A Research Note :Diffusion of
Durable Consumer Goods in Japan

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1. Introduction

The purpose of this study is to analyze the factors that contributed rapid popularization of consumer durable goods in Japan. A large number of studies have tried to explain such a historical event, and pointed out some significant factors that had caused the results. Most of them, however, seem to propose only general view. What factor, when, how contributed to the diffusion of each consumer durables remains unexplored. The main contribution of this paper is to point out a couple of significant facts relevant to the diffusion of consumer durables from the late 1950s to the early 1960s.

In 1955, high-speed growth era began in Japan. That prosperous period continued until early 1970s. The annual rate of economic growth during the period was about 10% on the average. Researchers have pointed out some characteristics of this period: a drastic change of industrial structure or expansion of heavy and chemical industry, an extraordinary high rate of investment to GNE, introduction and improvement of mass production and mass consumption, effective industrial policies, formation of main bank and long-term employment systems, westernization or Americanization of daily life etc. One of the most striking events in this period is the rapid diffusion of consumer durables. In this study 'consumer durables' include goods such as furniture, electric household appliance, passenger car, bicycle, piano. However, I will focus mainly on electric household appliances such as TV set, refrigerator, washing machine. The diffusion of consumer durables has been considered one of the most significant factors that helped to stimulate investment, to expand heavy and chemical industry, and to change our daily life.

Most developed nations, more or less, experienced similar change. Ordinary workers in developed nations had come to purchase durable goods with their wage. Thanks to technological innovations, new durable goods were developed one after another and the price of them dropped drastically. It is often said that income growth raised consumption demand for manufactured goods, then the price of these goods dropped due to the benefit of mass production. The price cut-down induced demand more, again. For example, in the 'Regulation' theory, the parallel increase in productivity and wage is one of the main elements of what they call Fordism[1]. Most studies seem to emphasize that the upward spiral of income growth and price cut-down contributed the diffusion of consumer durables.

As for Japan, the significance of income growth and price cut-down has also been pointed out. In many studies, however, how these two factors raised demand for each consumer durables does not seem to be sufficiently investigated. What has been emphasized is the general back-

ground of the diffusion of consumer durables: income equality caused by land reformation (nochi kaikaku) or labor reformation (rodo kaikaku) under the occupation of Allied Powers, the ability to import or improve foreign technology, increase of nuclear family who have strong inclination to rationalize house works, or demonstration effects by mass media and informal communication[2]. It is of much significance to point out such backgrounds when we describe the history about the diffusion of consumer durables. However, we should inquire about how such backgrounds caused the diffusion of consumer durables before rushing to conclusions. The subject of this study is to find facts about the process of the diffusion, focusing mainly on such factors as income growth, price changes or others.

In next section, I will show an overview about the diffusion of consumer durables. In the third section, I will try to measure the contribution of income growth to the diffusion of consumer durables. Analysis regarding the effects of price change is the subject of the forth section. I will take change of the diffusion rate into two elements and make analyses of them in the next two sections. In the concluding section, I will try to describe a brief history about how consumer durables were diffused.

2. Diffusion of Consumer Durables: Overview

The diffusion rates of consumer durables in Japan are shown in **Figure** 1-(1) to 1-(7). We can obtain these data from "Survey of Prospect for Consumption Demand (SPCD, Shohi Juyo Yosoku Chosa)[3]. SPCD was biannual survey conducted by Economic Planning Agency (EPA, Keizai Kikaku Cho) from Sep. 1957. The number of the sample households was about 4,000. They

Figure 1 Diffusion Rate of Durable Consumer Goods (1) Conveniences for Residence
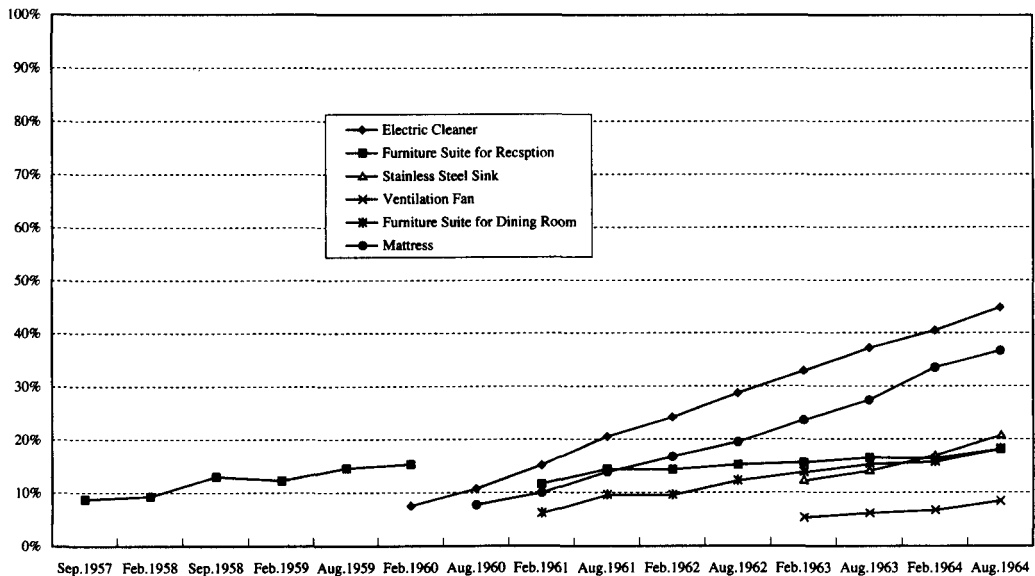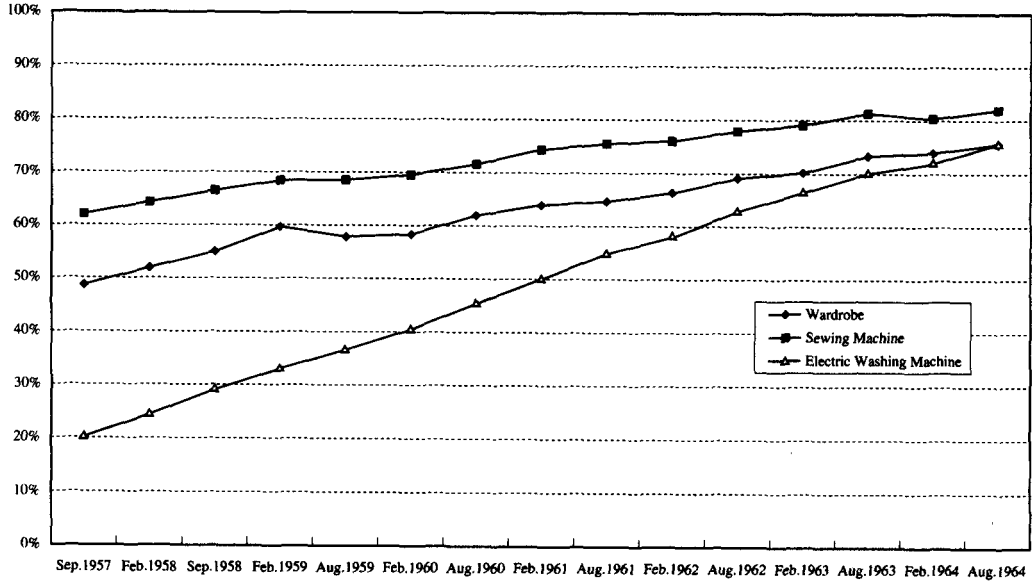
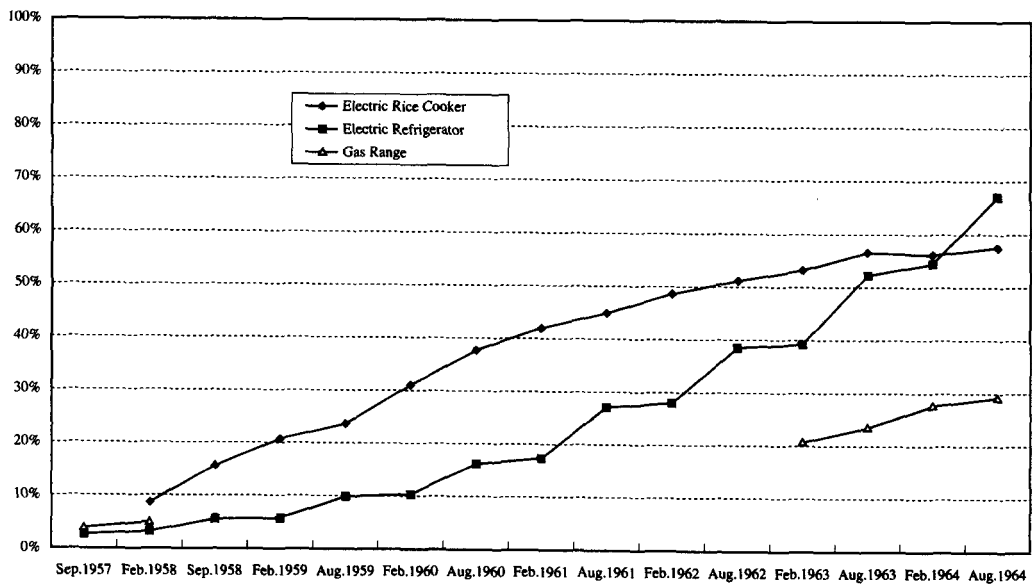**Figure 1 - (2) Conveniences for Clothing**

Legend:
- Wardrobe
- Sewing Machine
- Electric Washing Machine

Sep.1957 Feb.1958 Sep.1958 Feb.1959 Aug.1959 Feb.1960 Aug.1960 Feb.1961 Aug.1961 Feb.1962 Aug.1962 Feb.1963 Aug.1963 Feb.1964 Aug.1964

Figure 1 - (3) Conveniences for Meals

Legend:
- Electric Rice Cooker
- Electric Refrigerator
- Gas Range

Sep.1957 Feb.1958 Sep.1958 Feb.1959 Aug.1959 Feb.1960 Aug.1960 Feb.1961 Aug.1961 Feb.1962 Aug.1962 Feb.1963 Aug.1963 Feb.1964 Aug.1964

3

Figure 1-(4) Appliances For Air Conditoning

Legend:
- Electric Heating-Stove
- Gas Heating-Stove
- Kerosene Heater
- Air Conditioner
- Electric Foot Warmer (Kotatsu)
- Electric Fan

