Journal of The Japanese and International Economies xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Journal of The Japanese and International Economies

journal homepage: www.elsevier.com/locate/jjie

How do we choose to pay using evolving retail payment technologies? Evidence from Japan

Hiroshi Fujiki[a,*], Migiwa Tanaka[b]

[a] Faculty of Commerce, Chuo University, 742-1 Higashinakano, Hachioji-shi, Tokyo 192-0393, Japan
[b] Charles River Associates, Toronto, Canada

ARTICLE INFO

Keywords:
Cash demand
Credit cards

JEL Classification:
D14
E41

ABSTRACT

We examine the determinants of the choice of payment instruments for day-to-day transactions, and whether households that exclusively use cash (only cash users) hold more cash than households that use credit cards exclusively, cash and credit cards, or credit cards and other payment methods (card users) using Japanese household data. We obtain two main results. First, card users generally have higher disposable income, more financial assets, better financial knowledge, younger household heads, female household heads, higher educational attainment, and are not self-employed compared with only cash users. These findings suggest that an improvement in financial knowledge could increase the usage of credit cards in Japan. Second, holding other household characteristics constant, card users for day-to-day transaction values of more than 1000 yen have lower cash holdings than only cash users.

1. Introduction

As noted by Humphrey (2010), the heavy reliance of Japanese consumers on cash instead of personal checks or debit cards for point-of-sale transactions is unique among advanced economies, despite the presence of highly developed retail payment systems in Japan. One obvious reason may be Japan's very high level of public safety in comparison with North American and European economies. Recently, there appears to be a small but persistent departure from this long-standing reliance on cash in Japan for one-off, low-value payments. The dashed line in Fig. 1 illustrates that the share of the value of card payments to national household consumption expenditure increased from 13% in 2010 to 19% in 2016. Among card payments in 2016, credit cards (gray bars) accounted for 89%, debit cards (white bars) for 2%, and electronic money (black bars) for 9%.

On this basis, credit cards are the most-preferred card payment type in Japan, followed by electronic money. A series of annual surveys on Japanese households conducted by the Japan Credit Bureau (JCB), the largest credit card issuer in Japan, has confirmed this trend. According to the most recent JCB surveys, the share of value of card payments to total household expenditure made by credit card holders increased from 28.2% in 2010 to 34.3% in 2016. The JCB survey also showed that Japanese credit card holders mostly use their cards for payments for online shopping, groceries, and utility bills. Regarding the increase in the value of transactions made by electronic money, this is largely due to an increase in the value of transactions using noncontact integrated circuit (IC) prepaid cards issued by major public transport companies, national supermarket chains, and convenience stores, which are often accompanied by the option of automatic reloading from a credit card. However, the usage of credit cards in Japan is much lower than that in most other developed countries, including the US (where they represent some 40% of national household consumption expenditure), and even in developing countries like China (where they account for about 55% of national household consumption expenditure) according to the Japanese government's 2017 growth strategy.

Observing these changes, we pose two questions in this paper. First, what are the determinants of the choice of payment method for day-to-day one-off transactions by Japanese households? Further, given that the use of noncash payment methods requires financial knowledge, is there any relationship between the level of financial knowledge and the choice of noncash payment method? Second, will the increasing use of credit cards reduce the demand for cash in Japan? This question relates to a longstanding policy question posed by many central bankers around the world, including those in Japan: “Will the widespread use of noncash payment methods, say Apple Pay or electronic money, reduce the demand for cash?”

To respond to these questions, we use repeated cross-sectional data sets for Japanese family households from the Survey of Household Finances (SHF) conducted by the Central Council for Financial Services Information from 2007 to 2014. The original survey asks respondents to

* Corresponding author.
E-mail address: fujiki@tamacc.chuo-u.ac.jp (H. Fujiki).

https://doi.org/10.1016/j.jjie.2018.05.001
Received 29 September 2017; Received in revised form 20 May 2018; Accepted 23 May 2018

