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The impact of fraud prevention on bank-customer relationships

An empirical investigation in retail banking

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Abstract

Purpose – The purpose of this paper is to establish a conceptual as well as an empirical link between retail banks' activities to protect their customers from third-party fraud, the quality of customer relationships, and customer loyalty.

Design/methodology/approach – A conceptual framework is developed linking customer familiarity with and knowledge about fraud prevention measures, relationship quality, and customer loyalty. To empirically test the conceptual framework, data were collected in collaboration with a large German retail bank.

Findings – A positive association was found between customer familiarity with and knowledge about fraud prevention measures and the quality of customer relationships as measured by satisfaction, trust, and commitment. The quality of customer relationships, in turn, is positively associated with customer loyalty as measured by intentions to continue their relationship with and cross-buy other products from their bank.

Research limitations/implications – The paper focuses on the German retail banking market and uses data from only one bank. Future research may investigate the generalizability of the findings across other banks, as well as other countries. Moreover, future research could address how specific anti-fraud instruments and their communication differentially affect customer satisfaction, trust, and commitment.

Practical implications – The results stress the importance of fraud prevention for retail banks and show that besides the financial objective of reducing operating costs, fraud prevention and its effective communication is a meaningful way to improve customer relationship quality and, ultimately, customer loyalty.

Originality/value – This is the first academic study to empirically examine the relationship between a retail bank's (communication about) fraud prevention mechanisms and the quality of their customer relationships.

Keywords Germany, Retail banks, Customer relationship management, Customer service management, Fraud, Banking fraud, Customer loyalty

Paper type Research paper

1. Introduction

Security is a fundamental and increasingly important issue in today's banking industry (Kanniainen, 2010). Over the last few years, the number of fraudulent transactions committed by third parties has risen tremendously (Banks, 2005). Consequently, fraud prevention has become a central concern to banks, customers, and public policy makers (Sullivan, 2010). As banking fraud might ultimately affect customer relationship quality and customer loyalty, fraud prevention and its effective communication is an important topic for academic research.

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Banking fraud hurts both banks and their customers. Banks incur substantial operating costs by refunding customers' monetary losses (Gates and Jacob, 2009), while bank customers experience considerable time and emotional losses. They have to detect the fraudulent transactions, communicate them to their bank, initiate the blocking and re-issuance or re-opening of a card or account, and dispute the reimbursement of their monetary losses (Douglass, 2009; Malphrus, 2009). Becoming a fraud victim may also impact customers' perception of feeling secure and protected at their bank. Accordingly, fraud may damage the bank-customer relationship because of shattered trust and confidence (Krummeck, 2000), as well as increased dissatisfaction because of a perceived service failure (Varela-Neira *et al.*, 2010). This, in turn, may negatively affect customer loyalty and stimulate switching behavior (Rauyruen and Miller, 2007; Gruber, 2011), thereby hurting the banks' reputation and impeding the attraction of new customers (Buchanan, 2010).

Fraud prevention may thus entail chances for banks to enhance the relationships with their customers. It gives banks the opportunity to (re-)assure customer trust in their services (Guardian Analytics, 2011). Indeed, the associated feeling of security may be an effective means to retain existing customers and attract new ones (Behram, 2005). However, in order to translate fraud prevention into higher-quality relationships, communication is key. Effective communication allows a bank to evoke a shared understanding of values between itself and its customers (Asif and Sargeant, 2000). Banks should therefore demonstrate their knowledge and competence regarding fraud prevention by communicating anti-fraud measures effectively, thereby creating a feeling of safety among customers (Rauyruen and Miller, 2007). This feeling of safety likely improves customer relationship quality and customer loyalty, which are key success factors in the highly competitive retail banking industry (Alexander and Colgate, 2000).

The aim of this study is to empirically assess the impact of customer familiarity with and knowledge about fraud prevention measures on the current quality as well as future potential of bank-customer relationships. In so doing, we make several contributions to the bank marketing literature. First, we develop a comprehensive framework of fraud management in retail banking by integrating key concepts from the relationship marketing, customer loyalty, as well as fraud prevention literature. Second, by empirically testing this conceptual framework using an extensive set of survey data, we are first to show how fraud prevention measures and their effective communication are capable to improve customer relationship quality as measured by customer satisfaction, trust, and commitment. Moreover, we show how higher customer relationship quality subsequently translates into customer loyalty as measured by their tendency to continue the current relationship with a bank and to extend and enrich it through cross-buying from that bank. Third, we identify how both situational factors (e.g. a customer's prior fraud experiences) as well as socio-demographic factors (e.g. a customer's age, gender, income, and education) moderate the prior relationships.

