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## **Recent Developments in Electronic Money in Japan (2012)**

Payment and Settlement Systems Department  
Bank of Japan

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## **Recent Developments in Electronic Money in Japan (2012)**

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### **Abstract**

The total numbers of cards issued and terminals for electronic money continue increasing in Japan. Although the rates of increase have slowed somewhat compared to a while ago, they still remain at high levels. While the environment for the use of electronic money expands in this manner, the growth of value and volume of transactions settled using electronic money has recently accelerated slightly. The value and volume of transactions settled per card have continued their moderate growth, and combined with the increase in the number of cards issued, contribute to the increases in the total value and volume of transactions settled.

The results of a recent opinion survey in Japan suggest that electronic money is being increasingly used as a settlement instrument for relatively small-value payments. However, the degree of diffusion varies (1) not only in the range of payment values, but also by (2) region, (3) age and (4) households. One of the characteristics is that especially in payments of JPY 1,000 or less, marked differences are observed among the regions. This possibly reflects differences in (a) the environment for the use of electronic money by region and (b) the availability of opportunities for using electronic money by age group. Despite these differences, on the whole, it would be safe to assume that electronic money is being increasingly used as a convenient retail payment instrument in Japan.

## **Introduction**

As a part of its studies on payment systems, the Bank of Japan has been releasing a report on developments in electronic money in Japan since 2008. This report consists of two parts. Part 1 analyzes the developments in electronic money based on figures obtained from major domestic electronic money service providers. Part 2 analyzes the data on the choice of payment instruments based on the results of an opinion survey covering households' financial behavior conducted by the Central Council for Financial Services Information in Japan.

## **I. Recent Developments in Electronic Money in Japan**

### **A. Electronic Money Covered by This Study**

There are many types of electronic retail payment instruments.<sup>1</sup> Among them, "electronic money" generally refers to a stored-value or prepaid electronic payment instrument, which requires users to "load" a certain value before use (prepaid type). Among all prepaid types, the object of this study is the IC chip-based type.<sup>2</sup> Specifically, this study covers eight brands of electronic money provided by three types of issuers, which are electronic money service providers (Rakuten Edy), public transportation companies, such as railway companies, (ICOCA, Kitaca, PASMO, SUGOCA and Suica) and distribution companies, such as retail companies, (nanaco and WAON). This study covers the period through June 2012.<sup>3</sup>

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<sup>1</sup> Globally, a number of innovative developments in retail payments have emerged. For a report on studies on this situation, see Box 1.

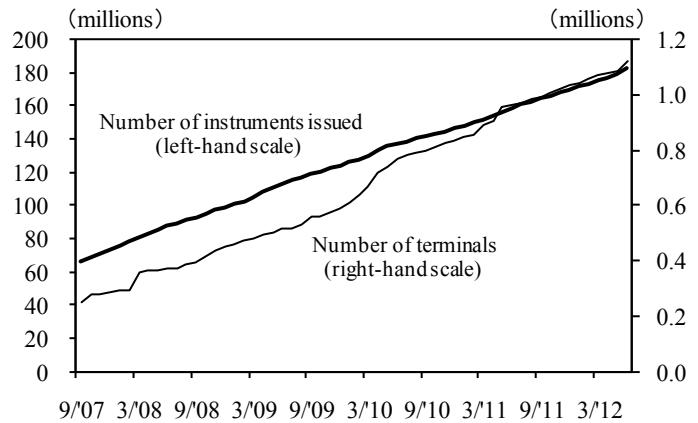
<sup>2</sup> In addition to the IC chip-based electronic money, in which the value is recorded on the integrated circuit (IC) chip embedded in devices, such as plastic cards and mobile phones, there is a server-based type that does not require physical cards. Designed for use on the Internet, value is recorded and managed centrally on the computer server of an electronic money service provider. Although it is not covered by the definition of "electronic money" adopted in this study, there is also post-pay electronic money, which uses credit functionality (post-pay type). As in the case of prepaid IC chip-based electronic money, IC chip-based contactless type of post-pay electronic money does not require signature of the user and allows speedy payments. Its use is spreading as it is installed in mobile phones.

<sup>3</sup> The figures are obtained by the Bank of Japan. Transaction value and volume reported by public transportation companies do not include those for fare collections. When monthly figures are not available, linear interpolation or previous value imputation is used.

## B. Number of Instruments Issued and Terminals

The number of electronic money instruments issued has continued increasing and reached 182.17 million in June 2012 (Chart 1, monthly figures are shown in appendix). Although the rate of increase has slowed somewhat compared to a while ago, at present, it still stands at around 15 percent year-on-year (the year-on-year rate of increase: 21 percent as of June 2010, 16 percent as of June 2011 and 15 percent as of June 2012).

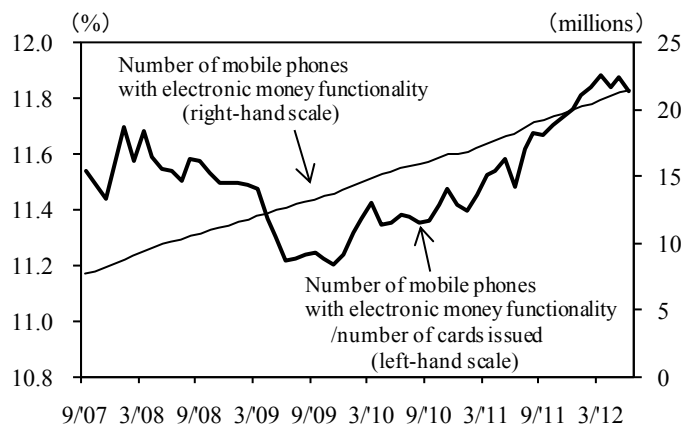
**Chart 1 Number of Instruments and Terminals**



The number of terminals has also continued increasing. After hitting the 1-million mark in October 2011, it reached 1.11 million in June 2012. The year-on-year rate of increase is still high in the mid-10s percent range, but has slowed from the previous survey period, at which time it stood in the mid-20s percent range (the year-on-year rate of increase: 25 percent as of June 2011 and 16 percent as of June 2012). In fiscal 2011, the increase in the number of terminals operating at outlets outside of the premises of railway stations for cards issued by public transportation companies had a large impact on the increase in the number of terminals, but this trend appears to have come to a pause.

Among all types of electronic money issued, the number of mobile phones that can record and store electronic money value (hereafter, mobile phones with electronic money functionality) has continued increasing and their share in total electronic money also shows an upward trend (Chart 2).

**Chart 2 Number of Mobile Phones with Electronic Money Functionality**



### C. Value and Volume of Transactions

Both the value and volume of transactions settled using electronic money have continued increasing.

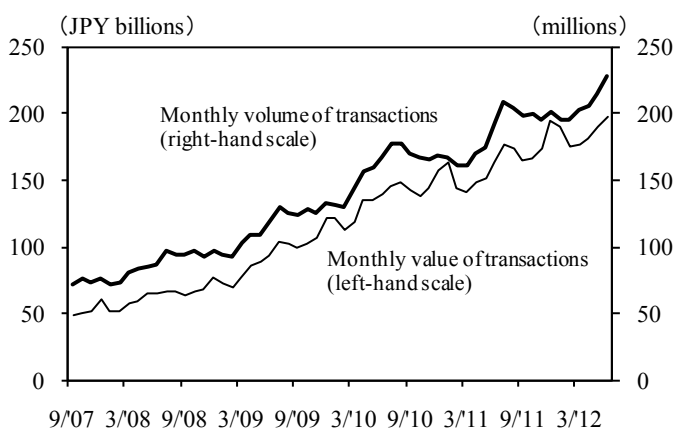
In June 2012, the monthly value and volume of transactions settled reached JPY 198.1 billion and 227 million, respectively (Chart 3).