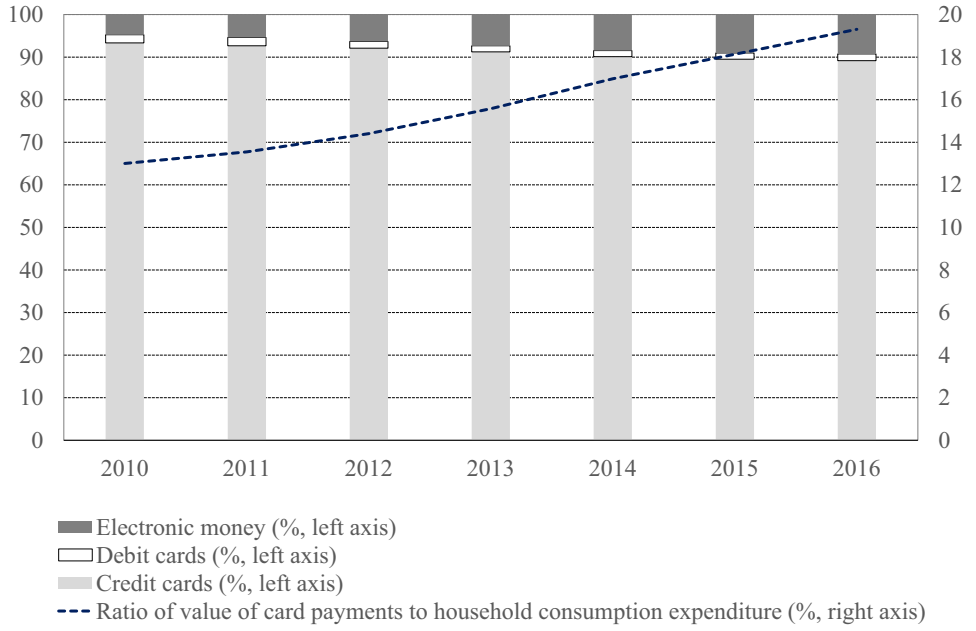

Fig. 1. Value of card payments in Japan.
Source: Bank of Japan (2017).

identify their two most frequently used payment methods for day-to-day transaction in each of the following transaction value intervals: 1000 yen or less, more than 1000 yen and less than or equal to 5000 yen, more than 5000 yen and less than or equal to 10,000 yen, more than 10,000 yen and less than or equal to 50,000 yen, and more than 50,000 yen from four different payment methods: cash, credit card, electronic money (including debit card), and other payment methods. Hereafter, we refer to these transaction values intervals as less than 1000 yen, between 1000 and 5000 yen, between 5000 and 10,000 yen, between 10,000 and 50,000 yen, and more than 50,000 yen. We find that payment choices vary depending on the value of the transaction. Specifically, the payment choices for low-value day-to-day transactions, those less than 1000 yen (or 9 US dollars when 1 US dollar = 110 Japanese yen), comprise three payment instruments, namely, cash, credit cards, and electronic money.[1] In contrast, the payment choices for high-value day-to-day transactions, those more than 10,000 yen (or 90 US dollars), typically comprise two payment instruments, namely, cash and credit cards.

To address our first question, we use a similar model to Dubin and McFadden (1984) and Amemiya et al., (1993). We assume that a multinomial logit model approximates a household's choice of payment method for each transaction value. The estimates from the multinomial logit model inform us which individual characteristics are important for a Japanese household becoming a credit card user (hereafter, card user). This is in the sense that a household chooses credit cards exclusively, cash and credit cards, or credit cards and other payment methods, rather than being an only cash user, in terms that the household exclusively chooses cash. Our estimates show that households with higher disposable income, more financial assets, better financial knowledge, a younger household head, a female household head, higher educational attainment, and that are not self-employed, living in a large city, and living in areas with more passengers per kilometer, tend to be card users rather than only cash users.

We also find that conditional on the level of education as measured by a respondent's educational attainment, financial knowledge matters for the use of a credit card. Incidentally, the Financial Service Agency (FSA) of Japan is currently attempting to improve the financial knowledge of Japanese households lest the initial investors in FSA-selected investment trusts make unwise investment decisions because of a lack of financial knowledge. Our results suggest that the FSA's policy to improve financial knowledge could increase the use of credit cards by Japanese households.

Regarding our second question, following Dubin and McFadden (1984) and Amemiya et al. (1993), we assume that conditional on the choice of the favorite payment method for each transaction value, the household determines the stock of cash holdings. This assumption allows us to estimate the conditional demand for cash that corrects for any self-selection bias arising from the choice of payment method. We then compare the forecast value of demand for cash conditional on the household being a card user and the forecast value of demand for cash conditional on the household being an only cash user. Holding household characteristics constant, a card user tends to have a smaller amount of cash holdings than an only cash user for day-to-day transaction values of more than 1000 yen. A card user tends to have a larger amount of cash holdings than an only cash user for day-to-day transaction values of less than 1000 yen, but we obtain this result by comparing only about 1100 card users with about 24,000 only cash users.

As a robustness check of the demand for cash conditional on the choice of payment method, we estimate the average treatment effects (ATEs) and average treatment effects of the treated (ATETs) of a card user compared with an only cash user using propensity-score matching and inverse-probability weighting. Both the ATEs and ATETs show that card users tend to have smaller cash holdings than only cash users for day-to-day transaction values of more than 1000 yen, except for the ATET using propensity-score matching for day-to-day transaction values between 1000 and 5000 yen. These are consistent with our findings of the demand for cash being conditional on the household being a card user.

Before discussing the details of our data and estimations, we summarize the two strands of the literature most related to our study. First, our research relates to work on the choice of consumer payment method and its determinants. For example, Hayashi and Klee (2003), Zinman (2009), Ching and Hayashi (2010), and Cohen and Rysman (2013) used US data in this regard, while Koulayev et al., (2016), Arango et al., (2012), Arango et al., (2015), and Wakamori and

[1] March 27, 2017 exchange rate is used throughout.