The remainder of this study is organized as follows. Section 2 reviews relevant literature. Section 3 introduces the conceptual framework and hypotheses. Section 4 presents the research design. Section 5 empirically tests the conceptual framework. Section 6 concludes.

2. Literature background

2.1 Fraud management in retail banking

Retail banking fraud entails any attempt of criminals to "achieve financial gain at the expense of legitimate customers or financial institutions through any [...] transaction channel, such as credit cards, debit cards, ATMs, online banking, or checks" (Sudjianto *et al.*, 2010, p. 5). Recent literature categorizes fraud by the person conducting it and differentiates between first-party and third-party fraud. In first-party fraud, a legitimate customer betrays the bank, whereas in third-party fraud, the customer becomes a victim of criminals who steal identities, use lost or stolen cards, counterfeit cards, or gain unauthorized access to customer accounts by other means (Gates and Jacob, 2009; Greene, 2009). This study focusses on third-party fraud.

Third-party fraud can be subdivided into different classes. Most common is a differentiation between payments fraud and identity theft. Payments fraud refers to "any activity that uses information from any type of payments transaction for unlawful gain" (Gates and Jacob, 2009, p. 7). It occurs when fraudsters gain access to customer accounts and use these accounts for their own financial benefit (Sullivan, 2010; Malphrus, 2009). Identity theft may also comprise fraudsters illicitly gaining access to customer accounts (Hartmann-Wendels *et al.*, 2009), but usually refers to opening new accounts in the customer's name (Malphrus, 2009). This study focusses on payments fraud in general and on card fraud in particular, since it is of rising importance globally (Worthington, 2009).

2.2 The nature of and trends in retail banking fraud

Nowadays, customers rely heavily on the web for their banking business, leading to an increase in the number of online transactions (Berney, 2008). Fraudsters react to these changes as the internet provides them with more opportunities to attack customers (Gates and Jacob, 2009). On the web, customers are not physically present to authenticate transactions, which facilitates fraud (Malphrus, 2009; Gates and Jacob, 2009). Orad (2010) even claims that the internet allows criminals to organize as a network, supporting each other in their attacks.

Fraudsters are particularly interested in accessing customers' online bank accounts. A common practice to steal access data are "phishing," where an e-mail from an allegedly credible source is sent to bank customers requesting sensitive information such as their username or password. During recent years, phishing has become a significant threat to online security (Bergholz *et al.*, 2010). Since (credit) cards have become a major payment instrument for web-based transactions, they have attracted great attention of fraudsters (Malphrus, 2009). Despite an inability to provide exact numbers on card fraud because of differences in banks' fraud tracing and a lack of customer reporting, worldwide card fraud likely exceeded $10 billion in 2009 (ACI Payment Systems, 2009). In general, fraud, either online or offline, hurts retail banks' operating performance, and increases their costs (Gates and Jacob, 2009). According to Greene (2009), the true economic costs are about 150 percent of the actual fraud loss.

3. Conceptual framework and hypotheses

3.1 A customer perspective on retail banking fraud

Becoming a fraud victim affects customers negatively not only in terms of monetary losses, which are typically refunded by banks, but also in terms of the efforts they have to make to restore the original situation (Malphrus, 2009; Douglass, 2009). Furthermore, confidence and trust into the bank may be shaken by fraud occurrences. Customers might have the impression that the "bank is not a safe place and incapable of protecting its clients' assets" (Krummeck, 2000, p. 268). They lose trust, become dissatisfied (Varela-Neira *et al.*, 2010), and may switch to a different financial services provider (Gruber, 2011; Bodey and Grace, 2006). Accumulated fraud incidents can have a profound negative impact on a bank's reputation and hurt it in several ways (Krummeck, 2000; Malphrus, 2009).