The rates of increase of both the value and volume of transactions settled slowed somewhat at the beginning of fiscal 2011, but more

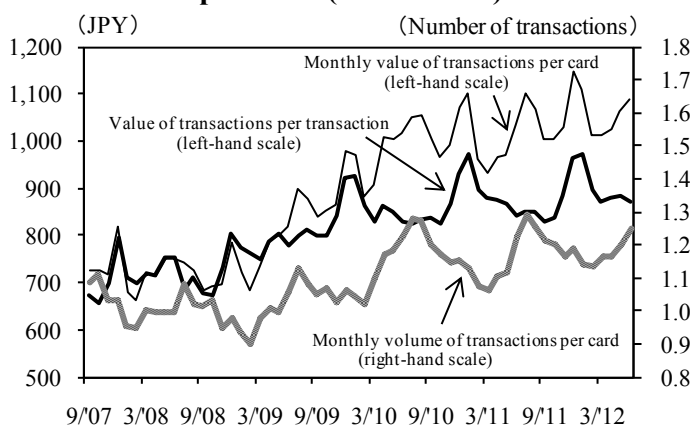
recently, the pace of growth has increased somewhat (the year-on-year rate of increase in the value of transactions settled: 50 percent as of June 2010, 11 percent as of April 2011 and 21 percent as of June 2012. The year-on-year rate of increase in the volume of transactions settled: 41 percent as of June 2010, 9 percent as of April 2011 and 17 percent as of June 2012). Although this trend can be observed for all electronic money service providers, the increases in the value and volume of transactions settled for electronic money provided by retail companies stand out.

The value of transactions settled per transaction has remained more or less stable, albeit certain seasonal fluctuations are observed (Chart 4). Seasonal fluctuations can be chiefly attributed to electronic money provided by retail companies. It is possible that the increase in retail sales at the end and the beginning of the year contributes to the seasonal spikes. Meanwhile, monthly value and volume of transactions settled per card have continued increasing moderately, albeit similar fluctuations are observed. At present, they stand at around JPY

**Chart 3 Value and Volume of Transactions**



**Chart 4 Value and Volume of Transactions per Card (Transaction)**



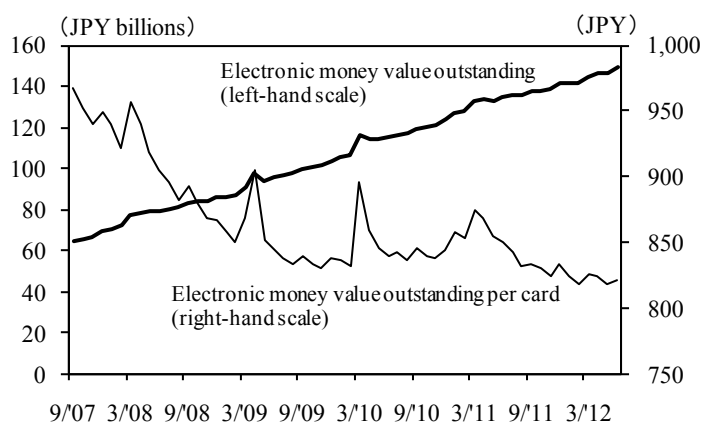
1,100 and 1.2 transactions, respectively. Since some electronic money issued is not likely to be used often, when these cards are excluded and the value and volume of transactions settled per card of only those cards which are used frequently (i.e., "active cards") are calculated, they would be higher than the levels shown in Chart 4 (Box 2).

#### D. Electronic Money Value Outstanding

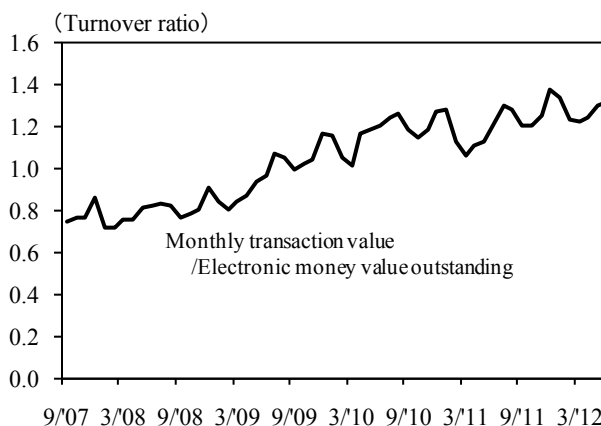
The value of electronic money outstanding (the value stored in cards) has continued increasing and reached JPY 149.7 billion in June 2012 (Chart 5). On the other hand, the value of electronic money outstanding per card has followed a moderate downward trend.<sup>4</sup>

The rate of turnover, obtained by dividing the monthly value of transactions settled by the value of electronic money outstanding, has continued rising moderately due also to the increase in the monthly volume of transactions settled (Chart 6).

**Chart 5 Electronic Money Value Outstanding**



**Chart 6 Turnover Ratio**



<sup>4</sup> Based on the analysis in Box 2, the level of value of electronic money outstanding per active card only can be estimated to be higher than that shown in Chart 5.

## Box 1 Innovations in retail payments: from the report by the Committee on Payment and Settlement Systems, Bank for International Settlements

The Committee on Payment and Settlement Systems (CPSS), Bank for International Settlements (BIS), summarizes innovative retail payment services from around the world in its report, *Innovations in Retail Payments*,<sup>(note)</sup> released in May 2012, in which it also analyzes the factors for the success of such innovations.

The report introduces 122 innovative services reported from the world's central banks, including (1) M-PESA (Kenya, etc.) and (2) iDEAL (the Netherlands), which use mobile phones or the Internet. Both services are now in wide use in their respective countries (See Table 1 below).

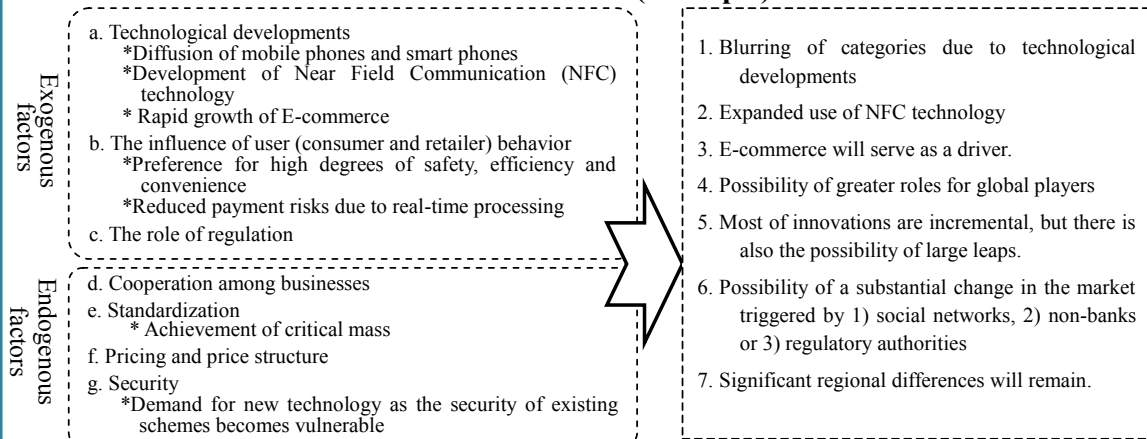
Based on the reported examples, the report also analyzes (1) exogenous factors (external environment surrounding payment services) and (2) endogenous factors (efforts by payment service providers) that could drive the diffusion of such services. Based on the analysis, it presents pointers as to what can be expected over the next five years (See Table 2 below).