X-axis: Sep 1957 Feb.1958 Sep.1958 Feb.1959 Aug.1959 Feb.1960 Aug.1960 Feb.1961 Aug.1961 Feb.1962 Aug.1962 Feb.1963 Aug.1963 Feb.1964 Aug.1964
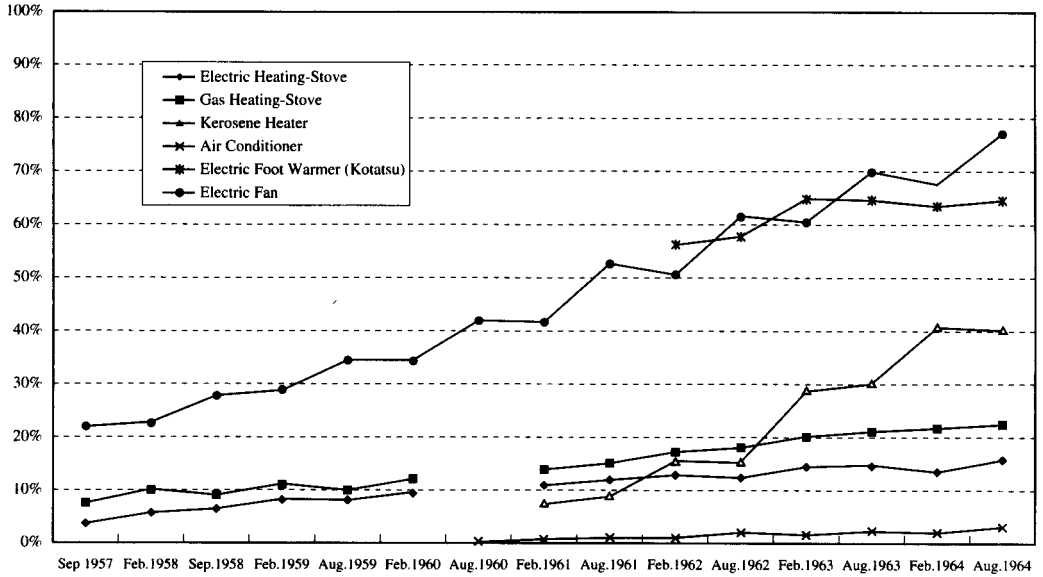
Figure 1-(5) Audio Visual Products

Legend:
- Television Set
- Stereo Set
- Radio
- Transistor Radio
- Tape Recorder
- Camera

X-axis: Sep.1957 Feb.1958 Sep.1958 Feb.1959 Aug.1959 Feb.1960 Aug.1960 Feb.1961 Aug.1961 Feb.1962 Aug.1962 Feb.1963 Aug.1963 Feb 1964 Aug.1964
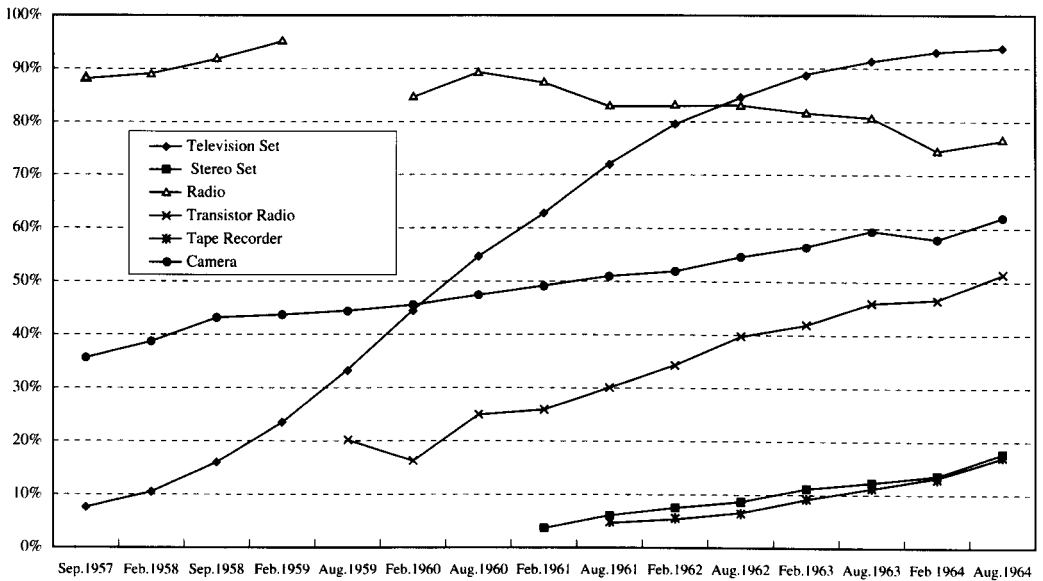
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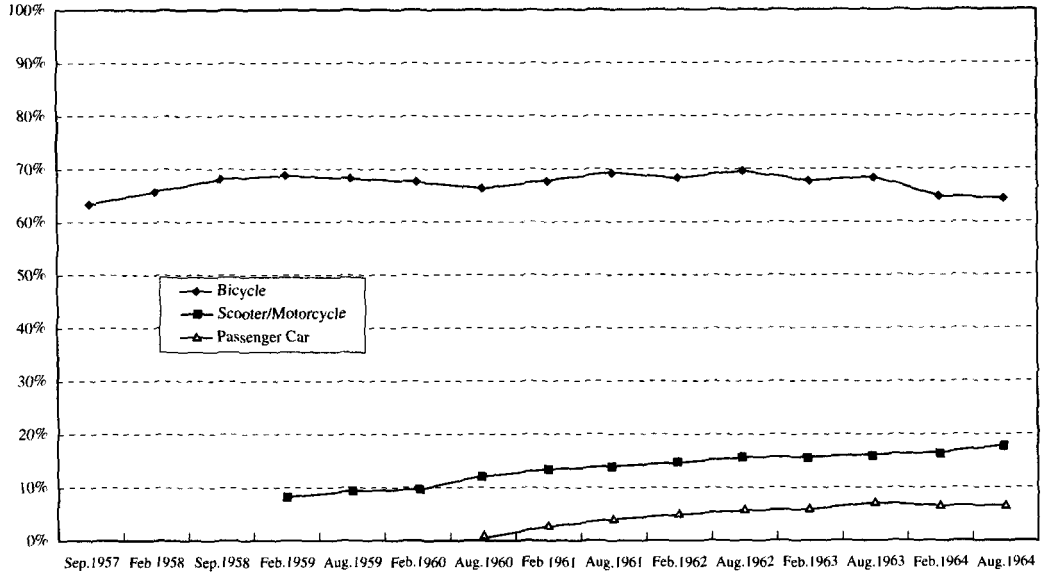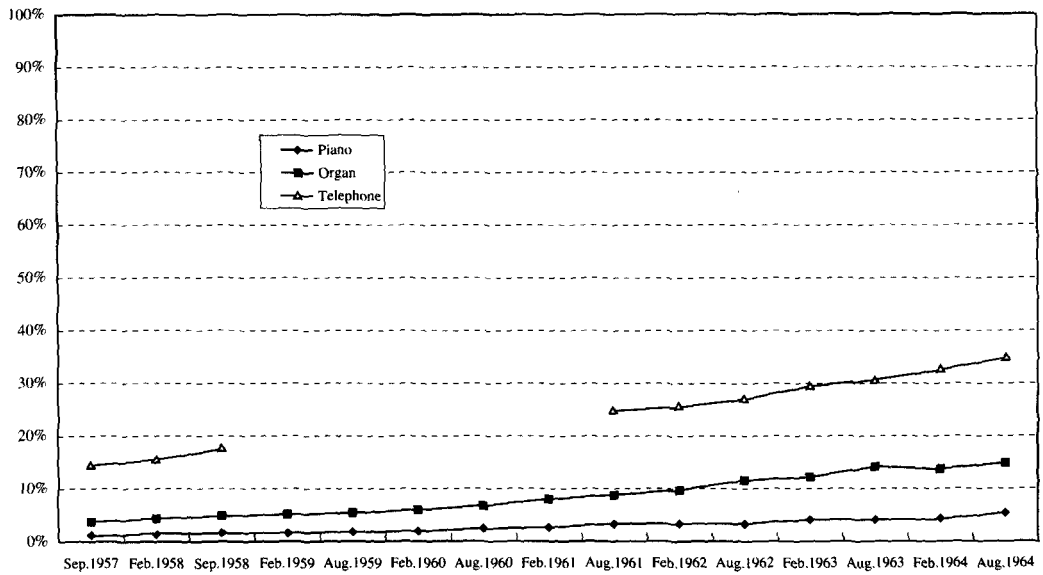**Figure 1-(6) Conveniences For Transportaion**

Figure 1-(7) Others

are selected randomly from 28 cities including large cities; Tokyo, Yokohama, Nagoya, Kyoto, Osaka, Kobe, medium sized cities; Sapporo, Sendai, Chiba, Toyama, Kofu, Gifu, Hiroshima, Tokushima, Fukuoka, Nagasaki, Kagoshima, small cities; Obihiro, Aomori, Takasaki, Matsumoto, Matsuzaka, Otsu, Nara, Tottori, Hofu, Imabari, Miyakonojo. After 1964, the survey covered more cities, and the number of sample households came to be more than 8000. We could take the data of similar survey about farming houses. I will discuss about the diffusion of goods in urban areas, however. Many consumer durables were diffused more rapidly in urban areas than rural areas, with some exceptions such as passenger car. Therefore, it may be safely said that people living in urban areas led the diffusion of consumer durables.

The period from the late 1950s to 1960s is remarkable concerning the diffusion of consumer durables. The diffusion rate of household electric appliances soared rapidly, especially. This period experienced three booms, each of which is called Jimmu-Keiki (from 1955-1957), Iwato-Keiki (from 1959-1961), and Olympic Keiki (from 1962-1964). The average growth rate of real GNP, consumption and investment were 9.9%, 9.0% and 17.1% respectively during this period.

Let us see Figures. Thirty consumer durables classified into seven from the view of their purpose. These figures show familiar facts to us, researchers of postwar economic history. Almost all goods came to be popularized as times went by, with the exception of radio and bicycle, which had been widely diffused before these years. Some goods in these figures, especially electric appliances, describe steep upward curve. The slope of washing machine or electric fan is rather constant through this period. Rice cooker and TV set seems to have been diffused more rapidly in the first half of the period. The diffusion of cleaner, mattress, refrigerator, kerosene-heater or tape recorder is accelerated in the last half of the period.

Price levels of some goods are the following. The average retail price of 14-inch-TV set was ¥67,000 in January 1959. Monthly earning of average salaried household was ¥36,873 at that time. In 1962, the retail price of 14-inch-TV set was about ¥50,000 or more and that of 100-litre-refrigerator was a little less than ¥50,000, when monthly earning of average salaried households was ¥50,817[4]. The prices seem to have been rather expensive when compared to our sense of relative prices today. Consumer durables such as electric appliances were never easy to buy in this period.

3. Income Growth and Other Factors

Now consider factors that contributed the diffusion of consumer durables. In this section, I will try to measure the effect of income growth. The measure can be used also for further study.

