THE IMPACT OF ECONOMIC, POLITICAL, AND INTERNATIONAL FACTORS ON URBAN PRIMACY

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Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
December, 1995

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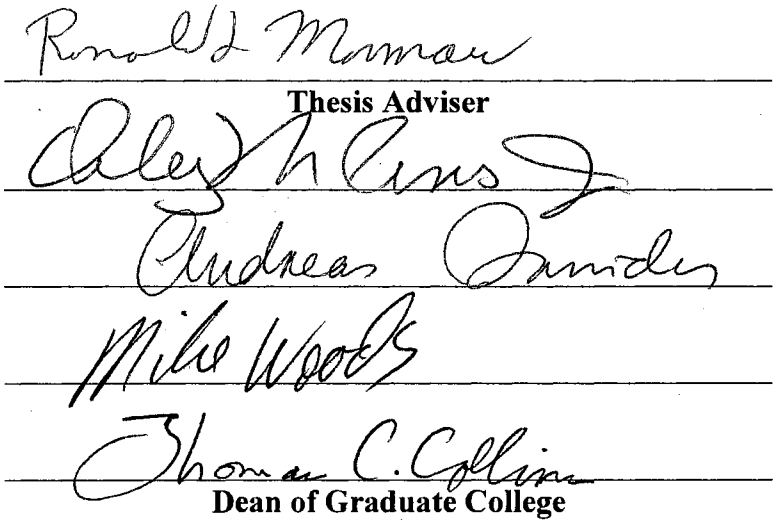
Thesis Approved:



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ACKNOWLEDGMENTS

Praise be to Allah the Sustainer of all the Worlds and peace and blessings upon Mohammad the last of all Prophets and Messengers, the members of his family, his companions, and all those who proceed on the path of righteousness until the Day of Judgment.

First, I would like to thank my major advisor, Dr. Ronald Moomaw for all his support, advice, and encouragement. I also would like to thank the other members of my dissertation committee, Dr. Andreas Savvides for his advice and support, Dr. Orley Amos, and Dr. Mike Woods for their useful suggestions.

Furthermore, I would like to thank my wife, Amatillah Alkhatib, for her encouragement, care and understanding. I appreciate her help in typing this dissertation, which saves me time and efforts. I also would like to express my sincere gratitude and love for my wonderful children, Lamise, Wella, and Omar. Their presence makes my life more enjoyable and colorful. I dedicate this work to them.

I wish to express my sincere gratitude to my parents, Abdullah Mohammed and Sa'adah, my brothers and sister, and the rest of my family in Yemen for their prayers, care, and support. I thank my brother-in-law Abdusslam Aburrijal and his family for their help and support. I also thank some sincere brothers in the Islamic Societies of Stillwater and Tulsa who make this period of my life easier and memorable. I thank them for their trust, support, and brotherhood.

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UP1: urban primacy index which is the ratio of the largest city population to the second largest city population.

UP2: urban primacy index which is the ratio of the largest city population to the sum of the second, third, and fourth largest city population.

UP3: urban primacy index which is the ratio of the largest city population to the urban population.

UP4: urban primacy index which is the ratio of the largest city population to the total population of a nation. Data for all urban primacy measures are from UNDESIPA's World Urbanization prospects: The 1992 Revision, from various issues of UN Demographic Yearbook, The Europa World Yearbook, The Statesman Yearbook, The world Development Report and World Tables of The World Bank.

GDP: gross domestic product. GDP is calculated from the Penn World Tables (Mark 5.6).

GDPC: gross domestic product per capita. Source: The Penn World Tables (Mark 5.6).

GDPCSQ: square of GDPC.

POPNDENS: population density which is the ratio of the total population to the arable land. Sources: total population data are from The UN World Urbanization Prospects: The 1992 Revision; arable land data are from FAO Production Yearbook.

EDUC: average years of schooling of people 25 years or older. Sources: Barro and Lee (1992), and different issues of Human Development Report.

DCAP: dummy variable that equals 1 if the capital city is also the largest city and equals 0 otherwise. Sources: UN Demographic Yearbook, and World Urbanization Prospects: The 1992 Revision.

EXP: exports of goods and nonfactor services as a percentage of GDP . Sources: World Tables, 1994 and different issues of World Development Report.

GDPCGR: growth rate of gross domestic product per capita. GDPCGR is calculated from the Penn World Tables (Mark 5.6).

LABOR: share of labor outside agriculture. It is calculated as 1 minus the percentage of economically active population in agriculture. Source: FAO Production Yearbook.

POPGR: population growth rate. Source: World Urbanization Prospects: The 1992 Revision.

URDISP: urban-rural disparity. The ratio of output per worker in nonagriculture to output per worker in agriculture. The data for percentage contribution of agriculture to total GDP are from various issues of World Tables and World Development Report, and data for percentage of the labor force in agriculture are from FAO Production Yearbook.

FDI: foreign direct investment as percentage of GDP. Data of FDI are collected from various issues of IMF Balance of Payments Yearbook and IMF International Financial Statistics, data for GDP used in this variable is from various issues of World Development Report and World Tables.

FE: the estimated fixed effects of urban primacy.

EXPORT: the ratio of export of goods and nonfactor services to GDP averaged over the year 1960 to 1990.

DICT: dictatorship variable (1 = free, 2 = partially free, 3 = not free). Sources: different issues of Gastil's Freedom in the World, and Bollen (1990), for cross-sectional data, it is averaged over 1975, 1980, 1985, and 1990.

POLINS: measures of political instability. (0.5 * assassination + 0.5 * revolution), averaged of 1965, 1970, 1975, 1980, and 1985. Source: Barro and Wolf (1990).

TRANS: for panel-data, it is the number of passenger cars over total population. For the cross-sectional data, it is the government expenditure on transportation and communication as a percentage of

GDP averaged over the years (1970, 1980 and 1990). Sources: Different issues of UN Statistical Yearbook, and UNICTAD's Handbook of International Trade and Development Statistics.

POLSTAB: political stability index averaged over 1980-1983. (10 = highest, 0 = lowest). Source: Paulo Mauro (1995).

BE: bureaucratic efficiency index. Average of judiciary system, red tape, and corruption indices, averaged over the years 1980-1983. (10 = highest, 0 = lowest). Source Paulo Mauro (1995).

MCITY: largest city population. Sources: UN Demographic Yearbook and World Urbanization Prospects. The 1992 Revision.

* Data for the Republic of China (Taiwan) are from different issues of The Republic of China Statistical Yearbook, The Europa Yearbook, and The Statesman's Yearbook.

In The Name of Allah, Most Gracious, Most Merciful

CHAPTER I

INTRODUCTION

Statement Of The Problem:

In some countries, a single urban agglomeration absorbs most of the urban population. This is identified as urban primacy. Countries that exhibit this phenomenon generally have most of their major economic and political activities concentrated in the primate city. In the 1992 Revision of World Urbanization Prospects, the United Nations (UNDESIPA, 1993, 21) asserted that

> The urban structure of a country is shaped by a number of factors, among them its history, topography, natural resources and climate. But economic factors are probably most important in understanding the location, size and growth of urban places. In the early stages of development, when a country is predominantly rural and has a low level of urbanization, it is economically more efficient to concentrate all the investments in infrastructure and manufacturing facilities in one location (Renaud, 1981, p. 107). In such a situation, the growth of a single city to primate status is virtually inevitable as government and administrative services, industry, commercial and financial activities, and transportation and communication networks are established, and as they expand.

Although many factors affect urban primacy, the relationship between economic development and urban primacy has received increased attention from both scholars

many previous studies, by gross domestic product (GDP) per capita. Urban primacy is concerned with the disproportionate size of the largest city in a country; it is measured by some index of relative population concentration. Countries with similar urbanization levels may have different degree of urban primacy. Some countries, usually developing countries, may have urban population concentrated in a single primate city. Other countries have a more balanced distribution of urban population, with an integrated and symmetric system of cities that fits better with both the rank-size (Pareto) distribution and central place theory.

Economists and other scholars generally agree that economic development and urbanization are positively related in both developed and developing countries. Mills and Becker, for example, assert that "urbanization is a natural and inevitable consequence of economic development." (Mills and Becker, 1986, 17). Dekle and Eaton stress that data on urban activity over time and across countries indicate a strong correlation between economic growth and urbanization. "This relationship suggests that the benefits of proximity increasingly outweigh the cost of congestion as economies develop" (Dekel and Eaton, 1994, 2).

While there may be agreement that economic development and urbanization are self reinforcing, there is no such agreement regarding the association between economic development and urban primacy. Berry (1961) and Mehta (1964) found no clear relationship between urban primacy and economic development, but Mera (1973) and London (1987) found a positive relationship. In his analysis of developing countries, Mera found that the largest cities are more productive than

other cities in a country. Also, he found that primacy of larger cities is more conductive to economic development than primacy of smaller cities. Ades and Glaeser (1995) found a positive but insignificant association between economic development and size of the largest city in a country.

On the other hand, other studies found a negative relationship between urban primacy and economic development (Linsky, 1965; Owen and Witton, 1973; Rosen and Resnick, 1980; Renaud, 1981; Vining, 1985; Mutlu, 1989). Williamson (1965) suggested that urban primacy is often associated with underdevelopment or the early stages of development. Moomaw and Shatter (Forthcoming) report empirical evidence suggesting that urban primacy decreases as economic development increases.

Another finding is a curvilinear relationship. El-Shakhs (1972), Wheaton and Shishido(1891), De Cola (1984), and Petrakos and Brada (1989) found a bell-shaped effect of economic development on urban primacy. El-Shakhs reports that urban primacy is rare in the very early stages of development, rises during the take-off stage, and decreases when the economy is developed, because of the spread effect. El-Shakhs concludes that primacy characterizes countries at intermediate levels of development and that log-normalcy in the urban system is found in fully mature (developed) economies. Wheaton and Shihido also find that a bell-shaped relationship exists between economic development and urban concentration. They show that optimal city size population increases with economic development up to an intermediate level of development and declines thereafter.

It is important to note that the mentioned scholars used different primacy measures, different groups of countries, and different time frames to reach their conclusions.

The curvilinear (bell-shaped) relationship between urban primacy and economic development is consistent with spread or trickle-down effects of growth pole cycles. The growth pole process can be divided into three stages. The first stage is triggered by the introduction of new ideas and innovations and by the existence of agglomeration economies, increasing return to scales, urbanization economies and transportation cost, in addition to the effect of government and trade policies. All these factors lead to concentration of people and activities in a single growth pole, usually the primate city. Alonso (1980) suggested that agglomeration economies and the high cost of developing urban infrastructure cause Third World countries at the early stage of modernization to concentrate their investment and therefore population into one or few large cities. Next, through the spread effect, with advances of transportation and communication, and the improvement of infrastructure, economic development becomes geographically dispersed creating multiple growth centers other than the primate city. In the third stage, innovation, education, capital formation, and technology spreads economic development to rural areas surrounding growth centers (Amos, 1990). Similarly, Walters (1985) stated that economic innovations originate in the larger urban centers and from there are expected to "trickle down" to progressively smaller cities in the urban hierarchy. Therefore, as Renaud (1981, 22) said, "most of the countries with a high primacy

value are in the early stage of development," or as El-Shakhs (1973, 26) concluded, urban primacy "decreases steadily as countries drive into economic maturity."

Several studies have suggested that urban primacy has a negative impact on economic development (Hoselitz, 1955; Owen and Witton, 1973; Vining, 1985, and Portes, 1989). This negative effect is a result of diseconomies of scale and other disamenities or as Findley (1993, 19) put it, "The marginal costs of production exceeds marginal benefits." Moomaw and Shatter (1993) found that concentration in the primate city has a negative effect on economic growth.

Several scholars have studied urban primacy from different perspectives. Todaro (1984) focused on the excessive size of the largest city in the country and argued that an urban bias exists in developing countries due to the structure of their economies and due to their economic policies. Frey, Dietz and Marte (1986), for example, study the effects of investment dependence and export dependence on urban primacy and found that both measures of economic dependence had positive -- albeit insignificant -- effects on urban primacy (Frey et. al., 1986, 359). Berry (1971, 138), in his study of South and Southeast Asia suggested that urban primacy may be greater in the inward looking countries of Southeast Asia, as opposed to the island countries that participate more fully in the international metropolitan economy. Elizondo and Krugman (1992) stated that a closed domestic market is a key factor in the emergence of urban primacy. They conclude that "in a relatively closed economy, the forward and backward linkages are strong enough to create and support a single large metropolis" (Elizondo and Krugman, 1992, 26). Ades and Glaeser

(1995) and Moomaw and Shatter (forthcoming) provide empirical support for the Elizondo and Krugman result that concentration in a single city is negatively related to international trade. Ades and Glaeser (1995) also studied the role of the political system and political instability in determining the population of the largest city in a country. They found a positive relationship between the size of the largest city and both dictatorship and political instability.

Many of the researchers that have studied urban primacy from different perspectives will be mentioned when different schools of thought are discussed in the literature review chapter (chapter II), and when different measures of urban primacy are investigated in chapter III. Furthermore, Chapters IV, V, andVI will cover a variety of researches when the determinants of urban primacy are analyzed.

Objective Of The Study:

The main purpose of this study is to determine factors that have an important effect on urban primacy and particularly to study the effect of economic development. One main hypothesis of this study is that the relationship between urban primacy and economic development is curvilinear. That is, at very early stages of development urban primacy is rare; then, as a country starts its development path, it increases with economic development until the country reaches an intermediate stage of development. As the country becomes more advanced, urban primacy eventually declines. A concentration of projects, activities, and people in a single primate city may be a necessary requirement at early stage of development. Then, with the

"trickle down" effects, multiple centers are created which lessens the relative importance of the single largest city.

We will accomplish our objectives and test hypotheses using pooled time-series and cross-sectional data analysis, commonly known as panel data analysis. We, first, will discuss different measures of urban primacy and show that using a primacy index that is based on total urban population leads to inaccurate conclusions. We will use an index that does not depend on the various arbitrary definitions of urban population. Thus, we will have greater confidence in the cross-country results than if we use urban population.

Second, we will test the effects of economic development and other factors on urban primacy using ordinary least squares (OLS) regression method. Then we will add groups and time effects and compare that to results of OLS without countries and time effect. This study will investigate the model when the three advanced countries are dropped, and analyze the data when the lagged dependent variable is added to the model. It will also study the model when the independent variables are presented at earlier period of time

Third, because some political variables do not change over a short period of time and due to missing data of these variables for some years, we will use a cross-sectional analysis that tests the effect of these variables on urban primacy.

The final empirical step is to use largest city size as dependent variable instead of urban primacy index and compare the results using the two dependent variables and Ades and Gleaser's (1995) results.

Our sample includes all non-socialist (non-former socialist) Asian (excluding Middle Eastern), Latin American, and North American countries that have population of 2 million or more and that have available data. The time periods of this study are 1960, 1965, 1970, 1975, 1980, 1985, and 1990. More discussion about the data is presented in Chapter IV. Also, descriptive statistics are available in Appendix 2

Importance Of The Study:

Unlike most of previous empirical works, this study uses panel data techniques. Using panel data analysis has many advantages (to be discussed in detail in Chapter IV), one of which is a substantial increase in degrees of freedom.

Different scholars use different sets of variables. Some scholars emphasize the economic factors that affect urban primacy; others concentrate on world system and uneven international relations; some try to test political effects and government policies; and just a few look broadly at all the different factors that may affect urban primacy. One of the most significant contributions of this study lies in the fact that it considers economic, international, political, and demographic aspects that can help explain the rise and decline of urban primacy.

Another important contribution of this study is adding group and time effects and the comparison of the result of ordinary least squares (OLS) regression with and without group and time effects. This is because pure cross-sectional studies probably omit relevant variables, creating a strong possibility that important coefficients will

be biased. Using the panel data technique and testing for country and time effects help to avoid this bias.

Another contribution is the use of a primacy measure that allows cross-country comparisons. Thus, it seeks to reduce the alternative measures of urban primacy to a single measure that leads to comparable and valid conclusions. Testing the impact of some important factors on urban primacy will give us a broader picture of the mechanism that leads to the interaction of all variables in the model.

With regard to policy implications, explaining the relationship between urban primacy and other factors, especially economic development, helps planners and policy makers distinguish controllable and uncontrollable factors so they can predict urbanization trends and patterns in developing countries and plan for the future with the right tools and with the least cost and high efficiency. El-Shakhs (1972,30) stated that

> if the future trend of changes in a city size distribution could be predicted, several policy choices with regard to type and location of investments, political and administrative structure, and urban development and planning could be made more efficiently and intelligently.

Finally, the time period from 1960 to 1990 is sufficient to show policy makers how time has affected urban primacy.

Organization Of The Study:

After the introductory chapter which includes a survey of the relevant theoretical literature and empirical studies on the relationship between urban primacy and economic development, chapter II presents an additional literature review that

covers a wide range of relevant economic, political, social, local, and international relation topics.

Chapter III begins by operationalizing definitions of urban primacy and economic development. It also discusses different measures of urban primacy and various indicators of economic development, and recommends which measure to use.

Chapter IV builds a model that shows the effects of independent variables on urban primacy. First, we compare, empirically, several common measures of urban primacy with the one that fits the criteria established in chapter III. Then, we run OLS regressions without and with groups and time effects and compare the results. Different estimates, models, and samples are used to examine robustness. The final part of chapter IV deals with lagged dependent variable and the independent variables at earlier period of time. Concluding remarks will be presented at the end of chapter IV.

Chapter V investigates cross-sectional data for some of the variables that do not change for prolonged period of time such as some political variables, or variables that have missing data for some of the periods that are included in this study.

In chapter VI we will run regression analysis with largest city size and urban primacy as dependent variables using this study's equations and those of Ades and Glaeser and compare the results.

Finally, in chapter VII, a summary of the study and conclusion of the findings will be provided, and recommendations for future studies will be discussed.

CHAPTER II

LITERATURE REVIEW

Introduction:

Although references to the literature throughout this study place our work in the context of previous work and show its originality, some topics are mentioned without in-depth discussion This chapter discusses these topics at some length. All topics, in one way or another, are linked to the main theme of this dissertation: urban primacy and economic development. They give the reader a broader picture of the development and primacy dilemma.

We will, first, survey the pattern and trends of urbanization in the world. Then, we will summarize the major theories of economic development and urban primacy. We start with modernization theory, considered a classical theory of economic development and urbanization. It emphasizes economic factors, such as higher income, higher human and physical capital and international trade and foreign aid, as the primary elements of development. It argues, in general, that economic development and urban primacy are positively related. The second theory emphasizes ecological aspects such as population size, transportation and communication technology, and other environmental factors, as major forces that

affect economic development and urban primacy. Political aspects have been the main elements of the other theories: dependency and world system theories, and urban bias theory. Dependency theory stresses that a relationship with capitalist countries is harmful to development in developing countries; and it views urban primacy as a result of this uneven relationship. Urban bias theory shifts the conflict from the international scene to within the national borders. Urban bias theory stresses that the poverty and underdevelopment of rural areas is caused by the extraction of countryside wealth by urban residents.

The third topic to be discussed is the overurbanization phenomenon and the role of cities, especially large cities, in the national economy. Next, we will discuss the puzzling dilemma of efficiency verses equity which has to be resolved by policy makers. Then the focus will be on economies of scale and agglomeration economies that have an effect on economic development and urban primacy. Finally, a summary will end this chapter.

World Urbanization Trends and Prospects:

Bairoch (1988, xvii) states that

> two centuries ago, one person in ten lived in a city. Today, the ratio is one person in four; in twenty years, it will be one in two--a proportion already surpassed in developing countries. Two centuries ago, neither of the largest cities in the world, London and Peking, had a population as much as a million, and in the entire world, there were fewer than ninety cities with population in excess of 100,000. By 1985, there were between 32 and 36 cities with population of more than five million and there are more than 2300 cities with population of more than 100,000. Clearly, then, the problem of the city and of its impact on

> economic life directly shapes the existence of the greater part of humanity.

Todaro (1984, 7) asserts that

> one of the most significant demographic phenomena of modern times and one that promises to loom even larger in the future is the rapid growth of cities in developing countries.

There is a wide variation in urbanization patterns around the world. While urbanization has slowed down in developed countries, rapid urbanization continues in developing countries and is projected to continue in the next century. At mid 1990, 43% (2.3 billion) of the world population lived in urban areas. The level of urbanization is projected to cross the 50 percent mark in 2005. By 2025, more than three fifth of the world population will live in urban areas. In 1950, urban population accounted only for 16 percent of the developing nations' total population, 285 million people. By 1970, that percentage had risen to 25 and by 1990, to 34 percent, 1.4 billion people. It is projected to reach 57 percent in 2025 with over 4 billion inhabitants. By 1990, approximately 2.3 billion people in the world lived in urban areas, 61 percent in developing countries. It is projected by 2025 that number will increase to about 5.2 billion, of whom 77 percent will live in developing world (UNDIESA, 1991; UNDESIPA, 1993).

The world's urban population growth rate for 1985-1990 is estimated at 2.7 percent per year. It is expected to be about 2.5 percent at the turn of the century, and to be below 2 percent for the first time in 2020-2025. At these rates, the world's urban population doubles in about thirty years. In the developed world, the urban

population has been growing at about 1 percent per year since 1980-1985, and it is expected to decline to 0.6 percent in 2020-2025, doubling in about 100 years. Urban population growth rates are much faster in developing countries. Growth exceeded 4 percent in 1950-1955 and 5 percent in 1955-1960. This rate was 3.8 percent during 1985-1990. It is projected to be less than 3 percent in 2010-2015, and it will decline to 2.4 percent in 2020-2025 (UNDESIPA, 1993). In the last half of the twentieth century the urban population of the developing countries doubled every 15 to 20 years.

To show the different patterns of urbanization and urban growth between developed and less developed countries, Kasarda and Parnell (1993) compare the growth of Mexico City and Sao Paulo to that of New York City. In 1950, Mexico City and Sao Paulo had 3.1 and 2.8 million inhabitants; they are expected to reach 25 and 22 million, respectively, by the year 2000. It took New York City (the world's largest metropolis in 1950) a century and a half to expand by 8 million residents. Clearly, Mexico City and Sao Paulo matched this growth in less than 15 years.

A significant proportion of the world's urban population will live in large cities in the 21st century. In 1990, 33 percent of the world's urban population resided in agglomerations of size 1 million or more inhabitants and 10 percent in agglomerations containing 8 million or more (UNDIESA, 1991, 20). It is projected that, by the year 2000, 6 of the 10 largest agglomerations of the world will be from Asia -- Tokyo, Shanghai, Beijing, Calcutta, Bombay and Jakarta; 2 of the 10 will be

from Latin America-- Mexico City and Sao Paulo; and the other 2 will be from North America -- New York City and Los Angeles. In 1970, there were 20 urban agglomerations in the world with 5 million or more inhabitants, 9 from developed countries. In 1990, there were 34 such agglomerations, one third of which were from developed world, and it is projected that in the year 2000 there will be 45 agglomerations, only one fourth of which will be from the developed world (UNDIESA, 1991, 22).

Increasingly, living in a developing country means living in a very large city. By the year 2000, over half of the developing countries' urban population will live in cities with 5 million or more inhabitants. By 2025, this could grow to 30 percent.(Findley, 1993, 9 and 10).

Kasarda and Parnell (1993, xiii) assert that

> the rapidly growing mega-cities (which in most cases are primate cities) of developing countries are among the important economic, social, and cultural centers of the world. Their importance, prosperity, and value to individual opportunity will likely continue to increase in the years ahead.

The United Nations has defined mega-cities as those with 8 million or more inhabitants. In 1950, only two urban agglomerations were this large: New York with 12.3 million persons and London with 8.7 million people. According to the United Nations estimates, 20 agglomerations have now reached mega-city status. By the year 2000, it is projected that there will be 28 mega-cities (UNDIESA, 1991, 23).

The mega-cities of many countries have a very large percentage of their country's total urban population. Of the 28 agglomerations that currently have

reached mega-city status, or are projected to do so by 2000, 11 have 20 percent or more of their country's total urban population. Another 5 have between 15 and 20 percent of their national urban population. Primacy of the mega-cities in the urban hierarchy is common in the developing world.

In Asia, more than one half of Thailand's urban population resides in Bangkok and approximately one third of the urban populations of South Korea, Bangladesh, and the Philippines resides in Seoul, Dhaka and Metro Manila, respectively. Thailand, South Korea, Bangladesh, the Philippines, Indonesia, and Pakistan have one mega-city each, and each mega-city is generally between 3 and 4 times the size of the next largest city in the country (UNDIESA, 1991, 26).

Among Latin American mega-cities, 31 percent of the urban population of Mexico lives in Mexico City, and 41 percent of the urban population of Peru and Argentina currently resides in Lima and Buenos Aires, respectively. In 1990, the population of Mexico City was 6.4 times than that of the second largest (Guadalajara), and the population of Buenos Aires was 10 times than that of Cordoba. Brazil is the only Latin American country with two mega-cities whose combined populations make up 25 percent of Brazil's urban population; 15 percent live in Sao Paulo and 10 percent in Rio de Janeiro. The developed world has six agglomerations that reached a population of 8 million persons before 1990. Currently, the population of New York is only 9 percent and Los Angeles is only 6 percent of the United States urban population. The urban population of Japan is

much more concentrated. In 1990, 19 percent of the urban population of Japan lived in Tokyo and another 9 percent in Osaka (UNDIESA, 1991, 28).

During the period 1980-1990, mega-cities in developed countries grew 0.7 percent per annum, whereas mega-cities in Africa, Asia and Latin America grew annually at 3.9 percent, 3.3 percent, and 2.8 percent, respectively (UNDIESA, 1991, 29).

Economic Development and Urbanization Theories:

The concepts of urbanization, economic development, political stability, international economic and political relations, and local social and administrative issues are all interrelated in the modern world. Therefore, economic and urbanization studies should consider all factors that affects the dependent variables of their studies. There are many theories of development and urbanization that can mainly be categorized under four major schools: Modernization, Dependency / World System, Ecological, and Urban Bias theories.

We will discuss briefly each one of them and its effect on economic development and on urbanization -- specifically on urban primacy.

Modernization school:

The modernization school or as it is sometime called "developmentalist approach" emerged in 1950s and early 1960s. The basic hypothesis of this theory is that all countries go through progressive, irreversible, lengthy stages of development. This

theory also claims that urbanization patterns are unified and universal in all countries (Smith and London, 1990)

One of the famous theories in the modernization school is Rostow's stages theory. Rostow (1960) has described several stages of a nation's economic development. They are the (1) Traditional society, (2) Preconditions for take off, (3) Take off, (4) Drive to maturity, and (5) Age of high mass consumption.

The developed countries all passed the stage of "take off into self-sustaining growth." To take off developing countries that are still in either the "traditional society" or the "pre-condition" stage have to follow a certain path of development (Todaro, 1985, 63).

Traditional society is characterized by static equilibrium in a broad sense (economic, social, and political), fixed production techniques, unequal wealth distribution between the elite and peasants, and restricted social and geographical mobility.

Pre-conditions for take off include a beginning of changes in attitudes, increased social and geographical mobility, improved transportation and communication infrastructure that facilitates ideas coming from the outside, an increased attention to education, and the emergence of entrepreneurs and industrialists.

The third stage is the Take off which spans 20-30 years. During this period, the change is faster and the investment rate accelerates. Take off is also characterized by the development of one or more key sectors, and the existence of

political, social, and institutional frameworks that expedite the expantion of modern sectors.

Drive to maturity encompasses the spread of technology from the key sector to other sectors of the economy, increases in per capita income, a predominantly urban labor force, and structural changes. At this stage, a nation has 3 options: to turn to international military and political power, to turn into a welfare state, or to reach high mass consumption, which is the fifth stage.

The Age of mass consumption is characterized by suburbanization, automobile, and durable consumer goods. The United States reached this stage in 1920 and Western European countries reached it in the 1950s.

This theory has been criticized because the stages are overlapping and because it is difficult to test it scientifically. Also, there is little evidence that countries fall in these 5 stages. Empirical data show that increases in investment rates and growth do not occur in the 20-30 year span that Rostow designated for the take off stage. Rostow claimed that once that a nation reaches "take off", growth is irreversible. This claim is not valid; for example, Argentina was one of the richest countries at the beginning of this century, but now it is one of the poor countries.

In addition to Rostow, members of the Chicago School claimed that free trade is the key to economic growth and that autonomous development is detrimental to it (Hein, 1992).

The modernization school stresses that the development process requires a change in institutions and social attitude from traditional values to modern ones. It

sometime argues that developing countries should adopt the economic and political systems developed in Western Europe and North America.

Modernization theorists stress that increasing domestic saving and investment rates is not sufficient for development; a country also needs to rely on foreign aid and loans, foreign investment and technology. Chenery and Eckstein (1970) found, based on data from Latin America, that foreign investment provides needed capital that the domestic economy is unable to produce. Foreign investment can compensate for a low rate of domestic savings. They conclude that foreign investment is positively related to economic development.

According to the modernization school, rapid urbanization occurs as a result of transition from traditional to modern society, and this expansion is positively related to economic development. The modernization school believes that cities are places for innovations, economic changes, and political transformation. It also believes that at the beginning of modernization and development, people, investment, and resources concentrate in one or a few large cities for efficiency and agglomeration economies reasons, and then, in later stage of development people and resources spread around the country. Developmentalists believe that cities have net generative effects on nations (El-Shakhs, 1972; Mera, 1973; Alonso, 1980; Wheaton and Shishido, 1981; Kelly and Williamson, 1984; Smith and London, 1990).

Although the modernization school asserts that employment growth in the industrial sector is the main determinant of urban expansion, several studies have found that industry or manufacturing employment has no significant effect on

urbanization and primacy in the developing countries (Moir, 1976; Todaro, 1981; Bairoch, 1988; and Findley, 1993). Moomaw and Shatter (forthcoming) find that employment in industrial sector has no significant impact on urban primacy.

Ecological Theory:

Ecological theory is considered by many scholars as part of modernization school. We study it separately to stress the importance of the issues emphasized by this school. Ecological theory studies the relationship among population, environment, technology and organization (Duncan, 1959). According to Hawley (1950), change in a social organization is a result of the combined effects of population, technology, and environment. Hawley specifically emphasizes the effect of environment on social organization; and he defined environment as all factors external to the organism exerting an influence on its behavior. Meyer (1986) added changes in international trade and finance, along with cultural changes are important sources of change in social organization.

Lenski and Nolan (1984) state that the techno-economic heritage of nations has an important impact on the pattern of development. Looking at the pre-industrial era, agrarian societies can do better with regard to development than horticultural societies. This happens because the former have a capacity for a variety of patterns such as urban system, specialization, standard currencies, administrative bureaucracies, and literacy that the latter lack. These capacities help make the developmental changes much easier.

Nolan and Lenski (1985) demonstrate how the techno-economic heritage affects demographic patterns which in turn have an effect on the direction of a country's economic development. For instance, old agrarian societies have a higher population density than new agrarian societies. Thus, an old agrarian society adopts labor-intensive methods, while a new agrarian society adopts capital-intensive methods as their development strategies. The different techno-economic past, also, results in different patterns of income inequality and international trade. Old agrarian countries (e.g., Asia) have a surplus of labor, but because of high population density they have a relative scarcity in land and capital due to the demand of people for various consumer goods (e.g., shelter, food, etc.). This leads to less disparity in income distribution. On the other hand, new agrarian societies (e.g., Latin America) have a surplus of land and perhaps capital but a relative scarcity in labor. Thus, a large amount of land and, maybe, capital will be accumulated by a few people which leads to a skewed distribution of income, and different pattern of urbanization than the rest of developing countries (Preston, 1979).