Note: This report can be accessed at BIS Website: <http://bis.org/publ/cpss102.htm>. A provisional Japanese translation of its abstract can be found at the Bank of Japan Website: [http://www.boj.or.jp/announcements/release\\_2012/re1120530a.htm/](http://www.boj.or.jp/announcements/release_2012/re1120530a.htm/)

**Table 1 Examples of innovative services**

| (1) M-PESA  | (2) iDEAL  |
|---|--|
| <ul style="list-style-type: none"> <li>• Outline<br/>This is a small-value retail payment service using mobile phones. It offers basic financial services, such as funds transfers and loan receipts and repayments, without the need for holding a bank account, to the unbanked poor or customers in underbanked areas.</li> <li>• Factors for its success<br/>The presence of mobile phone service areas, which are greater than the areas covered by bank networks, etc.</li> </ul> | <ul style="list-style-type: none"> <li>• Outline<br/>This is a bank account-based real-time online payment solution for online purchases.</li> <li>• Factors for its success<br/>As all the major banks in the Netherlands participated in the service, it was able to achieve a critical mass. Its familiarity, safety and ease of use for payers and the immediate payment confirmation and guarantee for payees are reasons for its success.</li> </ul> |

**Table 2 Drivers for and barriers to retail payment innovations and future outlook (Excerpts)**



Source: CPSS, BIS, *Innovations in Retail Payments* (2012).

## Box 2 "Monthly value of transactions per card" based on the operating rate of electronic money cards

Chart 4 shows that monthly value and volume of transactions per card are JPY 1,100 and 1.2 transactions, respectively. However, it is assumed that there are cards which are used with a high frequency (hereafter to be referred to as "active cards") and those which are not. Therefore, it is likely that monthly value of transactions per card calculated based on the total number of cards does not accurately reflect the actual use of electronic money.

Assuming that active cards are those "which are used at least once a month," the monthly value of transactions per active card was estimated. The estimation method is to obtain the number of active cards by "dividing the monthly volume of transactions by average monthly volume of transactions per card"<sup>(note)</sup> and to divide the total value of transactions by this figure.

Monthly value of transactions per active card obtained in this manner shows that it is as high as about JPY 5,000 (Chart below). As this figure is based on a certain hypothesis, some allowances need to be made, but it suggests that the monthly value of transactions per active card is considerably higher than the monthly value of transactions per card based on all cards.

Note: In making the estimation, findings in *Denshi Mane no Riyo Jittai to Saishin Doko—Denshi Mane ni Kansuru Anketo Chosa Dai 4 Kai—*(August 2010) [The Present Status of the Use of Electronic Money and Recent Developments – The Fourth Questionnaire Survey on Electronic Money (August 2010)] by Nomura Research Institute were used. The findings are that 1) approximately 60 percent of holders of electronic money own only one card, which they use frequently, while the remaining approximately 40 percent of holders own two or more cards, and 2) the most frequently used card is used for about seven transactions per month, while the second most frequently used card is used for about four transactions per month. Based on these findings, in order to obtain the monthly volume of transactions per active card, the writers have assumed, among others, that 1) 60 percent of the users of electronic money own only one card, which they use frequently, while the remaining 40 percent own two electronic money cards, and 2) the monthly volume of transactions is constant (the most frequently used card is used for seven transactions per month, while the second card is used for four transactions per month). The monthly volume and value of transactions used here are the averages for the present survey period (from July 2011 through June 2012)

### Estimation method

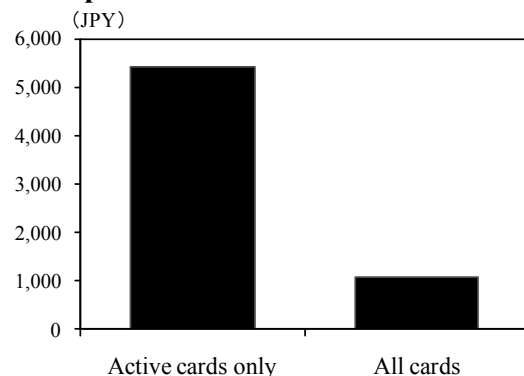
#### Number of active cards

$$= \frac{\text{Total monthly volume of transactions}}{\text{Average monthly volume of transactions per card}}$$

#### Monthly value of transactions per active card

$$= \frac{\text{Total monthly value of transactions}}{\text{Number of active cards}}$$

### Monthly value of transactions per active card





## II. Analysis of an Opinion Survey on Retail Payment Instruments in Japan

### A. Payment Instruments by the Range of Payment Values

The following is an outline of the trends in developments in electronic money from the viewpoint of users obtained from the results of the *Public Opinion Survey on Household Financial Assets and Liabilities* taken by the Central Council for Financial Services Information in Japan. This survey covers a wide range of subjects concerning financial behaviors of households. It asks which payment instruments are used mainly for ordinary expenses for each range of payment values.<sup>5</sup> The answers are to be chosen from the four alternatives of "cash," "credit cards," "electronic money,"<sup>6</sup> and "others."<sup>7</sup>

The aggregate results<sup>8</sup> for "households with at least two persons" show that the use of electronic money as a payment instrument is spreading for relatively small-value payments<sup>9</sup> (Chart 7). In payments of JPY 1,000 or less, the percentage of the use of electronic money is higher than that of the use of credit cards, and the difference between the two is growing. In payments of JPY 1,000 – JPY 5,000, although the increase in the percentage of the use of electronic money has slowed somewhat recently, the percentage of the use of electronic money is equivalent to as much as about 30 percent of that of the use of credit cards. On the other hand, in payments of JPY 5,000 – JPY 10,000, the increase in the percentage of the use of electronic money has been decelerating and the percentage of the use of

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<sup>5</sup> The specific question asked is: "For ordinary expenses (such as shopping), which payment instruments do you use for different values of payment? Please choose the instruments which are used frequently for each range of payment values (choose up to two answers)." The five ranges of payment values are "JPY 1,000 or less," "more than JPY 1,000 up to JPY 5,000," "more than JPY 5,000 up to JPY 10,000," "more than JPY 10,000 up to JPY 50,000" and "more than JPY 50,000."

<sup>6</sup> The "electronic money" here includes debit cards, although they are often used for large values of payment per transaction. [According to the *J-Debit Torihiki Jisseki Houkoku* (Report on Actual J-Debit Transactions) (July 2012) by Japan-Debit Card Promotion Association, the value of payment per transaction using debit-cards is approximately JPY 40,000.] Therefore, it is assumed that the results of the above survey for payments of JPY 10,000 or less primarily reflect the use of electronic money.