Proactive fraud management is an opportunity for banks to (re-)assure customer trust (Guardian Analytics, 2011) and may be a means to retain existing and attract new customers (Behram, 2005). Bank customers are deeply concerned about fraud and studies have shown that many would be willing to pay additional fees for a proper protection of their assets (Detica, 2010). Effective communication allows for a shared understanding of values and beliefs between a company and its customers (Asif and Sargeant, 2000). Communicating anti-fraud policies properly is therefore a cornerstone in fraud prevention (Krummeck, 2000) and may allow banks to materialize on the topic's importance to customers. Liu and Wu (2007) find that service attributes, such as fraud prevention, can positively affect relationship continuation and cross-buying. By demonstrating their fraud prevention knowledge and know-how, banks can create a feeling of safety (Rauyruen and Miller, 2007), thereby enhancing relationship quality, which may ultimately improve customer loyalty (Morgan and Hunt, 1994).

This study develops an innovative conceptual framework that integrates these findings and suggestions from previous research. In the framework, a bank's communication regarding fraud prevention is positively linked to the quality of the relationship with its customers as measured by customer satisfaction, trust, and commitment. Relationship quality, in turn, is expected to enhance customer loyalty as measured by their intentions to continue the relationship with their bank and to cross-buy other products or services from this same bank. Figure 1 provides a graphical summary of the conceptual framework that this study examines.

3.2 Customer relationships

Effective anti-fraud management and its communication toward customers potentially enhances relationship quality and, ultimately, loyalty. While there are many different forms of relationships, differentiated by type or participants (Morgan and Hunt, 1994), this study deals with the relationships of banks with their retail customers. From the bank's perspective, customer relationships can be built at the company or the employee level (Rauyruen and Miller, 2007; Liu *et al.*, 2011). Since fraud management is a corporation-wide approach (Malphrus, 2009), this study focusses on company-level

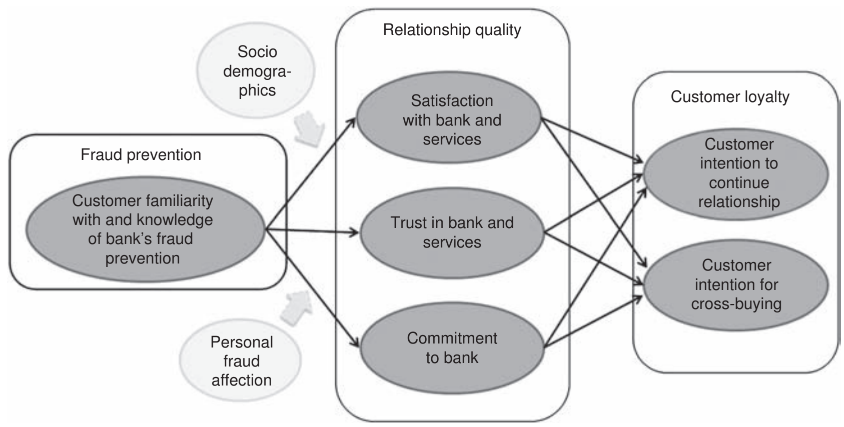


Figure 1.
Conceptual framework

relationships. Prior work identifies relationship quality and customer loyalty as crucial constructs in such customer relationships.

3.2.1 Relationship quality. Relationship quality refers to the strength of a relationship (Dimitriadis and Papista, 2010), and is generally composed of satisfaction, trust, and commitment (Morgan and Hunt, 1994; Dimitriadis and Papista, 2010; Liu *et al.*, 2011). All three constructs are key variables in establishing long-term relationships (Gutierrez, 2005) and are typically claimed to be positively related to customer loyalty (Liu *et al.*, 2011; Garbarino and Johnson, 1999; Dimitriadis and Papista, 2010; Morgan and Hunt, 1994; Randall *et al.*, 2011).

Satisfaction. Satisfaction refers to the post-purchase evaluation of products or services by a customer (Liu *et al.*, 2011; Randall *et al.*, 2011). Customers use past experience, expectations, predictions, goals, and desires (Liu *et al.*, 2011) to assess the quality of all past interactions with the respective company, in this case their bank. Satisfaction is more than fulfilling prior expectations: only exceeding expectations fosters customer intention to stay with their current service provider (Aldas-Manzano *et al.*, 2011; Dimitriadis, 2010).

