being, public health and safety, and effects on the physical environment.

It was found that while the transport industry has grown in leaps and bounds and, in the process, has provided people with greater access to mobility, there could be externalities which can negate the gains made by such improvements in transport technology. The effects of air pollution and stress on human health are particularly bothersome. For a long time now, there has been worldwide recognition of their grievousness, and yet the damage they bring continues to this day.

Measuring transport system performance was also discussed to operationalize such fa-

vorable qualities as reliability, accessibility, and safety. There is indeed a strong relationship between transport system performance measures and urban quality of life indicators. The government has to decide the level of transport service people must have access to. Once this is determined, there is a need to look into specific policy interventions that can help achieve this level of service. These policies can be pro-active (as in the case of demand-driven solutions to traffic congestion) or reactive (usually as the public and private sectors view current transport problems from the supply side). Definitely, no amount of planning can compensate for the lack of funds allocated to infrastructure development. Political will is required in implementing policies that promote the use of public over private transportation and measures that help control motor vehicle emissions.

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CITY SIZE AND CITY EFFICIENCY OF SELECTED PHILIPPINE CITIES[1]

Bernardino A. Atienza Jr.

INTRODUCTION

The role of cities has been amply discussed in the literature. According to Dwyer (1972), cities have been traditionally viewed as centers of economic and social development, the principal center of change and growth in industry and commerce. They are the focal point of a country's urbanization and play an important role in national and regional development. They also provide the higher services to the rural sectors of the economy.

Hoselitz (1970) traced the historical functions and roles of cities. According to him, during the early times and Middle Ages, cities played a predominantly non-economic role, like a religious or cult center, or a political administrative center, or a central place of protection. The city with principal economic functions is a rather late development—a consequence of the successful development of non-economic roles. Examples of this are mining towns, manufacturing centers and commercial towns in Asia, Africa, and Latin America.

In the Philippines, city roles and settings differ greatly. From 1901 to 1972, 61 cities were created through a "special act charter." No basic criteria for cityhood were laid down to comply with, e.g., minimum population or revenue. The word *city* therefore did not mean an urbanized municipality characterized by high population density and degree of socio-economic development. Today, cities in the Philippines are more of geographic units which have been granted autonomous status through charters passed by Congress (LGC 1972). Yet, most of these cities have remained dependent on the national government. Many have never achieved a high degree of economic development.

It was only in 1983 when the Local Government Code (LGC) was enacted that requirements for cityhood were specified. New cities must have a population of at least 100,000 and revenues of at least 10 million pesos for three consecutive years. Subsequently, the 1991 LGC prescribes that a new city must have a population of at least 150,000 and revenues of 20 million pesos for the last two years. Besides creating uniformity among cities, these criteria have implications on the economic role of cities.

Both the 1983 and 1991 LGC define a city as a "general purpose government for the coordination and delivery of all basic, regular, and direct services and effective governance of the inhabitants within its territorial jurisdiction."

Population is a major demographic factor in that a change in size may probably affect the economic growth of an area. Migration, natural increase, and reclassification of political units are among the factors that lead to changes in population. A continual increase of population leads to urbanization and structural transformation. Through this process, the municipality eventually evolves into a city.

According to the 1995 census, the country's total population was 68 million. From a population of 7.6 million in 1903, the average annual increase was estimated at 2.3 percent.

[1] This article is an abridged version of the author's thesis submitted to the University of the Philippines, Diliman in partial fulfillment of the requirements for the degree of Master of Arts in Urban and Regional Planning in 1998.

The level of urbanization, or the proportion of population living in urban areas, rose from 27 percent in 1948 to 48 percent by 1990. It was estimated that in 1995, 50 percent of Filipinos (around 34 million) were living in urban areas. It should be noted that the rate of population increase in urban areas is going up while the rate of increase of rural population is going down.

At the regional level, the same pattern was observed from 1960 to 1990. Cities and regional centers rapidly increased in size, e.g. Cebu tripled its size, Davao increased almost fourfold, and Cagayan de Oro fivefold.

These rapid increases in secondary city size reflected a lessening of the dominance of Metro Manila. While the population growth of these key regional cities accelerated, the population growth of Metro Manila decelerated from 4.8 percent a year in the 1960s to 2.6 percent during the 1980s.

Various factors could be attributed to these trends. These factors include government policy interventions like industrial location controls for Metro Manila, investment incentives for regions outside the National Capital Region (NCR), the establishment of export processing zones, integrated area development, counter magnet strategy, and infrastructure development outside NCR. While some policy makers look at these policies as ineffective or misdirected because of the continuing primacy of Metro Manila, cities outside the NCR have posted substantial growth in manufacturing and tertiary sectors.

In terms of economic growth, data from the National Statistical Coordination Board (NSCB) revealed that from 1946 to 1995, the Gross Domestic Product (GDP) was steadily increasing. Closer observation showed that the share to total production of the non-agricultural sectors, particularly manufacturing and tertiary services, was increasing. Although it is not conclusive that GDP growth was a result of increasing urbanization, what is noteworthy is that manufacturing and tertiary services were mostly found in urban areas. For example, from 1992 to 1996, the NCR contributed 32 percent to the GDP. The remaining 68 percent were shared by the 13 regions, each produced not more than 10 percent except for Region IV, which contributed 15 percent.

Considering that the urban population has risen nearly 50 percent, Balisacan, et al. (1994) claimed that rapid urbanization has not been supported by robust economic growth and structural transformation. It is therefore interesting to assess whether the unprecedented urban population level has substantially broadened economic activities and opportunities in cities.

STATEMENT OF THE PROBLEM

This study was undertaken to find out if growth in an urban economy was influenced by growth of the urban population. It sought to determine the relationship between city size and number of secondary and tertiary establishments, average employment size per establishment, and gross value added as indicators of efficiency.

Specifically, the study addressed the following problems:

1. Is there a relationship between city size and number of secondary and tertiary establishments, average employment size per establishment, and value added in the country?
2. What relationship, linear or non-linear, exists between the city size and the number of secondary and tertiary establishments, average employment size per establishment, and gross value added?

REVIEW OF RELATED LITERATURE

Certain indicators of production scale, efficiency and structure were found to be a function of, or influenced by, city size. These include per capita income, labor productivity/ production, shifts in employment and industrial activities, and technology. These factors may serve as indicators of a city's efficiency. The related literature below could provide an understanding of the relationship of city size and economic activities.

Alonso (1970) cited a broad observation with regards to urban size. He observed that in almost every country, there was a strong rise in per capita income or output with an increase in urban size. Data from West Germany and Japan showed that the Gross Regional Product per capita (index) rose with increasing urban size.