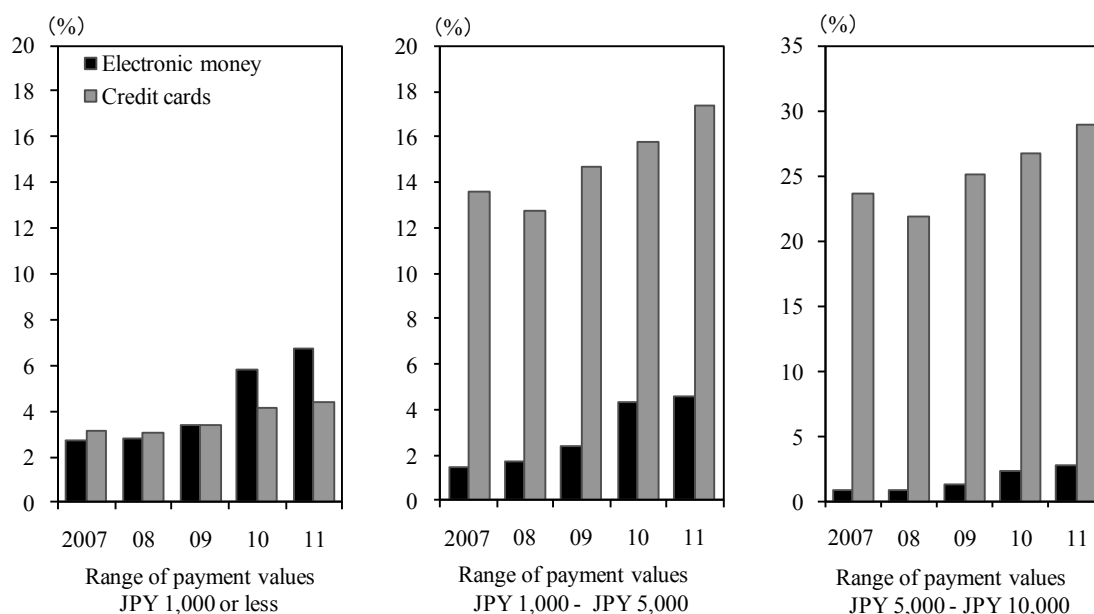
<sup>7</sup> In this paper, the results for "cash" and "others" are omitted from the Charts.

<sup>8</sup> Hereafter, the denominators for obtaining the percentages of the use of payment instruments exclude non-respondents.

<sup>9</sup> As a reference, the percentages of the respondents who chose "cash" to the question the answers to which are shown in Chart 7 (2011) for payments of JPY 1,000 or less, more than JPY 1,000 up to JPY 5,000 and more than JPY 5,000 up to JPY 10,000 were 98 percent, 92 percent and 84 percent, respectively. The percentages of the use of cash for retail payment settlements remain high.

electronic money is equivalent to less than 10 percent of that of credit cards.

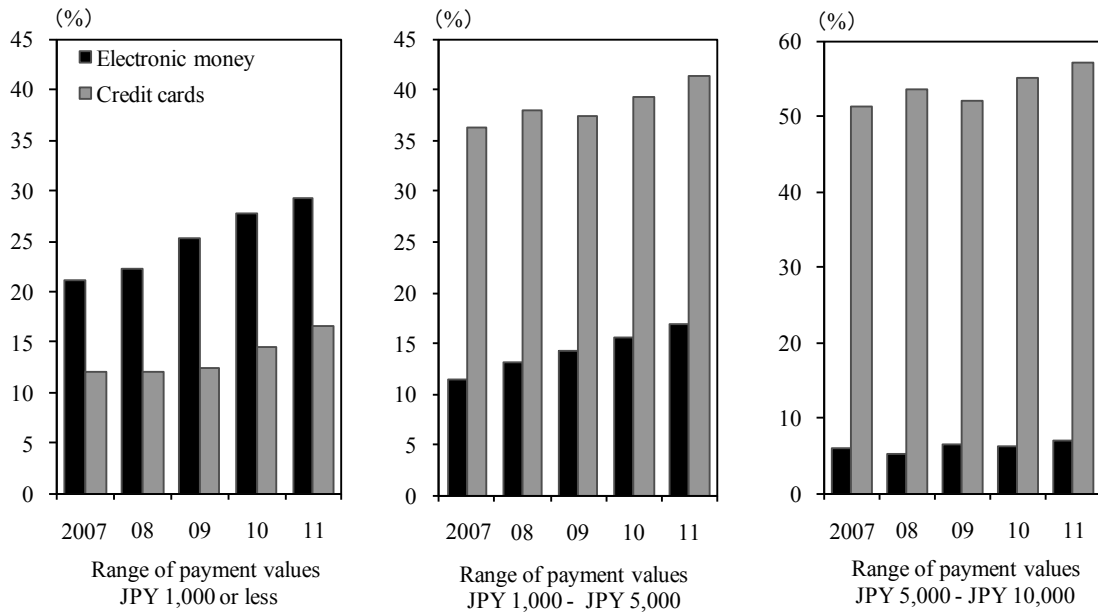
**Chart 7 Payment Instruments for Ordinary Expenditures  
(Households with at least Two Persons)**



These trends are also observable in the aggregate results covering "single-person households"<sup>10</sup> (Chart 8). In payments of JPY 1,000 or less, electronic money is chosen far more frequently than credit cards. In payments of JPY 1,000 – JPY 5,000, the percentage of the use of electronic money is equivalent to about 40 percent of that of credit cards. On the other hand, in payments of JPY 5,000 – JPY 10,000, the percentage of the use of electronic money is only about 10 percent of the percentage of the use of credit cards.

<sup>10</sup> The aggregate results obtained from the survey centering on "single-person households" show that in every range of payment values, the percentage of the use of electronic money is higher than that for "households with at least two persons." This is attributed partly to the difference in the survey methods, which resulted in a larger representation of those who are likely to use electronic money in the "single-person households" survey. Specifically, while the survey covering "households with at least two persons" was conducted by "the combination of or selection between interviews and postal mail" for delivering and recovering questionnaires, the "single-person households" survey was conducted using an Internet monitor survey. Since the latter requires the two steps of 1) using the Internet and 2) responding to the invitation to become a monitor, it should be noted that a sampling bias exists.

**Chart 8 Payment Instruments for Ordinary Expenditures  
(Single-person Households)**



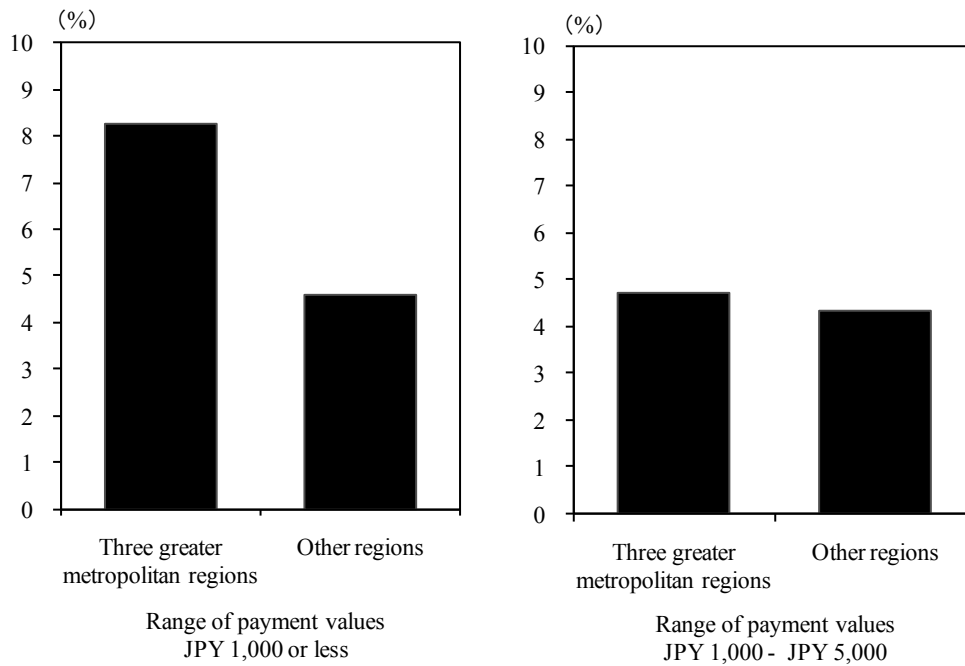
**B. Percentage of the Use of Electronic Money by Region and Age of Respondents**

