Land Price Changes in Sendai and Sapporo, Japan 1993-1998

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ABSTRACT

The rapid rise of land prices in Japan from the mid-1980s to the early 1990s and their subsequent collapse followed monetary responses by the Government to yen appreciation and later efforts to control the "bubble economy." Land price changes from 1993 to 1998 indicated a lag between the regional (local) and domestic (national) levels. Examination of data from the *Chika Koji Yoran* (Benchmark Land Price Survey) indicated three zones of local price changes in the study locations of Sendai and Sapporo. The largest reduction in prices occurred in city cores and moderated toward the periphery. Commercial lots declined the most because of higher prices from speculative buying, used as collateral for loans, and a drop in demand. Residential lot prices experienced a large drop in the core area because of potential conversion to other uses and high valuation of land. In the intermediate zone, drops in prices were smaller since residential lots dominated and not used for loan guarantees or speculation. In the periphery, in-migration caused growth of population and households which led to demand for residential lots as well as for commercial lots. Generally, prices were higher or remained stable at the periphery.

Keywords: Land Prices, Residential Land, Commercial Land, Internationalization Impact, Localized Factors, Territorial Industrialization, Japan.

INTRODUCTION

The concentration and growth of industry and population in certain regions of Japan since the end of World War II has increased the demand for land and contributed to a rise in land prices. This rise in land prices began about 1955, coinciding with the end of postwar recovery period, and continued during the high growth period of the economy in the 1960s (Takenaka 1991, 110). Land prices surged nationwide from the mid-1980s to the early 1990s during the period of the "bubble economy". Price increases ranged from 2.4 percent in 1985 to 21.7 percent in 1988 for all types of land and exceeded the previous high of 10 percent in 1980 (Zenkoku Shichokai 1992, 292). This national pattern changed to a downward trend from the early 1990s.

Selected aspects of the land price changes between 1993 and 1998 at the national and regional levels will be the main foci of this study. The average prices for all land uses nationally increased up to 1990 and dropped in 1991, but the regional pattern showed

the beginning of a downward shift about 1992 (Zenkoku Shichokai 1992, 272). These differences suggest that the regional patterns are reflective of the national pattern though delayed by the geographic transmission of price behavior. The interconnected nature of land prices at the national and regional (local) levels is clear; the differences between the two levels indicate that different kinds of factors were operative and are, thus, critical determinants of price behavior.

A Framework for Study of Land Prices

A method for the examination of land rent and location of activities was formulated by Johann H. von Thunen through a study of agricultural land use in Germany (von Thunen, 1966). In 1960, Alonso presented a theory of urban land markets as an extension of the agricultural model (Alonso 1960, 149-157). The Alonso paper recognizes differences in markets for business locations (profits) and residential locations (satisfaction) (Alonso 1960, 153-155).

Land markets in a city must recognize other factors as determinants of values and prices along with the location/or accessibility. The determination of urban land prices must incorporate the accounting for multiple factors associated with the parcel of land (Wendt 1965, 240). At the local level, the introduction of a new transportation mode will play an important role in shifting the center of accessibility, relocating a market center and be a continuing influence on land use and values. Intermingling of uses of lots within an area or district is certainly an element in the formation of prices of parcels because of the coexistence of incompatible social, economic and environmental conditions that will detract from its value. Further, the existence of incompatible conditions in an area may portent future land use changes to attain higher returns. Such elements as proximity to different activities, a transportation system which connects a location to different activities, and historical conditions determine the value associated with a parcel of land (Brigham 1965, 334). Also, a factor such as topography may affect land values by the impact it may have on the supply of easily accessible land, but can also provide premium locations by including scenic vistas for residents. Factors such as government policy, laws, and speculators' actions are also part of the determinants of land values in cities (Mills and Ohta 1976, 704). Thus, changes in local land prices in a city are influenced by the location of the land unit relative to other landscape elements and will be reflective of its uses such as commercial and residential land within the larger framework of a geographic area.

The intent of the "Isolated State" framework was to analyze regional or local patterns of land values and prices by excluding external factors. The interrelated nature of economies

or internationalization necessitates the incorporation of external factors within a framework of examining land prices. An increase in demand for building space in a section of a large city by externally-based multinational businesses is one such situation. Government monetary actions in response to international conditions by an economically dominant country will affect its land prices. The role of internationalization of the economy must be examined in the study of changes in land prices at the national level in Japan.