The ecological school asserts that while there are different elite groups (landlords, government bureaucrats, industrialists, etc.), the common characteristic of all these groups is a self-serving attitude (Lenski, 1966). The ecological theory also asserts that a lower rate of mortality in comparison to that of fertility results in high population growth in rural areas which leads to agricultural labor surplus and increases the number of people "available for redistribution." Consequently, rural-to-urban migration occurs, in addition to pull factors such as the perception of more

favorable economic opportunities in cities (Spengler and Myers, 1977; Hawley, 1981; Bairoch, 1988).

Firebaugh (1979) argued that "urban pull" factors have been overemphasized while "rural push" factors have been underemphasized. Therefore, he tested "the premise that rural conditions in the Third World independently contribute to urbanward population movement" (Firebaugh, 1979, 201). He found "support for the contention that agriculture has independent positive effects on urbanization in underdeveloped nations in Asia and Latin America" (Firebaugh, 1979, 212). Thus, the ecological approach considers rural adversity to be a major determinant of urban growth in developing countries.

Dependency/ World System School:

The dependency school originated in Latin America as a response to the failure of traditional theories of modernization to explain economic stagnation in many Latin American countries. It also came as a reaction to the failure of the program of the United Nation Economic Commission for Latin America (ECLA) which had given hopes for increasing economic development and rising welfare of people. The ECLA developmental strategies of protectionism and inward looking policies such as import substitution failed in early 1960s.

Frank (1966) was one of the early scholars who introduced dependency theory to readers in North America and West Europe. In his article, "The

Development of Underdevelopment," Frank (1966, 202) argued that foreign investment causes a

> de-industrialization of the peripheral economy, as the productive infrastructure is reoriented to the raw material needs of the core country. This process of underdevelopment is deepened as cheap imports from the core drives the manufacturers of the indigenous producers out of business.

According to Frank, a peripheral country can be developed only by withdrawing from the world capitalist system, which implies a large reduction in trade, aid, investment, and technology from the developed capitalist countries. Dos Santos (1970, 289-290) stated that

> Dependency is a conditioning situation in which the economics of one group of countries are conditioned by the development and expansion of others. A relationship of interdependence between two or more economics or between such economics and the world trading system becomes a dependent relationship when some countries can expand through self-impulsion while others, being in a dependent position, can only expand as a reflection of the dominant countries, which may have positive or negative effects on their immediate development.

Thus, the basic argument of the dependency school is that the development of core countries comes through exploitation of peripheral countries and contributes to their underdevelopment.

The dependency school became an ideology in Latin America during 1970s and resulted in official policies of import-substitution and a hostile attitude toward foreign investment. Import-substitution attempts to generate wealth through the domestic production of goods that were previously obtained from the international

market. It is accomplished through tariffs and other barriers that make foreign goods less competitive with local goods (Hein, 1992).

According to dependency school, the relationship between core and periphery is based on the international division of labor, where core countries export manufacturing goods while periphery countries export primary and raw material goods. The multinational corporations take advantage of low wages in the periphery by establishing factories that produce goods at low cost. Thus multinational corporations get high profits while extracting the wealth of the periphery, which leads to distortion of domestic economies, slow economic growth, income inequality, and overurbanization (Kentor, 1981; Timberlake and Kentor, 1983; London, 1987, Bradshaw, 1985 and 1987 ; So, 1990; Hein, 1992).

Dependency is not only an external, but also an internal phenomenon. It creates a dualistic economy (traditional and modern sectors). Modernity appears in the export sector, which relies on external markets and does not produce for local market. (Amin, 1976; De Janvry, 1981). The small elite, which includes state officials and exporters, uses the gains from exporting for luxury goods rather than investment. The elite is more associated with external forces in core countries than with their own people. Frank (1967) asserts that "it is capitalism, both world and national, which produced underdevelopment in the past and which still generates underdevelopment in the present". Therefore, dependency theory argues that development should be defined in terms of improving living standards for all people,

not just for a small elite at the expense of majority of people. Otherwise, that kind of development is not good at all (So, 1990, 165).

While the modernization school emphasizes the reliance of the periphery on foreign aid and technology from core countries as a road to economic development, the dependency school argues that it is harmful for peripheral countries to rely upon foreign aid and foreign technology. They should rely upon their own resources and plan their own paths of development. Dependency theory also encourages trade between peripheral countries. Both theories, however, emphasize a tendency for "excess" urbanization.

While modernization theorists view primacy as a potential development tool that may allow a nation to use its resources efficiently (Berry, 1971; El-Shakhs, 1972), dependency theory views mega-cities and urban primacy as important mechanism of capitalist penetration that allow wealth to be transmitted from periphery to the core. Primate cities keep peripheral nations underdeveloped due to disproportionate and uneven exchange with the hinterland. Peripheral countries must allocate additional resources for primate city services and infrastructure. These resources could be used for programs conductive to economic development (Armstrong and McGee, 1985). Castells (1977, 47-48) asserts that

> dependent urbanization causes a super-concentration in the urban areas (primate cities), and a considerable estrangement between those urban areas and the rest of the country.

Castells suggests that dependent capitalism will also be characterized by high level of urban unemployment and inequality.

The latest modification in dependency theory is what is called a "mature development" where a highly developed country such Canada and Belgium can be dependent on foreign capital. This kind of dependency will, also, result in a negative long term effect on economic development (Hammer and Gartrell, 1986; See Bradshaw, 1988; Hein, 1992, So, 1990).

World-system theory does not differ from dependency theory except that it is more global. Dependency theory is concerned with individual countries whereas world system theory chooses to study groups of nations that have similar conditions. Immanual Wallerstein (1974 and 1979) argues that capitalism created a world-system that was globally divided into a core, a semi-periphery, and a periphery. These distinct divisions play different economic and political roles in the international system. "They are a historical product of the expansion of the world capitalist economy and various forms of imperialism." (Smith and London, 1990, 576). The basic argument of world-system theory is that core countries mainly exploit the periphery, which results in uneven development in peripheral counties. The relationship among the three groups of countries is not only an economic relation but also a political and cultural one. The semiperiphery differs economically ,politically, and culturally from both the core and the periphery. Its role is to protect the core against any threat from periphery and to become a second suppliers of raw materials needed by the core. This theory asserts that peripheral and semiperipheral nations exhibit higher levels of urban primacy than the core nations. London

(1987), Smith and London (1990), and Lyman (1992) found support for the world system influence on urban primacy.

Urban Bias Theory:

Urban bias theory has been associated mainly with the works of Michael Lipton (1977) and later with Robert Bates (1981). Lipton (1977) stated that the development process in developing countries is systematically biased in favor of urban areas relative to rural areas because of self-serving urban-based groups. Government favors urban areas through pricing, tax, investment policies which result in overtaxing and underdeveloping rural areas. This bias creates disparity between rural and urban areas in terms of wages, consumption and productivity levels which result in excess rural to urban migration that leads to overurbanization, slow economic growth, and inequality (Lipton, 1977, 145-59 and 270-86; 1984, 147). This bias occurs because rural areas are politically powerless. If the countryside were more powerful, it would get better prices for its products, more public investment, and fewer taxes (Varshney, 1993). According to Lipton (1977, 13)

> the most important class conflict in the poor countries of the world today is not between labor and capital. Nor is it between foreign and national interests. It is between rural classes and urban classes. The rural sector contains most of the poverty and most of the low-cost sources of potential advances; but the urban sector contains most of the articulateness, organization and power. So the urban classes have been able to win most of the rounds of struggle with the countryside but in so doing they have made the development process needlessly slow and unfair. Resource allocations, within the city and the villages as well as between them, reflect urban priorities rather than equity or efficiency.

In contrast to modernization theory, urban bias theory asserts that farmers should remain in agricultural activities, instead of migrating to urban areas where they join the informal labor market. Lipton (1977) has pointed out that rural areas may actually subsidize urban residents, since prices for agricultural products are determined by urban markets, and food prices that are artificially low bring political benefits to urban leaders. " This urban bias eliminates the incentive for farmers to produce more crops; it may actually become cheaper to import food produced by agriculturally more efficient countries than to buy farm products grown locally" (UNDESIPA, 1993, 36). Urban bias may promote temporary economic growth in poor nations, but it will reduce efficiency and it will not produce long term equitable development that is possible only through aiding agriculture. (Lipton, 1977; Bradshaw, 1987, 226).

According to Lipton, rural poverty is attributed to rural-urban relations within developing countries, and foreign involvement is not important. Poverty and slow growth are statistically unrelated to involvement, or lack of it, in the world economy (Lipton, 1984,157). Preston describes empirical findings "consistent with the view that spatial patterns of government expenditure bias patterns of city growth toward capital cities and toward the largest city in a country" (Preston, 1979, 204). Gugler states that urban bias and its accompanying rural exploitation are critical to understanding underdevelopment in many developing countries. He stated that the real reason "why poor people stay poor" is that urban elite funnel an inordinate share

of the resources of their societies into large cities, which have become "centers of power and privilege" (Gugler, 1982, 188).

Bates (1981) argued that it is not enough to say that urban areas are powerful while rural areas are powerless. It is necessary to understand why that is the case and how the rural-urban relation can be changed. Vershney (1993, 14-15) identifies three steps in Bates works on African agriculture,

> First, to extract resources for the treasury, city and industry, African states set prices that hurt the countryside. Second, by selectively distributing state largesse (subsidies and projects), African states divide up the countryside into supporters that benefit from state action and opponents who are deprived of state generosity, and are frequently punished. Such policy induced splits pre-empt a united rural front. Third, independently of the divisive tactics of the state, rural collective action is difficult because (a) the agricultural sector is very large with each peasant having a small share of the product, and (b) it is dispersed, making communication difficult. The customary free-rider problem in such situation impedes collective action. Industry on the other hand is small and concentrated in the city, and the share of each producer in the market is large, making it worth while for each producer to organize.

Urban bias as measured by the ratio of non-agricultural to agricultural productivity is positively related to urban primacy (London, 1987) and to overurbanization (London, 1987; Bradshaw, 1985, 1987).

Critiques:

This section discusses some of the critiques of the theories just presented. With regard to the modernization school, we summarize several critiques. First, the reality of developing countries contradicts basic modernization theory. There is a

pattern of urban primacy, urban poverty, and inequality that is very different from that of Western countries. (Smith and London, 1990). Second, although the modernization school asserts that employment growth in the industrial sector is the main determinant of urbanization, several studies have found that industry and manufacturing have no significant effect on urban growth and/or primacy in the developing countries (Moir, 1976; Todaro, 1981; Bairoch, 1988; Moomaw and Shatter, forthcoming). Third, Bradshaw (1987) wonders why urban growth continues despite the high rate of unemployment and underemployment in the service and informal sectors in large cities. The "bright light" theory asserts that migrants do not respond to the actual wage differential between rural and urban areas, but rather to the expected differential (Todaro, 1969, 1979; Rogers and Williamson, 1982). Rural-to-urban migration will continue as long as their expected wage exceeds their current rural wages, and as long as people in rural areas are attracted to the excitement of cities. Fourth, Kasarda and Crenshaw (1991) note that modernization and ecological theorists view inequality as an inherent property of social organization (Kasarda and Crenshaw, 1991, 485-486).

The main criticism of the classical dependency theory relates to its claim that core countries in collaboration with the local elite exploit raw material and wealth of peripheral countries and result in underdevelopment. Some developing countries avoided dependency problems and moved toward economic independence and development. Using Brazil as an example, Evans (1979) argued that dependency and development can occur together. Others state that the high rate of development in

East Asian countries, such as Korea and Taiwan, resulted from government policies designed to attract foreign investment and to encourage export-led growth. Thus, dependency theory can not explain all nations' development experience (Smith and London, 1990; Hein, 1992). Thus, "dependent development" can increase economic development in the "modern" sector and probably increase inequality.

In short, the dependency / world system school places a disproportionate emphasis on external power and gives inadequate attention to the internal causes of development (Portes, 1979; Chirot, 1981; London, 1987).

Finally: The Journal of Development Studies issued a special volume on urban bias theory. Varshney (1993, 5-6) summarizes four critiques of the urban bias theory that emerged.

> First, the (urban bias) theory neglects political institutions. The urban bias outcome is not true across political systems (for example, democracy versus authoritarianism), or across ideological orientations of the ruling elite (pro-rural or pro-industrial). How the polity and political institutions are organized, what objectives the political elites have, and how those objectives are expressed in the policy process may have varying implications not only for the power of the rural sector but also for its economic well-being. Second, the urban bias theory did not anticipate how technical change over time, especially of the green revolution variety, could begin to make the rural sector powerful. Third, the conception of how rural interests are expressed in politics is limited in urban bias theory to the strictly economic issues. That would not be such an omission, were it not damaging to the argument. Ethnic (and religious) identities may cut across the rural and urban sectors. When they begin to dominate the political agenda of a country, they can obstruct a sectoral construction of rural interests in politics. The cross-cutting nature of rural identities may thus weaken the countryside more than the power of the city. Finally,..... the urban-rural boundaries may at times be hard to detect.

In his response, Lipton (1993) insists that urban bias is defined upon outcomes, not causes or processes, and these unfavorable economic outcomes are due to rural powerlessness. Lipton objects that contributions to this special volume concentrate more on the price-based interventions of the state and less on the expenditures-based interventions reducing the force of the arguments. The sum of all state interventions in rural areas will clinch whether an urban bias exists or not. Several developing nations have started to favor rural areas through price-based intervention, but non-price intervention may work in the other direction (Lipton, 1993; Varshney, 1993). Bates (1993, 227-228) agrees with some of the critiques and states that

> Future work, they suggest, should focus more on institutions that structure political competition. It should develop a theory of public financial institutions: one that explains why they provide effective agencies of constraint in some countries but not in others. It should focus on the political significance of technical change and productivity growth in agriculture and of markets in ownership rights and claims to income that link the interests of town and country, thereby altering the structure of interests that drive policy choices in developing areas.

Another criticism of the urban bias theory relates to the proxy used to measure urban bias, the ratio of non-agricultural to agricultural productivity. This proxy roughly represents the urban/ rural productivity differential. Kasarda and Crenshaw (1991, 492) state that interpreting this proxy as urban bias is problematic because;

> First, there is no guarantee that all modern production is located in urban areas for any given Third World country (e.g. extractive industries are highly productive and are generally

> located outside of cities). Second, this proxy variable does not guarantee that the productivity differential is related to an urban bias in public policies concerning infrastructural development, macroeconomic policy, or the placement of elite services. Finally, the variable at best measures the relative efficiency of urban areas over rural areas.

Overurbanization and Role of Cities:

Overurbanization is a term from the 1950s that refers to the degree to which urban population exceeds the general economic development or industrial labor force. A nation suffers overurbanization when its urban population can not be supported by its level of economic development (Kentor, 1981; Tinberlake and Kentor, 1983; Brdshaw, 1985 and 1987; London, 1987; Smith, 1987; Kasarda and Crenshaw, 1991). Bradshaw (1987) asserts that overurbanization is a sign of economic illness, rather than being a sign of development.

Abu-Lughed (1965, 313) describes overurbanization as follows:

> Many students of urbanization have suggested that countries in the early stages of industrialization suffer an imbalance in both the size and distribution of their urban population, implying primarily that they have a higher percentage of people living in cities and towns than is "warranted" at their stage of economic development. The term used to describe this phenomenon is "overurbanization," which refers to the end result of excessive migration of un-and underemployed rural folk to cities in advance of adequate expansion of urban employment opportunities. One consequence of this premature migration is the high rate of unemployment in the labor forces of the great cities of Asia and Africa.

Some scholars claimed that high rate of natural increase and migration from rural areas promoted by large urban center attractiveness led to overurbanization (Davis and Golden, 1954; Gibbs and Martin, 1962).

Sovani (1964) argues that the notion of overurbanization is vague and thus is an unsatisfactory analytical concept. Partly because of this vagueness, the analysis of its causes and consequences are inadequate. Furthermore, there is no reason to expect the developing countries to follow the same urbanization path as the presently "developed" countries. Sovani considers it just as reasonable to consider the core countries as "underurbanized" during their economic development. Kamerschen (1969) confirmed Sovani's conclusion that there is no "invariant positive correlation between rural pressure and overurbanization."

Gugler (1982) defines overurbanization as: (1) rural-to-urban migration that results in a less than optimal allocation of labor between rural and urban sector, and (2) rural to urban migration that increase the cost of providing for a country's growing population. He thinks that the basic problem is one of misallocation. Too much labor and resources flowing into cities lead to underutilization and waste in urban areas, while rural areas are drained of potentially productive workers and fail to receive adequate investment.

Graves and Sexton (1979) introduce a definition of overurbanization that involve net positive or negative external effects associated with city size. If the negative externalities dominate the positive externalities, the city may be said to be overurbanized. Timberlake and Kentor (1983) argued that dependence on foreign

capital investment leads to overurbanization. Smith (1987) argued that both overurbanization and economic stagnation result from dependent status in the world-economy, and that, therefore, it is misleading to conceptualize stagnation as resulting from overurbanization.

Many scholars argue that overurbanization leads to high levels of urban primacy, rapid rural to urban migration, saturated urban labor markets, overburdened public services, retarded economic development due to high costs of urban development, and income inequality (Lipton, 1977; Gugler, 1982, Gilbert and Gugler, 1982; Smith, 1987; Bairoch, 1988). Smith (1987) stresses that overurbanization is heavily influenced by the distortion and constraints of "dependent development" in the Third World.

Overurbanization could be operationalized in several ways. Some researchers use an urban to industrial ratio (Preston, 1979; Kentor, 1981 ; London, 1987). Other researchers use a residualized measure obtained by regressing the level of urbanization on the level of development (Timberlake and Kentor, 1983; Bradshaw, 1985 and 1987).

With regard to the role of cities, many authors doubt the "generative" nature of city growth in the developing countries. Cities, in particular large cities, are regarded as "parasitic" because they drain rural areas of people and resources into as increasingly unhealthy urban environment (London, 1980; Gugler, 1982).

It is claimed that the primate cities retard development of other cities and have a parasitic effect on the economy. Hoselitz states that "a city will be designated

as generative if its impact on economic growth is favorable, i.e., if its formation and continued existence and growth is one of the factors accountable for the economic development of the region or country in which it is located" (Hoselitz, 1955, 279). According to Hoselitz, primate cities, in that they indicate an overconcentration of urban resources, are viewed as parasitic in relation to the rest of the economy. Breese (1969) indicates that primate cities consume a disproportionate amount of wealth of the developing countries without contributing to national economy in the same proportion.

Keyfitz (1965) states that primate cities in preindustrial societies are parasitic because they exert force on their hinterland, but cities in industrial nations are generative since they are the object of force and the flow of goods between city and countryside is therefore no longer on balance toward the city. Theories of growth poles and trickle-down assume that large cities are generative in nature. An important exception to the "trickle down" theory is that not all large cities act as growth poles. Some cities use the surplus they extract for consumption purposes, and some reinvest it for purposes of enlarging productive capabilities. (Walters, 1985)

Mehta (1964) thinks that scholars have overstated the parasitic effect of primate cities. He asserts that primate cities not only become administrative, trade, educational, and cultural centers servicing the indigenous population, but also probably stimulate the growth of cities in their own hinterland. Cities in general, and primate cities in particular, have the advantage of a large and concentrated labor and

consumer market. They are centers for social, technological and cultural change necessary for economic development. They spread and diffuse new ideas and development into other town and countryside. Mera (1973), in his empirical analysis of developing countries, found that the largest cities are likely to be more productive relative to other cities in developing countries, and that primacy of large cities is more conductive to economic development more than that of smaller cities.

Efficiency versus Equity

The trade-off between efficiency and equity has been the concern of some studies. Alonso (1968) distinguishes between efficiency and equity. He defined efficiency as natural economic growth often measured in terms of national product per capita, and equity as a more equal distribution of income. Williamson (1965) finds, from cross-country data, that the degree of regional inequality increases as the degree of development increases until the level of development reaches middle-income, then starts to decline. He also finds, from time-series data of several countries, that regional inequality occurs during the early stages of development, while mature development reduces the differentials. Alonso (1968) suggested that economic growth may lead to geographic inequalities, and, conversely, policies of regional equalization may slow down the growth of the total economy. Alonso (1980, 6) asserts that the early or take-off stages of development are associated with increasing inequality of income and wealth among subgroups of the population; but after some points this trend reverses itself and inequality decreases.

Mera (1973) finds that there is a positive association between the growth of the largest cities and economic development in developing countries. He concludes that the largest cities are more productive than the others in less developed countries. He asserts that the per capita income of different regions differs greatly because of the difference in the urbanization levels. He discourages any policy of decentralization if the goal is to maximize the growth rate of national income, but he asserts that decentralization policy may be effective if the goal is to achieve a more equitable distribution of income over different regions.

Many scholars have argued that the urbanization process is characterized by uneven growth and inequality. There are imbalances between urban and rural areas, among cities, and within cities. These imbalances may retard economic efficiency and growth (Gugler, 1982).

Most poor people in Asia and Latin America live in rural areas. There are imbalances in the delivery of social services to urban and rural areas. The United Nations' Human Development Report (1991, 21) asserts that in "

> on third of developing countries, rural people are only half as likely to be covered by health services as those in the urban areas. Even then, they are likely only to have simple clinics compared with the modern hospitals to be found in the towns and cities. A similar contrast is evident for safe water and sanitation, rural access is less than half that of urban areas. Education services too, are much less adequate for rural children.

Urban bias theory, as discussed before, stresses the unequal allocations of public services between urban and rural areas and transfer of incomes from the rural to the urban areas.

With regard to the imbalances among cities, several scholars have noted the lack of important secondary cities in the developing countries (Kasarda and Crenshaw, 1991). Most of economic, political, administrative, and cultural activities are usually concentrated in the primate city. Renaud (1981, 138) wonders "at what point is it in the self-interest of those in control to encourage the development of alternative urban centers and invest in building their infrastructure?".

The third level of imbalances is within the primate cities. Inequality is a characteristic of the internal structure of large cities. These cities are places of very rich people living in expensive, segregated areas and very poor, unemployed people living in rapidly growing shantytowns. Within primate cities, one can find a small group of highly skilled workers and managers and a majority of people who are involved in low paying jobs, informal sectors, underemployed, or unemployed.

Renaud (1981) defines economic efficiency for a city as a net result of the benefits of agglomeration economies that lowers the average cost of production for many activities, and losses created by congestion and environmental deterioration. Richardson (1993, 44) states that

> it is reasonably clear that a mega-city can not remain efficient as a monocentric city. If most jobs continue to be concentrated in the central city core, population growth and radial extension of the urbanized area will inevitably result in progressively more severe congestion costs.

He suggests that centralizing jobs to subcenter locations will relive congestion without sacrificing the benefits of area-wide agglomeration economies. He also (1993, 45) suggests that

> many of the external diseconomies that erode mega-city efficiency can be avoided by changes in the metropolitan spatial and political structure toward a more polycentric pattern.

The 1991 World Development Report discussed the relationship between efficiency, equity, and economic growth. It concludes that there is no evidence that income inequality leads to higher growth, and it seems that inequality is associated with slower growth. This report suggests that when markets work well greater equity often comes naturally. Education is the most important factor influencing income inequality.

Agglomeration Economies:

Most urban areas exist because of the advantages of scale and agglomeration economies. Scale economies enables cities to supply goods and services to their residents and to the residents of smaller town and rural areas. Mills and Hamilton (1989, 9) state that

> without scale economies production can take place on a very small scale near each consuming location, and population and production density-and land values- thus will be uniform.

Agglomeration economies mean the advantages of concentration of population and economic activities resulting from scale economies. Mera (1973) finds that because of the existence of agglomeration economies in the largest cities,

countries with higher degree of urban concentration have a higher growth rate of GNP per capita. Wheaton and Shishido (1981) and Petrakos and Brada (1989) find that urban concentration is a bell-shaped function of the level of development and attributed this relationship to the existence of agglomeration economies in the largest cities in the early stages of development. Wheaton and Shishido (1981, 22) state that

> if the distribution of cities in a country follows the laws of economic efficiency, greater scale economies should result in more urban concentration, while a large and/or more dispersed market should lead to urban decentralization.

Petrakos (1992) states that most studies consider agglomeration economies in the largest urban centers as the reason for the relationship of urban concentration and economic development.

Agglomeration economies may arise because firms in larger cities benefit from the availability of a wide range of business services (banking, insurance, real estate, hotels, maintenance and repair services, printing, transportation, communication) and public services (highways, mass transit, schools, fire protection). Thus, large cities are both centers of production and services and nodes of exchange of goods and services. Larger cities also provide larger differentiated markets of labor. Greater division of labor in specialized firms reduces production cost relative to unspecialized firms (Moomaw, 1983; Walters, 1985; O'Sullivan, 1996). Moomaw (1988) concludes agglomeration economies induce firms to locate close to each other to minimize production and transportation costs. Manufacturing firms which locate in large cities minimize production cost more than firms in

smaller cities, even if input prices are higher in large cities. Moomaw (1981) finds that the productivity advantages of larger cities are much larger for the nonmanufacturing sector than for the manufacturing sector.

Two kinds of agglomeration economies can be distinguished: Localization economies and urbanization economies. Localization economies occur if the production cost of firm in a particular industry decreases as the total output of the industry increases. Urbanization economies occur if the production cost of an individual firm decreases as the total output of the urban area increases (O'Sullivan, 1996). In other words, localization economies are external to the firm but internal to the industry, while urbanization economies are external to the firm and to the industry but internal to the city (Moomaw, 1988, 150). Urbanization economies differ from localization economies in two ways. First, urbanization economies result from the scale of the entire urban economy, not just the scale of particular industry. Second, urbanization economies generate benefits for firms throughout the city, not just firms in an industry (O'Sullivan, 1996).

In his article "Agglomeration Economies: Localization or Urbanization?," Moomaw (1988) estimates localization and urbanization economies and compares his results to those of Nakamura and Henderson. He (1988, 150) states that

> Nakamura (1985) estimates statistically and quantitatively significant localization and urbanization economies for Japanese cities. With no industry experiencing significant diseconomies of scale, he concludes that urbanization economies are more important for firms in light industries and localization economies are more important for firms in heavy industries. Using a flexible production function in a study of 2-digit industries in Brazil and the United States, Henderson (1986)

> concludes that external economies of scale are based on localization, not urbanization, economies. His estimates include localization economies and urbanization diseconomies.

Moomaw's findings with regard to localization economies are similar to those of Nakamura and of Henderson. With regard to urbanization diseconomies, Moomaw's study supports Henderson's conclusion that external economies are predominately localization economies and urbanization diseconomies exist in some industries. Henderson (1988, 97) concludes that

> economies of scale in manufacturing are generally ones of localization, not urbanization, indicating that agglomeration benefits derive from local own industry employment, not overall urban size. Localization economies appear to be stronger for heavy than for light industry, although if one can correct for simultaneity problems in estimation, localization economies may be as strong for light industry.

Summary and Conclusion

This chapter reviewed the trends and prospects of world's urbanization. We relied heavily on the U.N. World Urbanization Prospects: The 1990 and 1992 Revisions. They are the most comperhensive references in this subject. This review predicts that urban population will increase in coming decades and that the number of mega-cities will increase, particularly in the developing countries. This shows how important it is to make plans that adjust to this changes in the concentration of people and activities.

This chapter also outlined the main theories of urbanization and economic development. It started with modernization theory, which emphasizes that a country

should increase its domestic savings and investment and should rely also on foreign investment and technology in order to develop itself. It considers rapid urbanization a result of transition from traditional to modern society and the primate cities a potential development tool that may allow nations to use their resources effeiciently. Ecological theory studies the effects of population, environment, and techno-economic heritage of nations on their economic development and urbanization. It considers the population pressure on rural areas due to high fertility and low mortality rates as a reason for rural-to-urban migration and thus rapid urbanization and urban primacy. Dependency and world system theories stress that development of core countries comes through exploitation of peripheral countries and contributes to their underdevelopment. They view urban primacy as an important mechanism of capitalist penetration that allows wealth to be transmitted from periphery to core nations and to keep peripheral nations underdeveloped due to disproportionate and uneven exchange with the hinterland. Dependent urbanization also leads to a high rate of urban unemployment and inequality. While dependency theory is concerned with individual countries, world-system theory chooses to study group of nations that have similar conditions. It divides the world into a core, a semiperiphery, and a periphery. Urban bias theory emphasizes that the development process in developing countries is systematically biased in favor of urban areas, which leads to a disparity between urban and rural areas. This disparity results in excess rural to urban migration that leads to overurbanization and urban primacy. Each of these four theories has its strength and its shortcomings and in real life. Partial support for each

theory has been found. We intend to test each theory empirically to see whether we can confirm their hypothesis.

Overurbanization refers to the degree to which urban population exceeds the number needed for economic development. It leads to misallocation of people and resources and to high level of urban primacy.

With regard to efficiency versus equity, the main conclusion is that it is difficult at the early stages of development to have them both. In order to use the limited resources efficiently, they have to be concentrated in one city or region which leads to inequal distribution of projects and resources. This probelm may become less severe with the of development to other areas and other people.

The final topic this chapter undertook is that of agglomeration economies. We reserve more discussion of this subject to another place in this study.

CHAPTER III

OPERATIONAL DEFINITIONS

Urban Primacy

Definitions:

In World Urbanization Prospects: The 1992 Revision, the United Nations (UNDESIPA, 1993, 20) stated that

> The level of urbanization in a country refers to the percentage of the total population living in urban places, however urban is defined in the national context. But countries with similar level of urbanization may have quite different urban structures. Some countries -- often but not always in the less developed regions -- may have most urban people concentrated in a single "primate" city. Others may exhibit a more balanced distribution of urban population, with a number of large urban agglomerations as well as a network of smaller cities and towns....This structure is more likely to be found in the more developed countries.

Urban primacy is not a product of the modern civilization. It goes back in history to ancient civilizations in the Middle East, China, India, and to the ages of Greek and Roman Empires, when the city was the center of commercial, spiritual, and political activities.

Mills and Hamilton say "the term primacy refers to the size, or allegedly excessive size, of the largest metropolitan area in a country. More generally, the term sometime refers to the claim that several of the metropolitan areas are too

large"(Mills and Hamilton, 1989, 411). Mehta (1964) stresses that the largest city must be significantly more than twice the size of the second-ranking center to be considered overlarge. Smith states that "urban primacy is not merely the existence of a city that is much larger than any other. It is a city that is too large in relation to a system of cities, whose sizes must be described in specific terms- whether in terms of population, economic infrastructure, or bureaucratic institutions" (Smith, 1985, 89).

Thus, the primate city, by definition, is the largest city (urban agglomeration) in a country, often its capital, that dominates other cities within the urban system in that country. Urban primacy increases as the primate city has a larger percentage of the national population. If a country has a high primacy index, the primate city concentrates all major national functions --population, wealth, production and power -- in a single city and the other regions in the country are slighted or ignored. Consequently, the primate city may retard the growth of other cities and thus retard diversification of economic activities and convergence toward equality among regions within a country. Existence of high urban primacy in a country does not mean the existence of a high urbanization level. The level of urbanization may be low, moderate, or even high (UNDESIPA, 1993).

Kasarda and Crenshaw state that the concept of urban primacy "has been modified to include the notion of two-city primacy (e.g., Brazil's Sao Paulo and Rio de Janeiro), regional multiple-city primacy (e.g., India's urban system), and multicentric urban systems (where cities are more nearly equal in population size than would be predicted by the rank-size rule). Still, the urban systems of the

developing world tend toward single-city primacy..."(Kasarda and Crenshaw, 1991, 471).

Measures Of Urban Primacy:

A number of measures have been devised to measure urban population concentration and urban primacy. Each measure has its own advantages and disadvantages in terms of representing the concepts of concentration and primacy.

Jefferson (1939) was the first scholar to use the expression "primate city"; he compared the population of the largest city to that of the second and third largest cities. Primacy, according to Jefferson's law of the primate city, means that the size of the first city in a country is disproportionately large in relation to the size of the second and the third cities.