The results of the *Public Opinion Survey on Household Financial Assets and Liabilities* also allow an analysis of the responses on the choice of the payment instruments for each range of payment values by the attributes of the respondents. The following is a summary of such an analysis for the payment value categories of JPY 1,000 or less and JPY 1,000 – JPY 5,000. Unless specified otherwise, this analysis covers only "households with at least two persons."

An analysis of the percentage of use of electronic money by region<sup>11</sup> shows that in payments of JPY 1,000 or less, there is a distinct difference between the three greater metropolitan regions and other regions. By contrast, in payments of JPY 1,000 – JPY 5,000, the percentages are about the same (Chart 9).

<sup>11</sup> The regions are classified into 1) the three greater metropolitan regions (Kanto [including Tokyo and Yokohama], Chubu [including Nagoya], and Kinki [including Osaka, Kyoto and Kobe]) and 2) other regions (Hokkaido, Tohoku, Hokuriku, Chugoku, Shikoku and Kyushu).

**Chart 9 Percentage of Use of Electronic Money by Region  
(Households with at least Two Persons)**



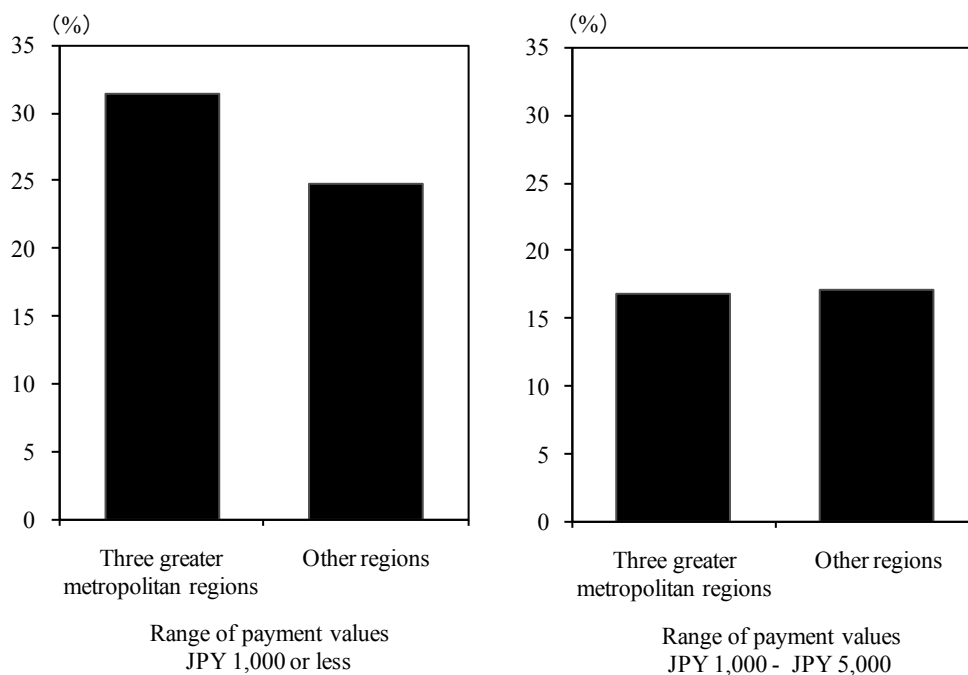
It could be assumed that these results reflect the differences in the availability of opportunities for using electronic money and also the differences in demographic composition. With respect to the availability of opportunities for using electronic money, large supermarkets and other large-scale stores, where payments are likely to be mostly for payments of JPY 1,000 – JPY 5,000, have increasingly been equipped for the use of electronic money in many regions. On the other hand, convenience stores and stores on the premises of railway stations, where most of the payments are likely to be in the range of JPY 1,000 or less, appear to have made more progress in offering an environment for the use of electronic money in greater metropolitan regions rather than other regions so far.<sup>12,13</sup>

<sup>12</sup> *Survey of Household Economy* (August 2012) by the Ministry of Internal Affairs and Communications (MIC) in Japan reports in its section on the analysis of the use of electronic money by region and the class of cities and the venues where the frequency of the use of electronic money was the highest (households with at least two persons) that in the three greater metropolitan regions centering on Kanto, Tokai and Kinki, the ratio of the use of electronic money was high at public transportation facilities, while in other regions, the ratio was high at supermarkets.

<sup>13</sup> "The value of transaction settled per transaction by type of electronic money" in *Denshi mane no Riyo Jittai to Saishin Doko – Denshi mane ni Kansuru Anketo Chosa Dai 4 Kai* – (August 2010) [The Present Status of the Use of Electronic Money and Recent Developments – The Fourth Questionnaire Survey on Electronic Money (August 2010)] (No English version available) by Nomura Research Institute reports that the majority of payments made by forms of electronic money provided by retail companies are for JPY 1,000 or more, while for other types of electronic money, the majority of payments made are for JPY 1,000 or less. Also, it found that principal opportunities

An examination of aggregate results for "single-person households," which show a high percentage of the use of electronic money, confirms the presence of a similar trend (Chart 10).

**Chart 10 Percentage of Use of Electronic Money by Region (Single-person Households)**



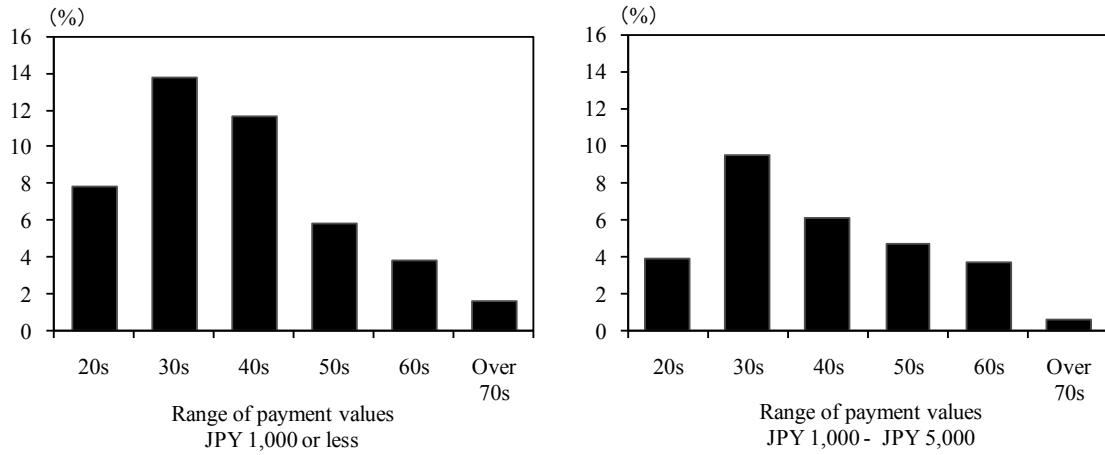
An analysis of the age<sup>14</sup> of respondents shows that the percentage of the use of electronic money is highest for those who are in their 30s regardless of the range of payment values. The percentage then declines for those in their 40s and those in their 50s in this order (Chart 11). In payments of JPY 1,000 or less, the difference by age group is relatively large compared with that for payments of JPY 1,000 – JPY 5,000. As described earlier, the typical opportunity for the use of electronic money for payments of JPY 1,000 or less is found in stores on the premises of railway stations, where people pass while commuting to school or work, or in convenience stores. The difference in behavior by age group could be attributed to this situation.