The movements of land price in Japan in this study will be considered at two levels. *First*, the consideration of contributory factors to land price changes at the national or domestic level, especially the rapid rise during the "bubble" economy and the subsequent period of decline, will provide insights into the effects of internationalization on land prices. *Second*, the examination of land prices at the local level in the two selected cities will reveal the effects of several additional factors on land price changes.

STUDY LOCATIONS AND DATA

The study locations selected are the cities of Sendai in Miyagi Prefecture, and Sapporo on Hokkaido. Criterion for their selection was the "regional nature" of these cities. Regional cities were selected to reduce possible direct distortions in prices and uses induced by proximity to a large metropolitan area. However, the effects of large metropolitan areas are virtually impossible to eliminate completely as demonstrated by the diffusion effect of prices from metropolitan areas to regional cities in the latter part of the 1980s. An additional criterion for the selection of the study locations was based on their population sizes. Another reason for the selection was to attain insights into effects on land prices when the core of a city shifts from one location to another.

The cities selected for this study have different origins. The initial impetus for growth of Sapporo was by its selection as the capital city in 1869 by the *Kaitakushi* (Colonial Office) for the settlement of Hokkaido. The city began to function as the capital with the movement of government offices from Hakodate in 1871 and continues to serve as the capital city of the *Do* (prefecture). The City of Sendai developed from its selection as the site of the castle town by the *Daimyo* (Lord) Date Masamune in 1601 (Toyoda 1976, 93). Currently, Sendai serves as the capital of Miyagi Prefecture and functions as the regional center for the Tohoku region. The geographic characteristics and locations of the selected cities are shown on Table 1 and Figure 1.

Table 1. *Characteristics of Selected Cities*

City	Incorporation Date	Population (1995)	Area (sq. km.)	Population Density (/sq. km.)
Sapporo	1899	1,757,025	1,121.12	1,567
Sendai	1889	971,297	783.5	1,240

Sources: Zenkoku Shichokai (ed.). Nihon toshi nekan (Heisei 4-nenhan) (Japan city yearbook, 1992 Edition). Tokyo: Dai-ichi Hoki Shuppan Kabushiki Kaisha. Somucho Tokeikyoku. Kokusei chosa hokoku (1980, 1990, 1995 Population census of Japan). Tokyo: Somucho Tokeikyoku.

Table 2. *Range of Land Price Changes in Percent*

City	Zone 1		Zone 2		Zone 3	
	Commercial	Residential	Commercial	Residential	Commercial	Residential
Sapporo	-78 to -17	-44 to -6	-49 to -7	-36 to +4	-30 to +20	-37 to +15
Sendai	-70 to -7	-38 to -2	-22 to +3	-26 to +8	-14 to +14	-4 to +14

Source: Computed from land values in Chika Koji Yoran, *1993 and 1998.*

The Chika Koji Yoran (Benchmark Land Price Survey) is the data source for this study. It is compiled annually on January 1 by the Kokudocho (National Land Agency; currently a part of Ministry of Land, Infrastructure and Transportation) to achieve the administrative objectives of the National Land Use Act of 1974. Among the purposes of the Benchmark Land Price Survey is to announce the prices of representative types of land yearly to provide an index of prices for land transactions (Chika Koji Kenkyukai 1993, Preface).

The formulation of an index price for a parcel of land begins with the classification of land into residential, potential residential, business, semi-industrial, industrial, forested land for conversion-renewal and residential land for renewal (Kokudocho Tochi Kantei Iinkai 1993, Preface). Parcels of similar land uses as well as displaying similar quality in natural and social conditions, in an area are aggregated into districts such as residential district, business district, industrial district and potential residential district. Within each district, a parcel is selected as the foundation ("base land") for price comparison. A value for the "District Factor" of a parcel is developed by assessing 25 specific items in five major categories such as street, transportation and proximity, environmental conditions, etc. A value for "Individual Parcel Factors" is

established by using the same five major categories with 34 specific items (Chika Chosa Kenkyukai 1992, 6). The index price is a product of: the price of the “foundation” (base) parcel in a district multiplied by “Differences in Quality Rate of District Factors” multiplied by “Differences in Quality Rate of Individual Parcel Factors” (Chika Chosa Kenkyukai 1992, 9).