Alonso also stressed that productivity increases with size because the latter is a mea-

sure of the opportunities to which an inhabitant or enterprise has access. Per capita income is also strongly correlated with population pctential, which is a mathematical measure of the accessibility available to residents of the city to the rest of the country.

According to the studies of Ornati and Burns, income is generally more evenly distributed in a larger metropolis than a smaller one, which is contrary to the popular impression due to a large concentration of poverty in larger areas. In general, all indicators such as education, skill levels, and the proportion of the population above the poverty level, rise with urban size (Alonzo 1970).

Hansen (1975), citing Alonso and Schnore, showed that per capita income rises as the size of the city increases. One reason is that a person resides near areas of opportunity, which are mostly cities. Alonso noted that proximity to opportunities is directly related with per capita income. This is also the same with the externalities benefiting firms. Higher wages encourage the workers to leave smaller places in exchange for money and psychological income.

Mera's (1980) theory summarized the different findings related to the economics of city size, such as productive efficiency of cities, and service functions of cities to hinterlands. It was found that per capita product increases with city size but with a diminishing rate. He assumed the following power function as:

$$Y_U = aU^b_I, \qquad a>0,\ 0<b<1$$

where,

y_U is per capita product of city U_I,
U_I is the population size of city U_I, and
a and **b** are constants.

According to Puryear (1977), there are two major types of benefits associated with urban size. The first is greater productivity. According to Sveikauskas, whom Puryear quoted, the measure of productivity was achieved with the production function approach, when a doubling of urban size results in an increase in the productivity of labor by roughly six percent. This relationship is observable in any urban size class. Larger urban areas are more productive by a substantial margin. For instance, Puryear observed that labor productivity in Chicago was 25 percent greater than Tulsa, Oklahoma. Such higher productivity of large urban areas commands higher wage payment. The second benefit is greater variety or diversification of economic activities. The larger the population, the greater the tendency of the local economy to be more diverse. However, population size at a certain level could create diseconomies.

Shafer (1977) suggested that a growth in population in an area might not reflect growth in the economy of that area. If the increase in population is a result of the increase in the productive areas of a community, then a rise in population may be regarded as a somewhat more reliable indicator of growth. An increase in the productive sector of the economy may be in manufacturing, as in the experience of auto and steel industries in the middle and late 1800s and early 1900s. Or it may reflect an increase in the productivity of the service sector such as financial districts and money centers. As a result, the benefits increase to the point of attracting larger labor pools of certain characteristics demanded by the growing economic sector.

Berry (1977) claimed that the efficiency of a city is a result of its centrality and concentration, which makes it able to facilitate production due to available markets and efficient management of inputs. An example is the relatively high wages that attract a more productive labor supply, which further increase the city's size.

UNCRD (1974) studies on three Asian countries suggested that cities of varying population from less than 100,000 up to one million or more vary in terms of employment and economic activities, from agriculture and related activities to small scale manufacturing and producer-oriented commercial and services sector. On the other hand, Rondinelli (1982) made some generalizations on the economic and social characteristics of middle-size cities. While the populations of South Korean cities increased, drastic changes occurred in the economic structure of secondary cities such as increase in manufacturing and commercial employment.

Bryce (1977), Rich (1982), and Solomon (1980) agreed with these findings. The

increase in population of major cities (e.g. in the U.S. and Australia) led to a corresponding increase in employment and activities in the manufacturing or industry sector. Later, as the population continued to increase, these sectors declined in employment and activities. This later gave way to an increase in activities and employment in the tertiary and administrative services.

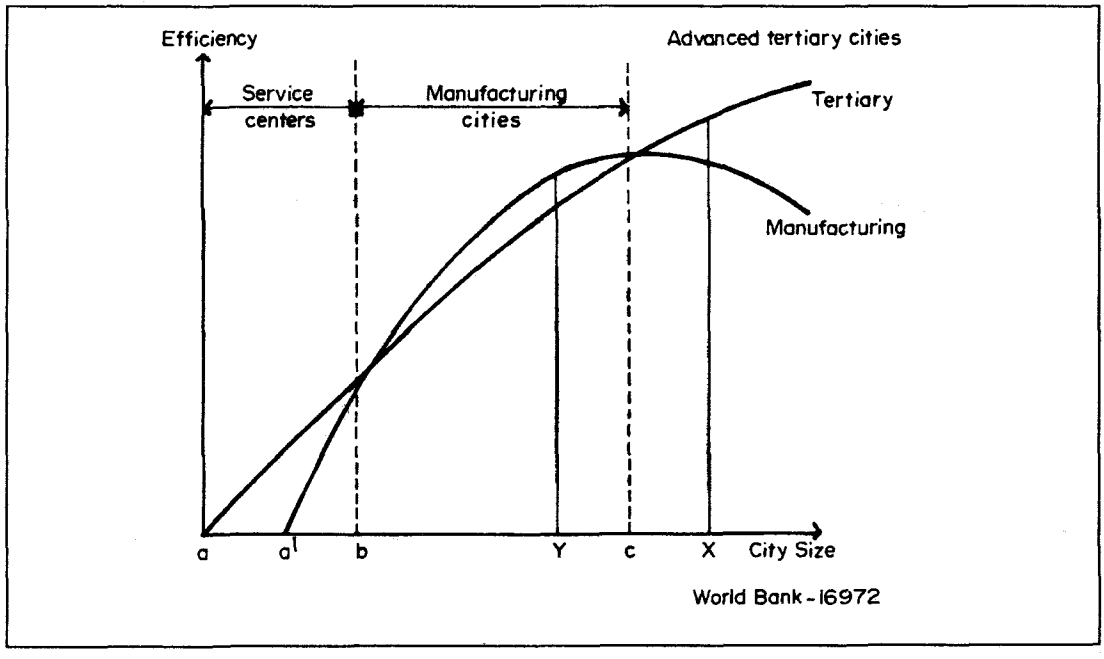
According to Knox (1994), many scholars believe that the larger the cities, the higher or greater the innovations that are produced or adopted. Hence, city size is a function of the probability of successful diffusion of innovations to a particular city.

Except for Alonso's study, most of the studies have no empirical evidence. His contribution is a significant basis of this study. Empirical studies on city size and labor productivity are important. Aside from these, Alonso also suggested that research on pathological conditions on mental health variations, and rise in mortality, morbidity, and crime in relation to urban size would be of great value.