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for using electronic money provided by public transportation companies are in convenience stores and outlets on the premises of railway stations, where most of the payments are for relatively small values.

<sup>14</sup> The age of the head of household at the time of responding to the survey.

**Chart 11 Percentage of Use of Electronic Money by Age of Respondent**

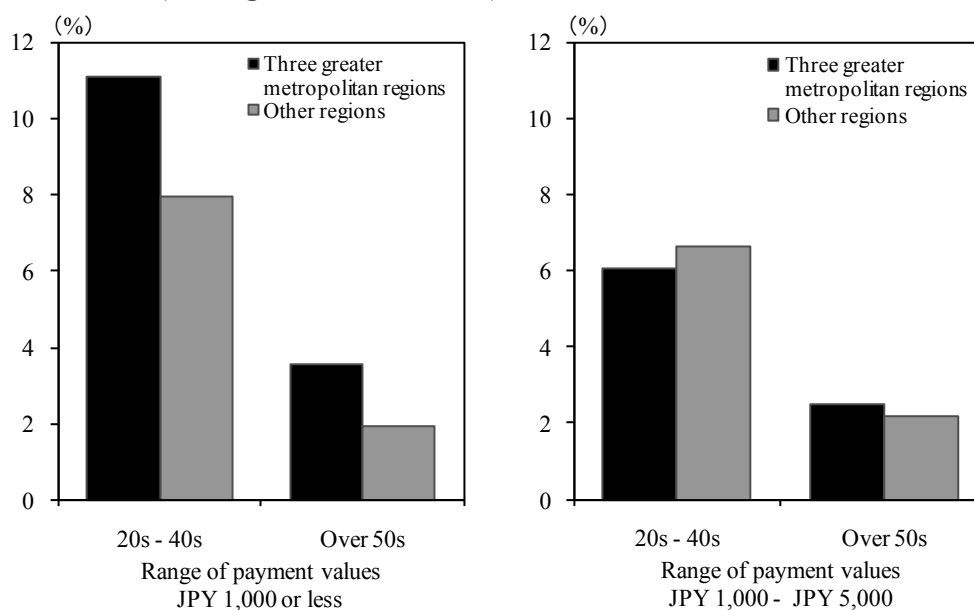


The question is whether the regional differences shown in Charts 9 and 10 can be wholly explained by the difference in the age composition of electronic money users shown in Chart 11, or whether other factors are also impacting the results, such as the aforementioned assumption concerning the difference in the availability of opportunities for the use of electronic money. Chart 12 shows the percentage of electronic money users for four categories of respondents classified by region and age: 1) those in their 20s through their 40s in the three greater metropolitan regions, 2) those in their 50s or older in the three greater metropolitan regions, 3) those in their 20s through their 40s in other regions and 4) those in their 50s or older in other regions.<sup>15</sup> In payments of JPY 1,000 or less, there are differences between the three greater metropolitan regions and other regions in both age groups. On the other hand, in payments of JPY 1,000 – JPY 5,000, there is little difference between the regions when the same age groups are compared. This shows that even when the impact of the difference in the age composition of electronic money users is excluded, differences persist in percentages of the use of electronic money by region and by age for payments of JPY 1,000 or less.

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<sup>15</sup> In Chart 12, averages for the past three years (2009 – 2011) are used because yearly figures fluctuate widely due to the small numbers of samples for obtaining percentages by payment value range and by age group.

**Chart 12 Percentage of Use of Electronic Money by Region and by Age (Averages for 2009 – 2011)**



Thus, the characteristics of the diffusion of the use of electronic money in Japan are that 1) electronic money is being increasingly used centering on payments of relatively small value transactions, 2) in payments of JPY 1,000 or less, it is likely that the environment for the use of electronic money varies by region, and 3) the use of electronic money is relatively limited among the elderly. Despite these differences, on the whole, electronic money is being increasingly used as a convenient retail payment instrument.<sup>16</sup>

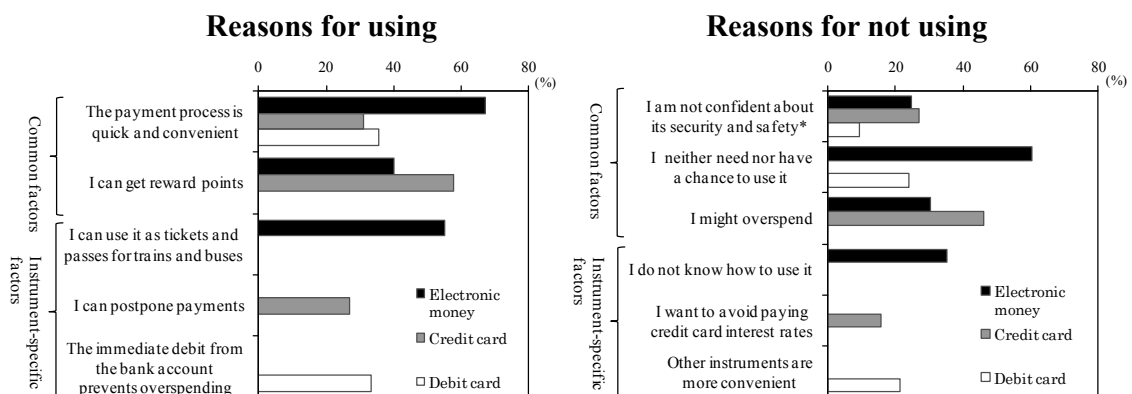
<sup>16</sup> *The Opinion Survey on the General Public's Views and Behavior* by the Bank of Japan includes questions on the factors in choosing settlement instruments for retail payments. Its outline is presented in Box 3.

### Box 3 Factors in the choice of retail payment instruments

The major retail payment instruments, in addition to electronic money, are credit cards and debit cards. Based on the Bank of Japan's *Opinion Survey on the General Public's Views and Behavior*,<sup>(note)</sup> this box attempts to provide insights into what is behind the users' behavior in selecting electronic money, comparing the reasons for the choice of the above three instruments. The relevant surveys ask "the reasons for using" and "the reasons for not using" a particular instrument, asking the respondents to choose all applicable answers. This box focuses on the responses to these questions.

As the reasons for using them, many respondents chose answers related to convenience, such as: "Because the payment process is quick and convenient," for all of the above payment instruments. Also, many chose the response: "Because of the rewards offered, such as reward points" as the reason for using credit cards and electronic money. On the other hand, many responses were peculiar to a particular payment instrument, suggesting that they reflect the instrument's characteristics. For electronic money, the answers for using it included "Because I can also use it in lieu of tickets and passes for trains and buses."