Questions have been raised about the usefulness of benchmark prices. Some have considered these prices to be unacceptable because they do not reflect the actual transaction prices. Still others indicate that it is "virtually useless" because land is “illiquid” during a period of economic stagnation or depressed market (Wood 1992, 51). Although benchmark prices may cause concerns from certain perspectives, they do provide a means for assessing the changes over time from a single source of government statistics. Also, a perusal of the methodology for deriving the index prices indicates a consistent and firm basis for each type of land use.

Figure 1. Study Locations

The pattern of land price distribution was established by plotting of data points from the Chika Koji Yoran on a city map according to the address of the parcel. Only data points which appeared in both 1993 and 1998 surveys were used in the study. The year, 1993, was selected as the base year since price decline had begun in regional cities (Kokudocho 1993, 100). The second year, 1998, was chosen because there is a continuation of price drop, with sufficient lapse of time to show variations in price changes. The number of data points mapped for the two cities were: Sendai, 252 locations, and Sapporo, 350 locations. After plotting the locations and recording the data for each, the distance from the central point to each point was measured and added to the data set.

Responses to International Conditions and Its Impact on Land Prices

Analysis of the data suggests adjustments in domestic policies to external pressures have an impact on changes in land prices. Responses to internationalization of the Japanese economy also appear to have contributed to the rise in land prices between 1986 and 1992, and its subsequent decline. It is also clear that Japan has had to take into account its impact on other countries as well as respond to the potential effects of actions taken by other countries.

Monetary measures undertaken by the government to cope with the effects of yen appreciation affected land prices domestically. Beginning with pressures to correct the trade imbalances between the United States and Japan, the Plaza Agreement, signed at the G-5 meeting in 1985, led a rapid appreciation of the yen (Nihon Keizai Shimbun, Inc. 1986, 7). The deflationary impact of *endaka* (yen crunch) resulted in the deployment of pump-priming measures as well as four discount rate cuts by the Bank of Japan (BOJ) in 1986 to slow the rise of the yen and to stimulate domestic demand for goods and services (Nihon Keizai Shimbun, Inc. 1987, 12). These monetary measures led to an increase in money supply, stimulated a monetary flow into the real estate and stock markets, especially by enterprises and financial institutions, and subsequently pushed the prices of land and stock prices to higher levels (asset inflation) (Nihon Keizai Shimbun, Inc., 1986, 14).

The demand for office space, especially the need for space by international financial firms, also contributed to the initial surge in prices. Land prices in the major cities began to rise in 1985 and 1986; for example, it rose as much as 54 percent in Central Tokyo in 1986 (Nihon Keizai Shimbun, Inc. 1987, 193). The ripple effect of this surge caused price rises in other large metropolitan regions and, eventually, diffused to regional cities (Oizumi, 1994).

Subsequent actions of the BOJ in reaction to domestic and international conditions reversed the upward trend of land prices. The BOJ changed its monetary policy on May 31, 1989 by raising the discount rate to 3.25 percent, the first such increase in nine years, and followed with two additional increases in the same year and one in early 1990 (Nihon Keizai Shimbun, Inc. 1990,8). The objectives of these increases were threefold: to bring the Japanese discount rate closer to the level charged in the United States; to shore-up the weakening yen as well as to ease inflationary pressures because of higher wage costs and a tightening of the supply-demand situation; and to help in slowing the rapid rise of land prices (Nihon Keizai Shimbun, Inc. 1990, 24-25). These moves on the part of the BOJ resulted in achieving the desired effect of slowing the rise of land prices and in some instances, reducing them.

General Land Price Distribution in Cities

The general pattern of land prices in cities selected for the study was established by computing the average price of land per square meter, and was computed for each one kilometer (band) distance from the main railroad station. These price-distance relationships for the two cities are graphically represented in Figures 2 and 3.

The expected spatial distribution of land prices in a city is a drop with distance from the core and is demonstrated in the distribution of land values from the "cores" selected for Sendai and Sapporo. In this study, the core or center of the city was determined on the basis of the clustering of highest land prices. In both of the two study cities, the clustering occurred around the main railroad station. Thus, the railroad station was selected as the central point, though no price was published for this point.

The railroad station became the core area of Sendai during the early Modernization Period (1867-1945). The original core was the castle. The ease of access provided by the railroad increased flows of passengers, especially from local hinterlands to the city, as well as interregional passengers and freight. Additionally, the main railroad station became the point of high accessibility because it also is the junction with other forms of transportation within that city. Accordingly, the importance of siting such a point of transportation convergence in close proximity to their establishments was not lost on local merchants. They mounted a vigorous lobbying effort in 1886 to influence the railroad company to move the location of a station from a previously selected site to one located much closer to their establishments (Miyagi Kenshi Hensan Iinaki 1954-1987,5, 649). Their successful lobbying resulted in establishing the core of Sendai

through the attraction of businesses and related activities around the station.