CONCEPTUAL FRAMEWORK

Based on the review of related literature, a change in the level of a city's population may result to a change in the composition of the city's economic activities. Lo and Salih (1978) described that the urban sectoral efficiency of cities rises as city size increases. The assumption here is that the urban sector is composed of two complementary sectors—manufacturing and service. The level of manufacturing increases as city size increases, but beyond a certain optimum level, manufacturing efficiency will decline. The manufacturing sector curve then takes the form of an inverted *U*. For the service sector, efficiency continues to increase with the level of city size though ultimately at a decreasing rate. The tertiary sector is directly related to an increasing city size as it intercepts at zero, showing that the efficiency of cities in the tertiary sector depends on its population size. This is shown in Figure 1. Harry (1975) supported this empirical validation and claimed that some economic phenomena, e.g. urban services, are a direct function of city size itself.

Figure 1
URBAN SECTORAL EFFICIENCY AND CITY SIZE



The graph showing city size on the x-axis and urban sectoral efficiency on the y-axis can be expressed in a statement: **city sectoral efficiency is a function of city size**. (Figure 2). With city size as the independent variable, this could be stated in a relationship formula:

City sectoral efficiency = f (city size)

Figure 2
FLOW OF THE CONCEPTUAL FRAMEWORK

Level	*Independent Variable*	*Dependent Variable*
Theoretical →	City Size →	City Efficiency
Conceptual →	City Population Size →	Efficiency Indicators
Operational →	City Population Size →	Number of Secondary Establishments
	City Size →	Number of Tertiary Establishments
	City Size →	Average Employment Size
	City Size →	Ratio of Tertiary Establishments
	Urban Population →	Industry Value Added
	Urban Population →	Service Value Added

Urban sectoral efficiency, as assumed for this theory, is the net output of the utilization and management of all the inputs or resources for productive purposes, such as human resources, capital, land, and technology. It is a measure of a city's production or growth such as gross value added, revenue/income, and productivity. However, since these indicators are not available at the city level, available indicators such as the number of secondary and tertiary establishments, average employment size per secondary and tertiary establishment, ratio of tertiary establishments to the total establishments, and ratio of tertiary employment to total employment in the city shall be used.

The number of establishments can be considered as a measure of efficiency, since additional establishments provide more production and supply of goods and services in response to market demand. It also creates additional employment and revenue and is able to respond to or create opportunities (Alonso 1970; Puryear 1977). Average employment size per establishment shows the scale of production and size of establishment. The ratio of tertiary establishments and employment describes the change in the economic structure of the city, while gross value added indicates the production of industry and service sectors of the urban area.

Applying the above formula to the available data, city size represents the city's population while city sectoral efficiency is represented by the number of establishments or average employment size per establishment in the secondary or tertiary sectors. Thus, the relationships of independent and dependent variables are expressed as:

1. Number of secondary establishments = f(city size)
2. Number of tertiary establishments = f(city size)
3. Average employment size = f(city size)
4. Ratio of tertiary establishments to total establishments = f(city size)
5. Ratio of tertiary employment to total employment = f(city size)
6. Industry value added = f(urban population)
7. Service value added = f(urban population)

These models assume that city population size influences the location of establishments and business operations in an urban economy. Existing and new establishments can sufficiently meet the demand for goods and services of the population, and at the same time, generate profit to sustain their businesses. This is also

based on Goodal's (1972) claim that the size of an urban area is positively correlated with the number of economic activities which locate within it.

Empirical Model

The hypothesized relationship was tested against available cross-sectional data using variants of the following simple and parabolic models:

$$Y = a + b_1X \quad : \quad \text{LINEAR MODEL}$$

$$Y = a + b_1X + b_2X^2 \quad : \quad \text{QUADRATIC MODEL}$$

Applying these models yield the following equations:

1. $NSE = a + b_1P$	for the manufacturing sector
2. $NSE = a + b_1P + b_2P^2$	
3. $NTE = a + b_1P$	for the service sector
4. $NTE = a + b_1P + b_2P^2$	
5. $AvEmp = a + b_1P$	for average employment size
6. $AvEmp = a + b_1P, + b_2P^2$	
7. $RTE = a + b_1P$	for ratio of tertiary establishment or employment
8. $IVA = a + b_1P + b_2P^2$	for gross value added in industry
9. $SVA = a + b_1P + b_2P^2$	for gross value added in services

Where:

- **NSE** is the number of establishments in the secondary sector.
- **NTE** is the number of establishments in the tertiary sector.
- **P** is the city size or the population of the city/urban population.
- P^2 is the square of city size/population.
- **AvEmp** is the average employment size.
- **RTE** is the ratio of tertiary establishments to total establishments (also ratio of tertiary employment to total employment).
- ***a*** is the intercept.
- ***b*** and ***c*** are the coefficients.

These equations were applied to the 34 urban areas including Metro Manila. The use of 0-intercept was also tested.

Analytical Method

Population data of 34 urban areas were used in the study as well as the number of establishments and average employment size for the secondary and tertiary sectors. The study areas included 33 major cities and Metro Manila (treated as a single urban area). Data sets for 1990 and 1995 were utilized to provide a better understanding of the problem. As of 1995, these cities had at least a total of 1,000 establishments, except for the cities of Puerto Princesa and Cavite that serve as examples of a provincial center and an export processing zone, respectively.

Average employment size per establishment was derived by dividing the 1995 Actual Total Employment (ATE) by the 1995 Number of Establishments for each sector. The ratios of tertiary establishments to total establishments and tertiary employment to total employment were also derived by regression with data on city size. All the data were sourced from the National Statistics Office.

Cross-country data were lifted from the World Bank's Selected World Development Indicators. Particularly, urban population and gross value added in industry and services of 133 economies grouped into four major divisions were regressed to determine their relationship. The findings support the earlier regression on city size and number of secondary and tertiary establishments. City size was the independent variable while the number of establishments, average employment size for secondary and tertiary establishments, and ratio of tertiary establishment and employment were the dependent variables. For cross-country data, urban population was the independent variable while gross value added in industry and services were the dependent variables.

The theoretical framework was tested using data on Philippine cities. Simple linear regression analysis was used using Microsoft Excel 97.

RESULTS AND INTERPRETATION

Table 1 shows the list of cities with their respective population sizes and number of establishments in 1990 and 1995.

Statistical Results

City Size and Number of Secondary and Tertiary Establishments, 1990 and 1995

Results of the quadratic, linear, and double log regressions for city size and number of establishments for 1990 and 1995 are summarized in Tables 2, 3, 4 and 5.

Summary of Quadratic Regression Results

The high R^2 arrived at and the highly significant t-values in most of the quadratic regressions imply that the parabolic equation of NSE or NTE = a + bP + cP^2 is a good fit. It also shows that the independent variable city size or *P* significantly explains the large proportion of the variations in the dependent variables NSE and STE. These show a high confidence in a positive relationship between the two variables. It is generally observed that as city size increases, NSE and NTE also increase.