"The reasons for not using" included worries about safety, such as the response "Because I am not confident about its safety and security." This factor was cited for all instruments. For electronic money and debit cards, many responses were related to the environment for their use, such as: "Because I neither need nor have a chance to use it." For electronic money, many respondents chose: "Because I do not know how to use it," suggesting that the respondents' knowledge, or the lack thereof, influenced their choice.



\*For "electronic money," the percentage of respondents who replied, "Not confident about the safety of the e-money system."  
 Source: Public Relations Department, Bank of Japan, *Opinion Survey on the General Public's Views and Behavior*.



These findings suggest that there are certain common factors for selecting payment instruments, such as convenience and safety, and certain instrument-specific factors which reflect the characteristics of each instrument. Compared with other instruments, the use of electronic money appears to be particularly influenced by the presence or absence of the environment for its use and the user's knowledge, or the lack thereof.

Note: The Bank of Japan regularly conducts *Opinion Survey on the General Public's Views and Behavior*, covering a nationwide sample of 4,000 individuals who are at least 20 years of age, chosen through random sampling. The 41st survey taken in March 2010, the 45th survey taken in March 2011 and the 51st survey taken in September 2012 included questions on electronic money, credit cards and debit cards, respectively. Although these surveys were taken at different times, since the basic characteristics of payment instruments are not thought to change significantly over time, this box has ignored the impact of the fact that these surveys were taken at different times.

## Appendix 1: Number of Electronic Money Instruments and Terminals

|           | Number of electronic money instruments issued |       |                            |       | Number of terminals |       |
|-----------|---|-------|----------------------------|-------|---------------------|-------|
|           | (millions)                                    |       | Of which:<br>mobile phones |       | (millions)          |       |
| Sep. 2007 | 66.49   |       | 7.67                       |       | 0.25                |       |
| Mar. 2008 | 80.61   | (21%) | 9.42                       | (23%) | 0.36                | (45%) |
| Mar. 2009 | 105.03  | (30%) | 12.05                      | (28%) | 0.48                | (34%) |
| Mar. 2010 | 129.89  | (24%) | 14.84                      | (23%) | 0.66                | (39%) |
| Mar. 2011 | 151.74  | (17%) | 17.49                      | (18%) | 0.89                | (34%) |
| Mar. 2012 | 174.97  | (15%) | 20.80                      | (19%) | 1.07                | (20%) |
| Jun. 2009 | 113.21  | (29%) | 12.70                      | (26%) | 0.52                | (39%) |
| Jul.      | 115.06  | (29%) | 12.91                      | (25%) | 0.52                | (38%) |
| Aug.      | 116.72  | (28%) | 13.12                      | (24%) | 0.53                | (36%) |
| Sep.      | 118.50  | (27%) | 13.33                      | (24%) | 0.56                | (42%) |
| Oct.      | 120.69  | (27%) | 13.55                      | (24%) | 0.56                | (36%) |
| Nov.      | 122.61  | (26%) | 13.74                      | (23%) | 0.57                | (31%) |
| Dec.      | 124.26  | (26%) | 13.97                      | (23%) | 0.59                | (32%) |
| Jan. 2010 | 126.00  | (25%) | 14.26                      | (23%) | 0.61                | (34%) |
| Feb.      | 127.82  | (25%) | 14.53                      | (23%) | 0.64                | (35%) |
| Mar.      | 129.89  | (24%) | 14.84                      | (23%) | 0.66                | (39%) |
| Apr.      | 133.44  | (24%) | 15.14                      | (23%) | 0.72                | (45%) |
| May       | 135.46  | (23%) | 15.38                      | (23%) | 0.74                | (48%) |
| Jun.      | 137.15  | (21%) | 15.61                      | (23%) | 0.77                | (49%) |
| Jul.      | 138.29  | (20%) | 15.73                      | (22%) | 0.78                | (51%) |
| Aug.      | 140.17  | (20%) | 15.91                      | (21%) | 0.79                | (49%) |
| Sep.      | 141.56  | (19%) | 16.08                      | (21%) | 0.80                | (43%) |
| Oct.      | 143.25  | (19%) | 16.35                      | (21%) | 0.81                | (45%) |
| Nov.      | 144.90  | (18%) | 16.63                      | (21%) | 0.83                | (44%) |
| Dec.      | 146.47  | (18%) | 16.72                      | (20%) | 0.84                | (42%) |
| Jan. 2011 | 148.43  | (18%) | 16.91                      | (19%) | 0.85                | (38%) |
| Feb.      | 150.24  | (18%) | 17.21                      | (18%) | 0.85                | (34%) |
| Mar.      | 151.74  | (17%) | 17.49                      | (18%) | 0.89                | (34%) |
| Apr.      | 154.04  | (15%) | 17.78                      | (17%) | 0.90                | (26%) |
| May       | 155.79  | (15%) | 18.05                      | (17%) | 0.96                | (29%) |
| Jun.      | 158.52  | (16%) | 18.21                      | (17%) | 0.96                | (25%) |
| Jul.      | 161.03  | (16%) | 18.71                      | (19%) | 0.97                | (24%) |
| Aug.      | 162.82  | (16%) | 19.02                      | (20%) | 0.99                | (25%) |
| Sep.      | 164.53  | (16%) | 19.20                      | (19%) | 0.99                | (24%) |
| Oct.      | 166.32  | (16%) | 19.47                      | (19%) | 1.00                | (24%) |
| Nov.      | 168.09  | (16%) | 19.72                      | (19%) | 1.02                | (23%) |
| Dec.      | 169.75  | (16%) | 19.97                      | (19%) | 1.03                | (23%) |
| Jan. 2012 | 171.65  | (16%) | 20.28                      | (20%) | 1.04                | (23%) |
| Feb.      | 173.13  | (15%) | 20.50                      | (19%) | 1.05                | (24%) |
| Mar.      | 174.97  | (15%) | 20.80                      | (19%) | 1.07                | (20%) |
| Apr.      | 177.29  | (15%) | 20.99                      | (18%) | 1.08                | (19%) |
| May       | 179.00  | (15%) | 21.27                      | (18%) | 1.09                | (13%) |
| Jun.      | 182.17  | (15%) | 21.55                      | (18%) | 1.12                | (16%) |

Notes: 1. End of each month.