After the establishment of the railroad station, some of the business-related sections of this castle town became part of the core area continuing with similar functions. Land values around the former castle area did not exhibit noticeable changes because of limited land area and preservation of historical land uses.

As expected, the overall land price distributions in the selected cities showed a pattern of high prices in the core area and a decline toward the periphery. However, the comparison of prices between the two years selected, 1993 and 1998, indicates a pattern of a large drop in prices in the center and smaller one toward the edge. These noted differences in land price changes from the center to the periphery between the two years demanded an examination of potential factors which contribute to these variations.

Patterns of Local Variations, 1993-1998

Changes in land prices were determined by computing the differences in land prices for lots which were listed in the 1993 Benchmark Survey and again in the 1998 Benchmark Survey. These differences were then converted to percentage changes. The original data of seven land use categories was reduced to two: **residential** and **commercial**, representing the six other land use classifications identified earlier. This consolidation of several land uses into two use categories reduced the complexity of examining differences in land types.

The distribution of percent changes in land prices by location is shown graphically for the two cities (Figures 4 and 5). On these scatter diagrams, the zero percent line represents the value of land units (square meters) in 1993 as the base line. The price - distance plots, below or above the base line, represents the direction of percentage change in the prices for each parcel observed in 1998. Figures 4 and 5 clearly reveal the general trend of smaller land price changes with increasing distance from the central core of each of the cities. A large decline in land prices are particularly noticeable in a zone extending five kilometers from the main railroad station of Sendai (Figure 4) and Sapporo (Figure 5). In this first zone, both commercial and residential land use prices experienced significant declines from 1993 to 1998 in each of these regional centers. Additionally, the percentage decline in commercial land prices was larger in comparison to that of residential land. In the second zone, extending from five to ten kilometers from the main railroad stations of these cities, price drops over this time period were much less severe and some price increases are evident. In the third zone, extending beyond ten kilometers from

the central core, positive changes in land prices are indicated; however, negative anomalies did occur. The ranges of land price changes are shown on Table 2.

Factors in Land Price Changes

Contributory factors to price changes are different in each zone. In the first zone of zero to five kilometers from the main railroad station, the dominant type of land use is commercial (businesses). The drop in prices in this use category from 1993 to 1998 in the two selected cities was similar to those of large metropolitan regions in Japan (Chika Koji Kenkyukai 1993 and 1998 editions). During the period of rising land prices, the higher increase in prices was pushed by the demand for more commercial space as the economy continued to grow during the 1980s. Also, the land was used as collateral for capital borrowing by corporations which lead to higher valuations, especially for land in the core areas of the cities (Kokudocho 1997, 109). Another factor was the increase in prices for speculative purchases. These three factors raised the land prices to very high levels in the core area. Eventually, downward pressure on prices was exerted by the slowing of the economy and the resultant decline in demand for commercial space. Further, enforcement of the land policy through financing procedures, adjusting the tax system, and regulation of land transactions led to still lower demand for space in the commercial sector (Kokudocho 1993, 102).

The occurrence of a price anomaly around the main railroad station demonstrates the role of localized factors in influencing land prices. Commercial location prices were higher in the "front" than in the "back" of the main railroad station. For example, in Sendai the price for a commercial location at about 450 meters from the station was about 28 percent less in the "back" than the "front" of the station. This phenomenon seems to continue, with the exception of one or two sites, to approximately two kilometers from the station. Such anomalies are attributable to the initial development pattern of commercial areas and investments in associated infrastructure in "front" of the station. Most people who come to the city to work or shop have used the "front" of the station to enter and leave; therefore, commercial activities tended to be concentrated in the areas of heavier foot traffic. Also, the "back" did not receive the same attention regarding construction of roads for access during the early years when the "front" of the railroad station was developing in response to increasing number of commuters and shoppers. Thus, the front developed more rapidly which translated into higher land prices over time. The difference in land prices between the "front" and "back" demonstrates the significance of the historical pattern of

development and its lasting effects over long period of time.