Table 1
POPULATION AND NUMBER OF SECONDARY AND TERTIARY ESTABLISHMENTS BY CI

CITY	POPULATION		NUMBER OF ESTABLISHMENTS			
			SECONDARY		TERTIARY	
	1990	1995	1990	1995	1990	1995
Angeles	236,686	234,011	502	381	3,533	3,395
Bacolod	364,180	402,345	440	405	3,375	4,424
Baguio	183,142	226,883	310	371	3,999	4,011
Batangas	184,970	211,879	198	274	1,320	2,131
Butuan	227,829	247,074	400	361	1,662	1,596
Cabanatuan	173,065	201,033	269	342	1,367	2,681
Cagayan de Oro	339,598	428,314	454	669	2,853	4,788
Cavite	91,641	92,641	117	111	764	806
Cebu	610,417	662,299	1,558	1,580	6,996	8,829
Cotabato	127,065	146,779	147	158	1,302	1,188
Dagupan	122,247	126,214	264	421	1,609	2,757
Davao	849,947	1,006,840	1,242	2,161	6,658	11,816
Dipolog	79,887	90,777	152	199	898	1,170
Dumaguete	80,262	92,637	85	159	573	1,039
Gen Santos	250,389	327,173	482	514	1,922	2,514
Iligan	226,568	273,004	304	290	1,685	1,366
Iloilo	309,505	334,539	422	515	2,864	4,222
Laoag	83,756	88,336	724	715	1,028	1,534
Lapulapu	146,194	173,744	204	253	406	460
Legaspi	121,116	141,657	121	125	907	1,081
Lipa	160,117	177,894	337	307	1,739	1,695
Lucena	150,624	177,750	252	386	1,380	1,867
Mandaue	180,285	194,745	517	481	856	1,011
Marawi	91,901	114,389	140	158	1,067	1,188
Naga	115,329	126,972	223	272	1,509	2,093
Olongapo	193,327	179,754	391	304	2,270	2,199
Pagadian	106,307	125,182	208	281	1,593	3,190
P. Princesa	92,147	129,577	121	130	679	875
Roxas	103,171	118,715	274	283	905	1,337
San Pablo	161,630	183,757	320	397	1,513	1,963
Surigao	100,379	104,909	134	167	775	1,008
Tacloban	136,891	167,310	207	189	1,184	1,250
Zamboanga	442,345	511,139	433	444	2,269	2,865
Metro Manila	7,907,386	9454,000	14,976	18,738	80,348	107,356

Source: Number of establishments by employment size (unpublished), Industry and Trade Statistics Dept., National Statistics Office

Table 2
SUMMARY OF REGRESSION RESULTS, CITY SIZE AND NUMBER OF SECONDARY ESTABLISHMENTS, WITH AND WITHOUT METRO MANILA, y AND 0 INTERCEPTS: 1990 and 1995

I	Model	a	t-test	b_1	t-test	b_2	t-test	R	R^2	AR^2	F-test	Trans
	Non-Linear											
y	1990	41.37	0.816	0.00153	7.43	4.50E-11	1.76	0.9978	0.9956	0.9953	3543.53	0.9961
y	1995	-30.2	-0.547	0.0019	9.68	1.03E-11	0.507	0.9983	0.9966	0.9964	4606.19	0.9961
	Non-Linear											
0	1990			0.00167	13.77	2.86E-11	1.83	0.9978	0.9956	0.9641	3580.65	0.9961
0	1995			0.0018	15.656	1.89E-11	1.534	0.9983	0.9966	0.9652	4709.19	0.9961
	Linear											
y	1990	-29.29	-0.9136	0.0019	81.53			0.9976	0.9952	0.9951	6646.98	0.9959
y	1995	-52.24	-1.55	0.002	97.11			0.9983	0.9966	0.9965	9430.97	0.9959
	Linear											
0	1990			0.0019	85.79			0.9975	0.9951	0.9648	6676.6	0.9958
0	1995			0.002	99.49			0.9982	0.9964	0.9661	9044.8	0.9958
	Double Log											
y	1990	-3.04	-6.57	1.92	10.34			0.8773	0.7697	0.7625	106.94	0.7486
y	1995	-2.82	-5.91	1.83	9.61			0.8618	0.7427	0.7346	92.35	0.7486
	Double Log											
0	1990			0.6989	94.42			0.6774	0.4589	0.4286	27.98	0.4603
0	1995			0.71	98.63			0.6795	0.4617	0.4314	28.30	0.4603

I = Intercept
Trans = Transferability = (1990R + 1995R) / 2

Table 3
SUMMARY OF REGRESSION RESULTS, CITY SIZE AND NUMBER OF SECONDARY ESTABLISHMENTS, WITH AND WITHOUT METRO MANILA, y AND 0 INTERCEPTS: 1990 and 1995

I	Model	a	t-test	b_1	t-test	b_2	t-test	R	R^2	AR^2	F-test	Trans
	Non-Linear											
y	1990	71.26	0.788	0.0013	1.98	3.60E-10	0.46	0.8362	0.6992	0.6792	34.88	0.7769
y	1995	204.28	2.54	0.0002	0.409	1.82E-09	3.606	0.9246	0.8545	0.8452	88.35	0.7769
	Non-Linear											
0	1990		0.0018	7.23		-1.60E-10	-0.037	0.8325	0.6934	0.6501	34.99	0.7586
0	1995		0.0014	6.531		7.60E-10	2.473	0.9076	0.8237	0.7858	72.42	0.7586
	Linear											
y	1990	36.44	0.746	0.0016	8.447			0.835	0.697	0.6874	71.36	0.7445
y	1995	-35.82	-0.67	0.0019	10.86			0.8899	0.792	0.7852	118	0.7445
	Linear											
0	1990			0.0017	14.84			0.832	0.692	0.661	71.79	0.741
0	1995			0.0018	16.83			0.8882	0.7889	0.758	119.59	0.741
	Double Log											
y	1990	-2.997	-4.51	1.899	7.101			0.787	0.619	0.607	50.43	0.625
y	1995	-2.57	-3.74	1.73	6.298			0.749	0.56	0.547	39.66	0.625
	Double Log											
0	1990			0.694	108.09			0.608	0.37	0.339	18.8	0.3665
0	1995			0.7	114.25			0.602	0.363	0.332	18.23	0.3665

I = Intercept
Trans = Transferability = (1990R + 1995R) / 2

Table 4
SUMMARY OF REGRESSION RESULTS, CITY SIZE AND NUMBER OF TERTIARY ESTABLISHMENTS, WITH AND WITHOUT METRO MANILA, y AND 0 INTERCEPTS: 1990 and 1995