Zipf (1941) used the "rank-size rule," which states that the population of a city within a given system of cities is an inverse function of its rank within the system. According to the rank-size-rule, the second largest city is one-half the size of the largest city, the third largest is one-third, and so on. Therefore, if the largest city population is greater than twice the population of the second largest, it could be said to exhibit excess primacy. While some scholars assume that the rank-size (Pareto) distribution of city sizes is the optimal urban hierarchy for purpose of economic development (Walters, 1985,72), others state that "the rank-size distribution is no more than an approximation and that other distributions fit much of the data somewhat better than the rank-size distribution."(Mills, 1979, 45).

A number of scholars have used the Herfindeihl (H) index, the squared sum of population shares. The H index uses the size distribution of all cities within a system; it gives a measure of urban concentration not of urban primacy. The inverse of H index can be interpreted as giving the number of equal-sized cities that could contain the entire population. If *n* equals one, then H and its inverse equal one. If *n* is a large number of equal size cities, the H is small; its inverse is large.

Since the main concern of this study is to investigate the impact of various factors on urban primacy, four primacy indices will be compared. These measures are commonly used in the literature. The best one of these will be used to measure urban primacy in this study.

Urban Primacy Indices:

An urban primacy index should provide an objective basis for the ranking of countries according to the degree of primacy and therefore offer a way of assessing whether a primate city is disproportionately large. (Browning and Gibbs, 1961, 440). Different studies have used different measurements of urban primacy. Using different measurements leads to different conclusions. Since there is no commonly accepted measure of urban primacy, we examine four common primacy measures used in the urbanization literature and recommend the one that we believe is the most appropriate.

The first measurement of urban primacy, UP1, defines urban primacy as a ratio of the largest city population to the population of the second largest city. It indicates

how many times larger the first city is than the second city. This urban primacy index has been used by Browning (1958), Stewart (1959), Linsky (1965), McGee (1967), London (1987), Mutlu (1989), and Smith and London (1990). This measure can be used in cross-country comparisons, no matter how a country defines its urban population. It can distinguish countries that have a disproportionately large first city from those that do not. UP1 can be interpreted in terms of the rank-size-rule. If UP1 equals two, the largest city is twice as big as the second largest city; if UP1 exceeds two it means the urban primacy level is high; if UP1 is less than two, there is a low level of urban primacy.

The advantage of this urban primacy index is its operational simplicity and data availability. The disadvantage is that it fails to capture the shape of the total city size distribution or urban hierarchy (Walters, 1985, 75). The other disadvantage is that it ignores the size distribution of cities below the two largest cities in the country. If the two largest cities of a country have approximately equal population, and if there is a wide gap between the two largest cities and the rest of the urban system, that may give an impression that the country has no primate city, although most of the urban population is concentrated in these two largest cities. But the most common pattern of urban primacy is one primate city many times larger than the other cities in a country (Frey et al., 1986).

The second measurement of urban primacy, UP2, is the ratio of the largest city population to combined population of three or more next largest cities. This type of primacy index is the most often used in studies of urban primacy. The most popular

index is the "four-city" index that compares the largest city population to the combined populations of the next three largest cities. If the population of the largest city is greater than the combined populations of the next three cities, then the four-city index is greater than one and primacy can be said to exist in the country. A modification of this index is in Davis or Ginsberg index, which is the ratio of the population of the largest city to the sum of the population of the four largest ones. This measures the share of the largest city of the four largest cities. If the ratio is above 0.5, urban primacy is said to exist. A higher number means greater primacy of the largest city.

Various scholars such as Browning and Gibbs (1961), Davis (1969), Gilbert and Gugler (1982) and Mutlu (1989) have used this method of measuring primacy in their studies of the relationship between urban primacy and economic development. Berry (1961), Mehta (1964), and Owen and Witton (1973) have modified this measurement by combining the largest city population to the other large city populations in the denominator. Some scholars have suggested that it might be preferable to compare the largest city population to the next ten largest cities. This primacy index, like UP1, has the advantage of avoiding the problem associated with the different definitions of urban population. Therefore, it can be used to cross-country comparisons. It has a similar disadvantage as UP1; in the case of dual-primacy, it misrepresents the urban primacy system in a country. It, also, ignores variation in the size of the second, third, and fourth largest cities; furthermore, changes in the ratio may result from fluctuation of size in any of the

Table: 3.1
Correlation Matrix of Urban Primacy Indices

	UP1	UP2	UP3	UP4
UP1	1.0000			
UP2	0.9835	1.0000		
UP3	0.6928	0.7040	1.0000	
UP4	0.3898	0.3458	0.6201	1.0000

four largest cities(Walters, 1985). The other disadvantage of this measure is that it requires data for several cities in each country that may not be available, especially in the least developed countries.

Mutlu(1989) finds that UP1 is highly correlated with the three-city index, and hence he concludes that either can be used with equal validity. Lyman (1992) cites results that found a high correlation between a three-city index and a five-city index. Using panel data, we have found that UP1 and UP2, for our sample that includes 30 countries from Asia, Latin America, and North America, are highly correlated (0.98) (Table 3.1).

The third measurement of urban primacy, UP3, is the ratio of the largest city population to the total urban population of a country. It measures the percentage of a country's total urban population living in a single city. This measure shows the presence and absence of alternative urban centers large enough to balance the

influence of the largest city(Renaud, 1981,36). El-Shakhs (1972) used average measure in order to combine urban population within a country. Renaud (1981), and Moomaw and Shatter (forthcoming) have used this type of primacy index. The World Bank states that since the data on the level of urbanization are "based on different national definitions of what is urban, cross-country comparisons should be made with caution." (World Bank, 1993, 321). The United Nations uses national definitions of urban population because they assume that the statistical authorities in each country know what constitutes an urban area better than experts from outside the country. The United Nations recognizes that "one of the major problems for an international comparative studies of urban/rural populations is definitional. The most common criterion for urban population is a minimum number of people, but the figure differs from country to country, reflecting a variety of social and geographical conditions." (UNDIESA, 1987, 1). The minimum number of people that constitute an urban area has a wide range: from 100 people in Uganda to 20,000 in Nigeria to 30,000 in Japan, but most countries choose a minimum between 2,000 and 5,000 people. Thus, if two countries with the same total population and same number of people who live in the largest city of each country, and if these two countries define what constitute urban population differently, the urban primacy index, UP3, will be different for both countries, and hence may lead to false conclusions. Therefore, urban primacy index, UP3, is not a reliable measure when it comes to comparing urban primacy in different countries.

The fourth measurement, UP4, is the ratio of the largest city population to the total population of the country. This index is not a common one in urbanization literature. Browning (1958) use this measurement to study urbanization trends in America. Vining (1985) also used it. This index does not accurately measure the concept of urban primacy since it does not distinguish between urban and rural areas, and it can not show the pattern of population distribution within a country. For example, in 1990, 13 percent of the total population of Canada and Thailand lived in the largest city. However, this primacy index does not tell how the remaining 87 percent are distributed in each country. For instance, the largest city in Canada, Toronto, is 1.2 times larger than the second largest, Montreal; while in Thailand, Bangkok is about forty times larger than the second largest city. Second, 77 percent of Canada's population live in urban agglomerations compared to only 22 percent for Thailand's. Therefore, UP4 fails to specify the patterns of population distribution within a country and does not indicate whether the largest city is primate or not. "It ignores the size distribution of cities below the largest" (Wheaton and Shishido, 1981, 19).

Some researchers have used a primacy measure that is a ratio of the largest city to the total population of cities of 100,000 people or more, but the problem with this measure is that there are many countries in the world that have only one city of 100,000 people or more, which result in just dividing the largest city population over itself. Clearly this measure does not help that much.

Conclusion:

This analysis has identified the different urban primacy indices, and their advantages and disadvantages. Evidently each index has its own shortcomings and there is no perfect measure. Nevertheless, some measures are better than others.

UP4 is less useful for this study because it ignores the distribution of cities below the largest one. This index does not measure primacy well. Therefore, we do not recommend using it to measure urban primacy.

The UP3 is deficient in a cross-country comparison because it is based on various definitions of urban areas.

UP1 ignores the distribution of cities below the two largest ones. It can be misleading when there is a "dual-primacy" case, but dual-primacy is not a common phenomenon in the world. Thus, in general, UP1 is a good indicator of urban primacy.

UP2 may capture more of the concept of urban primacy than UP1 because it depends on more cities in the urban system. Like UP1, it may not capture the concept, when there is a dual-primacy system. Nevertheless, because of high correlation between UP1 and UP2, they might be used interchangeably.

Economic Development

Definitions:

Although there is a fundamental distinction between economic development and economic growth concepts, some researchers have used the two concepts interchangeably. Bairoch (1988) distinguishes between the two concepts. He states that "growth usually means a simple increase in production; development implies underlying structural changes as well; and economic development adds the idea of broader social and cultural transformation or change" (Bairoch, 1988, xx). In drawing a distinction between development and growth, Sen (1988, 13 - 15) distinguishes the two concepts in the following manner: first, in so far as economic growth is concerned only with GNP per head, it leaves out the question of distribution of that GNP among the population. It is possible for a country to have an expansion of GNP per head, while its distribution becomes more unequal. A second source of difference between growth and development comes to the question of externality and non-market ability. The GNP captures only those means of well-being that happen to be transacted in the market, and this leaves out benefits and costs that do not have a price-tag attached to them. Third, even when markets do exist, the valuation of commodities in the GNP will reflect the biases that markets may have. There are important problems in dealing with different relative prices in different parts of the world.

Thus, while economic growth refers to a rise in a country's income per capita that is usually measured by gross national (domestic) product, economic development is a much broader concept. In addition to the increase in per capita income, economic development implies economic, social, political and cultural changes. It is a multidimensional process. It implies changes in production structure, a rise in urbanization, changes in pattern of consumption, and a reallocation of resources to more efficient use. Economic development primarily comes from within. It mainly depends on internal efforts with a gradual process that may take decades. Economic development is not homogenous. It takes different shapes in different countries at different times. "It is generally agreed that development encompasses the reduction of poverty, improvements in health and education of population, and an increase in productive capacity as well as rising per capita income" (Chenery and Srinivasan, 1988, xi). Gillis emphasize that "participation in the process of development implies participation in the enjoyment of the benefits of development as well as the production of those benefits. If growth only benefits a tiny, wealthy minority, whether domestic or foreign, it is not development" (Gillis et al., 1992, 9). It is possible for a country to experience economic growth without economic development, but no country experiences economic development without economic growth.

Economic Development Indicators:

There are several indicators used to measure economic development, such as labor force shares in industry, and energy consumption. In the following we will discuss only the major indicators

The first indicator of economic development is the national income per capita as measured by gross national (domestic) product. "Gross national product (GNP) is the total domestic and foreign value added claimed by residents, calculated without making deductions for depreciation. It comprises gross domestic product (GDP) plus net factor income from abroad, which is the income residents receive from abroad for factor services (labor and capital), less similar payments made to non-residents who contribute to the domestic economy. Gross domestic product "measures the total output of goods and services for final use produced by residents and non-residents, regardless of the allocation to domestic and foreign claims." (World Bank, 1992, 288).

GNP or GDP per capita is the most useful single indicator of economic development. It encompasses all of nation's economic activity in a few mutually consistent summary statistics, but there are problems associated with it. One of the major problems of this indicator is that it includes only market activities; it does not consider all kinds of production. Another problem is that World Bank converts domestic currency to US dollars using official exchange rates that may not reflect purchasing power. A third problem of per capita income is the unreliable data of many less developed countries because of poor statistical tools and the carelessness

of the people who collect these data. A fourth problem is that GNP per capita does not account for income distribution. The final problem is stated by the World Bank is that "GNP per capita does not by itself constitute or measure welfare or success in development. It does not distinguish between the aims and the ultimate use of a given product, nor does it say whether it merely offsets some natural or other obstacle, or harm or contributes to welfare. For example, GNP is higher in colder countries, where people spend money on heating and warm clothes, than in balmy climates where people are comfortable wearing light clothes in the open air (World Bank, 1992, 287)."

The second indicator of economic development is the Kravis Purchasing Power Adjustment. The International Comparative Project of the UN Statistical Office and the University Of Pennsylvania converts a country's GNP in local currency into international dollars by measuring the country's purchasing power, adjusted for the local cost of living, relative to all other countries rather than using the exchange rate (Nafziger, 1990, 24). GNP per capita based on purchasing power parity (PPP$) reflects not just income but also what that income can buy. If goods and services are cheaper in one country than another, a dollar is worth more in the former country and purchasing power parity adjusts for this (UNDP, 1994). Even with the Kravis Adjustment, income per capita is not a perfect indicator of economic development, and efforts have been made to replace it with a more reliable measures, usually an index of several economic and social variables.

The third indicator is the physical quality of life index (PQLI) developed by Morris (1979). PQLI measures people's basic needs. It is an aggregation of three widely available indicators of social performance. The three indicators are the literacy rate, life expectancy at age one, and the infant mortality rate. Each indicator was assigned a scale value from 1 to 100, where 1 represents the "worst" performance by any country and 100 the "best" performance. An unweighted average of the three indicators was then taken (Todaro, 1985; Nafzifer, 1990).

Todaro (1985, 104) state that "the PQLI appears on the surface to be free of the major problems associated with using GNP as a measure of development." It measures development in terms of the quality of life. It indicates the distributional level of benefits of development. Furthermore, it is a simple measure with available data.

Critics of the measure stress that "it is a limited measure, failing to incorporate many other social and psychological characteristics suggested by the term " quality of life" -security, justice, human rights, and so on" (Todaro, 1985, 104). Also, the correlations among the GNP per capita, the components of the PQLI, and the indicators of basic needs are generally high. Another criticism is that a country with high per capita does not necessarily reflect a high level of social welfare. A third problem of this indicator is that there is no clear rationale for giving the three indicators equal weights. A fourth problem is related to the component of this indicator. Meier states that if "non income factors captured by the PQLI are important, so are income and consumption statistics and distribution" (Meier, 1989,

9). Thus, to have a reliable measurement of economic development, use of additional economic, political, and social indicators is recommended.

Despite its limitations, the PQLI appears to be a useful indicator of development; it can serve as a useful complement to GNP statistics. (Todaro, 1985, 102-105). It has been noted that both Kravis index and PQLI do not alter the ranking of countries greatly from that utilizing per capita income.

The fourth indicator of economic development is the human development index (HDI). Since GNP (GDP) per capita, the Kravis index and PQLI do not reflect the broad concept of economic development, there has been a new effort by the United Nations Development Program (UNDP) to establish a new measure. The Human Development Report (1990) defined human development as the process of increasing people's options. It stressed that the most critical choices that people should have include the option to live a long and healthy life, to be knowledgeable and to find access to the assets, employment and income needed for a decent standard of living. Therefore, the 1990 report introduced a new way of measuring human development-- by combining indicators of national income (using purchasing power parity), educational attainment, and life expectancy into a composite human development index, the HDI (UNDP, 1994, 90). Educational attainment is measured by combination of adult literacy and mean years of schooling. "The idea of diminishing returns to income is captured by a progressively lower weight to income beyond the poverty cut-off point." (UNDP, 1991, 15). A high level of development is

accompanied by longer life expectancy. Life expectancy is, in fact, a measure of "quantity" of life rather than of its "quality."

Although the HDI reflects the broader meaning of human development beyond the GNP measure, the HDI concentrates on just three of the many and changing dimensions that define human development. The Human Development Report of 1990 acknowledged that no single index could ever completely capture such a complex concept of human development. Another criticism of this measure is that it suggests that rising per capita income from the level of middle income country to that of high income country makes little contribution to human development (Gillis et al., 1992, 81).

Conclusion:

All four indicators have shortcomings. Some represent only marketed activities, and these do not consider all types of output. Also, they all suffer from the lack of reliable data from less developed countries. The Kravis index does not alter the ranking of countries greatly from per capita income figures and is hard to compute. Fortunately, it is available for most countries from 1950 to the present. PQLI concentrate on three social indicators of well being and ignore economic and other aspects of development.

Comparing income per capita and HDI, we find that HDI is a more realistic measure. The strength of the HDI measure is that it looks to development as multidimensional process.

Because HDI is a relatively new measurement, data from previous years are not available. For this reason we use income per capita, with its shortcomings, in our model as an indicator of economic development for years 1960, 1965, 1970, 1975, 1980,1985, and 1990.

With regard to income per capita we can use either GNP or GDP. GNP per capita is the most widely used. We will use GDP per capita as the measure of the level of economic development because it reflects the value of domestic production. Our main source will be The Penn World Tables (Mark 5.6a), called PWT 5.6a, which is a newly revised, expanded, and updated version of Penn World Table (Mark 5) that was described in "The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950-1988" by Robert Summers and Alan Heston, Quarterly Journal of Economics, May, 1991. PWT 5.6a is distributed by the NBER on computer diskette and through an electronic bulletin-board file.

CHAPTER IV

Determinants of Urban Primacy: A Panel Data Approach

I. Introduction:

The main goal of this chapter is to find which factors that have significant impacts on urban primacy. Potentially, these factors include different aspects of economic ,demographic, political, and ecological effects. Although all determinants are important, we have a special interest in investigating the relationship between urban primacy and economic development because we are interested in the extent to which urban primacy responds to economic forces.

This chapter starts by sketching an economic model of urban primacy. Then, it empirically confirms the conclusion, reached in chapter III, that UP1 is the best practical indicator of urban primacy. Next, the impact of various determinants on urban primacy will be investigated using the ordinary least squares (OLS) regression. We compare the findings of a pooled OLS model with those of fixed-effects and random-effects models. Our purpose is to show the danger of ignoring fixed effects when they exist. Many past studies have not used country fixed effects, and thus may have reported biased results. Since the thirty countries that are included in this

countries (namely: Canada, Japan, and the United States) to determine how sensitive the results are to these observations. Next, we add the lagged dependent variable to the original equation and compare the results. Finally, we lag all independent variables by one period and regress them on the urban primacy index (i.e. regress the independent variables at periods 1960, 1965, 1970, 1975, 1980, and 1985 on the dependent variable at periods 1965, 1970, 1975, 1980, 1985, 1990), and explain the difference between this setting and the original one. This chapter will be concluded by emphasizing the most important results we have reached.

II. Basic Model of Urban Primacy:

There is no general agreement in the urbanization literature about the determinants of urban primacy. This suggests the need to explore a wide range of factors that have a significant impact on primate city. This section will explain the importance and the direction of the expected relationship between several variables and urban primacy. The model draws on variables found important in theoretical models and in past empirical work. Our strategy is first to present a basic model of urban primacy. Then, we add variables derived from the various approaches discussed in chapter II.

Elements of an economic model:

The main reasons for spatial concentration in urban areas, particularly in primate cities, are scale economies, transportation costs, and agglomeration economies.

Central Place Theory explains how many cities develop and why some cities are larger than others. It assumes that distance plays a significant role in the organization of cities, and the main function of a city is to provide goods and services to its population and those of its hinterland. The theory identifies the market forces that generate a hierarchical system of cities in such a way there exist a small number of large cities and large number of small cities (O'Sullivan, 1996, Mills and Hamilton, 1989). Richardson (1979, 61) indicates that "the spatial distribution of population and economic activity is explained as the marginal outcome of the influences of economies of scale and transportation costs over space." There are historical, religious, political, and administrative forces that determine city size distribution, but according to economic theory, scale economies of production and transport are significant determinants.

Most urban areas exist because of the advantages of scale economies. Scale economies enable cities to supply good and services to their residents and to the residents of smaller town and rural areas. "Without scale economies, production can take place on a very small scale near each consuming location, and population and production density -and land values- thus will be uniform" (Mills and Hamilton, 1989, 9).

Throughout history, transportation cost is a major determinant of the pattern of spatial distribution and existence of cities. High transportation costs motive the input suppliers and producers and consumers of goods and services to locate in proximity (Renaud, 1981; Mills and Becker, 1986; Bairoch, 1988). Urban

concentration is high when transportation is more expensive because people and activities group together to save on travel costs (Krugman, 1991; Elzindo and Krugman, 1992; Ades and Glaeser, 1995).

Agglomeration economies of scale induce firms to locate close to each other to minimize production and transportation costs. Manufacturing firms which locate in large cities minimize production cost more than firms in smaller cities, even if input prices are higher in large cities (Moomaw, 1988). Two kinds of agglomeration economies can be distinguished: Localization economies, which occur if the production cost of firm in a particular industry decreases as the total output of the industry increases, and urbanization economies, which occur if the production cost of an individual firm decreases as the total output of the urban area increase (O'Sullivan, 1996). In other words, localization economies are external to the firm but internal to the industry, while urbanization economies are external to the firm and to the industry but internal to the city (Moomaw, 1988, 150). O'Sullivan (1996, 28) states that urbanization economies differ from localization economies in two ways. First, urbanization economies result from the scale of the entire urban economy, not just the scale of a particular industry. Also, urbanization economies generate benefits for many firms in the city, not just firms in a single industry. Because of agglomeration economies, economies of scale, and high transportation costs, firm locate closer to each other, and workers live close to their jobs to save in commuting cost. This leads to concentration of people and activities in a one large city, which results in high prices of land and houses in the large city. Also, concentration in a

small area leads to congestion problems and other disamenities. People and firms start to compare the cost of locating in large cities to transportation cost if they move farther from the concentration center and, hence, many move to suburbs or other towns.

Pros and Cons of A Primate City:

Although there is an agreement that cities exist because of specialization and differentiation of economic activities among different cities, and between cities and their hinterlands, urban economists disagree on the impact of large cities, especially the primate ones, on national development and on the other smaller cities and towns in a nation. Mehta (1964) and Findley (1993) have analyzed the debate.

To summarize, those who encourage concentration of people in the largest cities claim that in addition to the advantage of economies of scale and agglomeration economies, a primate city serves as highly efficient center of specialization and technological innovation. It leads the development process of a nation. The primate city has the advantage of large and concentrated labor and consumer markets. It is more efficient to concentrate manufacturing and business activities in one place. It is also more efficient to build infrastructure such as roads, communication, port facilities in a single place. A primate city contributes disproportionately to national economic growth and social transformation. It offers a wide variety of educational, health, commercial, and personal services, and provides a large market for agricultural products and informal sector activities. It also

provides an ideal environment for social mobility and accommodation between diverse ethnic and religious groups.

Those against concentration of people and economic activities in one city argue that "a single urban agglomeration may drain the wealth of the whole country and make the benefits of modernization available only to those who live in or near the largest city. Areas distant from the urban center have little access to advantages associated with modernization, such as health care, education, transportation and social services (UNDESIPA, 1993, 36). The negative externalities of spatial concentration of population and economic activities, such as crime, pollution, traffic congestion, and pressure on scarce services are more prevalent in a primate city than in smaller urban areas. The opponents of excessive primacy argue for balanced urban and regional development.

Basic Model:

Our basic model deals with several important factors that affect urban primacy. The size of a country--output, population, and land area--plays a major role in determining whether a country has a balanced urban system. When the economic size of a nation increases, it makes it possible to have several production sites which creates new spatial concentration centers, and, thus, reduces urban primacy.

Economic development increases urbanization in a country. Furthermore, it is more efficient for a country in the beginning of its development process to concentrate infrastructure and investment in one place to take advantage of

agglomeration economies, to reduce transportation costs, and to have a focal point for manufacturing and commerce. Thus, at the early stages of development, urban primacy and economic development are positively related, until a point when benefits of development spread to other cities and rural areas which leads to a dispersal of population to other growing areas in the country. This is consistent with the theory of growth-pole cycles (Amos, 1990).

Transportation cost and population density are negatively related. When population density increases, transportation cost decreases, making it easier for people and activities to move from one place to another. Thus, there is no need for people to concentrate in one city to save in travel cost. Therefore, urban primacy decreases.

Nations start building their first institutions of higher education in the primate city. This increases the population of the largest city. Furthermore, a more educated population is expected to be attracted to large cities. Primate cities also attract educated and skilled labor for jobs and services that are not available in smaller cities and towns. Also, in most countries in the world, the primate city is the capital city. Public administration and government offices increase the employment in the primate city, and thus increase the total population of the largest city. In addition, rent seeking activities may make the capital city larger than it would otherwise be.

In short, urban primacy depends upon gross domestic product (GDP), economic development as measured by GDP per capita (GDPC), GDPC squared

(GDPCSQ), population density (POPDENS), education (EDUC), and whether the largest city is the capital city (DCAP).

Basic equation:

We specify a multiplicative equation for urban primacy,

(4.1) $UP1 = a\ GDP^{b}\ GDPC^{c}\ GDPCSQ^{d}\ POPDENS^{e}\ EDUC^{f}\ e^{gDCAP}\ E$

where,

GDP : gross domestic product.

GDPC : gross domestic product per capita

GDPCSQ : square of GDP per capita.

POPDENS: population density which is the ratio of a country's total population to arable land.

EDUC : average years of schooling.

DCAP : dummy variable equals 1 if capital city is the largest city in a country; and equal 0 otherwise.

Taking natural logarithms gives

(4.2) $LUP1 = a + b\ LGDP + c\ LGDPC + d\ LGDPCSQ + e\ LPOPDENS + f\ LEDUC + g\ DCAP + LE$

a is a constant term; **b, c, d, e, f, and g** are the coefficients. **L** indicates the natural log. **E** is the error term. All variables are for country i at time t.

To identify the effects of the fundamental variables, GDP, population, and land area, (4.2) can be rewritten as

$$(4.3)\ LUP1 = a + b\,LGDP + c\,L\left(\frac{GDP}{POP}\right) + d\,L\left(\frac{GDP}{POP}\right)^2 + e\,L\left(\frac{POP}{LAND}\right) + f\,LEDUC + g\,DCAP + LE$$

$$(4.4)\ LUP1 = a + b\,LGDP + c\,LGDP - c\,LPOP + d\,(LGDP - LPOP)^2 + e\,LPOP - e\,LLAND + f\,LEDUC + g\,DCAP + LE$$

$$(4.5)\ LUP1 = a + (b + c)\,LGDP + (e - c)\,LPOP + d\,LGDP^2 - 2d\,LGDPLPOP + d\,LPOP^2 + e\,LLAND + f\,LEDUC + g\,DCAP + LE$$

Before estimating equation (4.2), we describe the dependent and independent variables of the basic model and the additional variables that we plan to introduce.

III. Dependent Variable of the Basic Model

LUP1 is the natural log of the ratio of the largest city population to the population of second largest city in a country. Data for all urban primacy measures are collected mainly from the *UNDESIPA's World Urbanization Prospects: The 1992 Revision.* Some of the data necessary to calculate these measures are also collected from various issues of the *UN Demographic Yearbook, The Europa World Yearbook, The Statesman's Yearbook,* and *the World Development Report* and *World Tables of The World Bank.*

IV. Independent Variables of the Basic Model

Basic model variables

1. The economic size of a nation is expected to be negatively related to urban primacy. Large countries are expected to have a more balanced urban system than

small countries. The economic size of a nation is measured by gross domestic product (**GDP**), adjusted for purchasing power. We expect **GDP** to have a negative, partial effect on urban primacy. Data for **GDP** are calculated from *Summers and Heston's Penn World Tables (Mark 5.6).*

2. The level of economic development, as measured by GDP per capita (**GDPC**) is a significant determinant of urban primacy. As discussed in chapter I, different studies have found different relationships between the level of economic development and urban primacy. Our hypothesis of this relationship is that of a bell-shaped curve. Data for this variable comes from *Penn World Table (Mark 5.6).* We will use the squared GDP per capita (**GDPCSQ**) to test the curvilinearity of this relationship.

3. Population Density is the number of people per square kilometer of arable land. Mehta (1964), Rosen and Resnick (1980), Wheaton and Shishido (1981), Mutlu (1989), and Moomaw and Shatter (forthcoming) have found that a country's population size and urban primacy are negatively related. Countries that are highly populated have several large cities, each with a relatively small share of urban population. Ades and Glaeser (1995) found that concentration in the nation's largest city fall with total population. We expect that a country's total population will have negative effect on urban primacy. We use data of total population from *World's Urbanization Prospect: The 1992 Revision*

With regard to land, several scholars have found a negative relationship between land area and urban primacy (Berry, 1961; Ginsburg, 1961; Wheaton and Shishido, 1981; De Cola, 1984; Mutlu, 1989). We expect land area to be positively

associated with urban primacy because a large land area leads to high transportation cost which result in grouping people and activities together to save on travel cost (Krugman, 1991; Ades and Glaeser, 1995). "The size of the country (holding population constant) is a decrease in population density which might mean an increase in the transportation costs of supplying the hinterland" (Ades and Glaeser, 1995). Data for arable land is from *FAO Production Yearbook.*

Therefore, we expect population density (**POPDENS**) to have a negative effect on urban primacy. When population density is high, transport cost might be low and the urban population could be more evenly distributed across several cities.

4. When a nation starts its development, it builds schools and universities, first, in its primate city. Thus, educational opportunities (**EDUC**) attract many migrants from other towns and rural areas. Also, the kind of jobs in large cities that are related to services and manufacturing are associated with more specialized and educated individuals. These kinds of jobs are associated with higher wages in large cities. Thus, educated people migrate from rural areas and small towns to large cities and that may enhance urban primacy. We use the average years of schooling of people 25 years or older as a proxy for human capital effect on urban primacy. We expect this variable to have a positive effect on urban primacy. Data come from *Barro and Lee (1992),* and *from different issues of UN Human Development Report.*

5. Many scholars have asserted that if the largest city and the capital of a country are the same this will lead to greater urban primacy (Jefferson, 1939; Ginsburg, 1961; Berry, 1961; De Cola, 1984; Mutlu, 1989; Moomaw and Shatter, forthcoming; Ades

and Glaeser, 1995). The capital is a place where government bureaucrats, army officers, representative of local and international corporations, and other elite groups are concentrated. These groups control all major activities in a country and act to further their own interest which often conflict with development goals. The concentration of resources and infrastructure in the capital attracts migrants from rural areas and small towns. We use a dummy variable (**DCAP**) that equals 1 if the capital city is also the largest city and equals 0 otherwise. Data are available in the *UN Demographic Yearbook* and *World Urbanization Prospect: The 1992 Revision.*

Additional Variables

1. The degree of openness is expected to have a negative effect on urban primacy. Elizondo and Krugman (1992) assert that trade and population concentration are negatively related. Moomaw and Shatter (forthcoming) found that exporting has such an effect. Ades and Glaeser (1995) found that population concentration in the largest city is negatively related to international trade. In contrast, dependency and world system theory expect this variable to have a positive effect on primacy. We use exports of goods and nonfactor services as a percentage of GDP as a measure of openness (**EXP**). Data are collected from *World Tables, 1994,* and different issues of *World Development Report.*

2. As we use GDP per capita (GDPC) to measure the effect of the level of economic development, we use the growth rate of GDP per capita (**GDPCGR**) to test the effect of economic growth on urban primacy. Growth pole theory suggests that a rapidly

growing economy will generate both backwash and spread effects. Consequently, for a given development level a more rapid growth rate could either increase or decrease urban primacy. We expect a negative relationship between the two variables because we expect the spread effect to determine the backwash effect. GDPCGR is calculated from *Penn World Tables (Mark 5.6).*

3. Migration is one of the main contributors to urban primacy. Rural-to-urban migration, in most of the cases, is driven by economic motives. Migration is largely in response to real or perceived employment opportunities in industrial sector, government sector, or service and informal sectors (Todaro, 1969; Kelly and Williamson, 1984; World Bank, 1984).

Industrialization is an important factor in attracting employment to specific locations. Industries prefer to locate in urban areas, especially in large cities, to take advantage of scale and agglomeration economies and to share infrastructure and transportation costs, as well as specialized needs such as financial, legal, and technical services.

The service sector may attract people to the primate city to work in jobs such as banking industry, insurance and legal offices, and different kind of offices and agencies. Also labor in informal sector shares a large percentage of employment in big cities.

Thus, we want to test the effect of labor outside agriculture (**LABOR**) on urban primacy. We calculate the share of the labor force outside agriculture as one minus the percentage of economically active population in agriculture that we collect

from *FAO Production Yearbook.* Ades and Glaeser (1995) found that the share of labor outside agriculture has a positive effect on population concentration in the largest city in a country. We expect the same effect on urban primacy.