The decline in residential land prices was not as great as those of commercial land prices. In comparison to other zones, however, the decline in residential land prices in the first zone was larger. The association with nearby commercial land prices is reflected in higher residential land prices in this zone in 1993. As a result, lots in the first zone sustained greater drops in prices unlike residential lots in the other zones during the period of decline. Further, residential lots in the first zone that were classified as "general" residential districts intermixed with other uses such as "mansions" (condominiums), "apato"(apartments) and commercial activities tended to decline more than those districts designated as "general residences". Though intermixed districts are not uncommon in Japanese cities (81 percent of the sample in Sapporo and 61 percent in Sendai), such areas have the potential for being converted to more profitable land uses. In Sendai, all of the lots classified as being located in "intermixed" districts incurred very large price drop ranges (42 percent to two percent), while those lots in the "general" residences district category had smaller price drop ranges (30 percent to three percent). Similarly, in Sapporo all of the lots in "intermixed" districts experienced large price changes (44 percent to seven percent); while the other lots in "general" residence districts had a drop of 43 percent to six percent. The 43 percent drop in Sapporo represented a single lot that was listed as being in a "high class" district and appears to be an exceptional case.

The trend in price changes moderates in the region from 5 to 10 kilometers or Zone 2 in the selected cities during the same period. Three factors are identified as contributing to the variations in prices among residential lots. The *first* is similar to the large drop in prices of "residential" lots associated with" intermixed" land use in Zone 1. In this zone, the sample included 27 percent of the "residential" lots with "intermixed" land uses in Sapporo and 14 percent in Sendai. For example, one intermixed "residential district" lot experienced a larger drop of 28 percent, but the decline in a district of mainly "general" residences was only 2 percent. Yet, both districts were located approximately six kilometers from the core region but in different sections of the City of Sapporo (Chika Koji Kenkyukai 1993 and 1998 editions). The *second* is a "corridor effect of transportation;" larger drops in prices were noticed among lots in districts intermixed with stores, offices and operations offices located along major roads. The *third* aspect is prices among lots which were described mainly as general residences and middle class residences sustained smaller drops or remained unchanged. The relatively small decline or stability in prices in such districts is

explained by the fact that most owners were interested in keeping their houses and had not used them as collateral for loans as in the case of commercial buildings. Consequently, the prices of these lots did not reflect the fluctuations in economic activities or the commercial change in demand that occurred during the high activity period.

Commercial lots in Zone 2 showed a relatively smaller decline in prices than Zone 1, but they are larger in comparison to residential lots. The reason for the noticed decline in prices is the same as in Zone 1. The common characteristics shared by commercial lots sustaining larger declines were locations in which there were retail stores along a road. Another was those locations with offices and banks. Still another was those locations with a combination of stores, mansions, "apato" and other living accommodations. Lots which were in areas associated with distribution centers, trucking operations and related activities also experienced price drops.

The third zone beyond ten kilometers from the city core generally experienced an increase in prices, though there were some exceptions. The rise in prices between the years 1993-1998 reflected the demand for new residences a result of the outward movement to and/or growth of the population in the periphery. The population figures for both Sapporo and Sendai showed a similar pattern of population change. For example, there was a five percent population increase in Sapporo between 1990 and 1995; but the population increase in peripheral wards of the city was as high as 17 percent while wards toward the center showed about 3 percent decrease. Also, the growth of private households in Sapporo showed an increase of 23 percent in a peripheral ward, while it was as low as six percent in the core area between 1990 and 1995. In Sendai, one of the peripheral wards increased in population by 17 percent while wards near or close to the center experienced smaller increases or actual decreases (Somucho Tokeikyoku 1990 and 1995 editions). In Sendai, between 1990 and 1995 the increase in private households in one of the peripheral wards was 29 percent compared to only 9 percent in the inner wards (Somucho Tokeikyoku 1990 and 1995 editions).

Another element in the demand for residential lots in the peripheries involved families which had previously purchased residences within the inner zones and completed or almost completed the repayment of their loans. Such families had the option of either remodeling their current homes or purchasing a newer house and lot at the periphery. Additionally, the expanding economy provided these families higher income which made it possible to undertake the option to buy a new home at the periphery using the first residence as the financial foundation for such action.

Therefore, residential lot prices in new subdivisions in the periphery maintained their value or increased in value in 1998.