I	*Model*	*a*	*t-test*	b_1	*t-test*	b_2	*t-test*	*R*	R^2	AR^2	*F-test*	*Trans*
	Non-Linear											
y	1990	221.27	1.019	0.008	9.21	2.50E-10	2.32	0.9986	0.9972	0.9971	5576.5	0.9972
y	1995	-73.63	-0.258	0.0111	10.996	2.96E-11	0.282	0.9986	0.9972	0.9971	5642	0.9972
	Non-Linear											
0	1990			0.00885	16.98	1.66E-10	2.47	0.9986	0.997	0.966	5568.9	0.997
0	1995			0.0109	18.34	5.10E-11	0.8	0.9986	0.997	0.966	5812.14	0.997
	Linear											
y	1990	-177.10	-1.250	0.0102	99.01			0.9984	0.9967	0.9966	9082.4	0.997
y	1995	-137.00	-0.788	0.0114	107.79			0.9986	0.9973	0.9972	11619.3	0.997
	Linear											
0	1990			0.01012	103			0.9983	0.9966	0.9663	9636.5	0.9969
0	1995			0.0113	113.71			0.9986	0.9972	0.967	11753.6	0.9969
	Double Log											
y	1990	-1.83	-5.445	1.54	11.399			0.896	0.8024	0.7962	129.93	0.7661
y	1995	-1.66	-4.170	1.47	9.3			0.854	0.7297	0.7213	86.4	0.7661
	Double Log											
0	1990			0.802	164.66			0.787	0.6193	0.589	53.69	0.601
0	1995			0.812	158.88			763	0.583	0.5523	46.1	0.601

I = Intercept
Trans = Transferability = (1990R + 1995R) / 2

Table 5
SUMMARY OF REGRESSION RESULTS, CITY SIZE AND NUMBER OF TERTIARY ESTABLISHMENTS, WITH AND WITHOUT METRO MANILA, y AND 0 INTERCEPTS: 1990 and 1995

I	*Model*	*a*	*t-test*	b_1	*t-test*	b_2	*t-test*	*R*	R^2	AR^2	*F-test*	*Trans*
	Non-Linear											
y	1990	73.53	0.19	0.0094	9.21	-1.28	-0.387	0.8836	0.781	0.766	53.42	0.8123
y	1995	572.3	1.2	0.0064	2.19	5.00E-09	1.681	0.918	0.8436	0.833	80.91	0.8123
	Non-Linear											
0	1990			0.0098	9.55	-1.81E-09	-1.0158	0.8835	0.781	0.741	55.11	0.8085
0	1995			0.0097	8.44	2.04E-09	1.212	0.914	0.836	0.799	79.05	0.8085
	Linear											
y	1990	198.93	0.954	0.0083	10.473			0.883	0.78	0.773	109.7	0.805
y	1995	-89.3	-0.325	0.0112	12.25			0.91	0.8289	0.823	150.16	0.805
	Linear											
0	1990			0.00891	18.329			0.879	0.773	0.742	109.1	0.801
0	1995			0.011	19.643			0.91	0.8283	0.797	154.37	0.801
	Double Log											
y	1990	-1.75	-3.617	1.5	7.732			0.812	0.659	0.648	59.8	0.61
y	1995	-1.494	-2.62	1.41	6.155			0.746	0.55	0.535	37.88	0.61
	Double Log											
0	1990			0.8	184.83			0.7173	0.515	0.483	33.9	0.483
0	1995			0.81	172.7			0.671	0.451	0.419	26.26	0.483

I = Intercept
Trans = Transferability = (1990R + 1995R) / 2

In most cases, the b-coefficients increased from 1990 to 1995 while "with Metro Manila" has greater slopes than "without Metro Manila." This implies that as the city size increases, the city's number of establishments in secondary and tertiary sectors also increases.

Based on these results, a non-linear relationship between the dependent and independent variables has been established.

Summary of Linear Regression Results

Most of the regressions yielded high R^2 and significant t-values. Statistically, the linear equation of NSE or NTE = a + bP has a high degree of confidence or goodness of fit, and that the independent variable city size determines the dependent variable NSE and NTE. This confirms that there is a positive relationship between the variables. As city size increases, so do NSE and NTE.

Most equations have higher slopes relative to city size, which result in a more elastic response of NSE and NTE. This implies that rising population causes an increase in the number of establishments in secondary and tertiary sectors.

Summary of Double Logarithmic Regression Results

Most of the R^2 obtained are significant, showing a good fit in all equations. However, a number of equations have low R^2 (Table 3). The relationship between city size and NSE and NTE in most cases is positive. Most of the t-values are highly significant, which indicates that city size explains the large proportion in the changes of NSE and STE.

The slope coefficients of "with Metro Manila" are mostly higher than "without Metro Manila." The change in elasticity coefficients would mean that changes in city size might result to changes in NSE and NTE.

Table 6 presents the computation of first and second derivatives of *P* taken from the regression equations of city size and NSE and city size and NTE, both at *0* and *y* intercepts. Notice that the second derivative values of *P* are mostly positive. This means that the first derivative values of *P* are considered at minimum value of the parabolic equations, or that the city size has not yet achieved its maximum level. Statistically, it could be that the relationship of city size to the NSE and NTE is not parabolic nor non-linear.

Table 6
FIRST AND SECOND DERIVATIVES OF P, CITY SIZE, NSE AND NTE WITH AND WITHOUT METRO MANILA: 1990 AND 1995

NSE	FIRST DERIVATIVE (dNSE/dP)		SECOND DERIVATIVE (dNSE/dp2)	
	y-intercept	0-intercept	y-intercept	0-intercept
1990				
With Metro Manila	-16,666,667	-29,298,246	9.02E-11	-5.28
Without MM	-1,797,752	5,677,419	7.12E-10	-3.10E-10
1995				
With Metro Manila	-90,000,000	-47,368,421	2.06E-11	3.80E-11
Without MM	-36,170	-897,436	5.64E-09	1.56E-09
NTE	**FIRST DERIVATIVE (dNTE/dP)**		**SECOND DERIVATIVE (dNTE/dp2)**	
	y-intercept	0-intercept	y-intercept	0-intercept
1990				
With Metro Manila	-26,298,701	-16,635,338	3.08E-10	5.32E-10
Without MM	-3,632,813	2,722,222	-2.56E-09	-3.60E-09
1995				
With Metro Manila	-188,135,593	-107,843,137	5.92E-11	1.02E-10
Without MM	-640,000	-2,337,450	1.00E-08	4.08E-09

City Size and Average Employment Size Per Secondary and Tertiary Establishment

The abovementioned observations, however, are limited to the number of establishments per city. They do not show the magnitude or size of establishments. To reflect this, average employment per secondary and tertiary establishment was derived by dividing total employment data from the industry (secondary) and service (tertiary) sectors with the respective number of establishments (Table 7). The average employment per secondary and tertiary establishment was regressed with city size. Results are presented in Table 8.