4. Population growth may contribute to urban primacy. A rapid population growth rate in rural areas leads people to migrate to large cities. Linsky (1965) states that a rapid rate of national population growth will be positively associated with high primacy of the leading city. Berry and Kasarda (1977) and De Cola (1984) also found a positive relationship between urban primacy and the population growth rate. The hypothesis derives from an ecological approach, which states that population growth rate has a positive effect on urban primacy in two ways. First, because of the pressure of high rate of population growth on land availability in rural areas, people move to urban areas seeking a better way to live. This rural-to-urban migration increases urban primacy. Second, Firebaugh (1971, 203-4) argued that adverse rural conditions contribute to high rates of urban natural increase, in part because migrants tend to be of child bearing age. The data for population growth rate (**POPGR**) are from *World Urbanization Prospects: The 1992 Revision*

5. As discussed in chapter II, urban bias focuses on government policies that favors urban areas relative to rural areas which result in rural-urban income inequality and disparities in rural-urban standard of living (Bradshaw, 1987, 225; London and Smith, 1988). Gugler (1982) states that the capital city frequently receives the lion's share of public expenditures while rural areas face neglect.

Lipton (1977, 145) introduced an indicator of the disparity between rural and urban areas, which is the ratio of output per worker in nonagriculture (i.e., the percentage of nonagriculture GDP divided by percentage of labor force in nonagriculture) to output per worker in agriculture (i.e., the percentage contribution of agriculture to total GDP divided by the percentage of the labor force in agriculture). This urban-rural disparity measure (**URD1SP**) has been used by Lipton (1977), Bradshaw (1987) and London and Smith (1988) as a direct test of urban bias. This ratio increases when nonagricultural sector is more productive than agricultural sector. Urban bias theory predicts that this variable has a positive effect on urban primacy. The data for percentage contribution of agriculture to total GDP are from various issues of *World Tables and World Development Report*, and data for percentage of the labor force in agriculture are from *FAO Production Yearbook.*

6. Dependency and world system theories assert that developing nations remain highly dependent because they are penetrated by foreign capital that is invested in raw material extraction. Petrakos and Brada (1989) asserted that foreign investment may promote city primacy by expanding employment opportunities in large cities. Moreover, many multinational corporations pay higher wages relative to host country standards. The location of foreign investment in large cities, also attracts domestic investment to these cities. All these factors expand employment opportunities and promotes urban primacy. This study will investigate the effect of foreign direct investment (**FDI**), which has grown dramatically, on urban primacy. Froot (1993) stated that between 1980 and 1990 world flows of FDI have approximately tripled.

Dependency and World System Theories assert that FDI will increase urban primacy. FDI variable is calculated as the ratio of FDI to GDP. The data of FDI are collected from various issues of *IMF Balance Of Payments Yearbook and IMF International Financial Statistics.*

V. Econometric Approach:

This section discusses the advantages of panel data analysis, and provides description of data construction. Then, it gives a brief discussion on the difference between fixed and random effects models.

Data:

This study uses panel data analysis to study urban primacy. There are several advantages of panel data over cross-sectional or time-series data sets: (1) They are very informative about the parameters to be estimated due to substantial increase in degrees of freedom (if N is the size of the cross-section, and T is the number of time periods, the number of degrees of freedom increase from N to NT). (2) Panel data reduce multicollinearity among regressors and thus improve the efficiency of the estimates. (3) By permitting country and time-specific effects, panel data provide controls for the effects of missing or unobserved variables that are correlated with explanatory variables. (4) They allow the researcher to analyze a number of important economic questions that can not be addressed using cross-sectional or time-series data sets. (5) Using panel data does not require as strong assumptions about error terms as cross-sectional data requires. The disadvantage of panel data is

that N is usually very large and T is frequently very small. Thus, parameters that are identified by variation across the cross-sectional units will tend to be estimated very well, while parameters that are identified only by the variation across time may be estimated quite poorly. (Hsiao, 1986; Greene, 1993; Davidson and Mackinnon, 1993; Judge et. al., 1988).

This study includes countries from Asia (excluding Middle East), and the Americas. We choose to limit our sample to these areas for several reasons. One, as discussed earlier, rapid urbanization into large mega-cities is a phenomenon of Asia and the Americas. Asia and Latin America include a number of countries that have grown rapidly, as well as countries that have not. Moreover, the World Bank (1993) argues that openness to foreign influence is an important reason for southeast Asian development. Other Asian countries, such as India, have been more inward looking. Latin American countries, of course, provided the setting for the development of dependency theory. Thus, this group of countries is well-suited for testing dependency / world system theories. It is well-suited for testing ecological and elite theories because it contains countries that have experienced rapid and slow population growth. Moreover it includes countries in Southeast Asia where the benefits of development have been shared generally among the population and countries where development has generated inequality.

Each country should meet the following conditions: (1) have a total population of two million or more in 1990, (2) be a nation-state not a city-state, a criterion that eliminates Hong Kong and Singapore, and (3) not be a socialist or ex-

socialist country. These criteria give 33 countries. Because of substantial data unavailability, we drop Haiti, Jamaica, and Nepal. Therefore, our sample includes 30 countries; 11 countries from Asia, 17 countries from Latin America, and 2 countries from North America. The 30 countries, in alphabetical order, are: Argentina, Bangladesh, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El-Salvador, Guatemala, Honduras, India, Indonesia, Japan, Korea (south), Malaysia, Mexico, Pakistan, Panama, Paraguay, Peru, Philippines, Sri Lanka, Taiwan, Thailand, United States, Uruguay, and Venezuela.

This sample includes a wide range of countries, from a country with very large population such as India with about 850 million people in 1990 to a country such as Panama with only about 2.5 million. It also includes mega-cities such as Tokyo with more than 25 million inhabitants in 1990 and smaller cities such as San Jose (capital of Costa Rica) with 297 thousand inhabitants. It also has a wide range of income, from low-income countries such as India with GDP per capita of $1,264 in (PPP) to high income countries such as USA with $18,054 in 1990. Some countries have a highly primate city, for instance Thailand (UP1 = 26), others have low urban primacy, such as Canada (UP1 equals 1.2).

To investigate the time effect we collect data for 7 different years: 1960, 1965, 1970, 1975, 1980, 1985, and 1990. All sources of data are mentioned when the corresponding variable is discussed, except for Taiwan where data are collected from various issues of *Statistical Yearbook of Republic of China, The Europe Yearbook,* and *The Statesman's Yearbook.*

All statistical results were computed with the econometric software LIMDEP version 6.0 (Greene, 1992). Most variables have complete data. If data are missing, the "SKIP" command is used to bypass them.

One factor fixed and random effects models:

Simple pooling of panel data and using OLS to estimate an equation overlooks country-specific and time-specific information. Both fixed and random effects models can use this information. We now compare these two panel data techniques (Hsiao, 1986; Judge, et.al., 1988; Davidson and Mackinon, 1993; and Greene 1992 and 1993).

Fixed-Effects Model (FEM):

The fixed effects model (FEM) is the least squares dummy variable (LSDV) model. A dummy for each country is introduced and the equation is estimated by OLS; the fixed effects are unknown parameters to be estimated. The estimator of the coefficient is called the within group estimator because only the variation within (not between) each country is used when the estimator is formed. When FEM is used, inference is conditional on the observations that are in the study; inference can not be extended outside the sample. If differences in countries can be adequately captured by specifying different intercept coefficients for each country, the fixed effects model is appropriate.

Random-Effects Model (REM):

The random effects model (REM) is a generalized least squares (GLS) regression model. It treats the individual specific effects as random variables. The GLS estimator is a weighted average of the between group and within group estimator.

REM is appropriate if the cross-sectional units are viewed as a random sample from some larger population, and it is the population parameters that we wish to learn about.

To summarize, FEM constrains inference to observations within the model. To generalize inference from the sample to a population, the effects should be random. It may be up to the researcher to decide whether to make inference with respect to the effects that are in the sample or with respect to population characteristics in general. Greene (1993, 479) states that

> From a purely practical stand point, the dummy variable approach is costly in terms of degrees of freedom lost, and in a wide, longitudinal data set, the random effects model has some intuitive appeal. On the other hand, the fixed effects approach has one considerable virtue. There is no justification for treating the individual effects as uncorrelated with the other regressors, as is assumed in the random effects model. The random effects treatment, therefore, may suffer from inconsistency due to omitted variables.

We start our discussion by comparing the four urban measures to show empirically that UP1 is the most suitable variable to the purpose of this study.

VI. FINDINGS

Comparison of urban primacy measures:

This study has compared four measures of urban primacy. These measures, as mentioned in chapter III, are UP1 which is the ratio of the largest city population to the population of the second largest city, UP2 which is the ratio of the largest city population to the total population of the second, the third, and the fourth largest ones, UP3 which is the ratio of largest city population to the total urban population, and UP4 which is the ratio of the largest city population to the total population of a country. We conclude in chapter III that each measure has its own shortcomings, and that there is no perfect measure of urban primacy; but also we find that some measures have advantages over others.

UP4 is available for almost all countries on a frequent basis. Moreover, it uses all population information; as in an example of Thailand and Canada in chapter III, however, it may not measure urban primacy well. The correlation matrix in Table 4.1 shows that the correlation between the natural log of UP4 (LUP4) and the natural log of the other primacy measures ranges from 0.51 to 0.67. LUP1 and LUP2 are the most direct measures of urban primacy; LUP4's correlation with them is 0.51 and 0.54. This implies the R^2, the percentage of variation that the two variables have in common is only 25 to 30 percent The hope that LUP4 could proxy urban primacy is a vain one. LUP1 and LUP2, on the other hand, have a simple correlation of 0.97. Almost 90 percent of their variation is variation in common. Furthermore, UP4

Table 4.1:
Correlation Matrix of Urban Primacy Indices and Their Determinants

	LUP1	LUP2	LUP3	LUP4	LGDP	LPOP	LGDPC	LGDPCSQ	LPOPDENS
LUP1	1.0000								
LUP2	0.9719	1.0000							
LUP3	0.6967	0.7700	1.0000						
LUP4	0.5088	0.5400	0.6660	1.0000					
LGDP	-0.2475	-0.2579	-0.5404	-0.2444	1.0000				
LPOP	-0.2778	-0.2892	-0.5831	-0.5219	0.9014	1.0000			
LGDPC	-0.0145	-0.0158	-0.0788	0.4804	0.5008	0.0766	1.0000		
LGDPCSQ	-0.0368	-0.0382	-0.1058	0.4510	0.5236	0.1037	0.9984	1.0000	
LPOPDENS	-0.1037	-0.1209	-0.0850	-0.2031	-0.0332	0.0966	-0.2697	-0.2804	1.0000
LLAND	-0.1930	-0.1939	-0.4766	-0.3580	0.8255	0.8438	0.2141	0.2441	-0.4527
LEDUC	0.1218	0.0952	0.0245	0.5250	0.3187	-0.0068	0.7477	0.7412	-0.8802
DCAP	0.5809	0.5278	0.5620	0.4651	-0.4586	-0.4800	-0.0965	-0.1226	0.3712
LEXP	0.0987	0.0855	0.2847	0.3299	-0.4687	-0.5982	0.1167	0.0930	0.2309
GDPCGR	0.0728	0.0719	0.0215	0.2109	-0.0036	-0.0830	0.1577	0.1459	-0.0381
LLABOR	-0.0360	-0.0656	-0.0595	0.6149	0.2750	-0.1020	0.8372	0.8245	-0.1727
LPOPGR	-0.0708	-0.0569	0.0835	-0.2209	-0.4107	-0.2079	-0.5300	-0.5403	0.0671
LURDISP	0.0831	0.1588	0.1405	-0.1960	-0.1044	0.0621	-0.3739	-0.3739	0.1811
FDI	0.0774	0.0734	0.0972	0.2947	-0.0493	-0.1558	0.1890	0.1890	-0.0094

Table 4.1 (Cont.):
Correlation Matrix of Urban Primacy Indices and Their Determinants

	LLAND	LEDUC	DCAP	LEXP	GDPCGR	LLABOR	LPOPGR	LURDISP	FDI
LUP1									
LUP2									
LUP3									
LUP4									
LGDP									
LPOP									
LGDPC									
LGDPCSQ									
LPOPDENS									
LLAND	1.0000								
LEDUC	0.0413	1.0000							
DCAP	-0.6302	0.0862	1.0000						
LEXP	-0.6604	0.2797	0.4187	1.0000					
GDPCGR	-0.0538	0.2573	0.0677	0.0691	1.0000				
LLABOR	0.0017	0.7987	0.0165	0.2262	0.2603	1.0000			
LPOPGR	-0.2225	-0.5508	0.0663	0.0761	-0.0112	-0.4972	1.0000		
LURDISP	-0.0420	-0.4336	0.0809	0.0248	-0.0186	-0.5400	0.4382	1.0000	
FDI	-0.1345	0.2925	0.1706	0.2878	0.1652	0.3096	0.1685	0.0140	1.0000

shows the percentage of the total population that lives in the largest city. It does not tell how primate the largest city is relative to other cities in the urban system. Thus, it does not accurately measure the concept of urban primacy. Since this study defines primate city as the largest city relative to other cities within the urban system in a country, UP4 is the least useful for this study.

Table 4.1 shows that LUP3 has a relatively high correlation with LUP1 (0.70) and LUP2 (0.77); it is not as high as the correlation between LUP1 and LUP2. The implied R^2s range from about 50 to 60 percent. LUP3, like LUP4, uses more information than the other measures; in this case it is total urban population and the population of the largest city. Again, this information is more generally available than information about city population for cities other than the largest city. The measure suffers because the definition of urban population is not constant over countries. The correlation of 0.7 to 0.8 suggests that it is not a good proxy for urban primacy. Because LUP3 is based on various definitions of urban areas, it is not a reliable measure when it comes to cross-country comparison.

UP2, the "four-city" index, has the advantage of comparing the largest city to the next three largest cities, rather than to only the second largest. But for many developing countries, data for the third and fourth largest cities are difficult to get. UP1 has the advantage of simplicity and data availability, but it fails to capture the size distribution of cities below the two largest in the country. Both UP1 and UP2 have the advantage of making cross-country comparisons more accurate. Table 4.1 shows that the natural logs of UP1 and UP2 (LUP1 and LUP2) are highly

Table 4.2a:
Comparison of Urban Primacy Indices. OLS without group dummy variables.

VARIABLE	LUP1	LUP2	LUP3	LUP4	LUP1	LUP2	LUP3	LUP4	LUP1	LUP2	LUP3	LUP4
LGDP	0.1548***	0.1109***	-0.0775***	-0.1190***	0.0459	-0.0182	-0.1484***	-0.1837***	-0.0902*	-0.1072**	-0.1717***	-0.2398***
	(4.241)	(3.264)	(-3.469)	(-4.650)	(1.064)	(-0.467)	(-5.487)	(-5.903)	(-1.767)	(-2.749)	(-6.168)	(-6.856)
LGDPC	4.9115***	4.6982***	2.7295***	5.4526***	9.1018***	8.1280***	4.2958***	3.7429***	14.326***	11.963***	5.7703***	5.9967***
	(4.182)	(4.296)	(3.795)	(6.621)	(7.024)	(6.935)	(5.288)	(4.005)	(8.955)	(8.829)	(6.612)	(5.470)
LGDPCSQ	-0.3291***	-0.3092***	-0.1697***	-0.3121***	-0.5546***	-0.4885***	-0.2504***	-0.2182***	-0.8434***	-0.7021***	-0.3422***	-0.3496***
	(-4.462)	(-4.503)	(-3.758)	(-6.037)	(-7.047)	(-6.861)	(-5.074)	(-3.843)	(-8.710)	(-8.562)	(-6.479)	(-5.268)
LPOPDENS	-0.4785***	-0.4000***	-0.1782***	-0.2289***	-0.3917***	-0.3150***	-0.1434***	-0.1902***	-0.0949	-0.1034*	-0.0965***	-0.0813*
	(-8.526)	(-7.652)	(-5.184)	(-5.818)	(-6.877)	(-6.114)	(-4.014)	(-4.630)	(-1.449)	(-1.865)	(-2.700)	(-1.812)
LEDUC	0.2320**	0.1421	0.0255	0.3348***	0.5401***	0.4976***	0.2530***	0.2699***	0.6560***	0.5794***	0.3165***	0.3568***
	(1.970)	(1.296)	(0.353)	(4.055)	(4.078)	(4.153)	(3.046)	(2.824)	(3.924)	(4.092)	(3.471)	(3.114)
DCAP	1.5566***	1.1978***	0.5789***	0.6429***	1.3273***	0.9693***	0.4815***	0.6744***				
	(11.497)	(9.502)	(6.983)	(6.772)	(10.324)	(8.334)	(5.974)	(7.273)				
LEXP					-0.1898**	-0.2278***	-0.1353**	-0.2568***	-0.2528***	-0.2727***	-0.0979	-0.2511***
					(-2.098)	(-2.782)	(-2.385)	(-3.934)	(-2.165)	(-2.757)	(-1.536)	(-3.137)
GDPCGR					-0.0226	-0.0145	0.0023	0.0033	-0.0054***	-0.0379**	-0.0017	-0.0072
					(-1.523)	(-1.084)	(0.251)	(0.312)	(-2.974)	(-2.454)	(-0.174)	(-0.577)
LLABOR					-1.5543***	-1.4345***	-0.7016***	0.8453***	-2.9477***	-2.4647***	-0.8606***	0.4295*
					(-5.948)	(-6.069)	(-4.283)	(4.485)	(-8.425)	(-8.317)	(-4.509)	(1.791)
LPOPGR					-0.4088***	-0.4007***	-0.1556**	-0.0960	-0.5318	-0.5147***	-0.2858***	-0.1965
					(-3.540)	(-3.836)	(-2.149)	(-1.153)	(-2.951)	(-3.372)	(-2.907)	(-1.591)
LURDISP					-0.0714	0.0905	0.0067	0.2549***	-0.2626*	-0.0417	0.0896	0.2324**
					(-0.643)	(0.902)	(0.960)	(3.183)	(-1.803)	(0.338)	(1.128)	(2.328)
FDI									-2.6098	-1.3967	-0.2887	-1.1799
									(-0.695)	(-0.439)	(-0.141)	(-0.458)
CONSTANT	-20.382***	-19.614***	-11.044***	-24.082***	-37.678***	-33.543***	-17.370***	-14.307***	-58.121***	-48.632	-22.704***	-22.709***
	(-4.201)	(-4.342)	(-3.717)	(-7.079)	(-6.883)	(-6.774)	(-5.061)	(-3.624)	(-8.484)	(-8.382)	(-6.076)	(-4.837)
Adj. R^2	0.52	0.45	0.51	0.72	0.61	0.58	0.59	0.75	0.43	0.46	0.50	0.57

The number in parentheses is the t-statistic. The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels.

Table 4.2b:
Comparison of Urban Primacy Indices, (Fixed Effects Model).

VARIABLE	LUP1	LUP2	LUP3	LUP4	LUP1	LUP2	LUP3	LUP4	LUP1	LUP2	LUP3	LUP4
LGDP	-0.4328***	-0.4005***	0.0880	-0.0100	-0.6598***	-0.5868***	-0.0303	-0.2351	-0.6626***	-0.6029***	-0.2500***	-0.1951
	(-3.305)	(-3.215)	(0.670)	(-0.063)	(-4.204)	(-3.933)	(-0.271)	(-1.220)	(-3.893)	(-3.707)	(-3.227)	(-0.922)
LGDPC	1.1973*	1.129*	-0.1803	1.5928**	1.9243*	1.3431	-0.5183	0.4313	1.7037*	1.1512	-0.0741	0.1190
	(1.855)	(1.839)	(-0.389)	(2.027)	(2.032)	(1.491)	(-0.893)	(0.371)	(1.670)	(1.181)	(-0.123)	(0.094)
LGDPCSQ	-0.0349	-0.0314	0.0161	-0.080*	-0.0628	-0.0320	0.0416	-0.0010	-0.0500	-0.0181	0.0275	0.0171
	(-0.939)	(-0.889)	(0.665)	(-1.776)	(-1.178)	(-0.632)	(1.299)	(-0.015)	(-0.862)	(-0.327)	(0.793)	(0.238)
LPOPDENS	-0.1085	-0.1957*	-0.0807	-0.0291	-0.0907	-0.1830*	-0.0772	-0.0695	-0.1151	-0.2094*	-0.0067	-0.0830
	(-0.924)	(-1.752)	(-1.209)	(-0.204)	(-0.765)	(-1.623)	(-1.135)	(-0.478)	(-0.917)	(-1.746)	(-0.096)	(-0.532)
LEDUC	0.2449**	0.1927*	0.0314	0.1864	0.2609**	0.2148*	-0.0009	0.1953	0.3088**	0.2870**	-0.0324	0.2082
	(2.071)	(1.714)	(0.445)	(1.295)	(2.054)	(1.779)	(-0.012)	(1.253)	(2.164)	(2.105)	(-0.392)	(1.173)
DCAP	0.7306***	0.7397***	0.3066***	0.7680	0.5860***	0.6011***	0.2168**	0.4875**				
	(4.984)	(5.306)	(3.685)	(4.303)	(3.190)	(3.441)	(2.022)	(2.162)				
LEXP					-0.0620	-0.0497	-0.0113	0.0088	-0.0374	-0.0428	-0.0308	0.0033
					(-1.165)	(-0.981)	(-0.361)	(0.135)	(-0.624)	(-0.749)	(-0.853)	(0.045)
GDPCGR					-0.0037	0.0019	0.0015	-0.0022	-0.0056	-0.0007	0.0014	-0.0053
					(-0.550)	(0.294)	(0.339)	(-0.263)	(-0.772)	(-0.097)	(0.272)	(-0.591)
LLABOR					0.2613	0.3147	0.2798*	0.7697**	0.2036	0.2715	0.3164*	0.7178**
					(0.978)	(1.239)	(1.823)	(2.348)	(0.716)	(1.000)	(1.933)	(2.031)
LPOPGR					0.0449	0.0919	0.0914**	0.1408*	0.0457	0.1401	0.1849***	0.2061
					(0.632)	(1.360)	(2.121)	(1.614)	(0.489)	(1.568)	(3.219)	(1.772)
LURDISP					-0.1516**	-0.1342**	-0.0044	0.0299	-0.1245*	-0.1119*	-0.0065	0.0546
					(-2.334)	(-2.174)	(-0.119)	(0.375)	(-1.813)	(-1.705)	(-0.164)	(0.640)
FDI									1.0951	1.6187	-0.1856	0.8259
									(0.876)	(1.356)	(-0.253)	(0.531)
CONSTANT			-2.6203*				0.7847				2.1549	
			(-1.797)				(0.330)				(0.846)	
LMT	404.915	419.988	433.543	275.325	340.559	308.602	333.246	189.757	297.878	256.661	224.639	191.775
(p-value)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.00000	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Adj. R^2	0.96	0.95	0.96	0.92	0.96	0.95	0.96	0.92	0.95	0.94	0.95	0.88

The number in parentheses is the t-statistic. The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels.

Table 4.2c:
Comparison of Urban Primacy Indices,(Random Effects Model).

VARIABLE	LUP1	LUP2	LUP3	LUP4	LUP1	LUP2	LUP3	LUP4	LUP1	LUP2	LUP3	LUP4
LGDP	-0.1208*	-0.1053*	-0.1162**	-0.1430***	-0.1192*	-0.0860	-0.1530***	-0.1645***	-0.2288***	-0.1845***	-0.2431***	-0.2403***
	(-1.880)	(-1.739)	(-2.023)	(-2.951)	(-1.809)	(-1.458)	(-3.295)	(-3.472)	(-3.147)	(-2.980)	(-5.243)	(-4.764)
LGDPC	0.7453	0.7301	0.4202	2.1176***	1.8677**	1.4224*	0.2875	1.1985	2.0444**	1.8333**	0.2237	1.5586
	(1.307)	(1.348)	(1.207)	(3.232)	(2.249)	(1.819)	(0.583)	(1.310)	(2.178)	(2.072)	(0.392)	(1.466)
LGDPCSQ	-0.0299	-0.0289	-0.0102	-0.1026**	-0.0923*	-0.0675	-0.0008	-0.0522	-0.0970*	-0.0848*	0.0078	-0.0669
	(-0.856)	(-0.870)	(-0.491)	(-2.522)	(-1.899)	(-1.474)	(-0.028)	(-0.965)	(-1.773)	(-1.642)	(0.236)	(-1.071)
LPOPDENS	-0.1790**	-0.2191***	-0.0561	-0.1513*	-0.1535*	-0.1957***	-0.0508	-0.1359	-0.0587	-0.0900	-0126	-0.0245
	(-2.193)	(0.0045)	(-0.991)	(-2.186)	(0.0618)	(-2.600)	(-0.991)	(-1.989)	(-0.649)	(-1.117)	(-0.233)	(-0.330)
LEDUC	0.0672	0.0029	0.0018	0.3380***	0.0961	-0.0495	-0.0324	0.1859*	0.1251	0.0909	-0.0626	0.2136*
	(0.755)	(0.035)	(0.029)	(3.748)	(0.920)	(0.504)	(-0.489)	(1.678)	(1.073)	(0.836)	(-0.861)	(1.700)
DCAP	0.8289***	0.7923	0.3346***	0.7412***	0.8818***	0.8552***	0.3359***	0.6266***				
	(6.171)	(6.213)	(4.169)	(5.270)	(5.685)	(5.925)	(3.593)	(4.293)				
LEXP					-0.0480	-0.0382	-0.0092	-0.0302	-0.0531	-0.0590	-0.0379	-0.0425
					(-0.933)	(-0.785)	(0.301)	(-0.515)	(-0.912)	(-1.071)	(-1.078)	(-0.628)
GDPCGR					-0.0003	0.0049	0.0002	-0.0034	-0.0041	0.0003	0.0030	-0.0085
					(-0.045)	(0.817)	(0.037)	(-0.461)	(-0.584)	(0.039)	(0.591)	(-1.012)
LLABOR					-0.3465	-0.2894	0.0983	0.6613***	-0.355	-0.3681	0.1714	0.5359*
					(-1.501)	(-1.338)	(0.713)	(2.783)	(-1.393)	(-1.537)	(1.106)	(1.912)
LPOPGR					-0.0160	0.0305	0.0878**	0.0777	-0.0301	0.0471	0.1829***	0.1124
					(-0.231)	(0.465)	(2.127)	(0.974)	(-0.331)	(0.544)	(3.267)	(1.050)
LURDISP					-0.1309**	-0.1091*	-0.0062	0.00452	-0.1086*	-0.0968	0.0064	0.0454
					(-2.097)	(-1.844)	(-0.170)	(0.624)	(-1.627)	(-1.524)	(0.164)	(0.570)
FDI									0.4335	0.8805	-0.3203	0.5755
									(0.354)	(0.754)	(-0.442)	(0.383)
CONSTANT	-1.0607	-1.8344	-2.1082	-10.701	-6.0568*	-5.3387	-0.935	-5.5701	-4.6867	-5.2877	0.8995	-5.9079
	(-0.460)	(-0.838)	(1.364)	(-3.985)	(-1.695)	(-1.588)	(-0.430)	(-1.437)	(-1.179)	(-1.411)	(0.364)	(-1.310)
FE vs. RE	23.0576	18.7504	7.412	9.037	36.4885	37.407	25.7785	17.738	31.278	38.319	27.619	16.676
(p-value)	(0.0008)	(0.0046)	(0.2844)	(0.1715)	(0.0001)	(0.0001)	(0.0070)	(0.0879)	(0.0010)	(0.0001)	(0.0037)	(0.1178)
R^2	0.33	0.30	0.38	0.69	0.37	0.34	0.38	0.71	0.03	0.04	0.15	0.49

The number in parentheses is the t-statistic. The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels.

correlated (0.97).

To test whether these dependent variable give similar regression results, we report three models in tables 4.2a, 4.2b, and 4.3c, using OLS, FEM, and REM, respectively. Because the purpose is to compare the equations across dependent variables we do not discuss the coefficients at this time. Tables 4.2B and 4.2C show that the regression results of LUP1 and LUP2 are consistent. In the first equation, LUP1 and LUP2 favor fixed effects model over random effects model while LUP3 and LUP4 favor the random over fixed. In the second equation all indexes favor fixed over random effects model, but LUP1 and LUP2 have a high p-value compared with that of LUP3 and LUP4. In the third equation LUP1, LUP2, LUP3 favor fixed while LUP4 favors the random effects model. Examining the variables' coefficients and t-statistics we find that the results, in general, for LUP1 and LUP2 are very similar and close to each other in magnitude and direction. All these indicators allow us to conclude that LUP1 and LUP2 give similar results. The coefficients and t-statistics for the other two measures are quite different from those for LUP1 and LUP2. LUP1 is the urban primacy index that we use in the rest of this study.

Ordinary least squares (OLS) without group or time dummy variables:

The basic equation in table 4.3a (equation 1) shows that all independent variables in the model are highly significant and the explained variation is over 50 percent (adjusted R^2 is 0.52). The first independent variable coefficient in the equation (LGDP) is significant at 0.01 significance level. It implies that a *ceteris paribus*

Table 4.3a:
Determinants of Urban Primacy (LUP1).
OLS without group dummy variables.

VARIABLE	1	2	3	4	5	6	7	8	9	10
LGDP	0.1548***	0.1064**	0.1567***	0.1165***	0.1424***	0.1473***	0.0155	0.0404	0.0459	-0.0902*
	(4.241)	(2.387)	(4.238)	(3.311)	(3.955)	(3.944)	(0.337)	(0.956)	(1.064)	(-1.767)
LGDPC	4.9115***	5.0725***	4.9737***	6.8754***	5.6775***	4.6094***	7.3755***	8.798***	9.1018***	14.326***
	(4.182)	(4.333)	(4.100)	(5.874)	(4.819)	(3.788)	(4.843)	(7.302)	(7.024)	(8.955)
LGDPCSQ	-0.3291***	0.3355***	-0.3334***	-0.4268***	-0.3792***	-0.3097***	-0.4803***	-0.5369***	-0.5546***	-0.8434***
	(-4.462)	(-4.573)	(-4.381)	(-5.926)	(-5.116)	(-4.047)	(-5.021)	(-7.295)	(-7.047)	(-8.710)
LPOPDENS	-0.4785***	-0.4355***	-0.4820***	-0.4610***	-0.4860***	-0.4794***	-0.2057***	-0.3911***	-0.3917***	-0.0979
	(-8.526)	(-7.218)	(-8.257)	(-8.699)	(-8.827)	(-8.539)	(-3.036)	(-6.877)	(-6.877)	(-1.449)
LEDUC	0.2320**	0.2868**	0.2527**	0.5413***	0.1215	0.2681**	0.3830**	0.5465***	0.5401***	0.6560***
	(1.970)	(2.377)	(2.086)	(4.291)	(1.004)	(2.167)	(2.305)	(4.144)	(4.078)	(3.924)
DCAP	1.5566***	1.5425***	1.5680***	1.4438***	1.5312***	1.5464***		1.3258***	1.3273***	
	(11.497)	(11.445)	(11.319)	(11.154)	(11.516)	(11.384)		(10.330)	(10.324)	
LEXP		-0.1785*						-0.1989**	-0.1898**	-0.2528**
		(-1.870)						(-2.228)	(-2.098)	(-2.165)
GDPCGR			-0.0012					-0.024*	-0.0226	-0.0543***
			(-0.077)					(-1.606)	(-1.523)	(-2.974)
LLABOR				-1.1406***				-1.4772***	-1.5543***	-2.9477***
				(-5.158)				(-6.371)	(-5.948)	(-8.425)
LPOPGR					-0.3661***			-0.4224***	-0.4088***	-0.5318***
					(-3.054)			(-3.726)	(-3.540)	(-2.951)
LURDISP						0.0962			-0.0714	-0.2626
						(0.952)			(-0.643)	(-1.803)
FDI							-1.0070			-2.6098
							(-0.229)			(-0.695)
CONSTANT	-20.382***	-20.005***	-20.665***	-30.119***	-22.592***	-19.232***	-27.245***	-36.304***	-37.678***	-58.121***
	(-4.201)	(-4.145)	(5.008)	(-6.089)	(-4.697)	(-3.846)	(-4.290)	(-7.215)	(-6.883)	(-8.484)
Adj. R^2	0.52	0.52	0.51	0.57	0.54	0.52	0.16	0.61	0.61	0.43

The number in parentheses is the t-statistic. The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels.

increase in GDP has a positive impact on urban primacy. In other words, an increase in GDP accompanied by the same percentage increase in population and land area, (to hold GDP per capita and population density constant) increases urban primacy. This contradicts the hypothesis that the larger the country, the less primate its urban system would be.

