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## Do newspaper articles on card fraud affect debit card usage?



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### ABSTRACT

This paper investigates the impact of newspaper articles about skimming fraud on debit card usage in the Netherlands using daily transaction data and daily newspaper announcements from January 1st 2005 to December 31st 2008. Key finding is that articles about skimming fraud significantly affect same day debit card usage. The direction and strength of the media effects strongly depend on the specific characteristics of the publications, such as type of fraud addressed and their position in the newspaper, but above all on the frequency with which they come out. The effects, however, are economically small compared to other factors, such as calendar and holiday effects, and do not sustain or accumulate in the long run. Yet, some first cost calculations demonstrate that the impact of media attention on total retail payments efficiency is not to be underestimated.

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### 1. Introduction

During the last three decennia, debit cards have rapidly grown into widely used payment instruments at points-of-sale (POS) in the Netherlands. The ongoing increase in its acceptance and usage, however, has made the card increasingly attractive for fraud, and in particular for skimming fraud, where the card data on the magnetic stripe is copied and the PIN is captured at the POS or an automated teller machine (ATM) in order to produce a counterfeit card. Total skimming fraud in the Netherlands increased materially over the past few years, from less than EUR 4 million in 2005 to almost EUR 40 million in 2011 (NVB, 2012; Currence, 2011). Although the financial damages are still relatively small compared to total debit card sales, the overall societal consequences could be more widespread. Fraud incidents receive a fair amount of media attention in which not only the victims but the entire population is addressed. This may affect overall payment behaviour, as consumers may lose their confidence in the debit card and shift away to other means of payment. Since earlier studies show that the total costs of paying are not negligible and that each individual instrument carries a different cost (e.g. Brits and Winder, 2005; Humphrey, 2010; Schmiedel et al., 2012), this could eventually affect the overall efficiency of the retail payment system.

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Clear evidence of safety incidents affecting overall consumer confidence and payment behaviour, however, is lacking. Research into the impact of (perceived or actual) safety on payment choices is scarce and not providing a unanimous answer. Several theories and findings (e.g. Jonker, 2007; Bolt and Chakravorti, 2008; He et al., 2008; Borzekowski et al., 2008; Alvarez and Lippi, 2009; Kosse, 2010) find that safety is one of the factors considered when choosing a particular instrument. Others, however (such as Yin and DeVaney, 2001; Schuh and Stavins, 2010; Ching and Hayashi, 2010) find no evidence of safety playing an important role. Therefore, the aim of this paper is to further analyse consumers' payment behaviour in relation to safety. More precisely, this paper focusses on the impact of newspaper publications about debit card skimming fraud on debit card usage. In using actual high-frequency transaction data and actual newspaper announcements, this work adds to the existing payments literature which is mainly based on consumers' perceptions and stated behaviour. Moreover, thus far, the impact of media reports on payment choices has not been considered and tested for at all. Therefore, this paper provides new insights into the extent to which payment habits are affected by safety incidents and in particular through the media attention they get.

I use a rich set of daily transaction data and newspaper announcements from January 1st 2005 to December 31st 2008. The transaction data was provided by Equens, the Dutch Automated Clearing House (ACH), and covers all daily debit card

transactions made by Dutch residents at POS terminals in the Netherlands. Daily newspaper announcements on debit card fraud were extracted from the LexisNexis database, covering both national and regional papers. Key finding is that debit card usage is significantly affected by news reports on skimming fraud. The magnitude and size of the news effects strongly vary with the specific features of the announcements, such as the type of fraud addressed and their position in the paper, but above all with the frequency with which they come out. Overall, skimming fraud news depresses same day card usage, with consumers' reactions being stronger in periods when more articles are published. A first calculation of the direct social costs associated with the temporary shift in payment behaviour shows that the influence of media attention is not to be neglected when assessing total fraud costs. However, although significant, the media effects are economically small and only last for one day, with consumers reverting back to their regular payment behaviour almost immediately.

The paper proceeds as follows: Section 2 describes the development of debit card usage and skimming fraud in the Netherlands. Section 3 presents a selective review of the relevant literature and Section 4 describes the data and methodology. Section 5 reports the results illustrating the impact of newspaper publications on total debit card usage and Section 6 sheds some light on potential social cost implications. Section 7 summarises and concludes.

## 2. Debit card usage and skimming fraud in the Netherlands

Since their introduction in the late 1980s, debit cards have rapidly gained popularity in the Netherlands. Whereas cash transactions still outnumber debit card transactions, the debit card has gained the lead with respect to total value; in 2010, around 59% of total POS sales was paid by debit card versus 38% in cash. And the substitution is still ongoing: recent figures show that the yearly number and value of debit card transactions is still increasing at the expense of cash (Jonker et al., 2012). Several factors have contributed to the strong growth in card usage. First, the adoption of card terminals by retailers has strongly increased, enabling consumers to use their card at more and more places, whereas the number of ATMs has stabilised.<sup>1</sup> Also, consumers' payment preferences and habits are gradually changing due to changing population structures and external factors such as financial and non-financial incentives. Since 2007, for instance, Dutch banks and retailers have launched various projects and campaigns to promote the use of debit cards, in particular for low value purchases.