(1) Equality and Inequality in the Distribution of Consumer Durables

Before the measurement, let us see the difference of the diffusion rates in each consumer durables by income class. The data on Table 1 show the degree of inequality (DI). It is similar to Gini coefficient. Gini coefficient is often used as a degree of income inequality. Our DI means the inequality in the possession of each consumer durables. We can calculate DI from the diffu-

Table 1 Inequality in Distribution of Goods

	Feb.1958	Aug.1963
Furniture Suite for Reception	0.4108	0.3814
Wardrobe	0.2057	0.1339
Sewing Machine	0.1376	0.0903
Washing Machine	0.3949	0.1569
Rice Cooker	0.3258	0.0846
Refrigerator	0.6104	0.2240
Electric Heating-Stove	0.4373	0.4131
Gas Heating-Stove	0.4391	0.3678
Electric Fan	0.3075	0.1508
TV set	0.4872	0.0835
Radio	0.0689	0.0659
Camera	0.3151	0.2304
Bicycle	0.0583	0.0292
Piano	0.6207	0.5943
Organ	0.4241	0.1877

sion rates of consumer durables by income class. At first, I estimated the number of each consumer durables possessed by households belonging to each income class[5]. Then I made cumulative frequency distribution from the data and calculated DI with the same procedure as Gini coefficient.

Now let us see **Table 1.** In 1958, the highest are the values of piano and refrigerator. Furniture suite for reception, washing machine, electric or gas heating stove, TV set and organ belong to the second highest group. The next group includes rice cooker, electric fan and camera. We should note that all goods but sewing machine, radio and bicycle were distributed unequally in 1958.

We can observe something different about DI in 1963. The values of all goods were lowered. It was possible to underestimate the value in 1963. Even so, the equalization of electric appliances such as washing machine, rice cooker, refrigerator, electric fan or TV set seems to be marked. As for the rice cooker, refrigerator and TV set, the DI fell to about 1/4, 1/3 and 1/6 respectively of the value in 1958. Such a rapid decrease of DI is the characteristics of electric appliances in this period[6]. The average level of income was raised remarkably during this period. Income growth may have contributed the diffusion of many kinds of durables. The diffusion rate seems to have risen faster than the speed of income growth, however. Next, I will focus on this point.

(2) Income Growth and Other Factors for the Diffusion of Consumer Durables

The purpose of analysis here is to measure the contribution of income growth to the diffusion of consumer durables. I used the diffusion rates of each consumer durables by annual income class at two different times. Change in the diffusion rate during the period can be divided into three parts: the effect of the change in the distribution of income (CDI), the effects of the change

in the diffusion rate within the each identical income class (CDR) and interactive effect of the above two (IA). This analysis is shown in the following equation.

$$D_2 - D_1 = \sum_i d_{2i} \cdot \frac{F_{2i}}{F_2} - \sum_i d_{1i} \cdot \frac{F_{2i}}{F_2}$$
$$= \sum_i d_{1i} \cdot \left(\frac{F_{2i}}{F_2} - \frac{F_{1i}}{F_1} \right) + \sum_i (d_{2i} - d_{1i}) \cdot \frac{F_{1i}}{F_1} + \sum_i (d_{2i} - d_{1i}) \cdot \left(\frac{F_{2i}}{F_2} - \frac{F_{1i}}{F_1} \right)$$

D_j stands for the diffusion rate about all households on the survey at the time j ($j=1,2$). d_{ji} is the diffusion rate in the income class i at the time j. F_j is the total number of households and F_{ji} is the number of households which belong to the income class i at the time j. The first member on the right side of the equation indicates the total of change in the diffusion rate when the diffusion rate within the same income class remains constant and only income distribution changes. The value is CDI. The second is the total of change in the diffusion rate when the income distribution remains constant and the diffusion rate within the same income class only changes. This is the CDR. Then the last term is IA.

CDI can be considered as a contribution of income growth to change in the diffusion rate[7]. The effect of income growth may be measured by a kind of regression analysis. We should take some strong assumptions, however, when we make a regression analysis. The available data are too scarce to make regression analyses, moreover. Our CDI seems superior to the estimation of regression analyses, because it can be measured directly by SPCD data without estimation[8].

We should take a couple of notes about this analysis, however. First, The value of CDI or CDR depends on the classification of households by income. If some households earn more income at time 2 than at time 1, they are possible to remain in the identical income class. They may have bought some duarables for the first time during the period. In other words, CDI may remain constant although income growth contributed increase in the diffusion rate. We may underestimate CDI[9]. More precisely, it is desirable that the range of income class is narrower. Narrow enough, we can measure CDI and CDR more correctly, because we can presume that the households in each income class earn the same income. Each range in our data is ¥100,000. The lowest class is defined as less than ¥200,000 and the highest is ¥800,000 or more[10]. If the range were narrowed, CDI and CDR would change. The degree of change depends on the income distribution within each class. If there are more households belonging to the lower half of each income class at the time 1 and there are more households belonging to the upper half of each income class at the time 2, the degree of underestimation for CDI will become larger, and vice versa. If the households within each income class distributed uniformly, we can measure rather correctly, though it is unlikely when the income is growing rapidly year after year. We cannot but get into difficulties when we calculate the values about the lowest class and the highest class. It is likely that more and more households in those two classes come to earn more income even if they remain in the same class from the time 1 to the time 2. For that reason the possibility to underestimate CDI may be higher than to overestimate.

Other two problems in this analysis are concerned with the concept of income. Our CDI rep-

resents the effect of change in nominal income distribution. I did not consider the change of consumer price level. Therefore, we may overestimate of the effect of income growth. The other problem is the following. We should consider the income in the past or in the future when we investigate the contribution of income growth to the diffusion of consumer durables. Most households can save money from their income and accumulate them to make assets. If they have enough savings, they can purchase some goods regardless of their annual income. Additionally, some households may purchase more durables by monthly installments if they have better prospects for their future income. CDI does not include such an effect of income growth. CDI is too simple to investigate how income growth brought about the diffusion of consumer durables. It may be meaningful, however, for further investigation, to make such a naive analysis. What we should do in the first place is to extract an effect of one factor from the complicated cause-effect relationships.

Table-2 is the results of this analysis. The shares of CDI, CDR or IA to total change of the diffusion rate are shown. The first set of data is the results about five and a half years from Feb.1957 to Aug. 1963. There is much difference among goods. The share of CDI in electric

Table 2 Analysis of Change in Diffusion Rate

| | 1958/2-1963/8 | | | 1958/2-1959/2 | | | 1962/8-1963/8 | | |
| | | Share of | | | Share of | | | Share of | |
	CDI	CDR	IA	CDI	CDR	IA	CDI	CDR	IA
Electric Cleaner							42.0%	57.2%	0.8%
Furniture Suite for Reception	139.9%	-10.5%	-29.3%	66.8%	28.4%	4.7%	129.1%	-25.6%	-3.5%
Furniture Suite for Dining Room							54.5%	42.4%	3.1%
Mattress							30.7%	68.5%	0.8%
Wardrobe	82.1%	22.4%	-4.5%	55.7%	42.9%	1.3%	71.1%	33.3%	-4.4%
Sewing Machine	88.8%	9.0%	2.2%	97.2%	-5.2%	8.0%	62.5%	36.8%	0.7%
Electric Washing Machine	53.0%	49.1%	-2.2%	61.3%	37.7%	1.0%	57.9%	44.0%	-1.8%
Electric Rice Cooker	16.2%	79.6%	4.2%	13.6%	78.4%	8.0%	26.0%	71.2%	2.9%
Electric Refrigerator	15.1%	55.6%	29.4%	51.2%	32.6%	16.2%	30.9%	69.9%	-0.8%
Electric Heating-Stove	79.8%	13.1%	7.0%	-79.0%	108.3%	70.6%	87.5%	22.1%	-9.6%
Gas Heating-Stove	102.4%	2.4%	-4.8%	208.3%	-111.7%	3.4%	92.5%	18.0%	-10.5%
Kerosene Heater							9.2%	85.4%	5.4%
Air Conditioner							45.2%	40.3%	14.5%
Kotatsu							39.8%	59.9%	0.3%
Electric Fan	37.7%	62.5%	-0.2%	60.6%	38.6%	0.8%	39.1%	66.8%	-5.9%
TV Set	18.9%	82.1%	-1.0%	22.0%	65.7%	12.3%	36.9%	72.8%	-9.6%
Stereo Set							36.8%	57.3%	5.8%
Radio				12.5%	80.8%	6.8%	-43.0%	137.9%	5.1%
Transistor Radio							60.6%	38.2%	1.2%
Tape Recorder							21.2%	72.2%	6.5%
Camera	117.2%	-15.5%	-1.8%	115.7%	-16.6%	0.9%	84.4%	9.4%	6.2%
Bicycle	62.8%	-43.7%	80.9%	19.2%	78.5%	2.3%	-29.9%	140.0%	-10.1%
Scooter/Motor Cycle							162.8%	0.0%	-62.8%
Passenger Car							67.6%	41.0%	-8.6%
Piano	118.6%	-19.9%	1.4%	179.5%	-67.9%	-11.5%	195.3%	-67.7%	-27.6%
Organ	39.3%	42.1%	18.5%	90.4%	7.5%	2.0%	40.8%	64.0%	-4.8%
Telephone							81.7%	20.9%	-2.6%
Average of All Goods	69.4%	23.4%	7.1%	65.0%	26.5%	8.5%	56.8%	47.3%	-4.1%
Average of Electric Household Appliances	28.2%	65.8%	6.0%	41.7%	50.6%	7.7%	37.6%	61.2%	1.3%
Average of Samples in 1958-59							59.5%	42.8%	-2.3%
Average of Electric Household Appliances, Samples in 1958-59							38.2%	64.9%	-3.1%

appliances, especially rice cooker, refrigerator, electric fan and TV set, are much smaller than those of others. Considering IA, this result would change little. The average share of CDI about all goods is 69.4% and that of CDR is 23.4%. The average share of CDI about electric appliances is only 28.2% and that of CDR is 65.8%.

Turn to the second and the third set of data. We can compare the data about the late 1950s and the early 1960s. Some changes seem to have happened during this period. The average share of CDI decreased, and that of CDR increased. As for electric appliances, the share of CDI decreased and that of CDR increased. Values about refrigerator and electric fan changed drastically, CDR's share of them increased a great deal.

To sum up, the share of CDI and CDR varies among goods. Income growth accounts for around 40% on average of change in the case of electric household appliances. If we make allowance for the underestimation, income growth did not necessarily play a major role in the diffusion of electric appliances. Especially as for the goods such as TV set and rice cooker, the effect of income growth was relatively insignificant through the period of their diffusion.

