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Fraud, investments and liability regimes in payment platforms ☆

Anna Creti [a], Marianne Verdier [b,*]

[a] Université Paris Dauphine and Ecole Polytechnique, France
[b] EQUIPPE Faculté des Sciences Economiques et Sociales de Lille and MINES ParisTech, PSL — Research University, CERNA — Center for Industrial Economics, France

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ABSTRACT

In this paper, we discuss how fraud losses impact the price structure chosen by a monopolistic payment platform, if merchants can invest in fraud detection technologies. We show that liability rules bias the structure of the prices charged by the platform to consumers and merchants with respect to a case in which such a responsibility regime is not implemented. If consumers are liable for fraud, the profit-maximizing price structure is neither biased in favor of consumers nor merchants. If consumers are not liable for fraud, the platform lowers the price for merchants to provide them with investment incentives. Under the zero liability rule for consumers, the profit-maximizing allocation of fraud losses maximizes social welfare.

1. Introduction

The development of electronic payment instruments is often accompanied by an increase in fraud and cybercrime. For example, in 2011, credit card fraud represented 40% of overall financial frauds in the United States.[1] Fraud is often cited as a concern in the adoption of innovative payment solutions such as mobile payments. As a consequence, minimizing the occurrence and the burden of fraud losses in payment platforms has become a major issue for both the banking industry and legislators. At the same time, the pricing of payment instruments is increasingly being challenged by antitrust authorities and regulators.[2] However, no study has examined how fraud risks and liability regimes affect the prices charged by electronic payment platforms. This paper aims to provide a perspective on this issue, which is a concern for public authorities both in the United States and in Europe.[3]

Our paper studies the impact of fraud losses on the profit-maximizing price structure of a payment platform, in a setting where merchants invest in fraud prevention. We extend Rochet and Tirole (2003)'s model by explaining how a monopolistic payment platform modifies the price structure to reduce fraud losses and to provide merchants with investment incentives.[4] We also analyze the liability rules chosen by the payment platform.

In payment card systems, fraud occurs "when someone gains financial or material advantage by using a payment instrument, or information from a payment instrument, to complete a transaction that is not authorized by the legitimate account holder" (Sullivan, 2013). The security of payments impacts consumers' use of cards and merchants' incentives to accept cards, respectively. Banks report three main types of fraud: lost or stolen cards, card counterfeiting and "card-not-present" fraudulent purchases made either on the Internet, mail or telephone. Card-not-present transactions represent the majority of fraud cases,

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* Corresponding author.
E-mail address: marianne.verdier@univ-lille1.fr (M. Verdier).

[1] Source: Consumer Sentinel Network Data Book for January–December 2011, Federal Trade Commission, February 2012.

[2] Interchange fees, which are paid to the merchant's bank by the cardholder's bank, have been regulated in various countries (see for instance the regulation of the Federal Reserve Board in June 2011, which imposed a price cap on interchange fees).

[3] For instance, in the United States, according to Durbin Amendment of the Dodd-Frank Wall Street Reform and Consumer Protection Act voted in 2011, the « fraud adjustment rulemaking » allows the Federal Reserve Board to adjust its regulation of interchange fees to provide merchants with incentives to fight fraud.

[4] Our paper fits into a more general literature that extends models of multi-sided platforms beyond their traditional focus on pricing. Examples of papers in the literature on multi-sided markets include Weyl (2010), Caillaud and Julien (2003), Armstrong (2006), and Rochet and Tirole (2003, 2006).

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for which merchants bear the highest share of fraud losses. In our paper, we focus on this particular type of fraud, which can be limited mainly by merchant investment.[5] To reduce the occurrence of fraud on card-not-present transactions, merchants invest in fraud prevention by using scoring methods, rules-based methods, or security standards (for example, the Visa 3-D Secure™ system which requires a code sent to the cardholder to finalize the transaction). Consumers' and merchants' incentives to fight fraud depend on how liable they are in case of a fraudulent transaction. In most current payment card systems, consumers hardly ever bear meaningful liability for fraud because they are protected both by financial regulations, and the "zero liability rule", which has been privately adopted by several payment networks.[6] It follows that, for most electronic payment instruments, the burden of fraud losses is shared between banks or platforms and merchants.[7] Platforms generally determine private rules to allocate fraud losses between banks and merchants. The share of fraud losses incurred by merchants impacts their incentives to invest in fraud prevention, and therefore, consumer's use of payment cards.

In our paper, we consider a monopolistic proprietary payment platform that provides an electronic payment instrument to risk neutral consumers and merchants. Consumers and merchants decide whether to adopt the payment instrument based on its price and the expected loss that they will incur if a fraudulent transaction occurs. The probability to detect a fraud increases with merchants' investment. If a fraud is detected, then participants do not incur losses.

We start by analyzing a benchmark model, in which merchants' investment is exogenous and merchants' liability for fraud is given. With respect to the standard two-sided markets model of Rochet and Tirole (2003), the price structure and the total price are modified by two effects. First, all else being equal, the payment platform has an incentive to lower the price on the side of the market that bears the higher share of fraud losses (the loss allocation effect). Second, the platform passes through its losses to consumers and merchants through higher prices (the marginal cost effect).