As bank customers attach great importance to fraud prevention and are willing to pay for these services (Detica, 2010), we hypothesize that a solid and regular communication about fraud and the measures that are taken to prevent it, will lead to increased levels of satisfaction:

H1. Customers' fraud prevention knowledgeability, as triggered by bank communication, is positively associated with their satisfaction with the bank.

Trust. Trust is a critical success factor in firm-customer relationships (Suárez Álvarez *et al.*, 2011). In the context of this study, it comprises the perceived credibility and benevolence of the bank toward the customer (Doney and Cannon, 1997; Liu *et al.*, 2011; Rauyruen and Miller, 2007). Customer trust is expressed as confidence in the quality and reliability of the firm's products and services (Liu *et al.*, 2011; Garbarino and Johnson, 1999). It mediates customer behavior before and after a purchase decision (Liu *et al.*, 2011), and is the critical basis for a successful relationship (Rauyruen and Miller, 2007). Morgan and Hunt (1994) find that trust is largely dependent on communication and shared values. The timely passing on of meaningful information "fosters trust by [...] aligning perceptions and expectations" (Morgan and Hunt, 1994, p. 25). Liu and Wu (2007) show that the perceived level of competence determines the extent to which customers trust their bank. In the context at hand, this suggests that banks can enhance customers' trust in the bank and its competences to fight fraud by effectively communicating about their anti-fraud measures (Krummeck, 2000):

H2. Customers' fraud prevention knowledgeability, as triggered by bank communication, is positively associated with their trust in the bank.

Commitment. Commitment refers to the effort that relationship partners are willing to put into the relationship because of their evaluation of its importance (Morgan and Hunt, 1994). It expresses an "emotional bond and sense of belonging" which the customer feels toward the firm (Lewis and Soureli, 2006, p. 18). Commitment evolves when customers consider the "ongoing relationship [...] sufficiently important to warrant maximum efforts at maintaining it" (Randall *et al.*, 2011, p. 7). Morgan and Hunt (1994) find that commitment is largely influenced by relationship benefits and shared values. Fraud prevention represents a common interest of a bank and its customers and thus forms a shared value. Commitment is therefore hypothesized to be enhanced through effective fraud management communication:

H3. Customers' fraud prevention knowledgeability, as triggered by bank communication, is positively associated with their commitment to the bank.

3.2.2 Customer loyalty. Customer loyalty is a typical outcome of relationship quality (Rauyruen and Miller, 2007). It is often defined as the commitment to re-buy a particular product or service (Liu *et al.*, 2011) "despite situational influences and marketing efforts that might have the potential to cause switching behaviour" (Aldas-Manzano *et al.*, 2011, p. 1167). In a banking context, loyalty is typically high as relationships are often long-term oriented (Liu *et al.*, 2011; Morgan and Hunt, 1994) and switching costs are substantial (Kumar *et al.*, 2008).

Loyalty consists of both attitudinal and behavioral loyalty (Rauyruen and Miller, 2007; Lewis and Soureli, 2006; Aldas-Manzano *et al.*, 2011; Baumann *et al.*, 2011). While behavioral loyalty is observable through actual repurchases, attitudinal loyalty is reflected by customer preferences or intentions (Aldas-Manzano *et al.*, 2011; Lewis and Soureli, 2006). This study focusses on loyalty as an attitudinal concept. Loyalty comprises both the continuation of a relationship as well as the enrichment thereof through cross-buying (e.g. Liu and Wu, 2007).

Relationship continuation. Relationship continuation or retention describes a concept in which the company-customer relationship is prolonged through a customer making a repetitive decision for a product, service, or provider (Liu and Wu, 2007). Liu *et al.* (2011) stress that primarily in saturated markets like retail banking, it is crucial to focus on retaining customers instead of recruiting new ones. Customer retention is especially important as remote contact between the bank and the customer, as through the internet, is becoming more common (Lewis and Soureli, 2006; Lee, 2002). Generally, satisfaction with current products and services is regarded as a major antecedent of customer loyalty (Liu *et al.*, 2011; Rauyruen and Miller, 2007):

H4. Customers' satisfaction with their bank is positively associated with their intentions to continue the relationship with the respective bank.