As I mentioned before, there is limitation to this analysis. If we consider the concept of income more broadly, the effect of income growth may be larger. The analysis in this section is too naive to consider income in a broader sense. In the last half of this paper, I will take further investigation about the process how income growth affected the diffusion of consumer durables. Before that, I will continue simple analyses, taking price changes in next section.
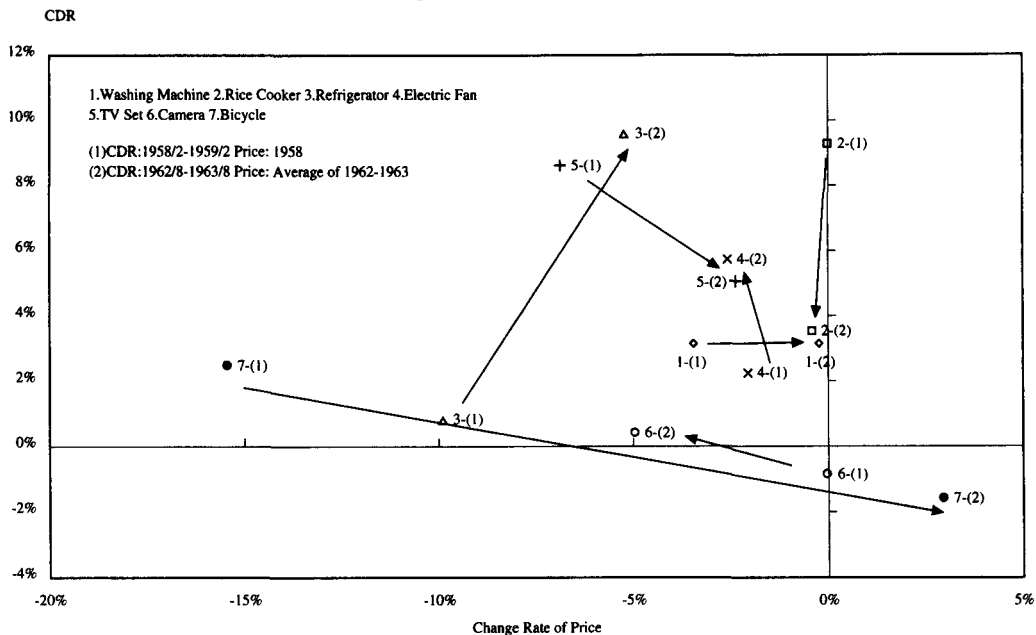
4. CDR and Price Change

I found out that much are left unexplained about increase in the diffusion rate, when limited concept of income growth is only taken into account. Then let us think about CDI again. I have taken some notes about the value in the section 3. The effects of long-term income or savings are not taken into CDI. As financial assets grow, people may purchase goods, considering less about their annual income. CDR includes the effect of assets growth, therefore. If we take the longer period in the analysis, the contribution of assets growth may be larger, although we cannot calculate the percentage. CDR may also include the effect of prospect for income growth. It may be larger in the boom years.

In that way, we can explain some of CDR. CDR seems too large, however. It is natural to consider price of each goods, next. If the utility function is simple and stable, change in relative prices will account for most of CDR. If CDR is high, we suppose it is because the relative price is decreasing. Begin with time-series analysis.

(1) Time-Series Analysis of CDR

We can predict that CDR will increase as the rapid price cut-down. In the late 1950s, it was said that TV sets had been rapidly diffused partly because the price cut-down was drastic compared to other consumer durables. **Figure** 2-(1), (2) is scatter plot of the price changes and CDR about seven consumer durables in 1958/59 and 1962/63[11]. In **Figure** 2-(1), the values of Electric

Figure 2 - (1) Price Change and CDR

CDR

1.Washing Machine 2.Rice Cooker 3.Refrigerator 4.Electric Fan
5.TV Set 6.Camera 7.Bicycle

(1)CDR:1958/2-1959/2 Price: 1958
(2)CDR:1962/8-1963/8 Price: Average of 1962-1963

Change Rate of Price

fan, TV set, Camera or bicycle meet our expectations, though the values of the other three does not. For example, the diffusion rate of refrigerator within the identical income class increased more rapidly when the price cut-down speed was slowed down. Something is different in **Figure 2-(2).** If we consider general Consumer Price Index, the values of refrigerator come to meet our expectation, but TV set moves to the other. Change in real price may have increased CDR's share of refrigerator and electric fan during this period.

We cannot say much about the correlation between CDR and price change with such poor data only. As for some goods, the price cut-down seems to have contributed significantly to the diffusion in a certain period. For example, the drastic fall in the price of TV set seems to have raised CDR in the late 1950s, though I could not find firm evidence. It is only natural that CDR in TV set decreased in the 1960s, when most households had already possessed one. We might find negative correlation between CDR and price cut-down regarding TV set if we could have got sufficient data to make a multiple regression analysis, which could control the other variables. As for rice cooker, however, the price level was insignificant to their diffusion. Rice cookers, which were relatively inexpensive, were diffused regardless of price cut-down and income growth. Anyway, the impact of price cut-down to some goods, if any, seems to be limited to short period. It is difficult to measure the impact of drastic price cut-down in short period, however.

What we can conclude about this analysis is that the speed of price cut-down did not necessarily contribute to raise CDR. Even if the price cut-down raised CDR to some extent, a large part of CDR will remain unexplained.

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Figure 2 - (2) Real Price Change and CDR

Figure 2 - (2) Real Price Change and CDR
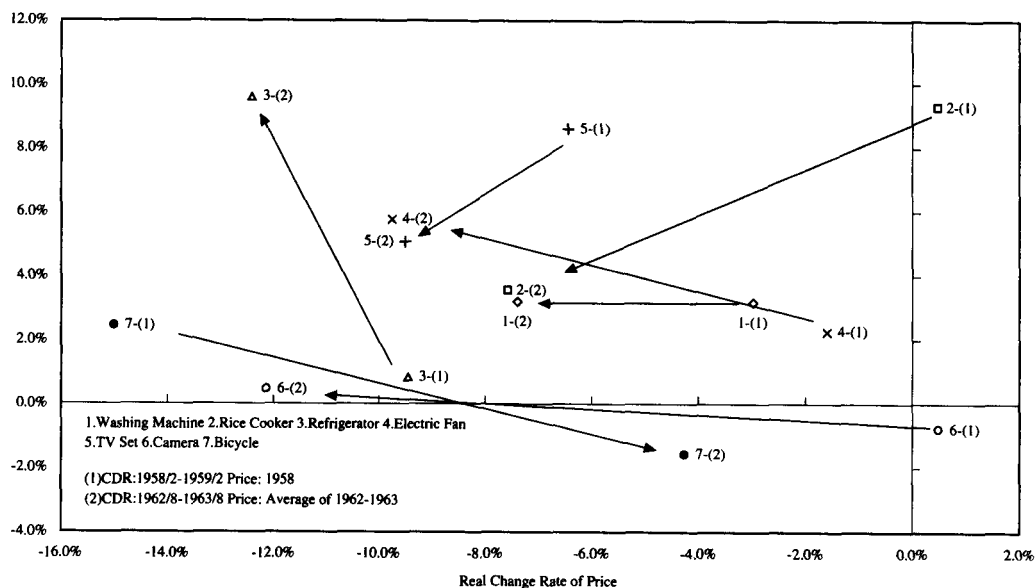
(2) Cross Sectional Analysis of CDR

Did the relative price of consumer durables influence the consumer behavior? Did people consider price change when they chose to buy some goods among consumer durables? Now I will examine whether the speed of price cut-down caused the difference of CDR among goods at one time.

Figure 3-(1), (2) is scatter plot of CDR and the change rate of price. We could find a slight inverse correlation, though neither of coefficients is significant. In other word, even if the price cut-down is fast, CDR of the goods is not necessarily high. Accordingly, the difference of CDR among goods cannot be explained by the price change only. For example, people who remained in the lower income class did not rush to purchase TV set only because the price fell drastically[12].

I could not explain the value of CDR very well with price changes. The above analyses seems too naïve. We should consider dynamic interaction of income growth, price changes or utility function and other factors relevant to the diffusion of consumer durables.

The utility function would be affected by various factors: Personal tastes and possession, neighbor's tastes and possession, life style, family structure, natural environment, social infra-structure such as electricity supply or construction of paved road etc. In the changing period such as 1950s-60s in Japan, the utility function must have often changed. Even if a basic utility function continued unchanged, temporary change of mind, which was caused by such factors as unexpected price change or income growth or attractive new products, may have shaken consumer behavior. Next subject is to investigate further the effect of income growth, price changes, preference and others, with available data mainly from SPCD.

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Figure 3 - (1) Price Change and CDR among Goods - 1958/59
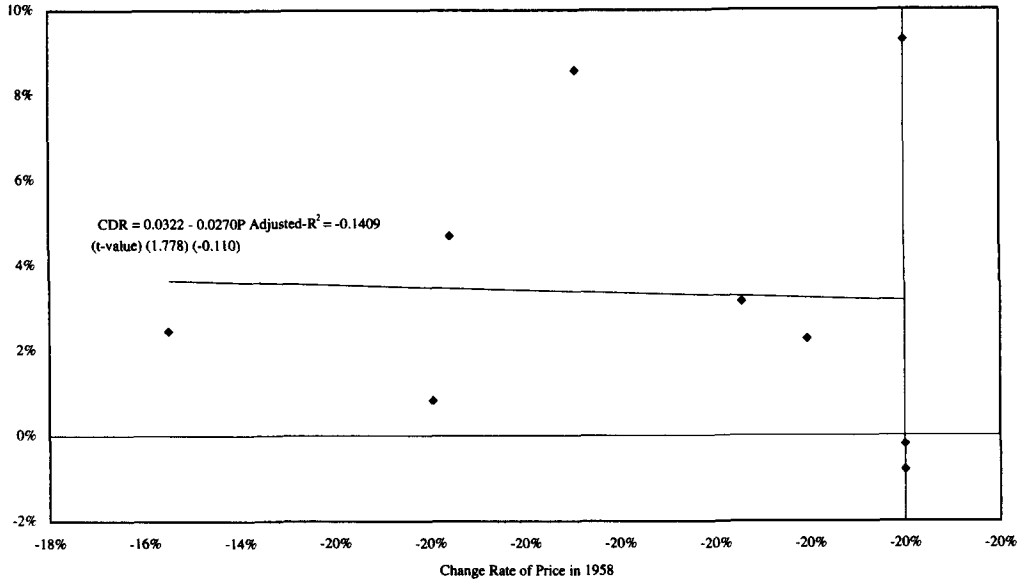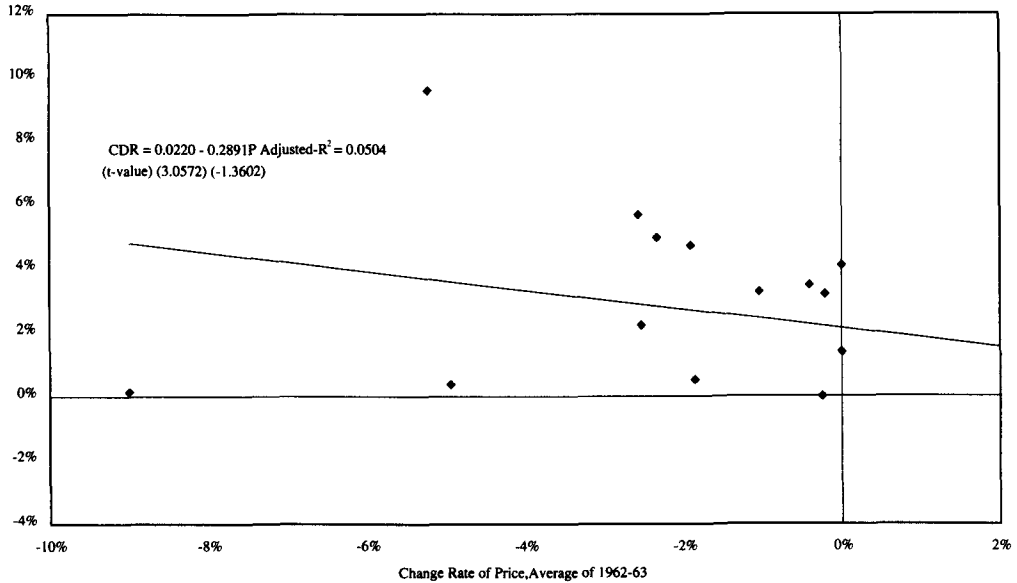
The effects of CDR
from Feb.1958 to Feb.1959

$CDR = 0.0322 - 0.0270P$ Adjusted-R^2 = -0.1409
(t-value) (1.778) (-0.110)

Change Rate of Price in 1958

Figure 3 - (2) Price Change and CDR among Goods - 1962/63

The effects of CDR
from Aug.1962 to Aug.1963

$CDR = 0.0220 - 0.2891P$ Adjusted-R^2 = 0.0504
(t-value) (3.0572) (-1.3602)

Change Rate of Price,Average of 1962-63

5. Purchase Schedule and Actual Purchase

For further investigation about the factor that affected the diffusion rate, I will introduce two values. These two values are defined from the view of consumer behavior.