The extension of a commuter transportation system into smaller towns at the periphery of a large city affected land prices. In one of the northern suburbs of Sendai, one site, located about seven kilometers from the core, was appraised at a level comparable to prices within a one to 1.9 kilometer radius from the main railroad station. In this case, the ease of commuting by the completion of a subway line was the basis for higher price. Also, prices for residential lots closer to the subway station were much higher than in the surrounding areas.

Commercial lots in Zone 3 show some price increases. These increases were connected to the rise in residential lot prices. As the population moved to the periphery, businesses saw opportunities to fulfill new family needs for goods and services; thus, they moved in to buy land in appropriate locations, putting pressure on land prices. Similar to Zone 2, drops in prices for commercial lots such as semi-industrial, industrial and transportation parks reflected the slowing of economic activities.

CONCLUSIONS

The importance of the linkage among national economies or internation-alization is demonstrated by the experience of Japan regarding the rapid rise of land prices in the 1980s and a subsequent decline in the 1990s. The Plaza Agreement to reduce trade imbalances led to yen appreciation and, in reaction, monetary responses affected its domestic money supply, causing a flow of money into the asset market and inflation of stocks and real estate. Eventually, the Government raised interest rates to control the "overstimulated" economy and in the process achieved the goal of slowing the rising prices of stocks and land. Responses to external pressures were significant in creating the conditions for an increase in land prices and its subsequent decline.

When the drop in land prices occurred it was not uniform, suggesting there were other forces at work at the local level. The general pattern of land prices in the study cities revealed a pattern of decreases with increases in distance from the core of the city, a pattern of change similar to that found in Western cities. A closer examination of local land prices indicated that price drop of commercial land in the core area of these cities was much greater than residential land during the study period. The large reduction in prices was a reflection of high prices associated with commercial land speculation by 1980s, and the use of commercial land as collateral for loans. An anomaly in land prices was the differences between the "front" and "back" of the main railroad station, demonstrating the effects of

local factors. Also, the shift of the core of the city from the castle to railroad station led to the organization of overall land prices based on the main railroad station as the core of the city in the case of Sendai.

The prices for residential lots dropped greatly in districts closer to the core areas of the cities and lost less toward the periphery. The larger reduction in prices of residential lots close to the core was very noticeable in districts where residential land use was mixed with other uses such as mansions, apartments, and other types of rental buildings. Toward the periphery, the residential lots experienced smaller price declines and even some increases. Land in these areas was not being used for the purpose of loan guarantees and did not have the potential of conversion to other uses. Thus, the stability of land use for residences contributed to a smaller decline in prices. Further, increases in land prices for some lots reflected a demand for new residential lots where an increase in population occurred through migration to or growth in the suburbs. Local price variations in this study are indicative of the impact of socio-economic forces over space and time; thus, they are, though linked, different from variations experienced at the national level. The factors for changes in land prices considered in this study are by no means exhaustive and at best they are the beginning point for further inquiry.