Next to satisfaction, trust is an acknowledged predecessor of loyalty, as it allows relationship partners to focus on the long-term benefits of their exchange (Doney and Cannon, 1997). Trust is often found to be significantly related to customers' willingness to continue the relationship (Rauyruen and Miller, 2007; Dimitriadis and Papista, 2010; Dimitriadis, 2010):

H5. Customers' trust in their bank is positively associated with their intentions to continue the relationship with the respective bank.

Alongside trust, commitment is considered a differentiating element between successful and unsuccessful long-term relationships (Garbarino and Johnson, 1999). It is a key element to loyalty (Rauyruen and Miller, 2007; Beerli *et al.*, 2004), as committed customers are generally more receptive to company communications and promotions (Parahoo, 2012):

H6. Customers' commitment to their bank is positively associated with their intentions to continue the relationship with the respective bank.

Cross-buying. Cross-buying comprises an enrichment and advancement of customer relationships through a customer deciding to purchase or use additional products or services from the same provider (Kumar *et al.*, 2008; Liu and Wu, 2007). Despite the previously stressed importance of customer retention, Verhoef *et al.* (2001) note that mere retention is not sufficient for success: managers have to find ways to sell additional products to existing customers. Kumar *et al.* (2008) find that this a common practice in the saturated financial services industry and retail banking. It is important to consider, however, that from a customer perspective the decision to purchase additional products involves higher risk and uncertainty than sticking with known products and services. Satisfaction with previously used products and services and the bank as such is therefore an important predecessor of customers' cross-buying intentions (Liu and Wu, 2007; Ngobo, 2004):

H7. Customers' satisfaction with their bank is positively associated with their cross-buying intentions.

Trust that developed during the existing relationship of a customer with its bank helps reducing uncertainty about what to expect from new products and services offered by the same bank. As a result, customer trust facilitates cross-buying intentions (Liu and Wu, 2007):

H8. Customers' trust in their bank is positively associated with their cross-buying intentions.

Finally, commitment is expected to be a positive trigger of cross-buying intentions. Committed customers appreciate the relationship with their bank and are willing to extend that relationship by also purchasing other products and services from that bank. Indeed, Parahoo (2012) finds that committed customers are more attentive to promotions/offerings:

H9. Customers' commitment to their bank is positively associated with their cross-buying intentions.

3.3 Moderating factors

We expect the proposed effects to be stronger for customers who have been personally affected by fraud before. As outlined by Malphrus (2009) and Douglass (2009), customers have to take great efforts in order to restore the original situation and even more severely, their feeling of the bank as a safe place is affected negatively (Krummeck, 2000). They may therefore pay more attention to the measures that their bank employs against third-party fraud:

H10. The effect of customer fraud prevention knowledgeability on customer relationship quality is stronger for customers who have been personally affected by banking fraud.

Next to the stated hypotheses, we include various socio-demographics such as gender, age, education, and income in the following analyses in order to examine whether they function as moderators of the relationship between fraud prevention and relationship quality.

4. Research design

To test the hypotheses of the conceptual framework, an online survey was developed and conducted amongst a sample of customers of a large German retail bank. Next, we discuss the data collection process, sample, questionnaire design, and measurement instruments in detail.

4.1 Data collection process

Before the final data collection, a pre-test with 71 bank customers was administered to ensure respondents understood all survey items and to check scale validity and reliability. Following this pre-test, some survey items were dropped or modified. The final questionnaire was distributed to 18,790 customers of the cooperating bank, which were randomly selected on the precondition that half of them had been affected by fraud during their relationship with the respective bank. Selected customers received a message in their online banking environment, which contained an invitation to participate and a link to the questionnaire.

4.2 Sample description

After a collection period of two weeks, we obtained a response of 1,491 complete surveys. Of the respondents, 75.4 percent are male and the average (median) age is 48 (45) years. Respondents hold contracts with on average 2.52 banks (including their house bank). Relationship length ranges from 0 to 55 years with a mean (median) of 15.91 (ten) years. Of the respondents, 74.9 percent earn a net monthly income of more than 1,800 euros, 15.2 percent have a higher education entrance qualification, and 58.9 percent indicate they are university graduates.