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In SPCD, there are two following questions. "Do you have a plan to buy some consumer durables within a year from now?" "Have you purchased the durable goods in the last one year?" The percentage of households that answered each question in positive is shown in the biannual report of SPCD. Let us call them purchase schedule (PS) and actual purchase (AP) here. PS is the percentage of households that have a plan to purchase the goods within a year from the time. AP is the percentage of households that have purchased the goods in the last one-year[13]. We can decompose AP_i into PS_{i-1} and AP_i/PS_{i-1} at the time i. We can regard a vector of PS about each goods as initial preference or latent demand. PS may be affected by the conditions, including relative price, income level, assets, prospect for the future income, utility function and others. A vector of AP/PS can be regarded as a rate of achievement to the initial purchase schedule or a degree of impulsiveness to purchase, which may be affected by the change of conditions .

Scatter plot of PS and AP/PS are presented in **Figure** 4-(1), (2). Goods on the upper left side of the Figures have two characteristics. One is latent demand is considerably strong. The other is it is not easy to purchase them actually. They are wardrobe, washing machine and rice cooker in the late 1950s, cleaner, washing machine, refrigerator and electric fan in the early 1960s. Goods on the lower right side of Figures do not induce strong latent demand, though they are likely to cause 'impulsive purchase' . They are radio, bicycle and electric heating stove in the late 1950s, TV set, radio and bicycle in the early 1960s. TV set was an exceptional goods in the late 1950s in that both PS and AP/PS were considerably high[14].

Next, I will examine what affected the value of PS and AP/PS of each goods.

Figure 4 - (1) PS and AP/PS in 1958-59
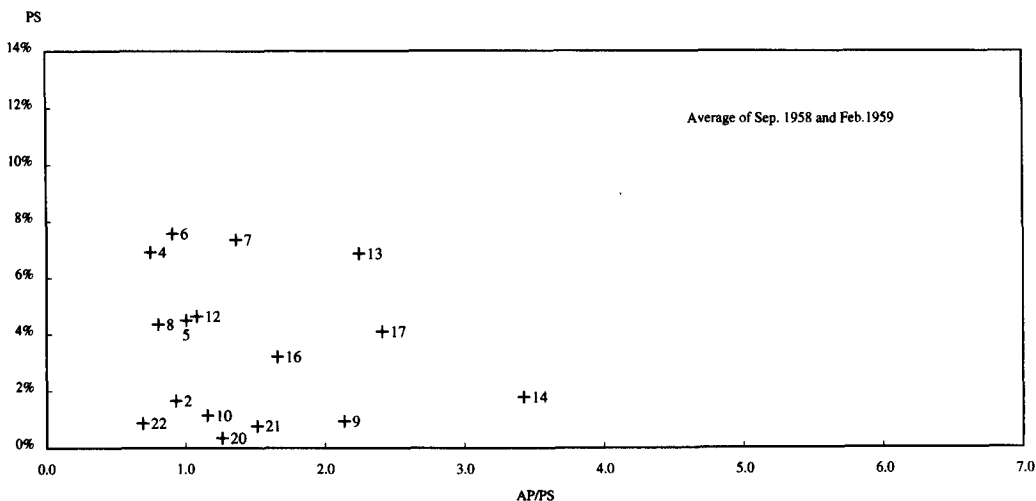
1.Cleaner 2.Furniture Suite for Reception 3.Mattress 4.Wardrobe 5.Sewing Machine 6.Washing Machine 7.Rice Cooker 8.Refrigerator 9.Electric Heating Stove 10.Gas Heating-Stove 11.Air Conditioner 12.Electoric Fan 13.Television Set 14.Radio 15.Transistor Radio 16.Camera 17.Bicycle 18.Scooter/Motorcycle 19.Passenger car 20.Piano 21Organ 22.Telephone

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Figure 4 - (2) PS and AP/PS in 1963

1.Cleaner 2.Furniture Suite for Reception 3.Mattress 4.Wardrobe 5.Sewing Machine 6.Washing Machine 7.Rice Cooker 8.Refrigerator
9.Electric Heating Stove 10.Gas Heating-Stove 11.Air Conditioner 12.Electoric Fan 13.Television Set 14.Radio 15 Transistor Radio
16.Camera 17.Bicycle 18.Scooter/Motorcycle 19.Passenger car 20.Piano 21 Organ 22.Telephone
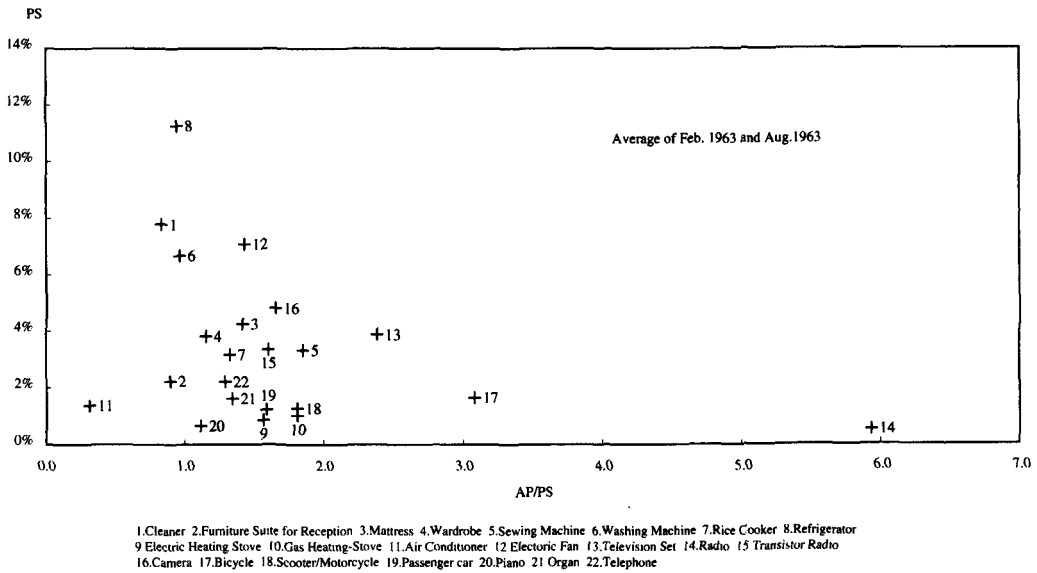
(1) Initial Preference or Latent Demand

What determined the purchase schedule for various consumer durables at the beginning of the period? Begin with cross sectional analysis. Households would consider price changes when they decide their purchase schedule for consumer durables. They may also think about what kind of goods has been popularized rapidly in resent days. In addition, PS may be lower if the goods have already diffused widely. In other words, the speed of diffusion may be slowed as the diffusion rate gets high. Thus, three independent variables are selected for the regression. First is the change rate of price (CP) in the past two years. Second is change in the diffusion rates about all income classes (CDA). Third is the diffusion rate at the beginning of the period (DR). PS would be lower, the higher CP was. CDA represents increase of households who purchased the goods within the last one-year. This value can be interpreted a measure of 'demonstration effects' [15]. The coefficients of these three independent variables are expected negative, positive, and negative respectively.

The results of cross sectional analyses among each goods are in **Table 3.** The coefficient of CP meets our expectation. They are negatively correlated to PS. However, the value of 1959 is insignificant. The value of 1963 is 10%-significant, though it becomes insignificant as soon as CDA is included to the equation. CDA is the most significant factor for PS. Most households seem to have referred to other people' s behavior when they make their purchase schedule for consumer durables.

I could not find significant correlation between PS and DR. DR seems insignificant in the cross sectional analysis among goods. Nevertheless, if one goods are chosen, we can get significant correlation. **Table** 4 shows the result of regional analysis for PS and DR in 1963. Thirteen of

Table 3 Cross Sectional Analysis of Purchase Schedule

Dependent	Coefficient of Independent Variables (t-value)				Adjusted-R^2
	Constant	CP	CDA	DR	
PS in Feb.1959	0.042	-0.2162			-0.0492
(Sample-9)	(4.0928)	(-0.7904)			
	0.0071		0.5682		0.7044
	(1.1782)		(5.8615)		
	0.1929	-0.1199	0.3814		0.3790
	(1.5697)	(-0.5597)	(2.4139)		
	0.0296			0.0188	-0.0261
	(2.8517)			(0.7725)	
PS in Feb.1963	0.0364	-0.503			0.1645
(Sample-17)	(4.4690)	(-2.0373)			
	0.0097		0.5684		0.5636
	(1.6286)		(5.8805)		
	0.0103	-0.1449	0.6210		0.5637
	(1.1415)	(-0.7200)	(3.8376)		
	0.0256			0.0302	0.0428
	(2.7141)			(1.4702)	
PS in Feb.1963	0.0397	-0.8266			0.3021
(Sample-9)	(3.2014)	(-2.1126)			

CP: Average change of WPI in 1957-58 or in 1961-62.