Table 7
NUMBER OF ESTABLISHMENTS AND DISTRIBUTION OF EMPLOYMENT FOR SECONDARY AND TERTIARY SECTOR: 1995

CITY	SECONDARY ESTABLISHMENTS				TERTIARY ESTABLISHMENTS				AVERAGE EMPLOYMENT	
	NUMBER		EMPLOYMENT		NUMBER		EMPLOYMENT			
	ATE:1-9	*ATE:10 & +*	*ATE:1-9*	*ATE:10 & +*	*ATE:1-9*	*ATE:10 & +*	*ATE:1-9*	*ATE:10 & +*	*S*	*T*
Angeles City	352	29	1,183	2,350	3,168	227	10102	6817	81	30
Bacolod City	394	101	1,584	5,593	3858	565	13812	23146	55	41
Baguio City	329	42	1,158	4,554	3696	315	10261	11012	108	35
Batangas City	254	20	889	1,709	1987	143	5874	6531	85	46
Butuan City	322	39	1,102	2,606	1424	171	4677	6139	67	36
Cabanatuan	325	17	952	370	2576	105	7237	4597	22	44
Cagayan de Oro	560	108	2,001	13,740	4287	501	13026	21295	127	43
Cavite City	101	10	362	222	772	34	2248	1333	22	39
Cotabato City	133	14	514	251	777	125	2788	3993	18	32
Dagupan	393	28	1,461	843	2502	255	8031	7388	30	29
Davao City	1,873	288	6,301	12,847	10601	1,213	31879	48438	45	40
Dipolog City	184	15	696	236	1091	77	3234	2738	16	36
Dumaguete City	149	10	536	152	926	113	3084	6626	15	59
General Santos	476	38	1,547	6,178	2271	243	7098	10651	163	44
Iligan City	259	31	991	5,449	1215	151	4251	7869	176	52
Iloilo City	431	84	1,696	3,518	3712	510	12725	25924	42	51
Laoag City	705	10	1,659	154	1405	129	4141	3844	15	30
Lapulapu City	142	111	525	28,334	419	41	1319	1818	255	44
Legaspi City	109	16	450	759	953	128	3044	5783	47	45
Lipa City	277	30	1,132	1,890	1607	88	5445	3170	63	36
Lucena	332	53	1,149	1,583	1708	159	5198	4845	30	30
Mandaue	254	227	1,080	26,973	823	188	3182	7745	119	41
Marawi	154	4	621	50	1160	28	2463	4418	13	158
Naga	236	36	818	1,308	1922	171	6113	5791	36	34
Olongapo City	296	8	761	122	2032	167	5368	6567	15	39
Pagadian City	255	26	831	366	3057	133	7098	3525	14	27
Puerto Pincesa	124	6	325	102	781	84	2361	3004	17	36
Roxas City	261	22	788	1,132	1236	101	3787	3116	51	31
San Pablo	346	51	1,308	2,235	1822	141	5384	6206	44	44
Surigao City	162	5	547	373	942	66	3012	2388	75	36
Tacloban City	163	26	685	743	1124	126	3910	6189	29	49
Zamboanga City	368	76	1,325	5,711	2585	280	7410	12982	75	46
Cebu City	1,429	132	5,385	8,025	7992	642	17550	37038	61	58
NCR	13,097	5,639	50,916	514,753	91650	15,701	306418	1086369	91	69

Source: National Statistics Office

Table 8
SUMMARY OUTPUT OF QUADRATIC, LINEAR AND DOUBLE LOG REGRESSIONS AT 0 AND y INTERCEPTS: CITY SIZE AND AVERAGE EMPLOYMENT SIZE PER SECONDARY AND TERTIARY ESTABLISHMENT

SECTOR	WITH METRO MANILA				WITHOUT METRO MANILA			
	QUADRATIC REGRESSIONS							
SECONDARY	a	b_1	b_2	R^2	a	b_1	b_2	R^2
y-intercept	48.94	5.98E-05	-17.86	0.0429	-1.79	0.00042	-3.97E-10	0.1975
t-values		1.06	-1		-0.071	2.7	-2.5	
0-intercept		0.000198	-2.00E-12	-0.2473		0.000413	-3.88	0.1973
T-values		5.25	-4.91			6.91	-4.42	
TERTIARY	a	b_1	b_2	R^2	a	b_1	b_2	R^2
y-intercept	42.95	4.35E-06	-1.69E-13	0.0384	41.93	1.17E-05	-8.04E-12	0.0017
t-values	6.54	0.188	-0.07		3.67	0.1653	-0.1123	
0-intercept		0.000126	-1.26E-11	-1.289		0.000251	-2.25E-10	-0.446
T-values		5.995	-5.56			7.72	-4.73	
	LINEAR REGRESSIONS							
SECONDARY	a	b_1	b_2	R^2	a	b_1	b_2	R^2
y-intercept	61.483	3.74E-06		0.01221	50.63	5.03E-05		0.0304
t-values	6.24	0.625			3.29	0.99		
0-intercept		1.52E-05		-1.189		0.00018		-0.3076
T-values		1.83				5.04		
TERTIARY	a	b_1	b_2	R^2	a	b_1	b_2	R^2
y-intercept	43.32	2.74E-06		0.0383	42.995	4.11E-06		0.0013
t-values	10.85	1.13			6.8	0.197		
0-intercept		1.08E-05		-3.501		0.00012		-1.49
T-values		2.21				5.75		
	DOUBLE LOG REGRESSIONS							
SECONDARY	a	b_1	b_2	R^2	a	b_1	b_2	R^2
y-intercept	-2.661	1.59		0.231	-4.95	2.51		0.2901
t-values	-2.07	3.099			-2.81	3.56		
0-intercept		0.527		0.1277		0.526		0.109
T-values		37.22				35.98		
TERTIARY	a	b_1	b_2	R^2	a	b_1	b_2	R^2
y-intercept	0.306	0.402		0.1102	0.497	0.326		0.039
t-values	0.604	1.991			0.682	1.12		
0-intercept		0.5243		0.1001		0.525		0.0242
T-values		99.43				96.2		

Average Employment Size and Real Wage Rate

Figure 3 shows the scatter graph of the 1995 Real Minimum Wage and the Average Employment Size per Secondary and Tertiary Establishment. It shows a weak association between wage rate and average employment size per establishment. The average employment size is inelastic with respect to the real wage rate.