To check for non-response bias, we compare early and late respondents (Armstrong and Overton, 1977). We found a slight shift toward female respondents, higher education levels, and higher income levels in late responses. However, as the majority of respondents is highly educated and earns a relatively high income, sample selection bias is no concern in this study.

4.3 Questionnaire design

The questionnaire is divided into five sections. It starts with a section testing customer knowledge of their bank's anti-fraud measures and then addresses their perceptions of these measures. Sections on relationship quality and loyalty follow before the questionnaire ends with a section on more sensitive topics like personal fraud affection and socio-demographics.

4.4 Measurement scales

We use established scales to measure all constructs. The scales are only modified in terms of wording to fit the context or changed to five-point scales for a uniform appearance.

To measure customers' familiarity with their bank's fraud management measures, we used a three-item bipolar adjective scale, which has been adapted from Oliver and Bearden (1985). The scale addresses both how well customers feel informed by their bank and how knowledgeable they consider themselves about the topic of fraud prevention in general.

Regarding relationship quality, the following measures were used. Customer satisfaction with their bank and the provided services was measured with a four-item scale from Aldas-Manzano *et al.* (2011). Trust was measured with a five-item scale from

Liu and Wu (2007). Customer commitment was gauged by the four-item scale of Garbarino and Johnson (1999).

Regarding customer loyalty, we used the scales for relationship continuation and cross-buying intention from Ngobo (2004). Both scales consist of four items. The cross-buying scale describes a scenario in which a bank customer's house bank offers the customer a service which he or she currently obtains from another bank, at the same terms and conditions. Four items measure the likelihood of the customer to rather hold this service at the house bank. Two items were phrased negatively and re-coded for the following analyses.

Finally, the questionnaire contained several questions on respondents' socio-demographics. Respondents were asked to indicate their gender, birth year, income and education category, and the number of years that they have been a customer of their house bank.

4.5 Scale validity and reliability

All previously introduced constructs are reflective, since the manifest items are highly correlated and the meaning of the constructs would not change if an individual item was removed (Jarvis *et al.*, 2003). The constructs' internal consistency is measured through Cronbach's α (Nunnally, 1978) as well as a measure of composite reliability, which Chin (1998a, b) claims to be more reliable as it is not affected by the number of indicators used in the construct. All scales exceed the recommended threshold criterion of 0.70 for both measures (Nunnally, 1978). Convergent validity is tested by examining the factor loadings and the average variance extracted (AVE). All items load significantly (>0.70) on their posited underlying constructs (Johnson *et al.*, 2006). Also, all AVE scores are >0.50, so convergent validity is established (Fornell and Larcker, 1981). Discriminant analysis is checked using the Fornell and Larcker (1981) criterion. For all constructs, the square root of AVE exceeds the construct correlations with all other constructs, indicating the measures' discriminant validity. See Table I for details.

5. Data analysis and results

We use structural equation modeling (SEM) to test the conceptual model. In particular, we employ a partial least squares (PLS) approach with a 2,000 subsamples bootstrapping procedure using the SmartPLS software (Ringle *et al.*, 2005). As the conceptual model is relatively complex, a PLS approach such as used in SmartPLS is typically more appropriate than using a covariance-based SEM technique such as employed in, for example, AMOS or LISREL (Fornell and Bookstein, 1982).

5.1 Main results

5.1.1 Model assessment. The PLS approach such as used in SmartPLS does not provide a traditional assessment of overall model fit (Chin, 1998b). Therefore, to evaluate the model, we calculate the corrected R^2s of all constructs (Ringle *et al.*, 2005) as well as employ a recently proposed diagnostic tool, the goodness of fit (GoF) index (see Tenenhaus *et al.*, 2005).