The relationship between economic development and urban primacy, however, fits the curvilinear hypothesis nicely. Urban primacy increases with economic development until certain level of development and then starts to decline. (The coefficient of LGDPC is positive and significant and that of LGDPCSQ is negative and significant at 0.01 level.). Thus, OLS without group and time dummy variables strongly supports the hypothesis about the relationship between urban primacy and economic development.

Population density has a negative coefficient significant at 0.01 level. When a country is highly populated relative to its area, urban population will be distributed among several cities. Since population density is the ratio of population to area, this coefficient along with the coefficient for GDPC implies that population size is negatively related to urban primacy. It also implies that the area has a positive impact on urban primacy. A country with large land area leads to a concentration of people in a few large cities to save in high transportation cost.

Average years of schooling (LEDUC) has the expected positive impact on urban primacy; its coefficient is significant at 0.05 level. Concentration of schools

and universities in the largest cities leads to migration of young people from rural areas and smaller towns to these cities.

The last variable in the basic equation (DCAP) has a highly significant, positive impact on urban primacy. Primacy increases when the largest city is also the capital of a country.

To summarize the findings of this phase of the analysis, except for the size of a country, all coefficients in the basic equation are highly significant and have the expected signs. The model fits our hypotheses nicely. Although we reserve detailed discussion of the additional variables in table 4.3a, it is pertinent that the results for the basic equation carry over to them. (The exceptions are equations 7 and 10 which omit one variable from the basic equation and omit some observations because of missing data for FDI.) It is also pertinent that many of the variables added to the basic equation have significant coefficients.

In this classical regression model, however, the groupwise nature of the data set is ignored and the full set of observations is pooled. To see if this is appropriate, Breusch and Pagan's Lagrange multiplier statistic is computed. Table 4.3b shows, for equation 1 and the other equations, a large value of the LM statistic which argues in favor of models with group and/or time effects against the classical regression model (Greene, 1992, 303 and 311). If the classical regression model is inappropriate, studies that rely on OLS to make cross-country comparison regarding urban primacy are inappropriate. The coefficients of OLS model may be biased if relevant variables are excluded. Given the complexity of the forces affecting urban

primacy and given the problem of assembling data for a variety of variables across countries, it is unlikely that existing studies have avoided omitted variable bias.

One factor vs. two factor fixed and random effects models:

To choose between one factor (includes country effects) or two factors (includes country and time effects) fixed and random effects model, an F statistic is computed to test the restricted model that there is no time effect. The comparison is a regression with country effects versus the unrestricted regression that includes both country and time effects. The result of F test using 0.05 significance level results favors the use of one way fixed and random effects models in all equations; the time effects are jointly insignificant. We re-estimate the model using a 10 year span instead of 5 year span for the period from 1960 to 1990. The F test still favors the restricted model (without time effects) for the different combinations that we used. This finding of insignificant time effects is an important one. The fear that technological or institutional changes have shifted the primacy function toward more urban primacy is unfounded for the 1960 to 1990 period. Overurbanization, if it defined as a primacy function that shifts over time, has not occurred over this period. Because this has been a period of rapid urbanization and growth of mega-cities, this result is particularly important.

Table 4.3b shows the findings of the basic equation when the one-way fixed effects model is used. The coefficient of LGDP is negative and significant at 0.01 level, confirming a central hypothesis of our model. A one percent increase in the

Table 4.3b:
Determinants of Urban Primacy (LUP1). (Fixed Effects Model).

VARIABLE	1	2	3	4	5	6	7	8	9	10
LGDP	-0.4328***	-0.4373***	-0.4855***	-0.5485***	-0.4355***	-0.5580***	-0.4613***	-0.5987***	-0.6598***	-0.6626***
	(-3.305)	(-3.334)	(-3.317)	(-3.803)	(-3.318)	(-4.107)	(-3.301)	(-3.818)	(-4.204)	(-3.893)
LGDPC	1.1973*	1.3455**	1.4496**	0.695	1.0853*	2.0178***	1.0174	0.8969	1.9243**	1.7037*
	(1.855)	(2.018)	(1.981)	(1.000)	(1.626)	(2.898)	(1.491)	(1.055)	(2.032)	(1.670)
LGDPCSQ	-0.0349	-0.0423	-0.0457	-0.0018	-0.0269	-0.0753*	-0.0234	-0.0078	-0.0628	-0.0500
	(-0.939)	(-1.111)	(-1.132)	(-0.045)	(-0.690)	(-1.925)	(-0.600)	(-0.160)	(-1.178)	(-0.862)
LPOPDENS	-0.1085	-0.0978	-0.1104	-0.1320	-0.1041	-0.0907	-0.1256	-0.1193	-0.0907	-0.1151
	(-0.924)	(-0.828)	(-0.931)	(-1.125)	(-0.884)	(-0.787)	(-1.030)	(-0.999)	(-0.765)	(-0.917)
LEDUC	0.2449**	0.2523**	0.2582**	0.2049*	0.2594**	0.2433**	0.2997**	0.2511*	0.2609**	0.3088**
	(2.071)	(2.127)	(2.067)	(1.716)	(2.155)	(2.099)	(2.294)	(1.952)	(2.054)	(2.164)
DCAP	0.7306***	0.7003***	0.6828***	0.5913***	0.7187***	0.7336***		0.5170***	0.5860***	
	(4.984)	(4.652)	(4.116)	(3.610)	(4.861)	(5.104)		(2.817)	(3.190)	
LEXP		-0.0472						-0.0519	-0.0620	-0.0374
		(-0.891)						(-0.965)	(-1.165)	(-0.624)
GDPCGR			-0.0058					-0.0033	-0.0037	-0.0056
			(-0.875)					(-0.487)	(-0.550)	(-0.772)
LLABOR				0.4496*				0.4589*	0.2613	0.2036
				(1.856)				(1.788)	(0.978)	(0.719)
LPOPGR					0.476			0.0599	0.0449	0.0457
					(0.674)			(0.835)	(0.632)	(0.489)
LURDISP						-0.1708***			-0.1516**	-0.1245*
						(-2.823)			(-2.334)	(-1.813)
FDI							1.1826			1.0951
							(0.975)			(0.876)
CONSTANT										
LM Test	404.915	389.849	405.203	389.101	392.531	403.128	399.491	336.948	340.559	297.878
(p-value)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Adj.R^2	0.96	0.96	0.95	0.96	0.96	0.96	0.95	0.96	0.96	0.95

The number in parentheses is the t-statistic. The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels.

size of a country (GDP) decreases urban primacy by 0.43 percent. This finding shows the importance of including country effects. In the classical regression model (without country effects) this coefficient has a positive sign.

The results also show that urban primacy increases with economic development in a country. The coefficient of LGDPC is positive and significant at 0.10 level, while that of LGPCSQ is negative but not significant, with t-value equal to -0.939. Later, however, we show that the coefficients of LGDP and LGDPCSQ are jointly significant, although they are individually not significant.

The population density coefficient is negative but not significant (t-value is just -0.924). (Note, however, that its coefficient is significant in the equations that use LUP2 in table 4.2b. In this case, using LUP2 as dependent variable made a difference.)

The coefficients for average years of schooling and the dummy variable of capital city are both significant and have the expected signs.

Table 4.3c shows the findings of random effects model when GLS with group dummy variables is used. All variables have the expected signs, but only three variables have significant coefficients, namely LGDP, LPOPDENS, and DCAP. So far we have investigated the classical OLS, the fixed-effects model, and the random-effect model. FEM and REM are preferred over the classical regression model.

To choose between fixed and random effects model (between LSDV and GLS), one can use the Hausman test. It is basically a test to see whether the GLS

Table 4.3c:
Determinants of Urban Primacy (LUP1). (Random Effects Model).

VARIABLE	1	2	3	4	5	6	7	8	9	10
LGDP	-0.1208*	-0.1327**	-0.1210*	-0.1026*	-0.1194*	-0.1396**	-0.2390***	-0.1088*	-0.1192*	-0.2288***
	(-1.880)	(-2.016)	(-1.813)	(-1.622)	(-1.867)	(-2.140)	(-3.097)	(-1.679)	(-1.809)	(-3.147)
LGDPC	0.7453	0.9143	0.6788	0.9727	0.7296	1.0608*	0.7615	1.178	1.8677**	2.0444**
	(1.307)	(1.506)	(1.115)	(1.548)	(1.230)	(1.782)	(1.244)	(1.553)	(2.249)	(2.178)
LGDPCSQ	-0.0299	-0.0377	-0.0259	-0.0430	-0.0289	-0.0474	-0.0246	-0.0537	-0.0923*	-0.0970*
	(-0.856)	(-1.042)	(-0.702)	(-1.138)	(-0.787)	(-1.309)	(-0.665)	(-1.201)	(-1.899)	(-1.773)
LPOPDENS	-0.1790**	-0.1630*	-0.1745**	-0.1802***	-0.1788***	-0.1742**	-0.1049	-0.1648**	-0.1535*	-0.0587
	(-2.193)	(-1.941)	(-2.104)	(-2.270)	(-2.189)	(-2.137)	(-1.135)	(-2.017)	(-1.867)	(-0.649)
LEDUC	0.0672	0.07539	0.0633	0.1031	0.0682	0.0387	0.1307	0.1043	0.0961	0.1251
	(0.755)	(0.841)	(0.675)	(1.025)	(0.750)	(0.428)	(1.285)	(0.992)	(0.920)	(1.073)
DCAP	0.8289***	0.804***	0.8133***	0.8799***	0.8296***	0.8168***		0.8577***	0.8818***	
	(6.171)	(5.856)	(5.460)	(6.204)	(6.141)	(6.166)		(5.556)	(5.685)	
LEXP		-0.0439						-0.0394	-0.0480	-0.0531
		(-0.854)						(-0.760)	(-0.933)	(-0.912)
GDPCGR			0.0009					-0.0010	-0.0003	-0.0041
			(0.151)					(-0.150)	(-0.045)	(-0.584)
LLABOR				-0.1602				-0.1902	-0.3465	-0.3551
				(-0.806)				(-0.883)	(-1.501)	(-1.393)
LPOPGR					0.0069			-0.0082	-0.0160	-0.0301
					(0.100)			(-0.118)	(-0.231)	(-0.331)
LURDISP						-0.0898			-0.1309**	-0.1086*
						(-1.591)			(-2.097)	(-1.627)
FDI							0.7953			0.4335
							(0.664)			(0.354)
CONSTANT	-1.0607	-1.5050	-0.7795	-2.5401	-1.0307	-1.9791	1.0327	-3.2815	-6.0568*	-4.6867
	(-0.460)	(-0.636)	(-0.322)	(-0.892)	(-0.436)	(-0.842)	(0.423)	(-1.001)	(-1.695)	(-1.179)
FE vs. RE	23.058	23.585	23.389	31.185	25.086	28.226	13.830	36.2861	36.489	31.279
(p-value)	(0.0008)	(0.0013)	(0.0015)	(0.0001)	(0.0007)	(0.0002)	(0.0316)	(0.0001)	(0.0001)	(0.0010)
R^2	0.33	0.33	0.32	0.37		0.30	-0.05	0.37	0.37	0.03

The number in parentheses is the t-statistic. The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels.

estimator is an appropriate alternative to the LSDV estimator. It is a test for orthogonality of the random effects and the regressors. The Hausman test is based on the idea that under the hypothesis of no correlation between the individual effects and the other regressors in the model, both OLS in the LSDV model and GLS are consistent, but OLS is inefficient, while under the alternative OLS is consistent, but GLS is not. Therefore, under the null hypothesis, the two estimates should not differ systematically, and a test can be based on the difference (Greene, 1993, 479). Large values of the Hausman statistic argue in favor of the fixed effects model over the random effect model (Greene, 1992). Table 4.3c shows that the Hausman statistics for all equations are large and significant; it favors fixed effects model. Thus, we will concentrate the remainder of our analysis on table 4.3b.

Other Independent Variables:

Now, we discuss the new variables that were added to the basic equation. Because the FEM is preferred, we discuss the results in table 4.3b.

Export of goods and nonfactor services (**LEXP**) was added but it does not make a significant difference. Equation 2 in table 4.3b has no significant changes in the coefficients of the basic variables, and adjusted R^2 stays the same. The export coefficient is negative as expected, but it is not significant (t-value is -0.891).

When economic growth measured by growth rate of GDP per capita (**GDPCGR**) is added to the model (equation 3), adjusted R^2 declines to 0.95 but the basic variables did not change their direction nor their significance. The coefficient of GDPCGR is not significant (t-value is -0.875).

The share of labor outside agriculture (**LLABOR**) has a significant coefficient at 0.10 level and has a positive sign (equation 4). It has a positive impact on urban primacy. Its inclusion also affects other coefficients in the model. The coefficient of LGDPC is no longer significant. Similarly, the significance of LEDUC's coefficient is reduced, although it is still significant. These changes occur because LGDPC, LGDPCSQ, and LEDUC are highly correlated with LLABOR (0.84, 0.83, 0.80 respectively). The simultaneous inclusion of these intercorrelated variables as regressors leads to inefficient estimation.

Equation 5 in table 4.3 B shows the effect of adding the population growth rate (**LPOPGR**) to the basic equation. Although LPOPGR coefficient has the expected positive sign, it is not significant (t-value is only 0.674). This means that population growth rate does not have a significant impact on urban primacy. This weakens support for the ecological idea that population growth, particularly rural population growth increase primacy.

To test the urban bias theory, urban-rural disparity measure (**LURDISP**) is added to the basic model (equation 6). The bell-shaped hypothesis with respect to development is clearly supported in this equation. LGDPC is positive and significant and LGDPCSQ is negative and significant. The significant coefficient of the urban disparity measure strongly contradicts the hypothesis that the ratio of productivity of workers outside agriculture to that of workers in agriculture enhances urban primacy. It is negative and significant at 0.01 level. This result implies that the greater the difference between nonagricultural and agricultural productivity, the lower the

primacy of the urban system. We suspect that this productivity difference increases urban population in general, although it does not increase urban primacy. This indicates that the population of smaller cities in urban system might increase more rapidly than that of the primate city, as nonagricultural productivity improves. This result is also consistent with the proposition that the city-size distribution responds to economic and market forces.

To test the dependency / world system theories hypothesis that dependency on foreign investment and multinational corporations' penetration enhances urban primacy, the foreign direct investment (**FDI**) variable is added (equation 7). FDI's coefficient is positive but not significant (t-value is 0.975). Thus, there is little support for the idea that foreign direct investment, or foreign dependency, causes resources to concentrate in the largest city. (DCAP in equation 7 is dropped because there are only 195 observations available for FDI variable so the "SKIP" command is used and it omits observations with missing values. This cause regressors to be collinear when DCAP is included (thus, DCAP is dropped). LGDPC and LGDPCSQ lose their significance, while LGDP and LEDUC remain significant.

In equation 8-10 of table 4.3b we add the groups of the additional variables to the basic equation to see if the results change. In equation 8 adjusted R^2 does not change; the coefficients of LGDP, LEDUC, DCAP, LLABOR are significant and have the same signs as before. The economic development coefficients (LGDPC and LGDPCSQ) became insignificant and the coefficients of LPOPDENS, LEXP, GDPCGR and LPOPGR remain insignificant.

Equation 9 adds LURDISP to equation 8 and LGDPC and LLABOR became insignificant. The LURDISP coefficient has the same sign and is significant as it was the case in equation 6.

In the final equation of table 4.3b (equation 10) we add FDI to (and drop DCAP from) equation 9. Results are the same as of that of equation 9 except adjusted R^2 is reduced to 0.95.

In summary, analysis of table 4.3b shows that a one way OLS with group dummy variables (fixed effects model) provides a useful explanation of urban primacy. Some of the variable coefficients are significant and have the expected impact on urban primacy throughout the 10 equations, such as LGDP, LEDUC, DCAP and to some extent LGDPC. The other variables, except LURDISP, have the expected signs but they are not significant. LURDISP's coefficient is significant, and has a negative sign which is inconsistent with urban bias theory.

Marginal effects of LGDP and LPOP on LUP1:

Although we have developed the model in term of GDP per capita and population density, it is of interest to determine the effects of GDP, population, and land area on primacy. To do so, we take partial derivatives of equation (4.5) with respect to each of these variables. Because the independent variables are not orthogonal, these partial derivatives must be interpreted with caution. The partial derivative of (4.5) with respect to LGDP is

$$(4.6)\ \frac{\partial LUP1}{\partial LGDP} = (b + c) + 2d\ LGDP - 2d\ LPOP$$

$$= (b + c) + 2d\left(\frac{LGDP}{LPOP}\right)$$
$$= (b + c) + 2d\ LGDPC$$

This gives the partial elasticity of urban primacy with respect to GDP, allowing GDP to have its size effect through economic development. The quadratic development effect results in the marginal effect of GDP on urban primacy being a linear function of economic development (GDPC). In the typical estimate in table 4.3b, the function has a positive intercept and a negative slope. The marginal impact of GDP is positive at low levels of development, and it becomes smaller and eventually negative with economic development.

For instance, for equation 1 in table 4.3b the effect of LGDP on LUP1 is

$= (b + c) + 2d\ LGDPC$

To get t-statistics for (b + c) and d, we estimate equations with LGDP, LPOP, and LLAND rather than GDP per capita and population density. Results for equations 1, 6, and 9 from table 4.3b are reported as equations 2-4 in table 4.3d. The t-statistics for (b + c) and d are in parentheses below the coefficients. For equation 1, we get

$$\frac{\partial LUP1}{\partial LGDP} = -\ 0.4328 + 1.1973 - 2\ (0.0349)\ LGDPC$$
$$= 0.7645 - 0.0698\ LGDPC,$$
$$(1.271) \quad (-0.94)$$

and for equation 6,

$$= -\ 0.558 + 2.0178 - 2\ (0.0753)\ LGDPC$$
$$= 1.4598 - 0.1506\ LGDPC,$$
$$(2.28) \quad (-1.93)$$

Table 4.3d:
Determinants of Urban Primacy (LUP1).
Net effects of LGDP and LPOP
(Fixed Effects Model).

VARIABLE	1	2	3	4
LGDP	0.2022***	0.7651	1.4609**	1.2661
	(3.331)	(1.271)	(2.284)	(1.395)
LPOP	-0.7447***	-1.3065**	-2.1097***	-2.0166**
	(-4.322)	(-2.100)	(-3.135)	(-2.191)
LLAND	0.1349	0.1084	0.0906	0.0906
	(0.2380)	(0.924)	(0.786)	(0.764)
LEDUC	0.2615**	0.2449**	0.2433**	0.2609**
	(2.238)	(2.071)	(2.099)	(2.054)
DCAP	0.7226***	0.7306***	0.7336***	0.5861***
	(4.940)	(4.984)	(5.104)	(3.190)
LGDPCSQ		-0.0349	-0.0754*	-0.0629
		(-0.940)	(-1.926)	(-1.180)
LURDISP			-0.1708***	-0.1517**
			(-2.824)	(-2.335)
LEXP				-0.0621
				(-1.166)
GDPCGR				-0.0037
				(-0.551)
LLABOR				0.2611
				(0.978)
LPOPGR				0.0449
				(0.632)
CONSTANT				
LM TEST	464.223	404.915	403.129	340.560
(p-value)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
FE vs. RE	15.924	23.057	28.230	36.500
(p-value)	(0.0071)	(0.0008)	(0.0002)	(0.0001)
Adj. R^2	0.96	0.96	0.96	0.96

The number in parentheses is the t-statistic.
The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels.

and for equation 9,

= - 0.6598 +1.9243 -2 (0.0628) LGDPC
= 1.2645 - 0.1256 LGDPC
(1.40) (-1.18)

Different levels of LGDPC of different countries around 1990 (7.142 of India, 8.375 of Chile, and 9.801 of United States) show that the marginal effect of LGDP on LUP1 is positive for India and Chile and negative for the United States (using the coefficients for equation 6 of table 4.3b).

The partial derivatives of equation (4.5) with respect to LPOP is

$$\frac{\partial LUP1}{\partial LPOP} = - c - 2d\ LGDP + 2d\ LPOP + e$$

$$= (e - c) - 2d\ LGDPC$$

For equation 1,

$$\frac{\partial LUP1}{\partial LPOP} = - 0.1085 - 1.1973 - 2\ (-0.0349)\ LGDPC$$

$$= - 1.3058 + 0.0698\ LGDPC,$$

(-2.10) (-0.94)

and for equation 6,

= - 0.0907 - 2.0178 - 2 (-0.0753) LGDPC
= - 2.1085 + 0.1506 LGDPC,
(-3.135) (-1.93)

and for equation 9,

= - 0.0907 - 1.9243 - 2 (-0.0628) LGDPC
= - 2.015 + 0.1256 LGDPC
(-2.191) (-1.18)

At all reasonable levels of LGDPC, the marginal impact of LPOP on LUP1 is negative. Countries with large population have less primacy in their urban system, regardless of the level of development.

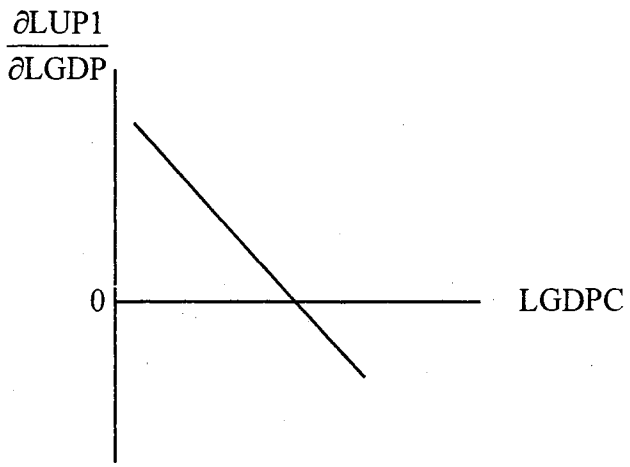
Given that LGDP and LGDPCSQ are significant in only one of the equations in table 4.3d, we test the joint hypothesis that the coefficients (b + c) and d equal zero. To do so, the variables LGDP and LGDPCSQ are removed from the equations. The rest of the variables are regressed on LUP1 to get the restricted model. An F test is conducted for the equations to test the restricted model versus the unrestricted one. All results of the F-test are significant and reject the null hypothesis that LGDP and LGDPCSQ can be removed from the model (F statistic equals 5.72, 8.29, and 7.24 for equations 2, 3, and 4, respectively). These results allow us to refine our discussion of the effects of GDP and population on urban primacy.

Equation 4.6 has a graph like that in Figure 4.1, which shows that the marginal effect of GDP on primacy depends upon the level of development. At low level of development, an increase in GDP increases urban primacy. Using the parameters for equation 6 in table 4.3b and setting equation 4.6 equals to zero, shows that the partial effect equals zero when GDP per capita is about $16,000.

The partial effect of population on urban primacy increases with GDPC. An increase in population reduces primacy by a smaller amount at higher levels of development.

If GDP per capita is a function of primacy, the results in tables 4.3b and 4.3d

Figure 4.1



may be subject to simultaneous equation bias. To test this possibility, we instrument LGDP and LGDPCSQ. The first stage equation includes all other variables in equation 9, as well as investment as a percentage of GDP (LINV), and per capita energy consumption (LENERGY).

Results are reported in table 4.3e. A comparison of the equations in tables 4.3d and 4.3e show that instrumenting makes little difference. LGDP is significant in most of the table 4.3e equations. LGDPCSQ is not significant in any equation. The coefficient of other

variable coefficients are similar in the two tables

VII. Without Developed Countries:

The sample in this study contains 30 countries from Asia, Latin America, and North America. Only 3 countries are considered advanced or developed countries. These countries are Canada, Japan, and the United States. The other 27 countries vary from

Table 4.3e:
Determinants of Urban Primacy (LUP1).OLS with group dummy variables
Instrumental Variables for LGDP and LGDPCSQ

VARIABLE	1	2	3	4	5	6	7	8	9	10	11
LGDPF	0.2878***	0.6232*	0.6536*	0.6756*	0.5272	0.5511	0.7946**	0.5629*	0.550	0.7198*	0.6557*
	(3.807)	(1.774)	(1.849)	(1.897)	(1.488)	(1.526)	(2.257)	(1.722)	(1.493)	(1.934)	(1.892)
LGDPCSQF		-0.0245	-0.0239	-0.0252	-0.0253	-0.0179	-0.0322	-0.225	-0.0180	-0.0232	-0.0212
		(-1.076)	(-1.049)	(-1.106)	(-1.118)	(-0.747)	(-1.423)	(-1.056)	(-0.751)	(-0.972)	(-0.929)
LPOP	-0.8895***	-1.1879***	-1.2220***	-1.3010***	-1.1995***	-1.1273***	-1.4568***	-1.1826***	-1.2773***	-1.4978***	-1.496***
	(-4.707)	(-3.126)	(-3.196)	(-3.270)	(-3.175)	(-2.914)	(-3.756)	(-3.255)	(-3.183)	(-3.666)	(-3.791)
LLAND	0.1396	0.1203	0.1164	0.1277	0.1190	0.1129	0.1241	0.1269	0.1133	0.1138	0.1309
	(1.218)	(1.030)	(0.993)	(1.088)	(1.025)	(0.962)	(1.079)	(1.055)	(0.967)	(0.978)	(1.078)
LEDUC	0.2387**	0.2460**	0.2580**	0.2563**	0.2136*	0.2641**	0.2501**	0.3209**	0.2627**	0.2809**	0.3481**
	(2.021)	(1.978)	(2.060)	(2.049)	(1.705)	(2.091)	(2.042)	(2.309)	(2.016)	(2.169)	(2.359)
DCAP	0.7599***	0.6907***	0.6640	0.6931***	0.5766***	0.6838***	0.7027***		0.5590***	0.6023***	
	(5.121)	(4.150)	(3.930)	(4.155)	(3.199)	(4.093)	(4.286)		(3.031)	(3.275)	
LEXP			-0.054						-0.0646	-0.0701	-0.0493
			(-0.991)						(-1.181)	(-1.290)	(-0.779)
GDPCGR				-0.0064					-0.0059	-0.0048	-0.0061
				(-0.981)					(-0.876)	(-0.710)	(-0.825)
LLABOR					0.4025				0.3334	0.2037	0.1993
					(1.593)				(1.265)	(0.763)	(0.749)
LPOPGR						0.0663			0.0723	0.0890	0.0783
						(0.902)			(0.956)	(1.180)	(0.832)
LURDISP							-0.1533***			-0.1461**	-0.1274**
							(-2.634)			(-2.416)	(-1.981)
FDI								0.7309			0.5418
								(0.590)			(0.423)
CONSTANT											
Adj. R^2	0.95	0.95	0.95	0.95	0.96	0.95	0.96	0.95	0.95	0.96	0.95

The number in parentheses is the t-statistic.
The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels.

newly industrialized countries to some poor countries in Asia and Latin America, but all are considered developing, less developed, or Third World Countries. Developed and developing countries differ in many aspects such as level of income, health, education, political and administration systems. To investigate the effect of these three developed countries, they will be dropped from the model and findings will be compared to that of full model.

Table 4.4 shows findings with and without the 3 developed countries. LGDP is negative and significant in all equations, but t-values when all countries are included is larger than that of only developing countries in the model. When developed countries are dropped from the model, the level of economic development is not significant. LGDPCSQ has negative sign in all equations, but t-values of 30 country equations is larger than that of 27 country equations. LPOPDENS coefficient has negative sign but is insignificant in all equations. Coefficients of LEDUC and DCAP are positive and significant in all equations. LURDISP is negative and significant in both equations. All other variables have the expected sign but are not significant; t-values of the 30 country equation are larger than those of the 27 country equation.

To summarize the findings of this section, it appears that exclusion of the three advanced countries does not change the regression results significantly. Results that include all thirty countries are more appropriate if we assume that the primacy relationship is a function of the independent variables. Thus, the data set that contains all thirty countries will be used in the rest of this study.

Table 4.4:
Determinants of LUP1 (Fixed Effects Model).
(With and Without Canada,Japan, and United States)

VARIABLE	LUP1 30	LUP1 27	LUP1 30	LUP1 27
LGDP	-0.4328***	-0.4016***	-0.6598***	-0.5956***
	(-3.305)	(-2.921)	(-4.204)	(-3.476)
LGDPC	1.1973*	0.8046	1.9243**	1.4007
	(1.855)	(0.851)	(2.032)	(1.157)
LGDPCSQ	-0.0349	-0.0123	-0.0628	-0.0348
	(-0.939)	(-0.211)	(-1.178)	(-0.487)
LPOPDENS	-0.1085	-0.1389	-0.0907	-0.1195
	(-0.924)	(-1.121)	(-0.765)	(-0.944)
LEDUC	0.2449**	0.2565**	0.2609**	0.2659**
	(2.071)	(2.042)	(2.054)	(1.967)
DCAP	0.7306***	0.7240***	0.5860***	0.6012***
	(4.984)	(4.757)	(3.190)	(3.121)
LEXP			-0.0620	-0.0430
			(-1.165)	(-0.744)
GDPCGR			-0.0037	-0.0010
			(-0.550)	(-0.141)
LLABOR			0.2613	0.2143
			(0.978)	(0.757)
LPOPGR			0.0449	0.0401
			(0.632)	(0.508)
LURDISP			-0.1516**	-0.1503**
			(-2.334)	(-2.177)
LM Test	404.915	388.862	340.559	334.250
(p-value)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
FE vs. RE	23.058	15.191	36.489	24.265
(p-value)	(0.0008)	(0.0188)	(0.0001)	(0.0117)
Adj.R^2	0.96	0.95	0.96	0.95

The number in parentheses is the t-statistic.
The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent,
95 percent, and 90 percent levels respectively.

VIII: Model with lagged Dependent Variable

To make our model a more dynamic one, we take into account the lagged value of the dependent variable. Using the partial (stock) adjustment model, the lagged value of the dependent variable is added to the original equations and they are reestimated. Following Mills (1972, 52-53), let us call all independent variables in the urban primacy equation X, and coefficients β^*. Thus, we have

$$(1)\, LUP1^*_{i,t} = \beta^* LX_{i,t} + LE_{i,t}$$

In this equation, $LUP1^*$ is equilibrium value of LUP1 in country i at time t, and is unobserved, except when the system is in equilibrium. It is assumed that the adjustment of LUP1 to equilibrium can be approximated by a distributed-lag process, which assumes that between successive observations the variable adjusts by a constant fraction of its deviation from equilibrium in the earlier period. This process can be represented as

$$(2)(LUP1_{i,t} - LUP1_{i,t-1}) = \lambda(LUP1^*_{i,t} - LUP1_{i,t-1}),$$

where λ is the adjustment coefficient. Thus,

$$(LUP1_{i,t} - LUP1_{i,t-1}) = \lambda(\beta^* LX_{i,t} - LUP1_{i,t-1})$$

$$= \lambda\beta^* LX_{i,t} - \lambda LUP1_{i,t-1}$$

Therefore, the estimating equation, with all variables observed is

$$(3)\, LUP1_{i,t} = bLX_{i,t} + lLUP1_{i,t-1} + LE_{i,t}$$

where, $b = \lambda\beta^* \quad \Rightarrow \beta^* = \frac{b}{\lambda}$ and $l = 1 - \lambda$ and $\lambda = 1 - l$.