2. The figures in parentheses are year-to-year comparisons.

## Appendix 2: Value and Volume of Transactions

|             | Volume of transactions<br>(millions) |       | Value of transactions<br>(JPY billions) |       | Value per transaction<br>(JPY) |       |
|-------------|--------------------------------------|-------|---|-------|--------------------------------|-------|
| Fiscal 2007 | 810                                  |       | 563.6                                   |       | 696                            |       |
| Fiscal 2008 | 1,116                                | (38%) | 817.2                                   | (45%) | 732                            | (5%)  |
| Fiscal 2009 | 1,510                                | (35%) | 1,254.9                                 | (54%) | 831                            | (14%) |
| Fiscal 2010 | 2,000                                | (33%) | 1,733.4                                 | (38%) | 867                            | (4%)  |
| Fiscal 2011 | 2,342                                | (17%) | 2,058.2                                 | (19%) | 879                            | (1%)  |
| Jun. 2009   | 119                                  | (37%) | 92.7                                    | (41%) | 777                            | (3%)  |
| Jul.        | 130                                  | (34%) | 103.5                                   | (55%) | 799                            | (16%) |
| Aug.        | 126                                  | (35%) | 102.5                                   | (55%) | 813                            | (15%) |
| Sep.        | 124                                  | (32%) | 99.3                                    | (56%) | 798                            | (18%) |
| Oct.        | 129                                  | (32%) | 103.0                                   | (56%) | 798                            | (18%) |
| Nov.        | 126                                  | (37%) | 106.1                                   | (57%) | 843                            | (15%) |
| Dec.        | 132                                  | (37%) | 121.7                                   | (57%) | 921                            | (15%) |
| Jan. 2010   | 132                                  | (40%) | 122.0                                   | (68%) | 926                            | (20%) |
| Feb.        | 130                                  | (41%) | 112.5                                   | (60%) | 863                            | (14%) |
| Mar.        | 143                                  | (39%) | 118.0                                   | (53%) | 827                            | (10%) |
| Apr.        | 156                                  | (44%) | 134.4                                   | (57%) | 861                            | (10%) |
| May         | 160                                  | (46%) | 135.8                                   | (54%) | 849                            | (5%)  |
| Jun.        | 168                                  | (41%) | 139.3                                   | (50%) | 830                            | (7%)  |
| Jul.        | 177                                  | (37%) | 145.5                                   | (41%) | 823                            | (3%)  |
| Aug.        | 178                                  | (41%) | 148.1                                   | (45%) | 832                            | (2%)  |
| Sep.        | 170                                  | (36%) | 141.8                                   | (43%) | 836                            | (5%)  |
| Oct.        | 168                                  | (30%) | 138.1                                   | (34%) | 823                            | (3%)  |
| Nov.        | 166                                  | (32%) | 143.7                                   | (35%) | 867                            | (3%)  |
| Dec.        | 169                                  | (28%) | 157.1                                   | (29%) | 930                            | (1%)  |
| Jan. 2011   | 168                                  | (27%) | 163.3                                   | (34%) | 973                            | (5%)  |
| Feb.        | 161                                  | (24%) | 144.6                                   | (29%) | 897                            | (4%)  |
| Mar.        | 161                                  | (13%) | 141.7                                   | (20%) | 880                            | (6%)  |
| Apr.        | 170                                  | (9%)  | 148.9                                   | (11%) | 877                            | (2%)  |
| May         | 174                                  | (9%)  | 150.9                                   | (11%) | 867                            | (2%)  |
| Jun.        | 194                                  | (16%) | 163.7                                   | (18%) | 842                            | (1%)  |
| Jul.        | 208                                  | (18%) | 177.1                                   | (22%) | 850                            | (3%)  |
| Aug.        | 205                                  | (15%) | 173.9                                   | (17%) | 850                            | (2%)  |
| Sep.        | 199                                  | (17%) | 165.2                                   | (16%) | 830                            | (-1%) |
| Oct.        | 200                                  | (19%) | 167.1                                   | (21%) | 836                            | (2%)  |
| Nov.        | 196                                  | (18%) | 173.3                                   | (21%) | 886                            | (2%)  |
| Dec.        | 201                                  | (19%) | 194.6                                   | (24%) | 966                            | (4%)  |
| Jan. 2012   | 196                                  | (17%) | 190.4                                   | (17%) | 973                            | (0%)  |
| Feb.        | 196                                  | (21%) | 175.6                                   | (21%) | 897                            | (-0%) |
| Mar.        | 204                                  | (26%) | 177.4                                   | (25%) | 872                            | (-1%) |
| Apr.        | 207                                  | (22%) | 182.0                                   | (22%) | 881                            | (0%)  |
| May         | 215                                  | (24%) | 190.1                                   | (26%) | 883                            | (2%)  |
| Jun.        | 228                                  | (17%) | 198.1                                   | (21%) | 870                            | (3%)  |

Notes: 1. Total for the period.

2. The figures in parentheses are year-to-year comparisons.

### Appendix 3: Electronic Money Value Outstanding

|           | Electronic money value outstanding |       | Amount outstanding per card |       |
|-----------|------------------------------------|-------|-----------------------------|-------|
|           | (JPY billions)                     |       | (JPY)                       |       |
| Sep. 2007 | 64.3                               |       | 896                         |       |
| Mar. 2008 | 77.1                               | (20%) | 919                         | (-1%) |
| Mar. 2009 | 91.3                               | (18%) | 852                         | (-9%) |
| Mar. 2010 | 116.4                              | (28%) | 846                         | (3%)  |
| Mar. 2011 | 132.8                              | (14%) | 855                         | (-2%) |
| Mar. 2012 | 144.6                              | (9%)  | 818                         | (-6%) |
| Jun. 2009 | 95.8                               | (21%) | 846                         | (-7%) |
| Jul.      | 96.4                               | (20%) | 838                         | (-6%) |
| Aug.      | 97.3                               | (21%) | 834                         | (-6%) |
| Sep.      | 99.5                               | (20%) | 840                         | (-6%) |
| Oct.      | 100.7                              | (20%) | 834                         | (-5%) |
| Nov.      | 101.9                              | (21%) | 831                         | (-4%) |
| Dec.      | 104.0                              | (21%) | 837                         | (-3%) |
| Jan. 2010 | 105.4                              | (22%) | 836                         | (-3%) |
| Feb.      | 106.3                              | (22%) | 832                         | (-2%) |
| Mar.      | 116.4                              | (28%) | 896                         | (3%)  |
| Apr.      | 114.6                              | (17%) | 859                         | (-5%) |
| May       | 114.6                              | (22%) | 846                         | (-1%) |
| Jun.      | 115.2                              | (20%) | 840                         | (-1%) |
| Jul.      | 116.4                              | (21%) | 842                         | (0%)  |
| Aug.      | 117.3                              | (21%) | 837                         | (0%)  |
| Sep.      | 119.6                              | (20%) | 845                         | (1%)  |
| Oct.      | 120.4                              | (20%) | 840                         | (1%)  |
| Nov.      | 121.4                              | (19%) | 838                         | (1%)  |
| Dec.      | 123.6                              | (19%) | 844                         | (1%)  |
| Jan. 2011 | 127.4                              | (21%) | 858                         | (3%)  |
| Feb.      | 128.1                              | (21%) | 853                         | (3%)  |
| Mar.      | 132.8                              | (14%) | 875                         | (-2%) |
| Apr.      | 133.8                              | (17%) | 869                         | (1%)  |
| May       | 133.3                              | (16%) | 855                         | (1%)  |
| Jun.      | 134.8                              | (17%) | 850                         | (1%)  |
| Jul.      | 135.6                              | (17%) | 842                         | (0%)  |
| Aug.      | 135.5                              | (15%) | 832                         | (-1%) |
| Sep.      | 137.2                              | (15%) | 834                         | (-1%) |
| Oct.      | 138.2                              | (15%) | 831                         | (-1%) |
| Nov.      | 138.6                              | (14%) | 825                         | (-2%) |
| Dec.      | 141.5                              | (14%) | 833                         | (-1%) |
| Jan. 2012 | 141.6                              | (11%) | 825                         | (-4%) |
| Feb.      | 141.7                              | (11%) | 819                         | (-4%) |
| Mar.      | 144.6                              | (9%)  | 826                         | (-6%) |
| Apr.      | 146.0                              | (9%)  | 824                         | (-5%) |
| May       | 146.3                              | (10%) | 818                         | (-4%) |
| Jun.      | 149.7                              | (11%) | 822                         | (-3%) |

Notes: 1. End of each month.

2. The figures in parentheses are year-to-year comparisons.