CDA: Change in Diffusion Rate from Feb.1958 to Feb.1959 or from Feb.1961 to Feb.1962

DR: Diffusion rate in Feb.1959 or in Feb.1963

Table 4 Reginal Analysis of PS and DR in Aug. 1963

	Coefficient of Variation	Results of regression	
		Adjusted-R^2	Coefficient of DR
Electric Cleaner	0.32978	0.039	-0.222
Furniture Suite for Reception	0.33886	0.065	-0.557
Stainless Steel Sink	0.59041	0.323	-2.648
Ventilation Fan	0.55204	0.144	-9.222
Furniture Suite for Dining	0.41731	0.061	-0.533
Mattress	0.31637	0.084	-0.381
Wardrobe	0.11248	0.101	-0.125
Sewing Machine	0.06907	0.008	-0.087
Electric Washing Machine	0.20087	0.668	-0.297
Electric Rice Cooker	0.19188	0.251	-0.157
Electric Refrigerator	0.28152	0.623	-0.769
Gas Range	0.44843	-0.008	-0.175
Electric Heating-Stove	0.48900	0.155	-0.822
Gas Heating-Stove	0.82529	0.021	-0.249
Kerosene Heater	0.33395	0.017	-0.215
Air Conditioner	0.95104	0.264	-31.857
Kotatsu	0.27785	0.031	-0.052
Electric Fan	0.33805	0.443	-0.185
TV Set	0.06872	-0.027	0.030
Stereo Set	0.41091	0.277	-3.357
Radio	0.06076	-0.024	-0.018
Transistor Radio	0.22497	-0.008	-0.101
Tape Recorder	0.41325	0.030	-1.067
Camera	0.17910	0.005	-0.043
Bicycle	0.25310	0.000	-0.016
Scooter/Motor Cycle	0.22992	-0.010	-0.260
Passenger Car	0.27813	0.356	-6.229
Piano	0.66170	0.185	-16.005
Organ	0.21584	-0.022	-0.431
Telephone	0.25882	-0.013	0.102

$\equiv$ 10% significant

— 5% significant

30 goods show significant correlation. PS is inversely correlated to DR. In the prefecture, in which the diffusion rate was higher, fewer households planned to purchase the goods.

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I have found out that when they made their purchase schedule for consumer durables, most households preferred goods that sold very well in the previous year, in both the late 1950s and the early 1960s. That correlation seems to be robust regardless of time during the period. What other people have purchased recently was of most significance to the choice of consumer durables.

This fact means that the most important factor to determine the preference for one goods is increase in the diffusion rate of the goods. Consequently, if the diffusion rate of one goods increase in one year, preference to the goods will be intensified, and as a result the diffusion rate may increase again in the next year. The problem about this cycle is that the initial purchase schedule is not always achieved. Therefore, the value of AP/PS is significant to drive this cycle. Add to it, higher CDA may raise PS of one goods only relatively to others. In other words, without sufficient conditions such as better prospect for the future income, the absolute value of PS could not rise. If something to raise AP/PS happen to the goods whose PS is high, with the promising prospect for the future income, upward spiral of the diffusion rate may be created.

We can strike on other factors that affect PS. If the new washing machine issued just before the time of planning, which was easier to use than the former product, PS may rise relatively to other goods. We cannot forget the impact of advertisement. Nation-wide propaganda may boost PS. We must search history in detail for each goods in order to examine such factors. Though I do not deny importance of such kind of factors, it is beyond the scope of this paper.

Turn now to the time-series analysis. We can examine relationship between PS and the prospect for income growth. In each goods, PS may rise if the prospect for income growth come to be promising, as far as it is not inferior goods. I made a time-series analysis for some selected goods in order to examine this predict.

In SPCD, there are data concerning the prospect for income growth within a year from then. Households were supposed to make a choice from six answers, which are '(a) increase by around 10% or more' , '(b) increase by around 5% or more and less than 10%' , '(c) almost constant' , '(d) decrease by around 5% or more and less than 10%' , '(e) decrease by around 10% or more' and '(f) having no idea' . I omitted the households who had chosen (f) and calculated the percentage of (a) to (e). Then I multiplied them by respective weights and created a new value: (a)*2+(b)*1+(c)*0+(d)*(-1)+(e)*(-2). This value can be regarded as a degree of prospect for income growth (PIG). **Table** 5 shows the time-series data of PIG. PIG increased in the period from the late 1950s to 1961. It marked the highest in August 1961 and decreased a little after then and increased from February 1963 again. The inflation of consumer price began from 1960. Gradually people might have begun to consider the inflation. Accordingly, we need discount PIG to some extent in later years.

Time series PS of eleven goods is shown in **Figure** 5. Trends are varied among goods. The values of washing machine, rice cooker and wardrobe are initially higher, but those of last two decline later. PS of TV set, refrigerator and electric fan seems to increase as the rise in PIG in the late 1950s. As for TV set, however, the value is decreasing from February 1960. In February 1961, when PIG soared, PS of refrigerator, cleaner, electric fan and washing machine are boosted.

Table 6 shows regression analyses of PS and PIG, controlling the diffusion rate at the time.

Table 5 Prospect and Result of Income Growth

	UIG	PIG	Change in CPI	
			1957	3.05%
Feb 58		0.2628		
Sep 58		0.2555	1958	-0.49%
Feb 59	0.1260	0.3560		
Aug 59	0.1853	0.3778	1959	0.99%
Feb 60	0.1917	0.4176		
Aug 60	0.2247	0.4755	1960	3.92%
Feb 61	0.3497	0.6420		
Aug 61	0.3732	0.6826	1961	5.19%
Feb 62	0.2338	0.6259		
Aug 62	0.1463	0.6022	1962	6.73%
Feb 63	0.1055	0.5969		
Aug 63	0.1673	0.6577	1963	7.56%

Figure 5 Purchase Schedule
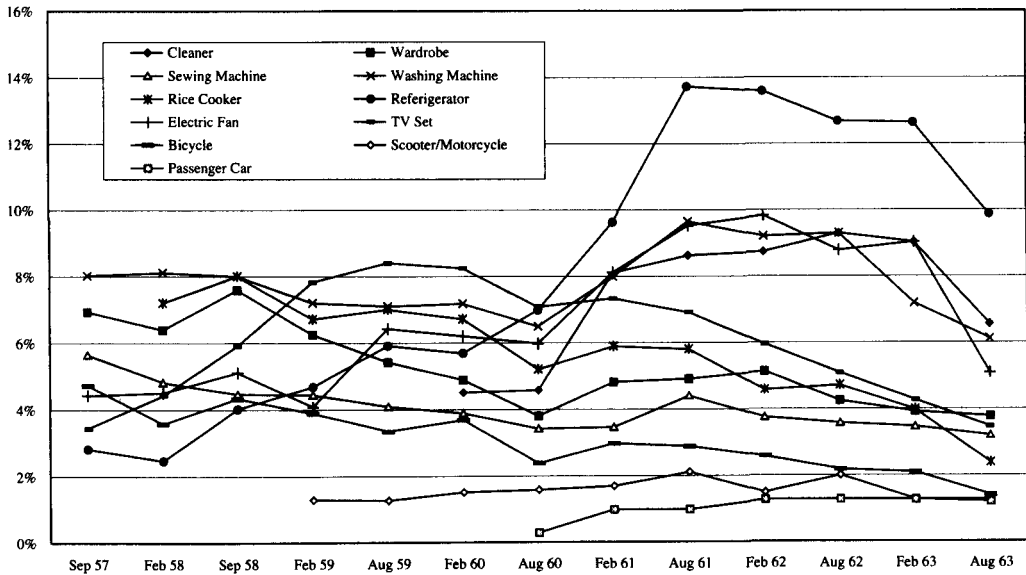
Coefficients of PIG in refrigerator and electric fan are positive and significant as I predicted. The values of washing machine and TV set are 20%-significant. In general, we can perceive correlation between the prospect for income growth and the initial purchase schedule of some goods, though there is difference about the significant period among goods. Promising prospect for income growth boosted the initial preference for some goods.

I made also time series analyses of price change and PS, though not presented in this paper. PS of some goods such as TV set, electric fan and refrigerator have slight negative correlation between PS and price cut-down in a certain period. However, it is only rough trend from the long-term point of view. We may suppose that there is a certain price level for each goods, at which

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Table 6 Regression Analysie of PS and PIG, AP/PS and UIG

Dependent Variable	PS			AP/PS	
Independent Variable	PIG	DR	R^2	UIG	R^2
Wardrobe	-0.0235	-0.0917	0.6465	0.4866	0.0411
	(-1.1882)	(-0.7447)		(0.5853)	
Sewing Machine	0.0071	**-0.0923	0.6165	1.0689	0.0911
	(0.4262)	(-1.9015)		(0.8952)	
Washing Machine	*0.0812	-0.0709	0.2212	***1.2643	0.5342
	(1.5705)	(-1.3160)		(3.0292)	
Rice Cooker	0.0499	***-0.1371	0.8301	0.0294	0.0006
	(1.1917)	(-3.2761)		(0.719)	
Referigerator	***0.2144	0.0267	0.8589	***1.6025	0.4370
	(3.8533)	(0.4807)		(2.4918)	
Electric Fan	***0.1353	-0.0446	0.5931	1.3429	0.1107
	(2.3920)	(-0.7550)		(0.9978)	
TV Set	*0.1228	**-0.0845	0.3201	-0.2149	0.0068
	(1.4822)	(-1.8832)		(-0.2343)	·
Bicycle	***-0.0508	0.1998	0.6784	2.6230	0.1492
	(-4.1646)	(1.1835)		(1.1846)	

DR: Diffusion Rate at the Time of Schedule
(t-value) *** 5%, ** 10%, * 20% -significant

preference for the goods is intensified. It is difficult to estimate the price level, however. We had better think the price cut-down to a certain level is one of the requirements for the boost of each goods. There is little evidence that price cut-down immediately caused sharp increase of the demand.

To sum up the findings in this section, what kind of goods diffused rapidly in the previous year was the most significant factor that determined latent demand for each consumer durables. This fact suggest that sudden boost of the diffusion rate of the goods in one period was significant to the long-term trend of the diffusion of each goods.

I could not propose the evidence that the change of relative price played a major role in making purchase schedule.

Prospect for income growth influenced the purchase schedule of each goods differently. In the later 1950s, latent demand for TV set, refrigerator or electric fan was intensified. Refrigerator, cleaner, electric fan, and washing machine were strongly preferred from 1961, when the prospect for income growth was markedly improved.

(2) Achievement of Schedule or Impulsiveness

Turn to discuss the value of AP/PS. This value is a degree of actual purchase that exceeds or does not reach the initial purchase schedule. PS also would be affected by many factors. If new appealing product is put on sale one day, people may rush to buy it although they have had no plan to buy the goods in the beginning of the period. Strong campaign or impressive TV commercial may cause change in preference. Sudden desire may be created when he or she looks at some durable goods at his/her friend's house. In the case of familiar goods, people will buy one for

renewal when some troubles happen. As for inexpensive goods, initial purchase schedule at the beginning of the period may be meaningless.

In the opposite case, even if people have wanted to purchase the goods, they cannot afford to buy it for some reason or other. In one case, people may put off the purchase of one goods when they must precede emergency spending such as medical expenses. In another case, someone had planned to buy refrigerator initially. When new product of TV set was put in sale and it was more attractive than had been expected, he/she could have changed his/her mind to purchase the TV set. Consequently, refrigerator might have been postponed.