All variables in (3) are observable.

In this model, the dependent variable (LUP1) and its lagged value (LAGLUP1) are highly correlated (0.99). If the city-size distribution adjusts slowly, most of the explanatory power will come from LAGLUP1 and with little left for the equilibrium determinants of urban primacy to explain. Inclusion of the lagged dependent variable produces a very conservative test of the effects of other independent variables on changes in the dependent variable, since the lagged value of dependent variable explains most of the variation in the dependent variable. This may result in ignoring theoretically important determinants because very little of the variance remains to be explained in the empirical analysis. Furthermore, the positive autocorrelation between the dependent variable and its lagged value upwardly biases the effect of the lagged dependent variable and, therefore, reduces the effect of other independent variables (Timberlake and Kentor, 1983; Bradshaw, 1987; London, 1988).

The F-test favors the model without time effects, and LM test favors FEM and REM over OLS. Table 4.5 shows that in all equations LAGUP1's coefficient is highly significant with large t-values and has the expected positive impact on urban primacy. In equation 1, a one percent increase in the lagged value of urban primacy will increase urban primacy by 0.80 percent. When the lagged dependent variable is added to the model, it dominates other variables and explains most of the variation in

Table 4.5: Determinants of LUP1 When Lagged Dependent Variable is included (Fixed Effects Model).

VARIABLE	1	2	3	4	5	6	7	8	9	10
LAGLUP1	0.8039***	0.9642***	0.8021***	0.8086***	0.9624***	0.8074***	0.8212***	0.9489***	0.9500***	0.8395***
	(13.132)	(40.697)	(13.088)	(13.101)	(40.691)	(12.957)	(13.003)	(35.703)	(36.088)	(12.908)
LGDP	-0.1362	0.0085	-0.1846	-0.0873	0.0171	-0.1223	-0.1835*	0.0051	0.0054	-0.0836
	(-1.281)	(0.578)	(-1.545)	(-0.679)	(1.341)	(-1.066)	(-1.618)	(0.329)	(0.350)	(-0.557)
LGDPC	0.0700	0.1278	0.3136	0.1289	0.1301	-0.0228	-0.0387	0.3890	0.3883	0.4619
	(0.138)	(0.357)	(0.543)	(0.249)	(0.366)	(-0.039)	(-0.074)	(0.923)	(0.868)	(0.638)
LGDPCSQ	0.0077	-0.0069	-0.0032	0.0025	-0.0084	0.0123	0.0166	-0.0220	-0.0221	-0.0175
	(0.267)	(-0.310)	(-0.100)	(0.083)	(-0.376)	(0.382)	(0.556)	(-0.863)	(-0.817)	(-0.424)
LPOPDENS	-0.0412	0.0057	-0.0377	-0.0401	-0.0067	-0.0437	-0.0876	-0.0009	-0.0006	-0.0782
	(-0.458)	(0.251)	(-0.418)	(-0.444)	(-0.309)	(-0.481)	(-0.940)	(-0.036)	(-0.025)	(-0.824)
LEDUC	0.0189	-0.0627	0.0268	0.0278	-0.0915**	0.0171	0.107	-0.0498	-0.0503	0.0848
	(0.196)	(-1.593)	(0.277)	(0.285)	(-2.348)	(0.177)	(0.995)	(-0.972)	(-0.988)	(0.754)
DCAP	0.1565	0.0655	0.1614	0.1937	0.0747	0.1527		0.0810	0.0797	
	(1.374)	(1.138)	(1.414)	(1.531)	(1.308)	(1.330)		(1.348)	(1.340)	
LEXP		-0.0370						-0.0395	-0.0391	-0.0280
		(-1.308)						(-1.345)	(-1.327)	(-0.647)
GDPCGR			-0.0041					-0.005	-0.0004	-0.0052
			(-0.892)					(-0.145)	(-0.118)	(-0.982)
LLABOR				-0.1496				-0.091	-0.0875	-0.3403
				(-0.681)				(-0.963)	(-0.880)	(-1.325)
LPOPGR					-0.0481			-0.0498	-0.0493	-0.0965
					(-1.348)			(-1.341)	(-1.332)	(-1.314)
LURDISP						0.0154			-0.0005	0.0333
						(0.331)			(-0.014)	(0.693)
FDI							-0.5012			-0.3407
							(-0.572)			(-0.375)
CONSTANT		-0.5452			-0.6391			-1.605	-1.6029	
		(-0.375)			(-0.439)			(-0.917)	(-0.856)	
LM Test	12.342	13.258	11.780	12.1305	11.667	10.134	10.299	12.091	10.432	7.816
FE vs. RE	12.992	11.974	14.310	13.1312	12.342	14.532	18.085	13.254	15.112	21.671
(p-value)	(0.0723)	(0.1524)	(0.0740)	(0.1074)	(0.1366)	(0.0689)	(0.0116)	(0.2771)	(0.2354)	(0.4138)
Adj.R^2	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98

The number in parentheses is the t-statistic. The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels.

the dependent variable. This happens because the lagged variable has already been explained by independent variables in previous periods; therefore it represents all explanatory power of those independent variables.

IX: Determinants of LUP1 when they are observed in earlier periods in time

To reduce the possibility of reciprocal causation, we regress LUP1 from the current period on the independent variables lagged one period. All independent variables are lagged by one period, so that this procedure estimates the effects of independent variables (from 1960 to 1985) on the dependent variable (from 1965 to 1990).

Regression results in table 4.6 show that GDP has a negative effect on urban primacy. A one percent increase in GDP, holding all other variables constants, reduces urban primacy, on average, by 0.6 percent. Although it is positive, the relationship between economic development and urban primacy is significant only in equation 6. Also, the equations do not support the curvilinear hypothesis. LGDPCSQ is negative but insignificant. LPOPDENS coefficient has the expected negative sign, but it is not significant. LEDUC and DCAP coefficients have the expected positive signs, and they are significant. The coefficient of the export variable is negative and significant in three out of four equations. This result supports Krugman's hypothesis that openness to international market reduces primacy of a nation's largest city. GDPCGR, LLABOR, and LPOPGR coefficients are not significant. LURDISP coefficient is negative, as before, but it has significant results only in equation 6.

Table 4.6: Determinants of Urban Primacy (LUP1). (Fixed Effects Model). Independent variables are observed in earlier periods in time.

VARIABLE	1	2	3	4	5	6	7	8	9	10
LGDP	-0.5204***	-0.5666***	-0.5359***	-0.6168***	-0.5214***	-0.6297***	-0.5818***	-0.6746***	-0.7148***	-0.7418***
	(-3.353)	(-3.629)	(-3.133)	(-3.715)	(-3.344)	(-3.888)	(-3.680)	(-3.707)	(-3.904)	(-3.893)
LGDPC	0.9025	1.2381	0.7885	0.3849	0.8794	1.5927*	0.6334	0.6113	1.5055	1.2448
	(1.188)	(1.595)	(0.930)	(0.467)	(1.125)	(1.944)	(0.831)	(0.615)	(1.306)	(1.022)
LGDPCSQ	-0.0106	-0.0247	-0.0025	0.0226	-0.0089	-0.0445	0.0097	0.0161	-0.0324	-0.0163
	(-0.237)	(-0.548)	(-0.052)	(0.460)	(-0.192)	(-0.946)	(0.218)	(0.284)	(-0.499)	(-0.238)
LPOPDENS	-0.0899	-0.0729	-0.1097	-0.1160	-0.0886	-0.0654	-0.149	-0.1176	-0.0831	-0.1414
	(-0.710)	(-0.578)	(-0.871)	(-0.913)	(-0.696)	(-0.520)	(-1.193)	(-0.930)	(-0.649)	(-1.075)
LEDUC	0.2756*	0.3123**	0.3008**	0.2315*	0.2788*	0.2752**	0.3811***	0.3120**	0.3280**	0.3793**
	(1.962)	(2.218)	(2.039)	(1.625)	(1.950)	(1.983)	(2.582)	(2.038)	(2.148)	(2.273)
DCAP	0.5812***	0.5185***	0.3984**	0.4600***	0.5985***	0.5791***		0.2412	0.3090*	
	(3.820)	(3.347)	(2.381)	(2.711)	(3.756)	(3.851)		(1.298)	(1.623)	
LEXP		-0.0996*						-0.1011*	-0.1031*	-0.0589
		(-1.807)						(-1.801)	(-1.844)	(-0.941)
GDPCGR			-0.0008					0.0004	-0.0003	-0.00298
			(-0.121)					(0.052)	(-0.039)	(-0.396)
LLABOR				0.4141				0.3949	0.1730	0.1847
				(1.581)				(1.435)	(0.557)	(0.582)
LPOPGR					0.0097			0.0060	-0.0024	-0.0299
					(0.134)			(0.083)	(-0.033)	(-0.307)
LURDISP						-0.1389**			-0.1132	-0.0694
						(-2.105)			(-1.514)	(-0.887)
FDI							3.3475***			3.1538**
							(2.794)			(2.523)
LM Test	294.021	279.427	288.021	288.397	287.093	294.268	294.245	245.557	249.520	221.613
FE vs. RE	24.640	27.325	27.194	30.706	25.786	27.641	16.0116	38.969	36.936	29.712
(p-value)	(0.0004)	(0.0003)	(0.0003)	(0.0001)	(0.0006)	(0.0003)	(0.0137)	(0.0000)	(0.0001)	(0.0018)
Adj.R^2	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96

The number in parentheses is the t-statistic. The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels.

The most significant difference between table 4.6 and the previous ones is the finding that relates to foreign direct investment. The FDI coefficient is significant and has a positive sign in both equations 7 and 10, supporting the dependence / world system hypothesis. Perhaps FDI take time to have its impact on the largest city of a country.

In summary, except for foreign direct investment, the findings of table 4.7 when independent variables are observed in earlier periods in time do not differ substantially from results of table 4.3b.

Summary and Conclusions:

With regard to urban primacy indices, we conclude that in studies that contain different nations it is important to have a comparable index of urban primacy to validate the result. LUP1 and LUP2 are comparable measures, and we find that both LUP1 and LUP2 can be used interchangeably with equal validity. We use LUP1 because of data availability and simplicity.

This study uses panel-data analysis that combines cross-section and time series data. The findings of the classical regression model (OLS without group effects) strongly support the hypothesis that urban primacy increases with economic development until a certain level of development, then starts to decline. Table 4.3b, with group effects, supports the hypotheses to some extent. LGDPC is positive and significant in most of the equations, while LGDPCSQ is negative in all equation but provides a significant coefficient only in equation 6. because the preferred model is

the fixed effects model, we conclude that there is a strong support for a positive relationship between urban primacy and economic development, but one modest support for the bell-shaped hypothesis.

The classical regression model without group effects (table 4.3a) shows a significant positive relationship between LGDP and urban primacy, while both fixed and random effects models show a significant negative relationship between these two variables. The negative relationship between the economic size and urban primacy is the expected one.

The marginal effect of population on urban primacy is significantly negative. The more populated the country, the more balanced urban system it has. Population density in the OLS model without group effects shows a strong significant relationship between population density and urban primacy. This implies that population and urban primacy are negatively related while land and urban primacy are positively related. The fixed effects model, however, does not display significant effects of population density on urban primacy. The other variables that show statistically significant expected signs such as capital city dummy variable, education variable, and the share of labor outside agriculture should be considered by planners and policy makers if they want to consider the right policy to urbanization and development.

The final conclusion is that when lagged dependent variable is included in the model it dominates other independent variables since it represent all explanatory power of the independent variables. And when the lagged dependent variable is

dropped from the model and independent variables are observed at earlier points in time, results do not differ from those of table 4.3b except for foreign direct investment coefficient (FDI) which shows a significant positive impact on urban primacy.

CHAPTER V

Determinants of Urban Primacy: A cross-sectional Approach

Introduction:

In Chapter IV the determinants of urban primacy were investigated using panel data analysis. The independent variables change over time. They are not fixed for a long period. Thus, seven periods from 1960 to 1990 have been used to capture the impact of independent variables on urban primacy. There are relevant variables, however, that do not change for long periods of time and other variables that suffer from data unavailability. Some variables have both symptoms. The panel-data analysis controls for these variables with country-specific dummy variables. The coefficients of these dummy variables are jointly significant in the models of Chapter IV. Their values reflect the fixed effect associated with each country and are a composite of various factors. For example, political regimes and a nation's position in the world system do not change over short. Data about corruption and bureaucracy, for example, may be hard to find for many countries for many years. Furthermore, their effects may be subjective reflecting the opinion and belief of the person or the institution that presents these data. They change slowly.

This chapter investigates the impact of political and dependency / world system factors on the fixed effects of urban primacy. It will start by regressing the fixed effects of urban primacy for 30 countries on several variables using ordinary least squares (OLS). Next, some new independent variables will be introduced to the model. Data of these variables are available only for 24 countries. Replication of the 30 countries' different sets of equations will be investigated to see whether there are any significant changes. Regression results of the 24 country model with new variables will be discussed. Finally, concluding remarks will be presented.

Dependent Variable:

In chapter IV, the dummy variable estimator is used to derive a separate intercept for each country. The fixed effects of urban primacy (FE) for the basic equation in chapter IV (equation 1, table 4.3b) are used as the dependent variable in this analysis.

Independent Variables:

1. There are many economic factors that affect urban primacy. Although this chapter is oriented toward political factors, we use an international trade variable, which represents political and economic factors, as one determinant of fixed effects. The effect of openness to trade may be based on the perception of the "normal" trade regime. Increased openness, as indicated by a greater importance of exports in a particular year, may not induce relocation in response to the availability of foreign customers or suppliers because the openness may not continue. Thus, Krugman's

hypothesis that greater openness to foreign trade reduces the dependency on location in the largest cities only works if the openness is expected is expected to be permanent. How do people determine their perception of openness? In Chapter IV we found that the lagged value of export has a significant negative effect on primacy even though the current value's coefficient was insignificant. Here, we take the value of the ratio of exports to GDP, averaged over a number of years, as a determinant of the fixed effects. The ratio of export of goods and nonfactor services to GDP from 1960 to 1990 (EXPORT) is averaged and used as a measure of international trade.

2. Dictators concentrate power in the administrative center and serve the interests of military, political, and economic elite that usually reside in the capital or the largest city. They may ignore the wishes of the politically weak hinterland (Ades and Glaeser, 1995), and favor elite groups in the largest city by offering subsidies, gifts, such as land, houses, cars, and money, and travel to foreign countries. These subsidies are paid from public money and resources, since dictators consider the nations' resources as their own. Dictators may also concentrate government programs and projects in the administrative centers, which increases employment and, hence, the population of the capital and/or largest city. Thus, residents of the largest city enjoy higher incomes and higher standard of life, which encourages people from smaller town and rural areas to migrate to the primate city and increases its size. It should be clear that pure dictatorships are not the only governments that prohibit freedom of speech and a multiparty system; there are also regimes that have

"democracy of speech" but not "democracy of change". In many Third World Countries in 1980s and 1990s, freedom of speech and a multiparty system might be allowed artificially, but the governments of these countries do not allow political or economic reform.

To measure the ability of a government to concentrate resources in the primate city, we use the Gastil index of political rights ranks countries in seven categories according to a checklist of political rights, annually. Countries that score one are the most democratic countries, while countries that score seven have the most dictatorial regimes. The Gastil index, also, categorize countries as free, partially free, and not free. We measure dictatorship variable in two ways. One way is assign one to "free" countries, two to "partially free" countries, and three to "not free" countries for the years 1975, 1980, 1985, and 1990, and then average this over the years for each country. The other way is to average the scores that the Gastil index assigns to each country for these years. We expect a positive relationship between DICT and the fixed effects of urban primacy (FE). Regression results of both methods do not differ significantly, but the former one shows more robustness and produces higher t-values than the latter one. Thus, the first measure of dictatorship (DICT) is used as one of the independent variables

3. The degree of political instability in a country influences the size of primate city in that country. Ades and Glaeser (1995) state that political instability increases largest city size, especially if weak governments are unable or unwilling to protect life and property of people outside the capital. They found that one extra

revolution or coup per year increases the average size of the largest city by 2.4 percent.

Unlike Ades and Glaeser, we believe that this instability variable can work in two directions. If the political unrest or the warfare is based in rural areas, people of affected areas will move to a safer areas such as the capital that are not affected by this unrest. Primacy would decrease if political instability such as assassinations, coups, or bombings of public targets is based in the capital or primate city because this might discourage people from migrating to cities and encourage residents of the primate city to move to other towns or to countryside. Sometimes when government is weak and the whole country is politically unstable, people migrate to other countries and probably reduce the population of urban areas more than rural areas. Thus, the relationship between political instability and urban primacy is complex and depends on where in the country this instability occurs and the degree to which it affects people's daily life. Consequently, we do not predict the sign of the coefficient of this variable.

As with the dictatorship variable, we have tried two measures of political instability. The first is the number of revolutions and coups from 1965 to 1985 or subsample, averaged for each country. The other is calculated as (0.5 * assassination + 0.5 * revolution) for the same period and then averaged for each country. Both variables produce similar results; we choose the latter one. Data for political instability variable (POLINS) are from the Barro and Lee data set that is available through National Bureau of Economic Research (NBER).

4. Ades and Glaeser (1995) create a variable to investigate the interaction between dictatorship and political instability. This variable is defined as UNREST = DICT * POLINS. We also will use this variable to test its effect in addition to the other two variables that measure the type and status of internal politics of each country.

The dependency and world system school was discussed in detail in chapter II. Here, we explain briefly the variables used to measure it in this regression analysis.

5. A measure for dependency theory is foreign direct investment (FDI) which can be normalized in many ways. One way that has been used in chapter IV is to take the ratio of FDI to GDP. Another method is to take the ratio of FDI to total population. Data are averaged from 1960 to 1990 or a subperiod for each country. Both methods yield similar results. A positive relationship between (FDI) and (FE) is expected, if the dependency approach provides an important explanation of primacy.

6. To measure the position in world system, dummy variables are used for periphery (PER) and semiperiphery (SEMPER), with the core as the reference category (Smith and London, 1990; Lyman, 1992). We use the world system classification by Nemeth and Smith (1985) published in Lyman (1992). Three countries in our sample are not included in this classification. We arbitrarily classify Bangladesh and the Dominican Republic in the periphery, and Taiwan in the semiperiphery (see Appendix 4). Both world system theory and modernization theory are consistent with a positive effect of the noncore variables on urban

primacy. Our reading of world-system theory, however, suggests that primacy should be greater in the semiperiphery than in the core and greater in the periphery than in the semiperiphery.

7. In his article, "Corruption and Growth", Paolo Mauro (1995) used indices on corruption, red tape, and the efficiency of the judicial system for the period 1980-1983 drawn from Business International (BI), a part of the Economist Intelligence Unite. The BI indices reflect the subjective opinion of BI's correspondents stationed in 68 countries. Each index has values from 0 to 10; a high value of the index means the country in question has "good" institutions. Data are averaged for each country over the 4 year period from 1980 to 1983 (Mauro, 1995, 684). Because the judiciary system, red tape and corruption indices represent closely related variables, Mauro averaged them and labeled the result bureaucratic efficiency (BE). He considered "the bureaucratic efficiency index to be a more precise measure of corruption than the corruption index on its own" (Mauro, 1995, 686). Mauro also used the BI political stability index. This index reflects subject opinions. Political stability index is not highly correlated with the political instability measure. We intend to use the bureaucratic efficiency (BE), and political stability (POLSTAB) as independent variables in explaining the fixed effects.

Table 5.1 shows the correlation matrix of variables in the model. Intercorrelations among the variables are not particularly high, except for the correlation between UNREST and POLINS. Because UNREST equals POLINS * DICT, it is not surprising that the correlation as high. UNREST's correlation with

political instability is 0.97 while its correlation with dictatorship variables just 0.27. Another exception is that between bureaucratic efficiency (BE) and corruption (COR).

Findings:

A 30 country model:

Using cross-sectional data for 30 countries, this section investigates the effects of several political variables on the fixed effects of the log of urban primacy.

The effect of openness or the average export ratio on the fixed effects of urban primacy is tested first. Table 5.1 shows that the correlation between FE and EXPORT is relatively high (-0.58), and equation 1 of table 5.2 shows that the coefficient of EXPORT is statistically significant at 0.01 level with t-value of -3.764. It is negative, which supports the hypothesis that international trade decreases urban primacy. The coefficient of EXPORT is negative and statistically significant at 0.01 level in all seven equations in table 5.2. It has a strong and robust impact on fixed effects of urban primacy (FE). Equation 2 in table 5.2 adds two political variables to equation 1, DICT and POLINS. The coefficient of dictatorship variable (DICT) is significant at 0.05 level with t-value of 2.114 and has the expected positive sign. Dictatorial regimes with their attitudes and policies lead to concentration of people in the primate city. The political instability coefficient (POLINS) has a negative effect but it is not significant. When the UNREST variable is added to the political variables, the dictatorship coefficient is still significant and positive, political

Table 5.1:
Correlation Matrix of Determinants of Fixed effects of Urban Primacy

	FE	EXPORT	DICT	POLINS	UREST	FDI	PER	SEMPER	POLSTA	BE	CORUPT
FE	1.0000										
EXPORT	-0.5781	1.0000									
DICT	0.1999	0.2647	1.0000								
POLINS	0.2418	-0.1251	0.1089	1.0000							
UNREST	0.3130	-0.1923	0.2681	0.9725	1.0000						
FDI	-0.1729	0.0688	-0.3754	-0.1223	-0.1344	1.0000					
PER	-0.1420	0.2087	0.1263	0.0406	0.0259	-0.1986	1.0000				
SEMPER	0.2865	-0.0730	0.2583	0.2197	0.2263	-0.1737	-0.7687	1.0000			
POLSTA	-0.5154	0.1789	-0.2384	-0.3401	-0.3467	0.4099	-0.0686	-0.3508	1.0000		
BE	-0.5205	0.1088	-0.3843	-0.3106	-0.3167	0.4682	-0.1792	-0.2856	0.6626	1.0000	
CORUPT	-0.4469	0.0063	-0.3873	-0.1891	-0.2082	0.4276	-0.1193	-0.2873	0.6285	0.9601	1.0000

Table 5.2:
Determinants of Fixed Effects of Urban Primacy
Ordinary Least Squares (30 countries)

VARIABLE	1	2	3	4	5	6	7
CONSTANT	1.9028***	0.8984	0.7031	0.47305	1.2169**	1.0933*	0.6756
	(6.517)	(1.550)	(0.958)	(0.529)	(2.737)	(2.001)	(0.767)
EXPORT	-0.0451***	-0.0509***	-0.0518***	-0.0531***	-0.0455***	-0.0466***	-0.0501***
	(-3.764)	(-4.308)	(-4.258)	(-4.190)	(-3.928)	(-3.857)	(-3.885)
DICT		0.7527**	0.8768*	1.0020*			0.3786
		(2.114)	(1.920)	(1.870)			(0.601)
POLINS		-0.7881	2.4449	3.6123			-4.5730
		(-0.754)	(0.333)	(0.460)			(-0.512)
UNREST			-1.8039	-2.4335			2.1171
			(-0.445)	(-0.562)			(0.432)
PER					0.5328	0.6577	0.6267
					(1.136)	(1.157)	(0.918)
SEMPER					1.0268**	1.1441**	1.0849
					(2.222)	(2.070)	(1.550)
FDI				0.0035		0.0030	0.0050
				(0.467)		(0.403)	(0.650)
Adj R^2	0.31	0.37	0.35	0.33	0.41	0.39	0.37

The number in parentheses is the t-statistic. The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels.

instability variable remains insignificant, and the new variable is insignificant.

To investigate the effect of world-system variables, dummy variables for periphery (PER) and semiperiphery (SEMPER) are added to equation 1 (equation 5 in table 5.2). Both coefficients are positive as expected, but the one for PER is not significant (t =1.136) while the other is significant at 0.05 level (t = 2.222). The fact that FDI is not significant in combination with political variables or with the world-system variables weaken dependency theory. Equation 7 combines all economic, political, and dependency / world system variables. This combination results in only one significant variable (EXPORT) and a t-value that is equal to 1.55 for SEMPER variable. This equation combines two types of political influence and has a total of 7 independent variables with only 30 observations. We are not surprised that there is not enough information to provide significant results.

The main conclusion from the 30 country model is that a nation's openness to the world has a significant negative impact on the fixed effects of urban primacy (FE), and that the fixed effects of urban primacy are influenced by political considerations and level of development. The variables that influence the later conclusion are dictatorship and semiperiphery position.

A 24 Country Model:

Data for the variables of bureaucratic efficiency (BE) and political stability (POLSTAB) are available in (Mauro, 1995, 708-710), but only for 24 of the 30 countries included in this study. Because we are using these new variables with a

smaller sample, we first replicate the equations of 5.2 for this sample. The purpose is to see if the results are sensitive to the excluded observations. A comparison of Tables 5.2 and 5.2a shows that the results do not change much when the 6 observations are dropped. The dictatorship variable, however, is not as strong in Table 5.2a.

Thus, Mauro's variables can be used in combination with some of other variables, and we can conclude that any changes in results are not strongly influenced by the different sample.

Bureaucratic efficiency (BE) is used as a proxy for corruption. There is a very strong correlation between BE and corruption for the 24 countries (0.96) (table 5.1). This is expected since BE is the average of corruption, red tape, and judiciary system. Mauro suggests that BE is the best measure of corruption. We expect that high bureaucratic efficiency will reduce urban primacy and lead to a more systematic distribution of urban population.

Regarding the political stability variable (POLSTAB), we find that it has a relatively high correlation with BE (0.66) and with corruption (0.63) respectively (table 5.1). As mentioned before, it is a subjective measure. We expect a negative relationship between political stability and urban primacy. Net of other factors, there are no reasons for people in a politically stable nation to gather in small area of land and leave the rest of the country unoccupied.

Table 5.3 contains the regression results of the 24 country model when bureaucratic efficiency (BE) and political stability (POLSTAB) are added. We investigate the

Table 5.2a:
Determinants of Fixed Effects of Urban Primacy (FE).
Ordinary Least Squares (24 countries)

VARIABLE	1	2	3	4	5	6	7
CONSTANT	1.9375***	0.6648	0.9805	1.0157	1.1875**	1.0611*	1.6788
	(6.580)	(1.105)	(1.176)	(0.977)	(2.661)	(1.891)	(1.580)
EXPORT	-0.0402***	-0.0457***	-0.0434***	-0.0431***	-0.0434***	-0.0445***	-0.0402***
	(-3.323)	(-3.895)	(-3.415)	(-3.149)	(-3.697)	(-3.613)	(-2.995)
DICT		0.7894**	0.5586	0.5375			-0.6681
		(2.140)	(0.999)	(0.797)			(-0.720)
POLINS		1.1484	-4.1368	-4.3784			-21.297
		(0.732)	(-0.430)	(-0.410)			(-1.530)
UNREST			3.2367	3.3807			12.610
			(0.557)	(0.525)			(1.568)
PER					0.8032	0.9360	1.4193
					(1.609)	(1.523)	(1.606)
SEMPER					1.0155**	1.1347*	1.5918*
					(2.193)	(2.009)	(1.835)
FDI				-0.0005		0.0030	0.0034
				(-0.060)		(0.378)	(0.437)
Adj R^2	0.30	0.40	0.38	0.34	0.38	0.36	0.40

The number in parentheses is the t-statistic. The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels.

effect of BE, the effect of POLSTAB, and the effects of both variables in different equations.

The statistical significance and the expected negative sign of EXPORT is maintained throughout table 5.3. In equation 2, when BE is added to EXPORT, the bureaucratic efficiency (BE) coefficient is significant at 0.01 level and has the expected negative sign. Countries that have high bureaucratic efficiency tend to have low urban primacy.

In equation 3, when POLSTAB is added to exports, the political stability coefficient (POLSTAB) is significant at 0.05 level with a t-value equal to -2.740. It has the expected negative sign. A nation with a politically stable regime might have its urban population dispersed in different cities and towns, and no single large city dominates the urban system.

When bureaucratic efficiency and political stability variables are combined in equation 4, we find that the significance level of BE is decreased; its t-value falls from -3.131 in equation 1 to -1.674 in equation 3. Thus, BE is significant at 0.10 level. The political stability variable lost its significance in equation 4, although it still maintains its expected negative sign. The reason for this result may be because of the correlation between BE and POLSTAB variables. When the dictatorship variable (DICT) is added to the model (equation 5), BE lost its significance, POLSTAB stays almost the same, and DICT does not show a significant result (t-value is 1.257), but has the expected positive sign. Adjusted R^2 is 0.52. In equation 6, when POLSTAB is dropped from the model, adjusted R^2 is still 0.52 and there is

Table 5.3:
Determinants of Fixed Effects of Urban Primacy (FE) When BE and POLSTAB are Included.
Ordinary Least Squares (24 countries)

VARIABLE	1	2	3	4	5	6	7	8	9	10	11
CONSTANT	1.9375***	3.2421***	4.2734***	4.0016***	3.0742**	2.3188**	3.0139**	4.2076***	3.1678***	4.245**	3.4374**
	(6.580)	(6.679)	(4.796)	(4.597)	(2.716)	(2.683)	(2.625)	(4.581)	(3.025)	(2.572)	(2.586)
EXPORT	-0.0402***	-0.0367***	-0.0349***	-0.0351***	-0.0396***	-0.0412***	-0.0419***	-0.0351***	-0.0354***	-0.0335**	-0.0335**
	(-3.323)	(-3.567)	(-3.231)	(-3.389)	(-3.660)	(-3.842)	(-3.804)	(-3.354)	(-3.062)	(-2.692)	(-2.609)
BE		-0.2246***		-0.1590*	-0.187	-0.1813**		-0.1814*	-0.2212*	-0.1899	-0.2082*
		(-3.131)		(-1.674)	(-1.199)	(-2.315)		(-1.810)	(-2.058)	(-1.632)	(-1.957)
POLSTAB			-0.3324**	-0.1623	-0.1573		-0.3063**	-0.1806		-0.1738	
			(-2.740)	(-1.050)	(-1.032)		(-2.368)	(-1.144)		(-0.973)	
DICT					0.4567	0.4665	0.7053*				-0.6103
					(1.257)	(1.282)	(1.906)				(-0.714)
POLINS											-19.645
											(-1.527)
UNREST											11.623
											(1.564)
PER									-0.1195	-0.1910	0.5657
									(-0.185)	(-0.253)	(0.612)
SEMPER									0.1262	0.0070	0.7660
									(0.207)	(0.010)	(0.848)
FDI							0.0057	0.0050		0.0044	0.0046
							(0.881)	(0.776)		(0.606)	(0.641)
Adj R^2	0.30	0.50	0.46	0.51	.52	0.52	0.50	0.50	0.47	0.45	0.49

The number in parentheses is the t-statistic. The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels.

almost no change in both DICT coefficient and its t-value. BE regained its significance at 0.05 level. From equations 4, 5, and 6, we conclude that addition or elimination of either the political stability variable or dictatorship variable does not effect the coefficient of other variable. On the other hand BE and POLSTAB have strong effects on each other. The correlation between BE and POLSTAB is 0.67, while that between DICT and BE, and DICT and POLSTAB is 0.11 and 0.18 respectively. Equation 7 tests the effects of EXPORT, POLSTAB, DICT, and FDI on the fixed effects of urban primacy. Political stability is significant at 0.05 level and has the expected negative sign. The dictatorship coefficient is positive and significant at 0.10 level. Foreign direct investment coefficient (FDI) is positive but insignificant (t-value is 0.881). BE is added to, and DICT is dropped from, equation 7, POLSTAB lost its significance and BE is significant at 0.1 level. FDI is not significant (t-value is 0.776). The findings of equations 7 and 8 confirm our conclusion about the association between BE, POLSTAB, and DICT.