We proceed by analyzing the profit-maximizing transaction fees when merchants' investment is endogenous for a given level of merchants' liability for fraud. We find that the platform modifies the price structure and the total price to provide merchants with investment incentives. Indeed, the platform incurs lower fraud losses when merchants invest in fraud prevention. Therefore, the platform modifies the total price and the price structure to reduce its cost of fraud. Moreover, merchants' investment incentives impact the elasticities of the transaction volume to the consumer fee and the merchant fee, respectively, which induces a change in the price structure.

If merchants' liability for fraud is endogenous, the platform trades off between increasing merchants' liability to increase their investment in fraud prevention, and reducing merchants' liability to increase its transaction volume. Unless consumers are not liable for fraud, the platform has an incentive to share fraud losses with merchants.

We conduct a detailed analysis of the impact of the zero liability rule for consumers. In this case, if consumer and merchant demands are linear and identical, the price structure is biased in favor of merchants because of the loss allocation effect. Moreover, the profit-maximizing allocation of fraud losses maximizes social welfare. This result also holds if we extend our model to account for investment undertaken by the platform. However, if merchants are risk averse, increasing merchants' liability may not provide merchants with higher investment incentives. In this case, the platform has an incentive to share fraud losses with merchants, and the profit-maximizing allocation of fraud losses is not necessarily socially optimal.

The remainder of the paper is organized as follows. In Section 2, we summarize the literature related to our study. In Section 3, we develop a theoretical model to analyze the optimal allocation of fraud losses between the payment platform and the merchants. In Section 4, we determine the profit-maximizing allocation of fraud losses. In Section 5, we analyze the welfare maximizing level of liability under the zero liability rule for consumers. We also enrich our framework by assuming that merchants are risk-averse and by accounting for the platform's investment. In Section 6, we discuss the role of interchange fees. Finally, we conclude. All proofs from Section 3 to Section 5.3 are in Appendix A. The rest of the proofs can be found in the online Appendix A on the journal's website.

2. Related literature

To our knowledge, this paper is the first attempt to model fraud detection technologies and liability regimes in the literature on payment systems. Our approach thus relies on three different strands of literature: the literature on payment platforms, investment in two-sided markets, and liability issues in law and economics.[8]

Most papers on payment systems focus on explaining the divergence between the profit-maximizing price structure that is charged by payment platforms and the price structure that maximizes social welfare (see Chakravorti, 2010 for a review). In particular, several papers aim to determine whether payment platforms charge excessive interchange fees when they maximize banks' joint profit (as surveyed by Verdier, 2011). Our paper contributes to this literature by extending Rochet and Tirole (2003) to study how the allocation of the expected fraud loss between the platform and the merchants changes the profit-maximizing price structure. Our paper is also related to the paper of Wright (2012), who argues that the price structure is biased in favor of consumers when merchants internalize a fraction of consumer surplus in their decision to accept payment cards. In our framework, merchants take into account buyers' demand in their investment decisions when consumers are liable for fraud.[9]

The literature on investment in two-sided markets is scarce. Verdier (2010) analyzes the impact of the interchange fee on banks' investment in quality in a four-party payment platform. In her model, the quality of the payment instrument depends on investments incurred by the issuer and the acquirer. It impacts consumers and merchants' incentives to use and to accept payment cards, respectively. She finds that a reduction of the interchange fee can improve social welfare if it increases the acquirer's investment, when the acquirer's investment impacts cardholders' demand. Our model departs from that paper because we consider a monopolistic three-party payment platform, and focus on the optimal allocation of fraud losses between the platform and the merchants. The only paper that considers merchants' investment in two-sided platforms is the work of Peitz and Belleflamme and Peitz

[5] Minimizing fraud losses in payment card systems requires efforts from all the participants in a transaction. See Appendix A-1 of the online Appendix A for details on the role of each participant in a transaction to the fraud prevention process. Merchants' investment plays an important role in the limitation of fraud on card-not-present transactions. By contrast, the protection against data breaches and phishing rather depends on investments incurred by the platform.

[6] See Appendix A-2 of the online Appendix A for some details about consumer protection laws in various countries.

[7] For instance, in France, according to the "Observatoire de la sécurité des cartes de paiement", fraud losses have been shared in 2009 between banks (41.1%) and merchants (53.5%). Merchants have been held liable mainly for fraud on internet transactions. Consumers were held liable for only 2.3% of the fraud losses. According to Furletti (2005), in the United States, "consumers of credit cards are shielded from nearly $3 billion in fraud losses each year". According to the Federal Reserve Register, vol. 75 no. 248 (2010), across all types of debit card transactions in the United States, 57% of fraud losses were borne by issuers and 43% were borne by merchants.

[8] There are also some rare papers in the monetary economics literature that study the role of fraud, but our paper takes a different perspective. For instance, Roberds and Schreft (2009) study the implications of networks' collection of personal identifying data on the costs and incidence of identity theft.

[9] Under the zero liability rule for consumers, Wright (2012)'s results apply to our setting, provided that merchants are monopolists. If consumers are liable for fraud or with other assumptions on retail competition between merchants, the bias found in Wright (2012) is more complex to identify.