Ratio of Tertiary Establishments to Total Establishments and Tertiary Employment and Total Employment

Table 9 shows the regression results of city size with the ratio of tertiary estab-

lishments to the total establishments, and city size with the ratio of tertiary employment to the total employment.

The ratios for both establishments and employment were derived to determine if there were changes in the composition of secondary and tertiary establishments and employment among the cities. Results indicate that there is no relationship between city size and the ratio of tertiary establishments and employment. This could be attributed to the earlier findings that the numbers of both secondary and tertiary establishments in cities increase with city size. The proportion of such increase might be equal.

Cross-country Data: Urban Population and Gross Value Added in Industry and Services

The relationships of the variables presented above are similar to the observed relationship of urban population (independent) with the gross value added in industry (dependent) and services (dependent) in other countries. One hundred fifteen countries were divided into four divisions: low income economies, lower middle income economies, upper middle income economies, and high income economies. It is assumed that high income economies are more urbanized than the rest. Table 10 presents the summary of regression results.

Results show a highly significant R^2 which means that the regression equations have a good fit, and that the independent variable UP is positively correlated with the dependent variables IVA and SVA. Majority of the t-values are significant. This means that most of the variations of IVA and SVA are significantly explained by UP. Elasticity coefficients are found to be increasing, the higher the UP the higher the slope. This indicates that an increase in UP will result in a relative increase in IVA and SVA.

Figure 3
REAL MINIMUM WAGE RATE AND AVERAGE EMPLOYMENT SIZE: 1995

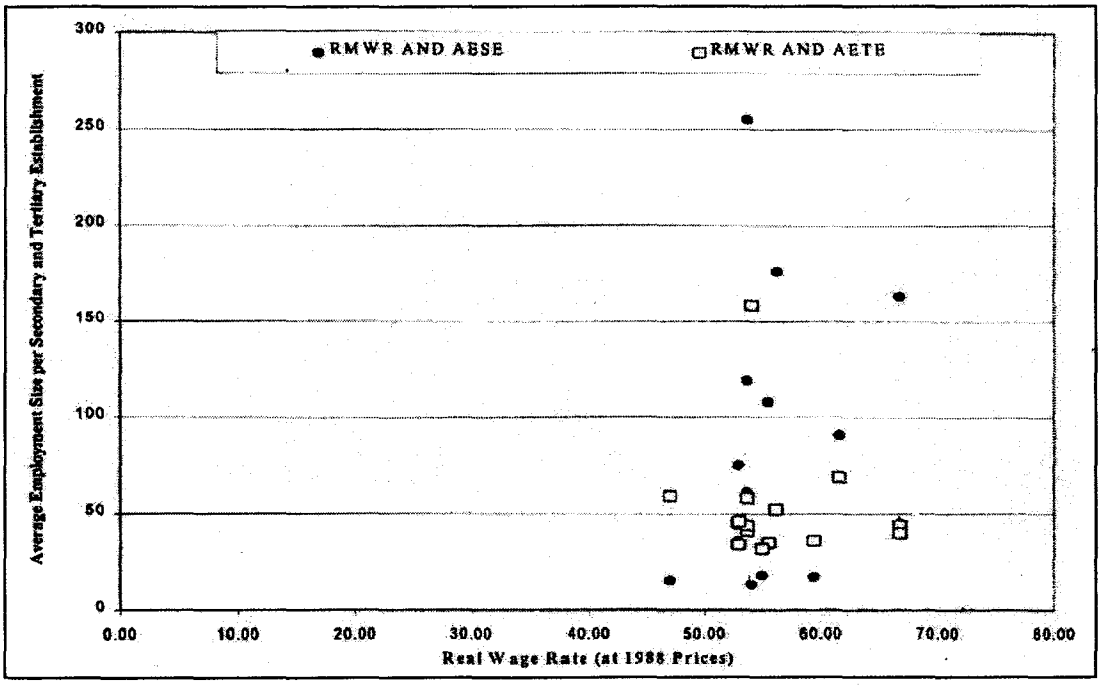


TABLE 9
SUMMARY OUTPUT OF REGRESSIONS OF CITY SIZE RATIO OF TERTIARY ESTABLISHMENTS TO TOTAL ESTABLISHMENTS AND RATIO OF TERTIARY EMPLOYMENT TO TOTAL EMPLOYMENT: 1995

	TERTIARY ESTABLISHMENTS			TERTIARY EMPLOYMENT		
	a	b_1	R^2	a	b_1	R^2
Coefficients	0.8485	5.90E-10	0.0002	0.791	-9.30E-09	0.007
Sb	0.012	6.98E-09		0.031	1.90E-08	
t-values	73.8	0.085		25.5	-.05	

TABLE 10
SUMMARY OUTPUT OF QUADRATIC REGRESSION AT y AND 0 INTERCEPTS: URBAN POPULATION AND INDUSTRY VALUE ADDED FOR FOUR-INCOME ECONOMIES: 1995

	With y-Intercept				At 0-Intercept			
Industry Value Added	a	b_1	b_2	R^2	a	b_1	b_2	R^2
Low Income	3371.85	-465.29	3.75	0.9785		363.39	3.47	0.9748
t	2.8	-5.32	14.2			-4.27	13.23	
Lower Middle Income	1577.81	1006.62	1.83	0.8333		1101.88	1.014	0.8316
t	0.594	4.28	0.733			6.48	0.49	
Upper Middle Income	12103.07	776.4	8.84	0.915		1372.14	4.65	0.898
t	1.422	1.185	1.62			2.6	0.964	
High Income	-94235.11	17535.94	-37.34	0.8539		14689.49	-25.05	0.8418
t	-1.036	4.34	1.79			4.95	-1.45	
Services Value Added	a	b_1	b_2	R^2	a	b_1	b_2	R^2
Low Income	421.51	382.46	0.599	0.9935		395.2	0.565	0.9933
t	0.87	10.91	5.65			12.43	5.76	
Lower Middle Income	4419.68	1168.2	4.52	0.8382		1435.04	2.25	0.831
t	1.26	3.76	1.37			6.27	0.809	
Upper Middle Income	6837.74	3655.49	-8.73	0.9376		3992.05	-11.1	0.935
t	0.65	4.5	-1.29			6.56	-1.99	
High Income	-75353.16	24107.27	9.395	0.9578		21831.16	19.22	0.9563
t	-0.689	4.96	0.374			6.25	0.947	

Interpretation of Results

City Size and Number of Secondary and Tertiary Establishments

Based on most of the statistical results of quadratic, linear and double log regressions, city size influences the number of secondary and tertiary establishments. Therefore, a city with greater population size is more efficient in terms of number of establishments.