In the 24 country sample, the world system position as well as dependency school provide weak and insignificant coefficients. Equation 9 show the expected signs and significance of EXPORT and BE coefficients. PER has unexpected negative sign with an insignificant coefficient, and SEMPER's coefficient is positive but insignificant. Adjusted R^2 has dropped to 0.47 and to 0.45 in equation 10 when FDI is added. These results suggest bureaucratic efficiency and political stability explain rather than dependency / world system theories the earlier results for periphery and semiperiphery dummy variables. In a 30 country model (table 5.2)

and in 24 country model without BE and POLSTAB, both PER and SEMPER are positive and SEMPER has significant effect on fixed effect of urban primacy. In equation 11, POLSTAB is dropped and the other three political variables (DICT, POLINS, and UNREST) are added. No surprising result occurs in this equation, and the main findings of table 5.3 prevail here.

Concluding Remarks:

The main noticeable remark is the small sample size of the cross-section analysis. When panel data are used, we have the advantage of the large sample size. But even with this sample size limitation, this chapter has produced results that support some well-established theories and provide some new ideas for urbanization and development planners and policy makers.

Krugman's theory of the degree of openness and its negative relationship has been supported throughout this chapter. Thus, one important step towards deconcentration of people from the primate city is to increase the interaction with the world economy. International trade is a key factor to a more systematic urban hierarchy. This, of course, contradicts of the implication of dependency / world-system theories.

While political instability did not show statistically significant results in the cross-sectional analysis, the dictatorship variable provides support to the theory that nations with democratic regimes have more balanced urban systems than dictatorial

regimes with their greater ability to follow policies that lead to concentration of people in the largest city.

Although dependency theory is not strong in this study, the world-system position supports the hypothesis that urban primacy occurs in periphery, comes strong in semiperiphery, and decline in core nations. This result, however, is also consistent with modernization theory. Thus, urban primacy may be a natural phase in the transfer of nations from one zone to another.

Other significant methods for planners and policy makers to fix unbalanced urban system is to increase the efficiency of government bureaucrats since bureaucratic efficiency is negatively related to urban primacy, and to eliminate political instability. Looking at the two variables of political instability (POLINS) and political stability (POLSTAB) we may conclude that political stability leads to a more balanced urban system.

Finally, to my knowledge, this is the first study to investigate the determinants of urban primacy from different perspectives: economic, political, demographic, international relations, and combine all those variables to give a broader picture of the mechanism that leads to concentration of people in one primate city.

CHAPTER VI

Urban primacy and size of a nation's largest city

Introduction

In the previous chapters of this study, the determinants of urban primacy were investigated. While we use the urban primacy index (LUP1) as the dependent variable, Ades and Glaeser (1995) used the log of average population in the largest city. They tested the effects of several variables on the size of a nation's largest city. Some of their variables are similar to those which we use in our analysis, such as a dummy for capital city, land area, real GDP per capita, share of labor outside agriculture, share of trade in GDP, a dictatorship dummy, and transportation. Ades and Glaeser emphasized the role of trade, governments, and politics in determining the size of a country's largest city. They find stronger results with the political variables. In this chapter we compare results of equations explaining the size of the largest city to equations explaining urban primacy.

In addition to the differences in the dependent variables, there are other differences between this and Ades and Glaeser (1995)'s study. (1) They used more countries in their sample than; (2) they used cross-sectional analysis with data averaged over time, while we use both panel data techniques and cross-sectional

analysis averaged over time; and (3) they used variables for non-urbanized population and urbanized population outside the main city. We so we use total population to proxy the effect of these two measures.

Dependent and Independent Variables

The dependent variables for panel data analysis are urban primacy (LUP1 from chapter IV) and the population size of the largest city in a nation (LMCITY). With regard to the cross-sectional analysis both variables are averaged for each country over the period 1970 to 1990.

The independent variables are the same as in Chapters IV and V, except for the dictatorship and transportation variables The dictatorship variable for panel data is calculated from Gastil Index for the period from 1972 to 1990. We used data of 1972 rather than those of 1970, which are not available. As Barro (1995) did, we used related data from Bollen (1990), who suggested that his measures are comparable to Gastil's. We categorize Bollen's measure as free, partially free, and not free for use in this study. The transportation variable for the panel data is measured as the ratio of the number of passenger cars to total population in a country. When cross-sectional data is used, the transportation variable is calculated as the 1970, 1980, and 1990 average of government expenditure in transportation and communication for each country. The other variables are as defined in Chapter IV and V

Findings:

This section presents the panel data results and then the cross-sectional results.

Panel Data Analysis:

Table 6.1 follows the Ades and Glaeser (1995) model. Most of Ades and Glaeser's variables are in this study. Thus, we use the variables that are common in both studies to compare the two dependent variables. Considering tables IV and V (specially equations 3 and 10) in Ades and Glaeser study, we estimated three sets of equations. The classical regression model is rejected for all equations. The Hausman test favors fixed-effects models (FEM) for all urban primacy equations and the largest city size equation that includes the dictatorship variable; random-effects models (REM) are favored for the other largest city size equations. The F-test favors the restricted model in both LUP1 and LMCITY equations, suggesting that time effects are jointly insignificant.

Comparing coefficients of the variables, we find that the DCAP coefficient is significant and positive in all equations. The impact of capital city is strong and positive in the largest city size and in the urban primacy equations. The population size coefficient is negative and significant in all urban primacy equations. Urban primacy falls as a nation's total population increases because the second largest city grows faster than the first. Conversely, as Ades and Glaser found, the population coefficient is highly significant and has a positive impact in all equations for LMCITY. A one percent increase in a country's population leads to an 0.8 percent

Table 6.1
Comparison of LUP1 and LMCITY
Fixed / Random Effects Models

VARIABLE	LUP1	LMCITY	LUP1	LMCITY	LUP1	LMCITY
DCAP	0.5659***	0.6045***	0.3854*	0.4823***	0.5470***	0.5982***
	(3.429)	(6.283)	(1.809)	(3.424)	(3.080)	(5.836)
LPOP	-0.5140***	0.7628***	-0.5797***	0.8589***	-0.5247***	0.7617***
	(-4.057)	(14.075)	(-4.455)	(9.983)	(-3.973)	(13.943)
LLAND	0.0645	0.1098**	0.1093	0.0902	0.0633	0.1093**
	(0.597)	(2.079)	(1.001)	(1.249)	(0.582)	(2.058)
LGDPC	0.1311*	0.1693***	0.1302*	0.1760***	0.1036	0.1600**
	(1.726)	(3.527)	(1.722)	(3.520)	(0.982)	(2.453)
LLABOR	0.5693***	0.7939***	0.6470***	0.6511***	0.5685**	0.7887***
	(2.635)	(7.524)	(2.910)	(4.429)	(2.578)	(7.293)
LEXP	-0.0443	0.0104	-0.0340	0.2374	-0.0462	0.0097
	(-0.853)	(0.318)	(-0.652)	(0.688)	(-0.873)	(0.291)
DICT			0.0607**	-0.0083		
			(2.151)	(-0.447)		
LTRANS					0.0161	0.0057
					(0.387)	(0.221)
CONSTANT		-2.0995***				-1.9846**
		(-3.244)				(-2.385)
LM Test	463.859	463.031	445.186	394.164	449.790	446.717
(p-value)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
FE vs. RE	19.2001	7.271	21.654	15.0524	20.0475	8.2385
(p-value)	(0.0038)	(0.2965)	(0.0029)	(0.0353)	(0.0055)	(0.3120)
R^2 / Adj.R^2	0.96	0.90	0.96	0.99	0.95	0.90

The number in parentheses is the t-statistic.
The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels respectively.

increase in the largest city size

The land area coefficient is insignificant in the three equations for urban primacy, but it is significant and has a positive impact on the largest city size when the random-effects model is favored. This is evidence for the proposition that larger land area-- greater transportation cost for a given amount of decentralization-- favors concentration in the largest cities, but not to the exclusion of concentration in the second largest city.

The level of economic development is positive and significant in two of the urban primacy equations; it is positive and highly significant in the largest city equations. Similarly, the share of labor outside agriculture is positive and significant in all equations of table 6.1. The measure of a nation's openness (LEXP) has insignificant effects in all equations. This result contradict Ades and Glaeser findings that share of trade in GDP is negative and significant.

When a dummy variable for dictatorship is added, it shows a significant positive effect in the urban primacy equation, but it shows an insignificant impact on the largest city's population. The transportation coefficient is positive, but insignificant, in both LUP1 and LMCITY equations. Thus, the panel data results are different from Ades and Glaeser's cross-section results.

Table 6.2 use a more complicated model than that of 6.1. The economic size of a country is added to the equations and population density (LPOPDENS) replaces population (LPOP) and land area (LLAND). The dummy

for capital city is always positive and significant. LPOPDENS is significant and

Table 6.2
Comparison of LUP1 and LMCITY
Fixed / Random Effects Models

VARIABLE	LUP1	LMCITY	LUP1	LMCITY	LUP1	LMCITY
DCAP	0.5659***	0.6045***	0.3854*	0.4823***	0.5470***	0.5982***
	(3.429)	(6.283)	(1.809)	(3.424)	(3.080)	(5.836)
LPOPDENS	-0.0645	-0.1098**	-0.1094	-0.0901	-0.0633	-0.1093**
	(-0.597)	(-2.079)	(-1.001)	(-1.248)	(-0.582)	(-2.058)
LGDP	-0.4494***	0.8725***	-0.4702***	0.9490***	-0.4613***	0.8710***
	(-3.412)	(19.804)	(-3.540)	(10.805)	(-3.339)	(19.541)
LGDPC	0.5805***	-0.7032***	0.6004***	-0.7730***	0.35650***	-0.7110***
	(3.898)	(-10.665)	(4.005)	(-7.798)	(3.666)	(-9.296)
LLABOR	0.5693***	0.7939***	0.6469***	0.6512***	0.5684***	0.7887***
	(2.635)	(7.524)	(2.910)	(4.430)	(2.577)	(7.293)
LEXP	-0.0443	0.0104	-0.0340	0.0237	-0.0462	0.00972
	(-0.853)	(0.318)	(-0.652)	(0.688)	(-0.873)	(0.291)
DICT			0.06067**	-0.0083		
			(2.151)	(-0.447)		
LTRANS					0.0161	0.0057
					(0.387)	(0.221)
CONSTANT		-2.0995***				-1.985**
		(-3.244)				(-2.385)
LM Test	463.859	463.031	445.186	394.164	449.790	446.717
(p-value)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
FE vs. RE	19.198	7.270	21.651	15.052	20.045	8.238
(p-value)	(0.0038)	(0.2966)	(0.0029)	(0.0353)	(0.0055)	(0.3121)
R^2 / Adj.R^2	0.96	0.90	0.96	0.99	0.95	0.90

The number in parentheses is the t-statistic.
The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels respectively.

negative in the largest city equations that favors random-effects model.

LGDP is significant and negative in all urban primacy equations, and significant and positive in the largest city equations. This indicates that urban primacy falls when the size of a country--GDP, population, land area-- increases. This does not mean necessarily that the largest city size decreases; it could mean that the second largest city increases more rapidly than the first largest.

Given the coefficient of GDP in city size equation, the latter interpretation is the correct one. In table 6.1 we report LGDPC's coefficient holding LPOP and LLAND constant. In table 6.2 we test LGDPC holding LGDP constant, which implies a reduction in LPOP and LLAND. The coefficient of LGDPC is significant and positive for the urban primacy equations and is significant and negative in the largest city equations (table 6.2). In smaller countries with higher levels of development primacy is greater but the largest city is smaller. This implies that in smaller countries, the second largest city is proportionately smaller than the largest city. This may indicate that people with higher income prefer the largest city because it has services and other amenities that are not available in other cities in smaller countries. The share of labor outside agriculture is significant and has a positive effect in all equations. The export coefficient is not significant in any equation. The coefficient of dictatorship, as in table 6.1, is positive and significant in the urban primacy equation and insignificant in the largest city equation. The coefficient of transportation is not significant in any equation.

Cross-sectional Analysis:

Table 6.3 shows the cross-sectional results of the LUP1 and the LMCITY equations using averaged data. The coefficient of the capital dummy variable (DCAP) is positive and significant in all equations. The population coefficient is significant in all equations; it has a negative sign in the LUP1 equations and a positive sign in the LMCITY equations. The results for these two variables confirm the panel data results.

The coefficient of land area is significant or approaches significance in the urban primacy equations. It is insignificant in the city size equations, which is the opposite pattern to that of the panel data equations. Similarly, unlike the panel data results, LGDPC is insignificant in all equations. LLABOR is negative and insignificant in all primacy equations, but it is positive and significant in all main city equations. If we accept these coefficients, we may infer that the share of labor force outside agriculture would increase largest city population but may not increase urban primacy. This may happen because in addition to increasing largest city population, this variable also increases the population of the second largest city and other cities in a nation's urban system.

The export coefficient is negative and significant in all main city equations while it is negative and significant in only two of the urban primacy equations. As we have previously suggested, an average over time of the export variable tends to be significant, although annual measures do not have significant effects.

The dictatorship coefficient is significant when it is combined with political

Table 6.3
Comparison of LUP1 and LMCITY
Cross-sectional Model

VARIABLE	LUP1	LMCITY	LUP1	LMCITY	LUP1	LMCITY	LUP1	LMCITY
CONSTANT	-0.9268	-0.0524	-2.2746	-0.9888	-2.5313	-2.4569	-0.6363	-0.0845
	(-0.333)	(-0.029)	(-0.781)	(-0.531)	(-0.778)	(-1.321)	(-0.228)	(-0.046)
DCAP	1.5961***	0.6943**	1.4279***	0.5774**	1.4478***	0.529**	1.6490***	0.6884**
	(3.987)	(2.693)	(3.456)	(2.185)	(3.345)	(2.115)	(4.087)	(2.591)
LPOP	-0.4039**	0.6677***	-0.3990**	0.6711***	-0.4389**	0.6651***	-0.4142**	0.6688***
	(-2.357)	(6.049)	(-2.367)	(6.224)	(-2.393)	(6.349)	(-2.414)	(5.919)
LLAND	0.3034*	0.0945	0.2804	0.0785	0.2923	0.0554	0.3198*	0.0927
	(1.723)	(0.833)	(1.612)	(0.706)	(1.594)	(.529)	(1.810)	(0.797)
LGDPC	0.3017	0.1117	0.4154	0.1907	0.4484	0.3219	0.3099	0.1108
	(0.3798)	(0.515)	(1.215)	(0.872)	(1.222)	(1.536)	(0.920)	(0.500)
LLABOR	-0.9266	1.0358**	-0.9739	1.0029**	-1.0825	0.8004*	-0.9888	1.0427**
	(-1.321)	(2.293)	(-1.411)	(2.271)	(-1.496)	(1.937)	(-1.405)	(2.251)
EXPORT	-0.00228	-0.0205**	-0.0255*	-0.0224**	-0.0293*	-.0264***	-0.0212	-0.0207**
	(-1.604)	(-2.247)	(-1.808)	(-2.486)	(-1.947)	(-3.65)	(-1.484)	(-2.204)
DICT			0.4593	0.3191	0.683	0.7228**		
			(1.338)	(1.453)	(1.501)	(2.780)		
POLINS					3.9138	9.5306**		
					(0.572)	(2.439)		
UNREST					-2.5402	-5.3115**		
					(-0.678)	(-2.481)		
LTRANS							-0.0772	0.0085
							(-1.012)	(.170)
Adj.R^2	0.41	0.88	0.43	0.89	0.40	0.91	0.41	0.88

The number in parentheses is the t-statistic.
The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels respectively.

Table 6.4
Comparison of LUP1 and LMCITY
Cross-sectional Model

VARIABLE	LUP1	LMCITY	LUP1	LMCITY	LUP1	LMCITY	LUP1	LMCITY
CONSTANT	-1.4377	-0.7044	-2.526	-1.678	-2.5417	-3.2152*	-1.2101	-0.7827
	(-0.522)	(-0.381)	(-0.870)	(-0.883)	(-0.784)	(-1.726)	(-0.438)	(-0.415)
DCAP	1.5528***	0.7153***	1.3995***	0.5781**	1.4100***	0.4812*	1.5849***	0.7043**
	(4.096)	(2.815)	(3.495)	(2.204)	(3.326)	(1.977)	(4.166)	(2.717)
LPOPDENS	-0.3537*	-0.1251	-0.3146*	-0.0901	-0.3150	-0.0198	-0.3575*	-0.1238
	(-1.956)	(-1.032)	(-1.719)	(-0.752)	(-1.593)	(-0.175)	(-1.977)	(-1.005)
LGDP	-0.0784	0.7776***	-0.0978	0.7601***	-0.1252	0.7174***	-0.0816	0.7787***
	(-0.567)	(8.394)	(-0.706)	(8.383)	(-0.843)	(8.408)	(-0.591)	(8.266)
LGDPC	0.4192	-0.6100**	0.5324	-0.5087*	0.5784	-0.3205	0.4477	-0.6198**
	(1.037)	(-2.250)	(1.285)	(-1.875)	(1.293)	(-1.248)	(1.105)	(-2.244)
LLABOR	-0.9245	0.9325*	-0.9606	0.9002*	-1.0378	0.6872	-1.0114	0.9624*
	(-1.331)	(2.003)	(-1.390)	(1.989	(-1.421)	(1.638)	(-1.445)	(2.018)
EXPORT	-0.0188	-0.0190*	-0.0216	-0.0216**	-0.0250	-0.0271***	-0.0178	-0.0193*
	(-1.299)	(-1.963)	(-1.483)	(-2.259)	(-1.577)	(-2.974)	(-1.228)	(-1.961)
DICT			0.3886	0.3477	0.5312	0.7931***		
			(1.130)	(1.544)	(1.137)	(2.956)		
POLINS					1.9818	10.235**		
					(0.284)	(2.551)		
UNREST					-1.452	-5.6826**		
					(-0.380)	(-2.587)		
LTRANS							-0.0749	0.0258
							(-1.002)	(0.506)
Adj.R^2	0.43	0.88	0.44	0.89	0.40	0.91	0.43	0.87

The number in parentheses is the t-statistic.
The number above it is the coefficient.
***, **, and * indicate significance at the 99 percent, 95 percent, and 90 percent levels respectively.

instability and unrest variables in the main city equation. The political instability coefficient is positive and significant. The interaction variable of dictatorship and political instability (UNREST) is also significant with a negative sign. The transportation coefficient is never significant. These are the same results that Ades and Glaeser report.

When LGDP is added and LPOPDENS replaces LPOP and LLAND in the cross-sectional model (table 6.4), LGDPC and LPOP results change but results for the rest of the variables do not change much. The findings for DCAP, LLABOR, and EXPORT are similar to the table 6.3 results. The coefficient of LPOPDENS is significant and has a negative sign in three urban primacy equations, but it is not significant in any of the largest city size equations. LGDP's coefficient is positive and significant in all largest city equations, but it is insignificant in the urban primacy equations. LGDPC is positive and insignificant in the urban primacy equations, but it is significant and negative in three of the largest city equations. The three political variables are significant in the largest city equation.

Conclusions:

When variables that are similar to Ades and Glaeser's variables are used in panel data and cross-sectional analyses, we find that when the capital city is the largest city, it has a positive effect on both the size of the largest city population and urban primacy. While the population size of a country is positively associated with the population of the largest city, it is negatively associated with urban primacy.

This indicates that the population of the second largest city, and perhaps other cities, in the urban system increases more rapidly than the population of the largest city. The level of economic development has a significant positive impact on LUP1 and LMCITY in the panel data analysis, but it does not show that effect for the cross-sectional analysis.

We believe when LGDP variable is introduced to the model along with LGDPC, that weaken the cross-section approach and other results obtained in the cross-section equations. LGDPC's coefficient becomes negative in the city size equations. This may occur because we assume the size of a country's population and land area falls in order to hold LGDP constant.

The share of labor outside agriculture increases the main city size (in all tables) for obvious reasons. This confirms Ades and Glaeser's results. The same variable is not as robust when LUP1 is used. It shows a positive impact when panel data are used (table 6.1 and 6.2), but it is insignificant when cross-sectional data are used. The measure of openness and dictatorship variables agree with Ades and Glaeser findings only when cross-sectional analysis is used.

The final thought that should be emphasized in this chapter is the operational differences between urban primacy and population size of the largest city of a nation. While LUP1 take into consideration the ratio of the largest city to the second largest city, LMCITY does not contain any information other than that of largest city population. Therefore, findings when LMCITY is the dependent variable do not reflect what is happening in the rest of the urban system, while findings when LUP1

is used take into account the largest city population and the second largest city population.

CHAPTER VII

Summary, Conclusions, and Recommendations

Summary:

Several scholars have studied the effect of economic development and other economic factors on urban primacy. Other scholars have tested the effect of international factors according to the dependency and world system theories. Some have investigated the demographic effects, while others have studied the political effects on urban primacy. Different findings have been reached because different specifications of urban primacy index, different sample sizes, and different statistical techniques have been used. No agreement exists on the direction of the relationship between economic development and urban primacy, international trade and concentration of people in the primate city, or between demographic or political factors and urban primacy.

The purpose of this study is to investigate the impact of different factors on urban primacy. It combines economic, demographic, political and international factors in to test the effect on urban primacy of each factor separately and when different factors are combined. One main hypothesis of this study that has been tested is the curvilinear relationship between economic development and urban

primacy. This study also tested the hypothesis of dependency and world system school, urban bias theory, and several other economic, demographic and political hypotheses. We used panel-data and cross-sectional analysis to test these hypotheses.

We use the log of the ratio of the largest city population to the population of the second largest (LUP1) as the urban primacy index. This can be used in a comparative study of different nations. Chapter IV used regression methods that produce results for the classical regression model, fixed-effects model, and random-effects model. Chapter V used ordinary least squares (OLS) regression method to analyze political factors in cross-sectional models. Urban primacy index and the largest city size as dependent variables are compared in chapter VI. The full sample of this study includes 30 countries from Asia, Latin America, and North America, and 7 time periods from 1960 to 1990.

Findings and Conclusions:

Comparative studies need to use comparable measures. This study concludes that LUP1 and LUP2 are comparable measures of urban primacy. We use LUP1 for its simplicity and data availability.

With regard to panel-data analysis, we find that both fixed and random effects models are favored over the classical regression model, and the fixed-effects model (FEM) is favored over the random one. Thus, the findings from the FEM are preferred. The basic economic determinants show significant effects on urban

primacy. An increase in a size of a country (GDP, population) reduces urban primacy. Furthermore, GDP has a positive effect on urban primacy at early stages of development, but it has a negative effect when a nation is more developed. The bell-shaped hypothesis has modest support. LGDPC is positive and significant in most of the equations, while LGDPCSQ is negative in all equations.

The education variable shows a significant positive impact on urban primacy. Educated people prefer to live in the largest city. The same impact occurs when the largest city is also the capital city. The fixed-effects model does not show a significant effect of population density on urban primacy, but the net effect of a nation's total population is negative. The share of labor outside agriculture shows a positive significant impact on urban primacy in some of the equations. The urban-rural disparity has a significant negative impact on urban primacy.

When the lagged dependent variable is included, it provides much explanatory power. It has a highly significant positive effect on urban primacy. When the independent variables are lagged one period, we find that the coefficient of foreign direct investment (FDI) has a significant positive effect on urban primacy. This result supports the hypothesis of dependency school that FDI leads to the concentration of people in the primate city.

Cross-sectional analysis deals mainly with political variables that take prolonged time to change. The degree of openness to international markets has a significant negative impact on the concentration of people in the primate city. This finding supports Krugman's theory. Ades and Glaeser's (1995) hypothesis about the

positive relationship between dictatorship and concentration of people in the main city is also supported in this study. The dictatorship coefficient is significant and has a positive sign in most of the equations in the cross-sectional model. This study also finds results that support world system theory. The semiperiphery coefficient has a significant positive effect on urban primacy. Nations that are in the semiperiphery zone have higher urban primacy than other core and periphery nations. Finally, bureaucratic efficiency (BE) and political stability (POLSTAB) lead to a reduction in urban primacy and a more balanced urban system. BE and POLSTAB coefficients are negative and significant in most of the equations of table 5.3.

When the largest city size is used as dependent variables in chapter VI, we find that, with panel-data analysis, LGDP, LGDPC, and DCAP coefficients have the expected significant effects on main city size and on urban primacy. Unlike urban primacy model, the main city model shows a significant positive impact of a nation's total population. Labor outside agriculture and population growth also have a significant positive impact on population of the largest city.

When the cross-sectional model is used in chapter VI, the same effect of DCAP, LPOP, LLABOR occurs in all equations. The export coefficient has a significant negative effect on the main city size. The political variables (DICT, POLINS, and UNREST) are all significant.

Recommendations:

Unlike many others, this study uses panel-data technique to capture the county and the time specific effects and tests a variety of hypothesis that have not tested together before. However, several questions can be raised for discussion and for future research. We present here some problems, suggestions, and recommendation for future studies.

1. Urban primacy measures discussed in this study do not capture primacy in the best way possible. Further research to find a better measure of urban primacy is an important task. Because, for many countries, data of cities smaller than the first and the second largest are not available for different periods, scholars may be discouraged about finding a new improved measure. One solution may be for the United Nations to adopt a universal definition of urban area and motivate its members to use this measure. Another interesting point is the size difference of primate cities. Some primate cities have a population of less than half million people, while others have more than 1o million residents. Do they have the same effects on their national economies? Do we have to give them equal weight when policies are made?

2. Regarding research methodology, this study shows that, when panel-data technique is used, fixed and random effects models are favored over the classical regression model. Thus, the coefficients of the OLS may be biased because of the exclusion of relevant variables. This bias may exist in most of the cross-country studies that use OLS model. Allowing dummy variables for the fixed effects

eliminates this bias because of the correlation between fixed effects and the omitted variables

3. Because some variables are hard to quantify, researchers use proxies to measure them. But these proxies do not exactly represent the real variables. For example, is life expectancy a good measure of human health? Is GDP per capita a representative measure of human development? The level of economic development, for example, is more than GDP per capita. It is also more comprehensive than education and health measures. It is an economic, social, cultural, and political phenomena. It encompasses equality and fair distribution of wealth and sources among all people in a country. Economic development does not mean much if 10 percent of a nation's population have more than 40 percent of the nation's wealth or when development is concentrated in small portion of a country, while the rest of the country is very backward. Therefore, these measures should be taken with caution until more sophisticated ones are available. Kasarda and Crenshaw (1991, 492) give an example of how interpreting a proxy may be problematic. They refer to the ratio of non-agricultural to agricultural productivity as a proxy of urban bias and show that the validity of this proxy is questionable. They state that

> First, there is no guarantee that all modern production is located in urban area for any given Third World country. Second, this proxy variable does not guarantee that the productivity differential is related to an urban bias in public policies concerning infrastructural development, macroeconomic policy, or the placement of elite services. Finally, the variable at best measures the relative efficiency of urban areas over rural areas.

4. More comprehensive studies are required to cover new areas or expand research in existing ones. Many questions about urban primacy need to be answered. Some of these questions are: What is the effect of urban primacy on economic growth and what are the simultaneous effects of these variables on each other? Several studies have dealt with the effect of industrial sector on primacy, but how about the effects of the growing services and informal sectors on shaping the population of the largest city? How about the effect of information industry and high technology on urban primacy? How do social mobility and the existence of religious and ethnic minorities influence the concentration of people in a nation's main city? Is income inequality between rural and urban areas the main reason for migration to large cities? If several socio-economic and spatial inequalities occur within the largest cities why do people continue to move to them? Does the growth of new industries, such as tourism, help in reducing urban primacy? Is it possible to study international nodes without reference to national boundaries? Some of these questions have been investigated, but more comprehensive studies are required.

5. This study uses data from thirty countries. Future research can use regional groupings to capture the effect of each region. Another grouping of countries can be explored. For example, dividing countries according to their size (GDP, population, and land), or grouping countries by their levels of GDP per capita, or their human development index. This may lead to further understanding of the factors that affect urban primacy.

6. Some scholars think that urban primacy is a natural phenomenon of modernization and suggest letting market forces decide the optimal size of cities; others consider urban primacy harmful and call for total intervention of governments to solve this problem. As in many things in life, the best solution is in the middle.

A more balanced urban system may be achieved if the right policies are taken. Simmons (1979) recommends strategies aimed at discouraging rural migration to urban areas by improving rural conditions, by resettling potential migrants in frontier lands, and by redirecting rural migrants to new industrial "growth poles" located in non-metropolitan cities. Simmons asserts that this combination of policies may only slow, not stop, the growth of primate cities. Renaud (1981, 130) states that

> Direct national spatial policies have two roles. First, the provision of transport and communication infrastructure is crucial to releasing the growth potential of every region of the country. Second, by improving the comparative advantage of other areas, direct spatial policies help direct migration and resource flows away from the primate city.

Mutlu (1989) suggests that urban primacy can be reduced by decreasing income inequality and decentralizing administration. He also suggests that if the capital is the economic, political, and administrative center, then the capital should be relocated. Of course, this last suggestion is hard to implement in most countries. The United Nations (1993, 36) asserts that

> as the primate city becomes larger and wealthier and more dominant, regional inequality increases. At what point is it in the self-interest of those in control to encourage the development of alternative urban centers and invest in building their infrastructure? Without such publicly funded investment,

> the urban hierarchy may remain unbalanced in favor of the primate city....Urbanization policies often have little effect on the movement of people to the cities especially displaced workers who can no longer make a living in rural areas. Evidence has accumulated that shows that migrants will come to cities where there are jobs, in spite of living conditions in urban areas.

Therefore, policies not only needed to discourage people from moving to primate city; more importantly, policies are needed to improve the quality of life for the majority of the primate city population as well as for the population in other areas in a country.

BIBLIOGRAPHY

Abu-Aianah, F. (1980, December), "Primate cities in the Arab world," Population Bulletin of the Economic Commission for Western Asia (Beirut, Lebanon), 19, 29-45.

Abu-Lughod, J. L. (1965) "Urbanization in Egypt: Present State and Future Prospects," Economic Development and Cultural Change, 13 (3),

Ades, A. F. and E. L. Glaeser (1995), "Trade and Circuses: Explaining Urban Giants," Quarterly Journal of Economics, 110,195-227.

Alesina, A., S Ozler, N. Roubini, and P Swagel (1992), "Political Instability and Economic Growth," NBER Working Paper No. 4173.

Alonso, W. (1968, October), "Urban and Regional Imbalances in Economic Development," Economic Development and Cultural Change, 17, 1-14.

Alonso, W. (1980), "Five Bell Shapes in Development," Papers and Proceedings of the Regional Science Association, 45, 5-16.

Alperovitch, G. (1992), "Economic Development and Population Concentration," Economic Development and Cultural Change, 41: 63 -74.

Amin, S. (1976), Unequal Development: An Essay on the Social Formation of Peripheral Capitalism, New York: Monthly Review Press.

Amin, S. (1979), "Underdevelopment and Dependence in Black Africa-Origins and Contemporary Forms," in Abu-lughod and Hay (eds.), Third World Urbanization, New York: Methuen.

Amos, O. M. (1989), "An Inquiry into the Causes of Increasing Regional Income Inequality in the United States," Review of Regional Studies, 19.

Amos, O. M. (1990), "Growth Pole Cycles: A Synthesis of Growth Pole and Long Wave Theories," Review of Regional Studies, 20.

Armstrong, W. and T. G. McGee (1985), Theaters of Accumulation: Studies in Asian and Latin American Urbanization, New York: Methuen.

Bairoch, P. (1988), Cities and Economic Development: From the Dawn of History to The Present, Chicago: The University of Chicago Press.

Balassa, B. (1987), "Economic Integration," The New Palgrave: A Dictionary of Economics, V. 2 (pp.: 43-47), New York: The Stocton Press.