The strong increase in its acceptance and usage has made the debit card increasingly attractive for fraud. The most important type of debit card fraud in the Netherlands is skimming fraud, where the data on the magnetic stripe is copied and the PIN is captured in order to produce a counterfeit card. Total skimming fraud increased materially over the past years, from less than EUR 4 million in 2005 to nearly EUR 40 million in 2011, reaching its peak of EUR 36 million in 2009 (NVB, 2012; Currence, 2011). Initially, the cards were mainly copied at ATMs, but since 2008 the fraud has spread towards payment terminals in shops, at petrol stations and ticket machines as well. Dutch banks compensate for the damages incurred when the afflicted cardholders have taken reasonable safety measures. However, the total costs to cardholders are higher than solely the financial losses; by way of precaution, banks immediately block the underlying accounts if debit cards appear to be copied, leading to administrative and payment inconveniences. Moreover, at a regional level, cardholders as well as retailers are confronted with the inconvenience of temporary closedowns of

stricken ATMs and payment terminals.

Compared to the size of the Dutch debit cards market, the scale of skimming fraud is still relatively small. In 2009, around 0.3% of all debit cards were copied, 0.4% of all ATMs and payment terminals were sabotaged and total financial damages amounted up to 0.03% of total debit card sales.<sup>2</sup> Yet, all stakeholders along the payments chain are giving high priority to its prevention and fight so as to preserve public confidence in the debit card. Banks and retailers try to minimise the risks and consequences through continued investment in anti-skimming devices and fraud detection systems and through informing and educating the public by means of public awareness campaigns. In particular, the shift towards the more secure EMV technology<sup>3</sup> is expected to significantly reduce the skimming threat. As from January 2012, all debit card transactions in the Netherlands are conducted with EMV chip-embedded cards that use PIN verification. The first results are already visible in that attempted withdrawals with skimmed magnetic stripes of EMV cards are no longer successful within the Netherlands or in other countries that have adopted EMV.

## 3. Related literature

The introduction of new electronic payment instruments has given rise to a considerable stream of payments research examining the use and acceptance of different means of payment by consumers and retailers. The theoretical papers depart from the idea that payment instruments differ from each other with respect to costs, safety, anonymity, speed, acceptance and other characteristics and that consumers' and retailers' choice of which one(s) to use and accept is based on their net benefits received. When studying consumer demand for cash, Alvarez and Lippi (2009) explicitly incorporate the probability of cash theft into their model and assume that consumers keep smaller cash balances and increase the number of cash withdrawals when the probability of theft increases. Bolt and Chakravorti (2008), He et al. (2008), and Kahn and Roberds (2009) too consider the probability of getting mugged as a proxy for the safety benefit of cards over cash. None of the theoretical papers, however, take into account possible safety costs of cards. Also in the empirical payments literature, the effects of card safety and card fraud are still underexposed. In general, debit card usage is found to be influenced by relative prices, demographics (e.g. age, education and income), transaction variables (e.g. type of good, spending place, amount) and characteristics of the market infrastructure.<sup>4</sup> The literature, however, does not provide a unanimous answer with regard to consumers' attitudes towards risks and the impact of safety perception. Some find that safety is one of the factors considered when choosing a particular instrument (e.g. Jonker, 2007; Borzekowski et al., 2008), that perceptions of risks negatively affect the usage of payment instruments (e.g. Arango and Taylor, 2009; Kahn and Linares-Zegarra, 2012) and that debit card usage is negatively correlated with rates of violent crime (Humphrey

<sup>2</sup> Calculations based on payments statistics of De Nederlandsche Bank and Currence as published on <http://www.dnb.nl> and <http://www.currence.nl>. The financial losses related to cash counterfeiting amounted up to 0.003% of total POS cash turnover in 2010.

<sup>3</sup> The EMV technology is an international standard for debit card and credit card transactions at ATMs and POSs. The two main characteristics of the standard are (i) the authorisation is based on a PIN instead of a signature and (ii) the data is no longer stored on a magnetic stripe but on a chip embedded into the card. The name EMV comes from the initial letters of Europay, Mastercard and Visa, which originally developed the standard. As the EMV chip is more secure than the magnetic stripe, the EMV technology is considered as an important measure in fighting the skimming threat.

<sup>4</sup> The many references include Humphrey et al. (1996), Yin and DeVaney (2001), Cheney (2006), Jonker (2007), Rysman (2007), Borzekowski et al. (2008), Arango and Taylor (2009), Ching and Hayashi (2010), Schuh and Stavins (2010), and Kahn and Linares-Zegarra (2012).

<sup>1</sup> Source: retail payments statistics of De Nederlandsche Bank as published on <http://www.dnb.nl>.

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