The increase in city population is equivalent to an increase in the size of the market as well as demand for goods and services, which leads to the expansion of both secondary and tertiary establishments. This supports Puryear's (1977) claim that an increase in urban size results in diversification of economic activities, creating more employment opportunities at higher wages (Puryear and Berry 1977). In this case, income in big cities would be higher and more evenly distributed relative to small cities. This is evident in Metro Manila's case. Metro Manila's dominance in terms of population concentration is equated with its dominance in the number of secondary and tertiary establishments. Therefore, a continuous increase in population of Metro Manila and other cities may also bring a corresponding increase to its secondary and tertiary establishments. This further supports the discussions provided by Alonso (1975), Hansen (1975) and Shafer (1977). Bigger population allows economies of scale. The city then becomes more productive, an indication of higher efficiency. Hence, efficiency is a function of city size.

The statistical relationship between city size and NSE and NTE is linear. This means that population of the cities are more likely to grow, since the maximum population levels have not been reached. In the same way, the number of establishments in both secondary and tertiary sectors would also relatively increase for some time until the maximum level is reached.

In relation to the conceptual framework, the population and efficiency levels of cities in the country are still on the upswing. One basic consideration is that the conceptual framework was patterned from Western European cities that have already attained high urbanization levels and are more economically advanced.

City Size and Average Employment Size per Secondary and Tertiary Establishment

Quadratic, linear, and double log regressions for city size and average employment size per secondary and tertiary establishment exhibited weak results. City size is not an important factor influencing the average employment per secondary and tertiary establishment. Besides city size, the minimum wage rate set by the regional wage board could be a major factor that influences average employment. Minimum wage rates in large cities are higher than in smaller-sized cities. This is because the required additional employment might always be substituted by an increase in capital.

Real Wage Rate and Average Employment Size

The finding that there was little or no association between wage increase and efficiency in terms of average employment size —as an alternative measure of efficiency— contradict the earlier finding that an increase in city size would also increase the city's efficiency. As city size increases, the productive efficiency of cities also increases that is mainly due to an increase in capitalization and not to additional labor input. This implies that additional labor requirements are always substituted by capital. There are other factors that lead to the inconsistency of the findings. First is the preferential treatment through tax holiday incentives given by the Department of Trade and Industry/Board of Investments (DTI/BOI) that favor areas or firms outside Metro Manila should these establishments employ more workers. Second, highly developed cities are more inclined to adopt new technologies.

Cross-country Data: Urban Population and Gross Value Added in Industry and Services

The statistical results imply that urban population is strongly associated with the level of industry and services value added. This finding establishes that foreign countries exhibit greater efficiency and productivity as their

urban population continues to increase. This conclusion is similar to the discussions of Alonso (1975), Puryear (1977), Mera (1980), Hansen (1975), and Shafer (1977). Their findings support the results of the analysis on the size of Philippine cities and its number of establishments in secondary and tertiary sectors.

The above findings likewise confirm that urban areas with a greater population would likely become more efficient compared to urban areas with a smaller population. Among the benefits associated with greater population sizes are: *(1)* larger market of goods and services; *(2)* greater accumulation of savings for capital or investment needs; *(3)* agglomeration economies; *(4)* diversification of economic activities; and, *(5)* greater specialization of goods and services. Population expansion corresponds to a larger market and more consumption of goods and services. As a consequence, there would be more firms or producers to answer greater market demands. The needs for higher production for firms can command higher wages to attract a young and skilled labor force. An increase in population could also generate additional investment or capital through savings. City size also influences public and private investment generation.

Moreover, greater population leads to agglomeration economies, which is a result of the concentration of firms and businesses competing or complementing each other. Similar services or activities will cluster together to share their costs and facilities resulting in reduced production costs and inputs due to large-scale production. Lastly, as population increases, goods and services, skills, labor, and technology become specialized. An equally important factor is the large entrepreneurial base that can take advantage of the existing transportation network, size of labor force, financial institutions, market area, and service to the hinterlands. This includes the entry of sophisticated firms and industries. New demand, taste, or products are created. There would be more goods and services produced at greater value added.

In sum, productivity for the entire production sector increases in response to increasing population. At the same time, population increase also generates greater revenue for the government to finance additional infrastructure and social services that could add to the efficiency of cities. Metro Manila's primacy is attributable to this phenomenon.

Policy Implications

The National Urban Development and Housing Framework 1993-1998 adopts several strategies to implement a cohesive and over-all urban development policy. Aside from a controlled or managed development scheme for Metro Manila, a simultaneous dispersal development throughout the country is being promoted. Among the strategies that are adopted to implement are the countermagnet, growth center, multi-polar, and regional center development strategies.

In the same manner, the National Framework for Regional Development of the Draft Philippine National Development Plan for the 21st Century identifies the social costs of rapid urbanization and migration. It suggests the encouragement of growth in existing regional urban centers throughout the country to serve as alternative migration destinations.

The findings of this study could serve as an input to attain the objectives of these plans. First, cities of higher population size seem to be more efficient than smaller cities in terms of number of establishments and value added. Urbanization and the expansion of cities, especially regional cities, should be viewed positively. Large cities support a greater number of economic activities and promote economies of scale. The promotion of urban centers throughout the country could create magnets for attracting population and capital resources in the various regions. Thus, the spread and efficient distribution of population and economic activities away from Metro Manila to the regional centers and small urban centers in the periphery could be achieved.

Second, the finding that production efficiency in terms of average employment per establishment does not increase with city size is attributed to the capital bias that may be brought about by unrealistic, legally-set regional wages and may also fail to consider intra-regional productivity differentials. It may be necessary that the policies and consi-

derations followed by regional wage boards be reviewed to eliminate undue intra-regional wage distortions.

A major limitation of other cities in the country is infrastructure and utilities support. Specifically, the cities need an efficient transport system that will connect the national center to interregional centers, major urban areas, secondary centers, minor centers, and rural areas. This transport system must be in place to maximize the flow or movements of population and services within and among the cities as well as minimize the concentration of population and economic activities in a few urban centers. Such infrastructure support is necessary if Philippine cities are to serve as engines of economic growth and catalysts for regional development.

With proper policies, Philippine cities, including Metro Manila, could still increase their population-carrying capacities with the resulting increase in the number of secondary and tertiary establishments.

Suggestions for Further Research

The study on city size could be explored further with the following suggestions:

1. Empirical study on Metro Manila's population size and changes in economic structure using the available data on gross value added in industry and services sector.
2. A study on city size and patterns of diversification or variation of economic activities among cities in the country.
3. A need to conduct regular surveys on cities which will generate necessary information on business establishments such as capitalization, production, labor productivity, sales/revenue, etc. This information could provide the level of efficiency among cities, e.g. efficiency in terms of social and economic benefits.

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