Barro, R. J. (1991, May), "Economic Growth in a Cross-Section of Countries," The Quarterly Journal of Economics, CVI (2), 407-443.

Barro, R. J. (1995), "Democracy and Growth," NBER Working Paper No. 4909, Cambridge, MA: National Bureau of Economic Research.

Bartone, C. (1991), "Environmental Challenge in Third World Cities," Journal of the American Planning Association, 57 : 411-415.

Bates, R. (1981), Markets and States in Black Africa: The Political Basis of Agricultural Policies, Berkeley: University of California Press.

Bates, R. (1993), "Urban Bias: A Fresh Look," Journal of Development Studies, 29 (4), 219-228.

Becker, C. M., E. S. Mills and J. G. Williamson (1986, October), "Modeling Indian Migration and City Growth, 1960-2000," Economic Development and Cultural Change, 35(1), 1-33.

Beckman, M. J. (1958), "City Hierarchies and the Distribution of City Sizes," Economic Development and Cultural Change, 6, 243-248.

Bentler, P. M. (1984), "Structural Equation Models in Longitudinal Research", in Mednick, Harway, and Finello(Eds.), Handbook of Longitudinal Research: V. 1, New York: Praeger Publishers.

Berry, B. (1961, July), "City Size Distributions and Economic Development," Economic Development and Cultural Change, 9 (4), 573-587.

Berry, B. (1971), "City Size and Economic Development: Conceptual Synthesis and Policy Problems, With Special Reference to South and Southeast Asia," in L. Jackson and V. Prakash (eds.), Urbanization and National Development, 1, 111-155, Beverly Hills: Sage.

Berry, B. and J. Kasarda (1977), Contemporary Urban Ecology, New York: MacMillian.

Bollen, K. A. (1990), "Political Democracy: Conceptual and Measurement Traps," Studies in Comparative International Development, 25, 7-24.

Bornschier, V. and C. Chase-Dunn (1985), Transational Corporations and Underdevelopment, New York: Praeger.

Bradshaw, Y. (1985), "Overurbanization and Underdevelopment in Black Africa: A Cross-National Study," Studies in Comparative International Development, 20 (3), 74 - 101.

Bradshaw, Y. (1987), "Urbanization and Underdevelopment: A Global Study of Modernization, Urban Bias, and Economic Dependency," American Sociological Review, 52, 224- 239.

Bradshaw, Y. (1988), "Reassessing Economic Dependency and Uneven Development: The Kenyan Experience," American Sociological Review, 53, 693 - 708.

Breese, G. W. (1969), The City in Newly Developing Countries: Reading on Urbanism and Urbanization, Englewood Cliffs, NJ: Prentice - Hall.

Brezis, E. S. and P. Krugman (1993), "Technology and the Life Cycle of Cities," NBER Working Paper No. 4561, Cambridge, MA: National Bureau of Economic Research.

Browning, H. L. (1958, March), "Recent Trends in Latin American Urbanization," American Academy of Political and Social Science Annals, 316, 111-120.

Browning, H. L. and J. P. Gibbs (1961), "Some Measures of Demographic and Spatial Relationships among Cities," In J. B. Gibbs (Ed.), Urban Research Methods, 436-459, Princeton, NJ: D. Van Nostrand.

Brueckner, J. K. (1990, April), "Analyzing Third World Urbanization: A Model with Empirical Evidence," Economic Development and Cultural Change, 38(3), 587-610.

Castells, M. (1977), The Urban Question: A Marxist Approach, Cambridge: MIT Press.

Chamberlain, G. (1984), "Panel Data," in Z. Griliches and M. Intriligator (eds.), Handbook of Econometrics, II, Amsterdam, The Netherlands: Elsewier, Science Publishers.

Champion, A. (1989), Counterurbanization: The Changing Pace of Nature of Population Concentration, London: E. Arnold.

Chen, S. (ed.) (1995), Foreign Direct Investment in a Changing Global Political Economy, New York: St. Martin's Press.

Chenery, H. and M. Syrquin (1975), Patterns of Development: 1950 - 1970, London: Oxford University Press.

Chenery, H. and P. Ecksten (1970), "Development Alternative for Latin America," Journal of Political Economy, 78, 966-1006.

Chenery, H. and T. N. Srinivasan (eds.) (1988), Handbook of Development Economics, VI, Amsterdam, The Netherlands: Northholand.

Chiort, D. (1981), "Changing Fashions in the Study of Social Causes Of Economic and Political Change," in J. Short (ed.), The State of Sociology: Problems and Prospects, Beverly Hills, CA: SAGE.

Clark, R. (1985), "Urban Primacy and Incorporation into the World Economy: The Case Of Australia, 1850-1900," in M. Timberlake (ed.), Urbanization in The World Economy, Orlando: Academic Press.

Davidson, R. and J. G. Mackinon (1993), Estimation and Inference in Econometrics: New York: Oxford University Press.

Davis, K. (1969), World Urbanization 1950-1970, 1, Berkeley: University of California.

Davis, K. and H. Golden (1954), "Urbanization and Development of Preindustrial Areas," Economic Development and Cultural Change, 3 (1), 6-24.

De Cola, L. (1984, October), "Statistical Determinants of the Population of a Nation's Largest City," Economic Development and Cultural Change, 33, 71-98.

DeJanvry, A. (1981), The Agrarian Question and Reformism in Latin America, Baltimore: John Hopkins University Press.

Dekle, R. and J. Eaton (1994), "Agglomeration and the Price of Land: Evidence From the Prefectures," NBER Working Paper No. 4781, Cambridge, MA: National Bureau of Economic Research, Inc.

Dos Santos, T. (1970), "The Structure of Dependence," American Economic Review, 50, 231-236.

Duncan, O. D. (1959), "Human Ecology and Population Studies," in P. M. Hauser and O. D. Duncan (eds.), The Study of Population, Chicago: The University of Chicago Press.

Duncan, O. D. (1975), Introduction to Structural Equation Models, New York: Academic Press, Inc.

Eaton, J. and Z. Eckstein (1994, January), "Cities and Growth: Theory and Evidence from France and Japan," NBER Working Paper No. 4612, Cambridge, MA: National Bureau of Economic Research, Inc.

El-Shakhs, S. (1972, October), Development, Primacy, and Systems of Cities," The Journal of Developing Areas, 7, 11-36.

Elizondo, R. L. and P. Krugman (1992), "Trade Policy and the Third World Metropolis," NBER Working Paper No. 4238, Cambridge, MA: National Bureau of Economic Research, Inc.

Evans, P. (1979), Dependent Development, Princeton, NJ: Princeton University Press.

Evans, P. and M. Timberlake (1980), "Dependence, Inequality, and Growth of the Tertiary: A Comparative Analysis of Less Developed Countries," American Sociological Review, 45 (3), 531-552.

Findley, S. A. (1993), "The Third World City: Development Policy and Issues,' In Kasarda and Parnell(Eds.), Third World Cities: Problems, Policies, and Prospects, Newbury Park CA: Sage Publications, Inc.

Firebaugh, G. (1979), "Structural Determinants of Urbanization in Asia and Latin America, 1950 - 1970," American Sociological Review, 44, 199 - 215.

Frank, A. G. (1966), The Development of Underdevelopment, New York: Monthly Review Press.

Frank, A. G. (1967), Capitalism and Underdevelopment in Latin America, New York: Monthly Review Press.

Frank, A. G. (1969), Latin America: Underdevelopment or Revolution? New York: Monthly Review Press.

Frank, A. G. (1979), Dependence Accumulation and Underdevelopment, New York: Monthly Review Press.

Frey, R. S., T. Dietz, and J. Marte (1986), "The Effect of Economic Dependence on Urban Primacy: a Cross-National Panel Analysis," Urban Affairs Quarterly, 21, 359-368.

Froot, K. A. (ed.) (1993), Foreign Direct Investment, Chicago: The University of Chicago Press.

Gastil, R., Freedom in the World, Westport: Greenwood Press (different years).

Gibbs, J. P. (1961), Urban Research Methods, Princeton, NJ: D. Van Nostrand.

Gibbs, J. P. and W. T. Martin (1962), "Urbanization, Technology, and The Division of Labor: International Patterns," American Sociological Review, 27, 667-677.

Gilbert, A. (1993), "Third World Cities: The Changing National Settlment System," Urban Studies, 30 : 721 - 740.

Gilbert, A. (1994), "Third World Cities: Poverty, Employment, Gender Roles, and the Environment during the Time of Restructuring," Urban Studies, 31: 605 - 633.

Gilbert, A. G. and J. Gugler (1982), Cities, Poverty, and Development: Urbanization in the Third World, New York: Oxford University Press.

Gillis, M., D. H. Perkins, M. Roemer and D. R. Snodgrass (1992), Economics of Development: Third Edition, New York: W. W. Norton and Company, Inc.

Ginsburg, N. S. (1961), Atlas of Economic Development, Chicago: University of Chicago Press.

Glaeser, E. L., H. D. Kallal, J. A. Scheinkman, and A. Shleifer (1992), "Growth in Cities," Journal of Political Economy, 100, 1126-1152.

Graves, P. and R. L. Sexton (1979), "Overurbanization and its Relation to Economic Growth for Less Developed Countries," In Ghosh (Ed.), Urban Development in the Third World, 95-100. Westport, CT: Greenwood Press.

Greene, W. (1992), LIMDEP Computer Program (Version 6.0), Bellport, NY: Econometric Software, Inc.

Greene, W. (1993), Econometric Analysis: 2nd edition, New York: Macmillan.

Gugler, J. (1982), "Overurbanization Reconsidered," Economic Development and Cultural Change, 31, 173 - 189.

Hammer, H. and J. W. Gartrell (1986), "American Penetration and Canadian Development: A Case of Mature Dependency," American Sociological Review, 51, 201-213.

Hawley, A. (1950), Human Ecology: A Theory of Community Structure, New York: Ronald press.

Hawley, A. (1971), Urban Society: An Ecological Approach, New York: The Roland Press.

Hawley, A.(1981), Urban Society: An Ecological Approach, 2nd ed., New York: Wiley.

Hay, R. (1979), "Patterns of Urbanization and Socioeconomic Development in the Third World: An Overview," in Abu-lughod and Hay (eds.), Third World Urbanization, New York: Methuen.

Hein, S. (1992), "Trade Strategy and Dependency Hypothesis: A Comparison of Policy, Foreign Investment, and Economic Growth in Latin America and East Asia," Economic Development and Cultural Change, 40, 495- 521.

Henderson, J. V. (1986), "Efficiency of Resource Usage and City Size," Journal of Urban Economics, 19, 47-60.

Henderson, J. V. (1988), Urban Development: Theory, Fact, and Illusion, Oxford: Oxford University Press.

Hirschman, A. O. (1958), The Strategy of Economic Development, New Haven: Yale University Press.

Hoselitz, B. F. (1955), "Generative and Parasitic Cities," Economic Development and Cultural Change, 3, 278-294.

Hsiao, C. (1989), Analysis of Panel Data, New York: Cambridge University Press.

Intriligator, M. D. (1978), Econometrics Models, Techniques, and Applications, Englewood Cliff, NJ: Prentice Hall, Inc.

Jefferson, M. (1939, April), "The Law of Primate City," Geographical Review, 29, 226-232.

Judge, Hill, Griffiths, Lutkepohl, and Lee (1988), Introduction to the Theory and Practice of Econometrics: Second Edition, New York: John Wiley and Sons.

Kamerschen, D. R. (1969, October), "Further Analysis of Overurbanization," Economic Development and Cultural Change, 17, 235-253.

Kasarda, J. D. and A. M. Parnell(Eds.) (1993), "Third World Cities: Problems, Policies, and Prospects," Newburry Park, CA: Sage Publications, Inc.

Kasarda, J. D. and E. M. Crenshaw (1991), "The Third World Urbanization: Dimension, Theories, and Determinants," Annual Review of Sociology, 17, 467-501.

Kelly, A. C. and J. G. Williamson (1982, April), "The Limits to Urban Growth: Suggestions for Macromodeling Third World Economies," Economic Development and Cultural Change, 30, 595-623.

Kelly, A. C. and J. G. Williamson (1986), "What Drives Third World City Growth?," in Tolly and Thomas (eds.), The Economics of Urbanization and Urban Policies in Developing Countries, Washington, DC: The World Bank.

Kennedy, P. (1989), A Guide to Econometrics: Second Edition, Cambridge, MA: The MIT Press.

Kentor, J. (1981), "Structural Determinant of Peripheral Urbanization: The Effects of International Dependence," American Sociological Review, 46, 201 - 211.

Kentor, J. (1985), "Economic Development and the World Division of labor," In M. Timberlake (ed.), Urbanization in the World Economy, Orlando, Fl: Academic Press.

Keyfitz, N. (1965), "Political Economic Aspects of Urbanization in South and Southeast Asia," in P. M. Hauser and L. E. Schonore (eds.), The Study of Urbanization, New York: Wiley.

Keyfitz, N. (1982), "Development and the Elimination of Poverty," Economic Development and cultural Change, 30 (3), 649 -670.

Kmenta, J. (1986), Elements of Econometrics: Second Edition, New York: Macmillan Publishing Company.

Krugman, P (1991), "Increasing Returns and Economic Geography," Journal of Political Economy, 99 : 483-499.

Ledent, J. (1982, April), "Rural-Urban Migration, Urbanization, and Economic Development," Economic Development and Cultural Change, 30, 507-538.

Lenski, G. (1966), Power and Privilege: A Theory of Social Stratification, New York: McGraw- Hill.

Lenski, G. and P. Nolan (1984), Trajectories of Development: A Test of Ecological-Revolutionary Theory," Social Forces, 63, 1 - 23.

Linksy, A. S. (1965, September), "Some Generalizations Concerning Primate Cities," Annals of the Association of American Geographers, 55, 506-513.

Linn, J. F. (1982, April), "The Cost of Urbanization in Developing Countries," Economic Development and Cultural Change, 30, 625-648.

Lipsey, R. E. and B. Swedenborg (1993), "The High Cost of Eating: Agricultural protection and International Differences in Consumer Food Prices," NBER Working Paper #4555, Cambridge, MA: National Bureau of Economic Research, Inc.

Lipton, M. (1977), Why Poor People Stay Poor: Urban Bias in World Development, Cambridge, MA: Harvard University Press.

Lipton, M. (1984), "Urban Bias Revisited," Journal of Development Studies, 20, 139-166.

Lipton, M. (1993), "Urban Bias: Of Consequences, Classes and Causality," Journal of Development Studies, 29 (4), 229-258.

Little, I. (1982), Economic Development: Theory, Policy, and International Relations, New York: Basic Books, Inc.

Locke, L. F., W. W. Spirduso and S. J. Silverman (1987), Proposal That Works: A Guide for Planning Dissertations and Grant Proposals: 2nd Ed.," Newbury Park, CA: Sage Publications, Inc.

London, B. (1986), "Ecological and Political Economics Analysis of Migration to a Primate City: Bangkok, Thailand, 1970," Urban Affairs Quarterly, 21, 501-526.

London, B. (1987), "Structural Determinants of Third World Urban Change: An Ecological and Political Economic Analysis," American Sociological Review, 52, 28-43.

London, B. and D. Smith (1988), "Urban Bias, Dependence, and Economic Stagnation in Non-core Nations," American Sociological Review, 53, 454 - 463.

Lyman, B. (1992, September), "Urban Primacy and World-System Position," Urban Affairs Quarterly, 28(1), 22-37.

Mauro, P. (1995), "Corruption And Growth," Quarterly Journal of Economics, 110 (3): 681 - 712.

McCann, P. (1995), "Rethinking the Economies of Location and Agglomeration," Urban Studies, 32, 563-577.

McGee, T. G. (1967), The Southeast Asian City: A Social Geography of the Primate Cities of Southeast Asia, New York: Praeger.

McGee, T. G. (1971), The Urbanization Process in the Third World, London: G. Bell and Sons, Ltd.

Mckee, D. (1994), Urban Environments in Emerging Economies, Westport, CT: Praeger.

Mehta, S. K. (1964), "Some Demographic and Economic Correlates of Primate Cities: A Case for Re-evaluation," Demography, 1, 136-147.

Meier, G. M. (1988), Leading Issues in Economic Development: Fifth Edition, New York, Oxford University Press, Inc.

Mera, K. (1973, January), "On the Urban Agglomeration and Economic Efficiency," Economic Development and Cultural Change, 21, 309-324.

Meyer, D. (1986a), "The World System of Cities: Relations between International Financial Metropolises and South American Cities," Social Forces, 64, 553- 581.

Meyer, D. (1986b), "System of Cities Dynamics in Newly Industrializing Nations," Studies in Comparative International Development, 21, 3-22.

Mills, E. S. (1972), Studies in The Structure of The Urban Economy. Baltimore: The John Hopkins Press.

Mills, E. S. (1979), Urbanization and Urban Problems, Cambridge, MA : Harvard University Press.

Mills, E. S. and B. W. Hamilton (1989), Urban Economics: 4th ed., Glenview, IL: Scott, Foresman and Company.

Mills, E. S. and C. Becker (1986), Studies in Indian Urban Development, Oxford: Oxford University Press.

Moir, H. (1976), "Relationships between Urbanization Levels and Industrial Structure of the Labor Force," Economic Development and Cultural Change, 25, 123 - 135.

Moomaw, R. L. (1981, November), "Productivity and City Size: A Critique of the Evidence," The Quarterly Journal of Economics, 96, 675-688.

Moomaw, R. L. (1983), "Spatial Production Variations in Manufacturing: A Critical Survey of Cross-sectional Analysis," International Regional Science Review, 8, 1-22.

Moomaw, R. L. (1985), "Firm Location and City Size: Reduced Productivity Advantages as a Factor in the Decline of Manufacturing in Urban Areas," Journal of Urban Economics, 17, 73-89.

Moomaw, R. L. (1988), "Agglomeration Economies: Localization or Urbanization?," Urban Studies, 25, 150-161.

Moomaw, R. L. and A. M. Shatter (1993, Fall), "Urbanization as a Factor in Economic Growth: An Empirical Study," The Journal of Economics, XIX(2), 1-6.

Moomaw, R. L. and A. M. Shatter (Forthcoming), "Urbanization and Economic Development: A Bias Toward Large Cities?," Journal of Urban Eonomics.

Morris, D. M. (1979), Measuring the Condition of the World's Poor: The Physical Quality of Life Index, London: Frank cass.

Muller, E. N. (1988), "Democracy, Economic Development, and Inequality," American Sociological Review, 53, 50-68.

Mutlu, S. (1989, April), "Urban Concentration and Primacy Revisited: An Analysis and Some Policy Conclusions," Economic Development and Cultural Change, 37, 611-639.

Nafziger, E. W. (1990), The Economics of Developing Countries: Second Edition, Englewood Cliffs, NJ: Prentice Hall.

Nakamura, R. (1985), "Agglomeration Economies in Urban Manufacturing Industries: A Case of Japanese Cities," Journal of Urban Economics, 17, 108-124.

Nolan P. and G. Lenski (1985), "Technoeconomic Heritage, Patterns of Development, and the Advantage of Backwardness," Social Forces, 64, 341- 358.

O'Sullivan, A (1996), Urban Economics: Third Edition, Chicago, Irwin.

Oberai, A. S. (1993), "Urbanization, Development, and Economic Efficiency," In J. D. Kasarda and A. M. Parnell, Third World Cities: Problems, Policies, and Prospects, Newbury Park, CA: Sage Publication, Inc.

Olson, M. (1982), The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities, New Haven: Yale University Press.

Owen, C. and R. A. Witton (1973, January), "National Division and Mobilization: A Reinterpretation of Primacy," Economic Development and Cultural Change, 2, 325-337.

Parr, J. (1985), "A Note on the Size Distribution of Cities Over Time," Journal of Urban Economics, 18: 199 - 212.

Paxton, John (ed.) (Various Issues), The Statesman's Yearbook, New York: St. Martin's Press.

Petrakos, G. (1992), "Urban Concentration and Agglomeration Economies: Re-examining the relationship," Urban Studies, 29: 1219 - 1229.

Petrakos, G. and J. C. Brada (1989), "Metropolitan Concentration in Developing Countries," Kyklos, 42, 557-578.

Portes, A. (1979), "On the Sociology of National Development: Theories and Issues," in Abu-lughod and Hay (eds.), Third World Urbanization, New York: Methuen.

Portes, A. (1989), "Latin American Urbanization During the Years of the Crisis," Latin American Research Review, 24(3), 7-44.

Portes, A. and J. Walton (1981), Labor, Class and the International System, New York: Academic Press.

Preston, S. (1979), "Urban Growth in Developing Countries: A Demographic Reappraisal," Population and Development Review, 5, 195 - 215.

Ranis, G. and S. Mahmood (1992), The Political Economy of Development Policy Change, Cambridge, MA: Blackwell.

Rauch, J. E. (1991, November), "Productivity Gains from Geographic Concentration of Human Capital: Evidence from the Cities," NBER Working Paper No. 3905, Cambridge MA: National Bureau of Economic Research, Inc.

Renaud, B. (1981), National Urbanization Policy in Developing Countries, New York: Oxford University Press.

Richardson, H. W. (1978), "Growth Centers, Rural Development and Regional Policy: A Defense," International Regional Science Review, 3, 133-152.

Richardson, H. W. (1979), Regional Economics, Urbana: University of Illinois Press.

Richardson, H. W. (1980), "Polarization Reversal in Developing Countries," Papers and Proceedings of the Regional Science Association, 45, 67-85.

Richardson, H. W. (1981), "National Urban Development Strategies in Developing Countries," Urban Studies, 18, 267-283.

Richardson, H. W. (1987, April), "The Cost of Urbanization: A Four-Country Comparison," Economic Development and Cultural Change, 35, 561-579.

Richardson, H. W. (1993), "Efficiency and Welfare in LDC Mega-Cities," in Kasarda and Parnell (eds.), Third World Cities: Problems, Policies, and Prospects, Newbury Park, CA: SAGE Publication.

Rodwin, L. (1961), "Metropolitan Policy for Developing Areas," In W. Isard and J. H. Cumberland (Eds.), Regional Economic Planing, 221-232, Paris: DEEC.

Rodwin, L. (1970), Nations and Cities: A Comparison of Strategies for Urban Growth, Boston, MA: Houghton Mifflin Company.

Rogers, A. (1982, April), "Sources of Urban Population Growth and Urbanization, 1950-2000: A Demographic Accounting," Economic Development and Cultural Change, 30, 483-505.

Rogers, A. and J. G. Williamson (1982, April), Migration, Urbanization, and Third World Development: An Overview," Economic Development and Cultural Change, 30, 463-482.

Rondinelli, D. A. (1983), Secondary Cities in Developing Countries: Policies for Diffusing Urbanization, Beverly Hills, CA: Sage Publications.

Rondinelli, D. A. (1988), "Giant and Secondary City Growth in Africa," In M. Dogan and J. D. Kasarda (Eds.), The Metropolis Era, v.1: A World of Giant Cities, 291-321, Newbury Park, CA: Sage Publications, Inc.

Rosen, K. T. and M. Resnick (1980), "The Size Distribution of Cities: An Examination of the Pareto Law and Primacy," Journal of Urban Economics, 8, 165-186.

Rostow, W. (1960), The Stages of Economic Growth: A Non-Communist Manifesto, Cambridge: Cambridge University Press.

Sassen, S. (1994), "The Urban Complex in a World Economy," International Social Science Journal, 46, 43-62.

Savvides, A (Forthcoming), "Economic Growth in Africa," World Development.

Sen, A. (1988), "The Concept of Development," in H. Chenery and T. N. Srinivasan (eds.), Handbook of Development Economics, VI, Amsterdam, The Netherlands: Northholand.

Simmons, A. B. (1979), "Slowing Metropolitan City Growth in Asia: Policies, Programs, and Results," Population and Development Review, 5, 87-104.

Smith, C. (1985), Theories and Measures of Urban Primacy: A Critique," in M. Timberlake (ed.), Urbanization in the World Economy, Orlando: Academic Press.

Smith, D. (1987), "Overurbanization Reconceptualized: A Political Economy of the World System Approach," Urban Affairs Quarterly, 23 (2), 270-294.

Smith, D. and B. London (1990), "Convergence in World Urbanization? A Quantitative Assessment," Urban Affairs Quarterly, 25 (4): 574 - 590.

Snyder, D. and E. Kick (1979), "Structural Position in the World System and Economic Growth, 1955 - 1970: A Multiple - Network Analysis of Transational Interactions," America Journal of Sociology, 84,1096 - 1126.

So, A. Y. (1990), Social Change and Development: Modernization, Dependency, and World-System Theories, Newbury Park, CA, SAGE Publication.

Soroka, L. (1994), "Manufacuring Productivity and City Size in Canada, 1975 and1985: Does Population Matter?," Urban Studies, 31: 895 - 911.

Sovani, N. V. (1964, January), "The Analysis of Overurbanization," Economic Development and Cultural Change, 12(2), 113-122.

Spengler, J. and G. Myers (1977), "Migration and Socioeconomic Development: Today and Yesterday," in A. Brown and E. Neuberger (eds.), Internal Migration: A Comparative Perspective, New York: Academic Press.

Stewart, C. T. Jr. (1959, April), "The Size and Spacing of Cities," Geographical Review, 48, 222-245.

Summers, R and A. Heston (1993), "The Penn World Table (Mark 5): An Expanded Set of International Comparisons 1950 - 1988," Quarterly Journal of Economics, 106: 327 -368.

Sunkel, O. (ed.) (1993), Development from Within: Toward a Neostructuralist Approach for Latin America, Boulder, CO: Lynne Rienner.

The Europa World Yearbook (1926-), London: Europa Publications Ltd.

Timberlake, M. (1985), "The World-System Perspective and Urbanization," in Timberlake (ed.), Urbanization in The World Economy , Orlando: Academic Press.

Timberlake, M. and J. Kentor (1983), "Economic Dependence, Overurbanization, and Economic Growth: A Study of Less Developed Countries," Sociological Quarterly, 24, 489 - 507.

Todaro, M (1969, March), "A Model of Labor Migration and Urban Unemployment in Less Developed Countries," American Economic Review, 59(1), 138-148.

Todaro, M (1981), City Bias and Rural Neglect: The Dilemma of Urban Development, New York: Population Council

Todaro, M. P. (1984), "Urbanization in Developing Nations: Trends, Prospects, and Policies," In P. K. Ghosh (Ed.), Urban Development in the Third World, 7-26, Westport, CT: Greenwood Press.

Todaro, M. P. (1985), Economic Development in the Third World, 3rd ed., New York: Longman, Inc.

Tolly, G. S. and V. Thomas (eds.) (1987), The Economics of Urbanization and Urban Policies in Developing Countries, Washington, DC: The World Bank.

United Nations (1984), Population Distribution, Migration, and Development, New York: UNDIESA.

United Nations (1987), The Prospects of World Urbanization, New York: UN, Department of International Economic and Social Affairs.

United Nations (1991a), Human Development Report New York: Oxford University Press.

United Nations (1991b), World Urbanization Prospects: The 1990 Revision, New York: UN Department of International Economics and Social Affairs.

United Nations (1993), World Urbanization Prospects: The 1992 Revision, New York: UN Department of Economic and Social Information and Policy Analysis.

United Nations (different issues), Demographic Yearbook, New York: Department of International Economic and Social Affairs.

Vapnarsky, C. (1975), "The Argentine System of Cities: Primacy and Rank-size Rule," in J. Hardoy (ed.), Urbanization in Latin America, Garden City, N. J.: Anchor.

Varshney, A. (1993), "Urban Bias in Perspective," Journal of Development Studies, 29 (4), 3-22.

Vining, D. R. Jr. (1985, September), "The Growth of Core Urban Regions in Developing Countries," Population and Development Review, 11 495-514.

Wallerstein, I. (1974), The Modern World System, New York: Academic Press.

Wallerstein, I. (1979), The Capital World-Economy. London, Cambridge University Press.

Walters, P. B. (1985), "Systems of Cities and Urban Primacy: Problem of Definition and Measurement," in M. Timberlake (ed.), Urbanization in The World Economy, Orlando: Academic Press.

Wheaton, W. C. and H. Shishido (1981), "Urban Concentration, Agglomeration Economies, and the Level of Economic Development," Economic Development and Cultural Change, 30, 17-30.

Williamson, J. G. (1965, July), "Regional Inequality and the Process of National Development: A Description of the Patterns," Economic Development and Cultural Change, 13, 4-84.

Williamson, J. G. (1988), "Migration and Urbanization," In H. Chenery and T. N. Srinivasan (Eds.), Handbook of Development Economics, 1, 425-465, Amsterdam: North Holland.

World Bank (1991), Urban Policy and Economic Development: An Agenda for the 1990s, Washington, D. C.

World Bank (1993), Sustaining Rapid Development in East Asia and Pacific, Washington, DC.

World Bank (1993), The East Asian Miracle: Economic Growth and Public Policy, New York: Oxford University Press.

World Bank (Different Issues), World Development Report, New York: Oxford University Press.

Zipf, G. K. (1941), National Unity and Disunity, Indianapolis: Bookwalter-Ball-Greathouse Printing Co.

APPENDIX

APPENDIX A:
List of Countries
included in different Samples

No.	Full Sample	Not in the 24 Country Sample
1	Argentina	
2	Bangladesh	
3	Bolivia	*
4	Brazil	
5	Canada	
6	Chile	
7	Colombia	
8	Costa Rica	*
9	Dominican Rep.	
10	Ecuador	
11	El Salvador	*
12	Guatemala	*
13	Honduras	*
14	India	
15	Indonesia	
16	Japan	
17	Korea (South)	
18	Malaysia	
19	Mexico	
20	Pakistan	
21	Panama	
22	Paraguay	*
23	Peru	
24	Philippines	
25	Sri Lanka	
26	Taiwan	
27	Thailand	
28	United States	
29	Uruguay	
30	Venezuela	

APPENDIX B:
Descriptive Statistics of Regression Variables, 1990

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
UP1	30	5.1778	5.5609	1.138	25.49
UP2	30	2.1917	1.9998	0.5050	9.399
UP3	30	0.28613	0.13388	0.05700	0.5830
UP4	30	0.16326	0.10327	0.01440	0.4160
GDP*	30	368570	867790	6983	4520000
GDPC	30	4612.0	4426.7	1264.	18050
GDPCSQ*	30	40213	82746	1598	325900
POP*	30	75700	158300	2418.	849500
LAND*	30	20127	44544.	285.0	187900
POPDENS	30	8.2797	7.3156	0.5782	29.98
EDUC	30	6.0290	2.6825	1.900	12.30
DCAP	30	0.80000	0.40684	0.0000	1.000
EXP	30	27.600	18.301	7.000	91.00
GDPCGR	30	1.7543	3.0307	-3.838	9.179
LABOR	30	0.67073	0.19089	0.3150	0.9720
POPGR	30	1.9552	0.74016	0.4400	3.200
URDISP	30	3.1794	2.2842	0.7768	13.21
FDI	28	0.0095368	0.014016	-0.02604	0.05884
MCITY*	30	6203.5	6266.0	297.0	25010
DICT	30	1.5000	0.50855	1.000	2.000

* add (000).

APPENDIX C:
List of Countries According to their positions in the World-System*

No.	Core	Semiperiphery	Periphery
1	Canada	Argentina	Bangladesh**
2	Japan	Brazil	Bolivia
3	United States	Chile	Costa Rica
4		Colombia	Dominican Rep.**
5		India	Ecuador
6		Korea (South)	El Salvador
7		Malaysia	Guatemala
8		Mexico	Honduras
9		Pakistan	Indonesia
10		Philippines	Panama
11		Taiwan**	Paraguay
12		Thailand	Peru
13		Venezuela	Sri Lanka
14			Uruguay

* Countries are classified according to Nemeth and Smith (1985) classification published in Lyman, Brad (1992), "Urban Primacy and World- System Position," Urban Affairs Quarterly, 28 (1): 22-37.

** countries that are not included in Lyman's list.

VITA

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