It is beyond the scope of this study to make comprehensive analysis of such factors. Social psychological factors might be complicated. In this study, I will examine measurable factors that are likely to affect AP/PS.

First, AP/PS may reflect the strength of desire for the certain goods. If the strength of desire is in proportion with the initial preference, AP/PS and PS will be positively correlated. **Figure** 4-(1) and 4-(2) do not seem to support this predict, however. People do not always purchase consumer durables according to the initial preference. In other words, people purchase some goods impulsively and cannot afford to buy other goods that they have wanted to get.

Next, consider relative price. If the price of the goods is cut down to unexpectedly low level, some households may purchase the goods despite lack of initial plan. On the other hand, if the price cut-down is smaller than expected, people may put off their initial purchase schedule. Accordingly, unexpected price cut-down of some goods may cause increase in AP/PS relatively to the other goods. It is difficult to measure unexpected price change precisely, but I presumed that households regard average price change in previous two years as expected price change in the next period. Thus, I defined unexpected price change as the difference between price change in the current period and average price change in the previous two years. Scatter plot and regression analysis is shown in **Figure** 6-(1), (2). Both coefficients in 1958/59 and in 1962/63 are negative as I predicted, but not significant. We cannot explain very well about the distribution of AP/PS among goods by unexpected price change[16].

Turn now to time-series analysis. The value of AP/PS would be affected by unexpected income growth. If income grow faster than expected, more households will purchase some goods than had been scheduled initially.

For the time-series analysis, I created a new value in order to measure the degree of unexpected income growth. **Table** 5 shows the value. It is calculated with the method similar to PIG. We can obtain the data from SPCD about the results of income growth in the last one-year. Households supposed to choose one out of six answers similar to the prospect for income growth. I calculated the value of the results of income growth (RIG) with the same weight as PIG. Subtract PIG from RIG. I get the new value, then. I defined this value as a degree of unexpected income growth (UIG). UIG describes similar trend to PIG until August 1961. After then, UIG fell rather quickly.

Turn now to **Figure** 7. This figure shows the time series AP/PS of eleven goods identical to **Figure** 5. I can point out three marked facts on this figure. First is that the relative level of AP/PS

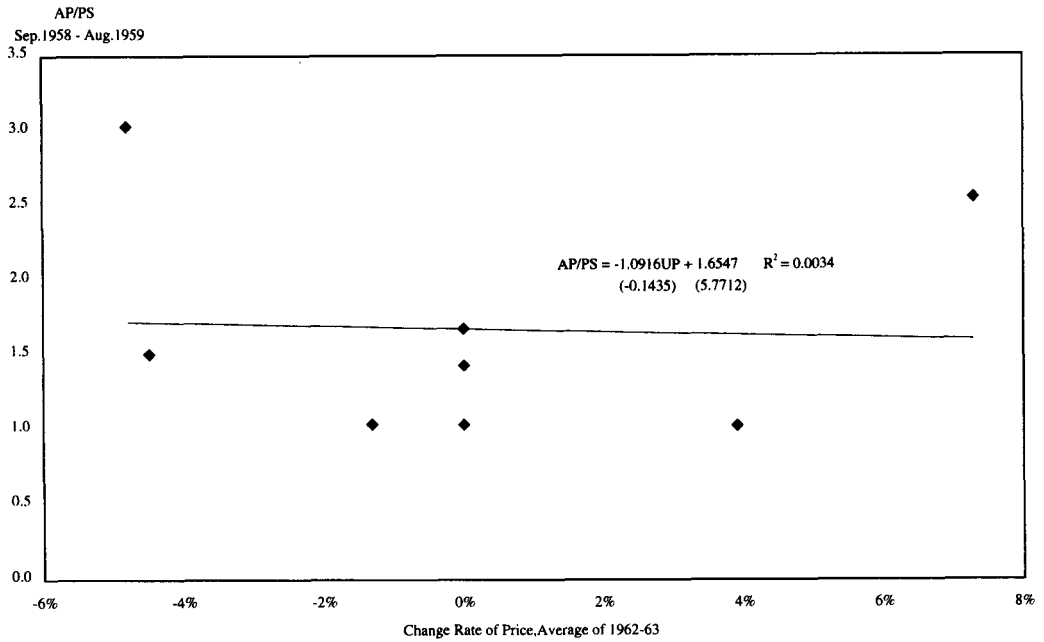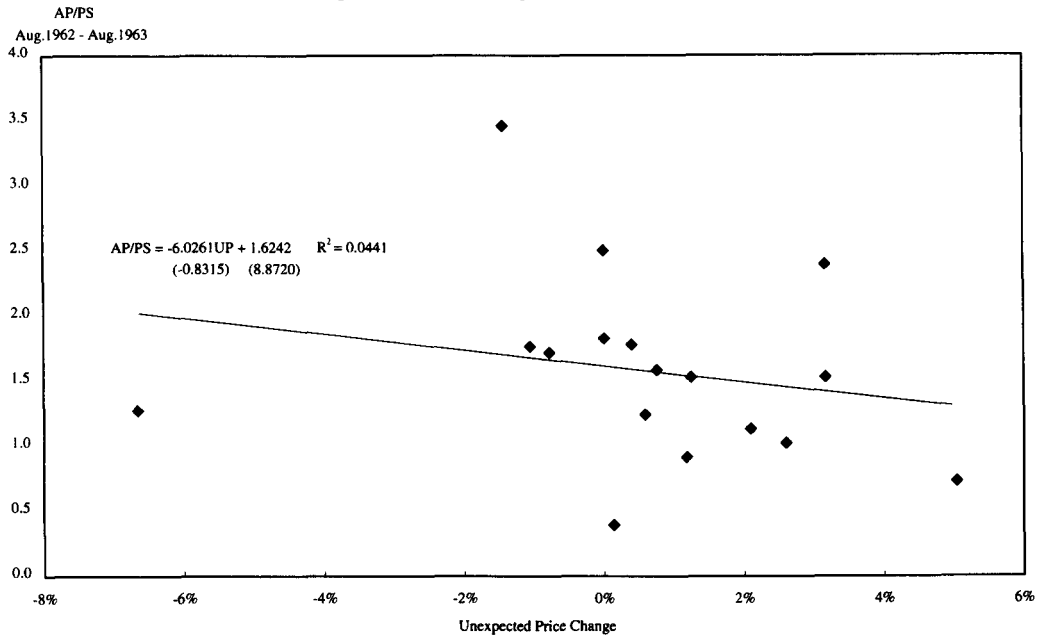**Figure 6 - (1) AP/PS and Unexpected Price Change in 1958-59**

AP/PS
Sep.1958 - Aug.1959

AP/PS = -1.0916UP + 1.6547 R^2 = 0.0034
(-0.1435)   (5.7712)

Change Rate of Price,Average of 1962-63

Figure 6 - (2) AP/PS and Unexpected Price Change in 1962-63

AP/PS
Aug.1962 - Aug.1963

AP/PS = -6.0261UP + 1.6242 R^2 = 0.0441
(-0.8315)   (8.8720)

Unexpected Price Change

among goods except scooter/motor cycle and passenger car seems to be rather unchanged during this period. TV set and bicycle were always purchased more than scheduled. Actual purchase of

Figure 7 Actual Purchase / Purchase Schedule
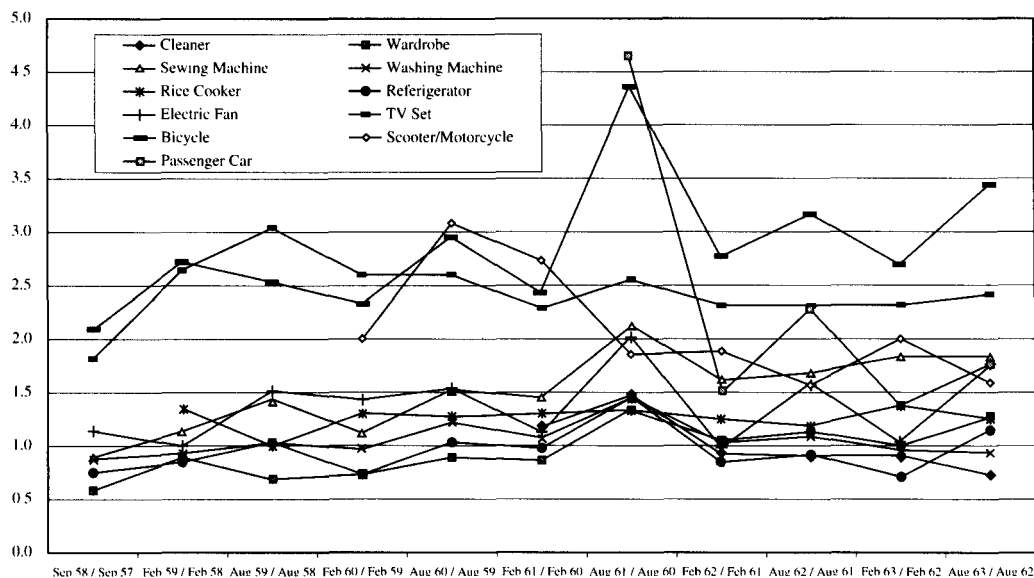
refrigerator, washing machine and wardrobe could not often reach the initial schedule. The level of AP/PS seems to be peculiar to each goods. The number of households who actually purchased TV set is annually two or three times as the number of those who had planned initially. It is natural that I could not find any significant results in the cross sectional analysis of AP/PS. These facts may reflect the style of consumer behavior in Japan's high growth period. Consumer behavior for each durables seems to have been stable through this period. People bought the goods such as TV set rather impulsively. Refrigerator and washing machine were scheduled to purchase by many households. Nevertheless, the actual purchase of such goods was often procrastinated.

Secondly, the values of all goods but rice cooker and scooter/motor cycle, indicate considerable rise in the period from August 1960 to August 1961, when UIG recorded highest. As for TV set, AP/PS was boosted in 1959[17].

The third fact is that eliminating the effect of seasonal fluctuation, the values of all goods but TV set, scooter/motor cycle and passenger car, describe upward trend until August 1961, drop in the next year, and are constant.

I also made regression analyses about eight goods. We can see the results in **Table 6.** Coefficients of all goods but TV set are positive as had been expected. Two values about washing machine and refrigerator are significant. At least the purchase of washing machine and refrigerator were considerably affected by unexpected income growth[18].