Figure 2. Land Price Changes, Sendai

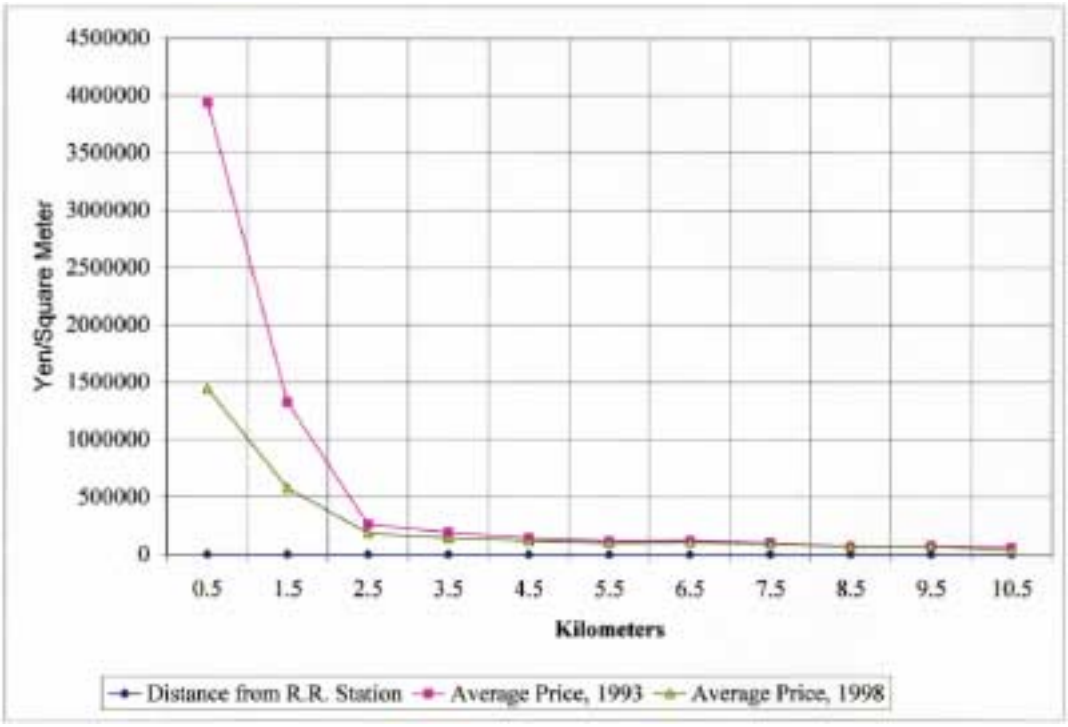


Figure 3. Land Price Changes, Sapporo

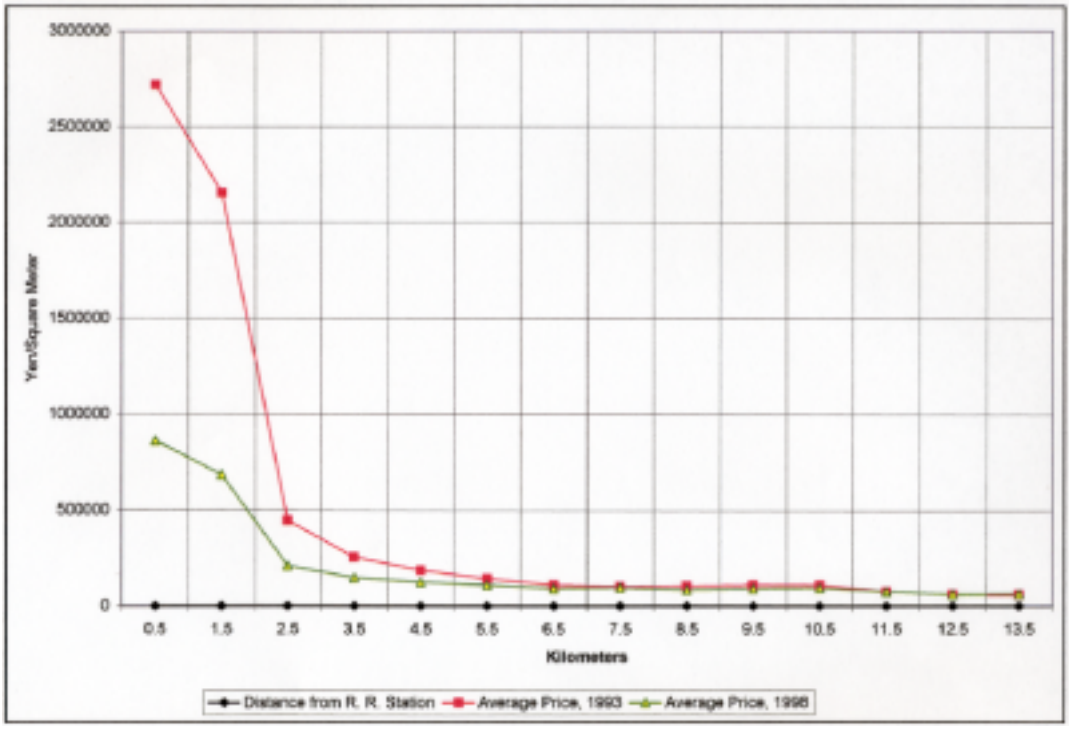


Figure 4. Percent change of residential and commercial land, Sendai