We have found that the period from August 1960 to August 1961 is remarkable. **Figure 8** shows the change rate of AP/PS in each goods and the change rate of price in the period. We could not find negative correlation of the two values among goods. It is suggested that effective demand for refrigerator be boosted by its drastic price cut-down. This period may have been cru-

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Figure 8 Change in AP/PS and Price
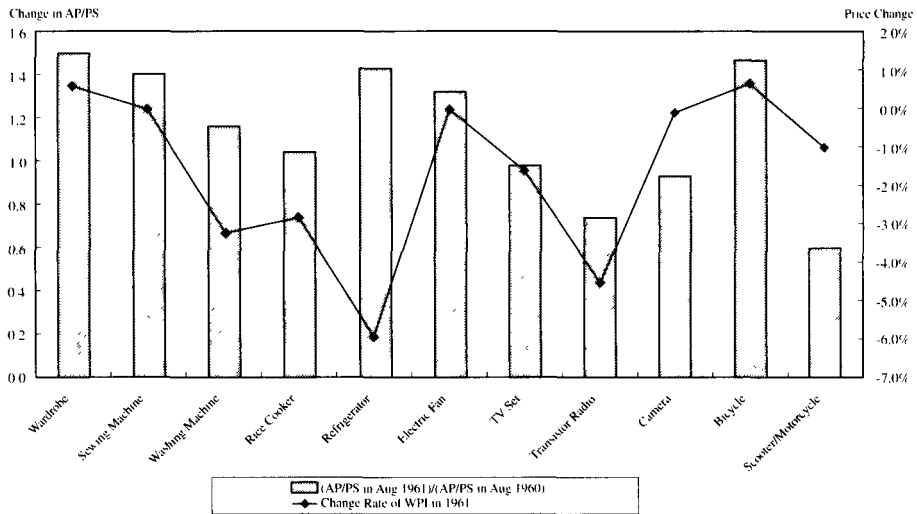
cial for the rapid diffusion of refrigerator after then.

To sum up this section, people did not always rush impulsively to the goods whose price cut-down was faster. AP/PS seems to have been peculiar to goods. The relative values of AP/PS among the goods were rather constant. AP/PS rose drastically in the period from August 1960 to August 1961, when the unexpected income growth was highest.


6. Concluding Remarks

How can we describe the history about the diffusion of consumer durables with our finding facts (**Figure** 5, 7, 9 and others)?

Take an example of TV set. TV set was an extraordinary goods in the point the AP/PS was always high. The crucial period for the rapid diffusion of TV set seems to be the year 1959. TV sets were purchased impulsively more than before. It may be because the price of TV set was falling drastically or unusual event such as 'prince wedding' was held. Therefore, actual pur-chase of TV set increased rapidly. Then, people who did not possess TV set came to have strong preference for TV set, because of 'demonstration effects' . Promising prospect for the future income also accelerated this movement. Actual income growth realized the latent demand, then. In that way, the upward spiral for TV set was created in 1959.

The process about refrigerator was different. Many households came to prefer refrigerator as the prospect for income growth was getting better in the late 1950s. It may be caused also by the fall of relative price, though I could find no firm evidence. Nevertheless, the schedule did not often achieved. It may be because TV set was given priority. Most households preferred the goods
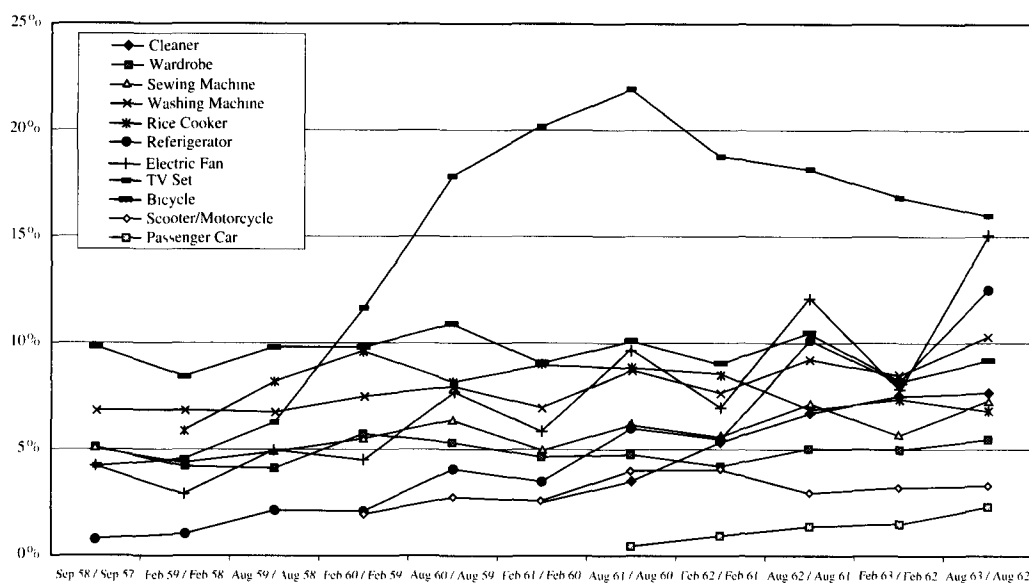
that had been popularized rapidly. Unexpected income growth in the period from 1960 to 1961 changed the situation around refrigerator. Much more households purchased refrigerator than scheduled. Drastic price cut-down also may have contributed to the boom. Then the diffusion rate was considerably raised. Preference to refrigerator was intensified by 'demonstration effects' and by the most promising prospect for the future income growth in 1961. The new upward spiral began then. The rate of achievement to initial schedule about refrigerator declined after this booming period. However, the preference for refrigerator had been considerably intensified. The upward spiral could not stop. Cleaner, electric fan or washing machine seems to have followed a similar process.

In that way, electric appliances were diffused rapidly one by one in Japan's high growth period.

At the closing of this study, I would like to emphasize four points regarding the diffusion of consumer durables. First is that 'income growth' in a narrow sense did not necessarily play a major role in the diffusion of electric household appliances, especially TV set and rice cooker. Second is that consumers preferred to the goods which had been diffused more rapidly than others in those days. It is important from the long-term perspective. Third is that most households had promising prospect for the future income growth from 1959 to 1962. As a result, the latent demand for such goods as TV set, refrigerator, electric fan was raised. It is important from the mid-term perspective. Forth is that unexpected income growth in the period from 1960 to 1961 boosted effective demand for almost all kinds of electric appliances, especially refrigerator and electric fan. It is important from the short-time perspective. The background of the above second to fourth points, further examination regarding price change, and the difference of consumer

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behavior among income class are left for another study.

1 R. Boyer [1990] "The Regulation School: A Critical Introduction", Columbia University Press. The main concern of 'Regulation' school seems to be the relationship between management and workers, which affected income distribution and production system.

2 An excellent overview about the diffusion of consumer durables is shown in H. Yoshikawa[1995] "Macroeconomics and the Japanese Economy," Oxford University Press

3 After Sept. 1958, this survey was called "Survey of Prospect for Consumer Behavior (Shohisha Doko Yosoku Chosa)". The data in this study is obtained from Survey of prospect for consumption demand (Shohi Juyo Yosoku Chosa) insofar as I do not make a special remark.

4 Retail price data is obtained from EPS [1960] "White Paper on National Lifestyle (Kokumin Seikatsu Hakusho) p121, Dempa Publications Co. [1963] "Electronics Industry Yearbook (Denshi Kogyo Nenkan)" and 'Monthly Report on the Retail Price Survey' (Kouri Bukka Tokei Chosa Hokoku)' by Bureau of Statistics, Office of the Prime Minister. Earnings are the data of 'Household Survey (Kakei Chosa)'.

5 There are some problems in the procedure of calculating DI. In the SPCD, there are two figures about the diffusion rates by income class. Take an example of TV set, one is the percentage of the number of households who possess one set of TV. The other rate is about the households possessing two or more sets of TV. There is no available data about whether households have two, three or more sets. Then we must estimate about that. However, we do not have convincing way for the estimation. Therefore, I supposed there is no households who have three or more sets. This supposition is not always exceptional. The average percentage of the number of households who have two or more sets of TV is only 0.1% in February 1958. The percentage about the highest income class is 1.5%. The average percentage in refrigerator is lower than TV set and the percentage in bicycle is higher. Then we may underestimate DI about some goods. The percentage about two-or-more-sets owner is higher in later years in almost all goods. For example, the average percentage of TV set is 6.5% and the figure about highest income class is 32.2% in August 1963. The degree of underestimation is probably larger in 1963 than in 1958.

 We must take care about the quality of goods, too. DI is correct value only if the all products in each goods have the same quality. It is, however, strong presumption. Households in the higher income class may have possessed high-quality goods. For example, most people bought a 14-inch-TV set, but some rich family could purchase larger one. In this point, we may be underestimating, too. It is difficult to predict whether we may underestimate more or less in the later years than in the earlier years. As for TV set, 96% of the production are 14-inch sets in 1958. In 1963 the share of 12 or smaller inch-sets, 14 to 16 inch sets, and 17 to 19 inch sets are 20%, 68%, and 11% respectively. People could also get color TV sets then. Households in higher income class may have preferred bigger TV sets or smaller for their second purchase. Accordingly, we cannot predict correctly only with these data. However, if we take it into consideration that high-quality goods appeared one after another in those days, the degree of

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underestimation in later years may be higher.

6 Economic Planning Agency [1963] "White Paper on the National Lifestyle" (Kokumin Seikatsu Hakusho) referred 'the improvement and equalization of consumer activity'.

7 Precisely CDI is the value for the effect of the change in income distribution. During this period, however, income of most households was growing rapidly. If the diffusion rate in each income class had been determined by the income level at the initial time, we can consider CDI as the effect of income growth.

8 We can consider that increase in the diffusion rate paralleled the increase in sales of each goods in the period of diffusion. Once diffused widely, we cannot estimate in such a way because there is much demand for renewal or second one.

9 In the reverse case, we may overestimate. However, in the period of rapid growth, underestimation is more possible.

10 The highest class defined as \1,400,000 or more from 1961. Considerable number of households belonged to lowest two classes especially in the late 1950s.

11 Price data in this figure are quoted from the WPI which is measured by EPA in 1958/59 or Bank of Japan (BOJ) in 1962/63. We have little retail-price data on the same basis. Accordingly, our analysis with price is limited. It is difficult to make a meaningful regression analysis due to scarcity of the data.

12 As for TV set and refrigerator, each of which sold at approximately the same price. We may say the following. The price cut-down of TV was more drastic than that of refrigerator in the later 1950s. The price cut-down of refrigerator was more rapid than that of TV set in the early 1960s. Consequently, TV sets were diffused rapidly in the late 1950s and refrigerator did so in the early 1960s. We could also explain the fact from the viewpoint of the preference for each goods. Anyway, we do not have sufficient evidence of data.

13 AP is supposed to be in proportion with increase of the diffusion rate ($H2 - H1$). Increase in the diffusion rates is not always identical to AP in SPCD. Possible reason is retirement of goods, grant free, etc.

14 We can obtain the data of PS and AP about every income class. Consumer behavior may have been different by income class. However, it is impossible to calculate AP/PS of every income class because the income distribution changes during the period. In this study, I will take the behavior of 'average consumer'.

15 'Demonstration effects' is that people are inclined to desire for the kind of goods which other people possess.

16 I also made multiple regression analyses regarding AP/PS and PS, unexpected price changes. I could not find any significant results, however.

17 The boost of AP/PS in TV set may be the result of the 'Prince Wedding' boom.

18 I made a time series analysis of AP/PS and unexpected price change. However, I could not find significant results as the cross sectional analysis.