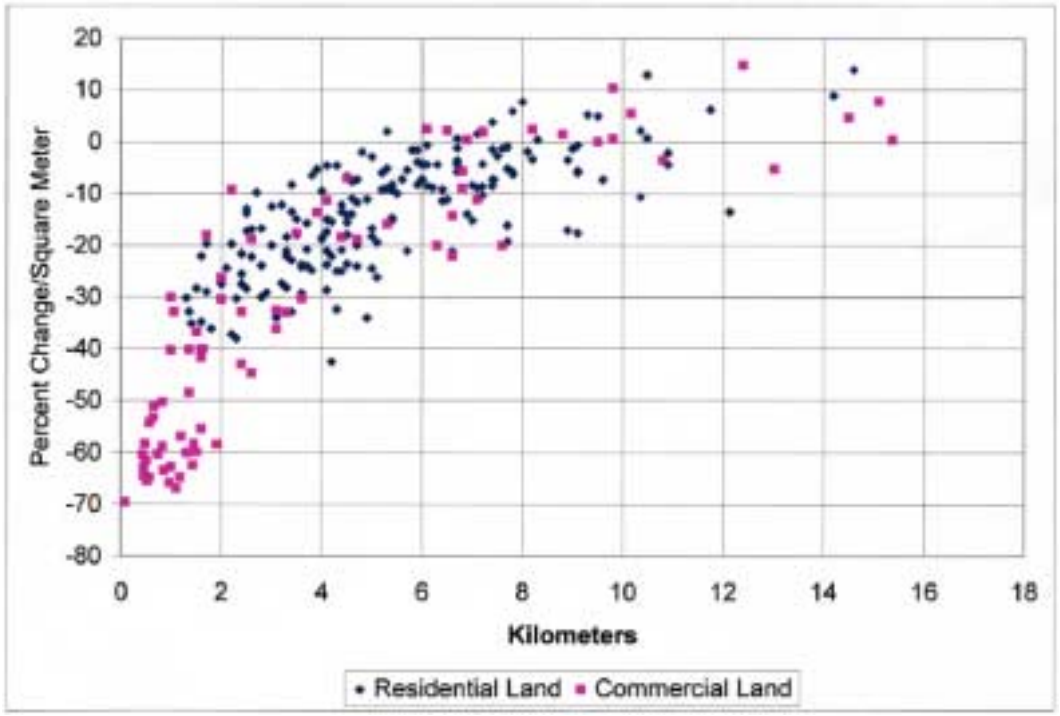
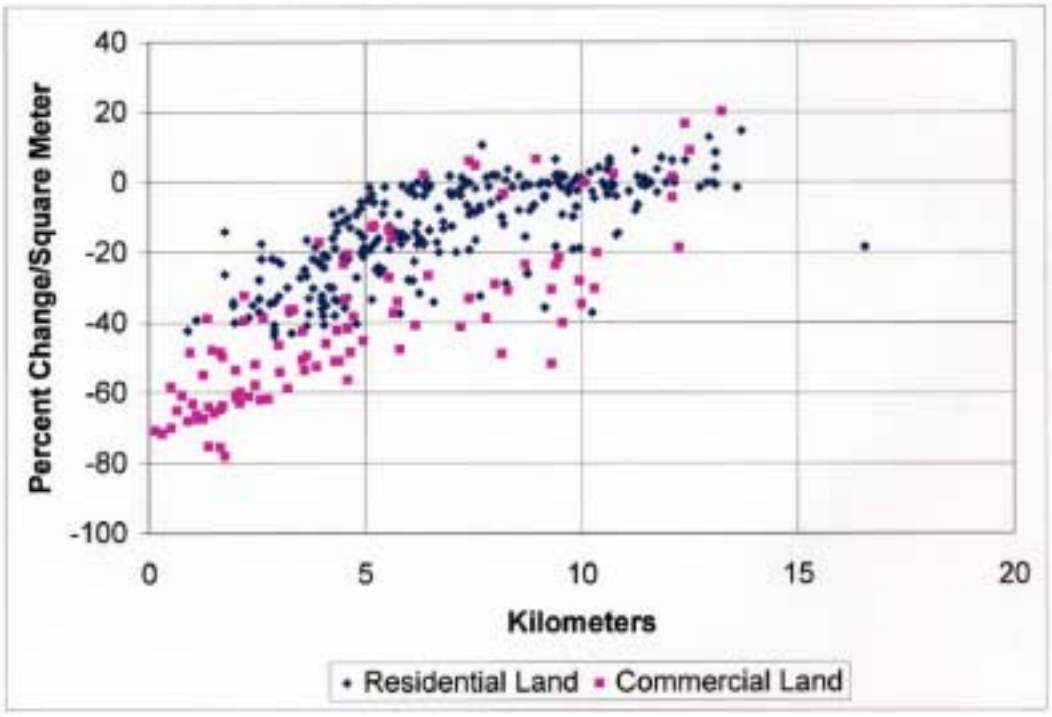


Figure 5. Percent change of residential and commercial land, Sapporo



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