The corrected R^2s refer to the explanatory power of the predictor variable(s) on the respective construct and are reported in Figure 2. Customer familiarity with and knowledge about the bank's fraud prevention measures explains 9.14 percent of customer commitment, 12.34 percent of customer trust and 13.92 percent of customer satisfaction. Familiarity with and knowledge about the bank's fraud prevention

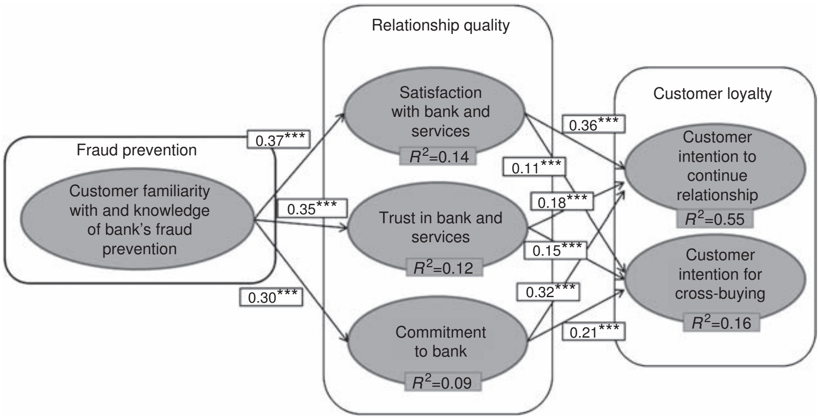
Table I. Measurement constructs

Construct	Authors	Item wording	Cronbach's α	Factor loading	Composite reliability	AVE
Fraud familiarity	Oliver and Bearden (1985)		*0.79*		*0.88*	*0.71*
Item 1		How familiar would you consider yourself with the fraud prevention initiatives of your bank?		0.92		
Item 2		How informed would you consider yourself about the fraud prevention initiatives of your bank?		0.90		
Item 3		How knowledgeable do you consider yourself about fraud prevention?		0.69		
Satisfaction	Aldas-Manzano *et al.* (2011)		*0.92*		*0.94*	*0.80*
Item 1		I think I have taken the right decision to choose for my bank		0.90		
Item 2		I am satisfied with my decision to choose for my bank		0.93		
Item 3		I am generally satisfied with the way my bank has managed transactions in the past		0.90		
Item 4		In general, I feel good with the service provided by my bank		0.84		
Trust	Liu and Wu (2007)		*0.91*		*0.93*	*0.74*
Item 1		My bank has high integrity		0.79		
Item 2		My bank keeps the promises it makes to me		0.90		
Item 3		My bank can be trusted at all times		0.89		
Item 4		My bank is trustworthy		0.91		
Item 5		My bank is genuinely concerned with my needs		0.78		
Commitment	Garbarino and Johnson (1999)		*0.85*		*0.91*	*0.77*
Item 1		I am proud to be a customer of my bank		0.86		
Item 2		I feel a sense of belonging to my bank		0.93		
Item 3		I am a loyal customer of my bank		0.83		
Continuation	Ngobo (2004)		*0.91*		*0.94*	*0.84*

(*continued*)

Construct	Authors	Item wording	Cronbach's α	Factor loading	Composite reliability	AVE
Item 1		I strongly intend to stay with my bank for a long time		0.92		
Item 2		I strongly intend to continue my relationship with this bank		0.93		
Item 3		I strongly intend to keep my current products at my bank		0.83		
Cross-buying	Ngobo (2004)	Most banks offer both regular banking products and installment credits. Imagine your bank offers you to cancel your installment credit with your current provider and transfer it under the same terms to your bank to only have one provider for all your banking business. How would you react?	*0.88*		*0.92*	*0.74*
Item 1		I will seriously consider the offer		0.86		
Item 2		The chances are very low that I will consider that offer		0.86		
Item 3		I will take this opportunity		0.91		
Item 4		Nothing can make me accept that offer		0.79		
Socio-demographics						
Number of banks		Please indicate the number of banks you are a customer of (including your house bank)				
Relationship length		Please state the number of years you are a customer at your house bank				
Gender		Please indicate your gender				
Birth year		Which year were you born in?				
Education		What is your highest educational degree?				
Income		Please indicate to which of the following income categories you belong				

Table I.



Note: ***1 percent significant level

Figure 2.
Results: main effects

thereby represents an important aspect of the bank-customer relationship. The relationship quality constructs, in turn, take an important position in predicting the scores of the customer loyalty constructs. Jointly, customer satisfaction, trust, and commitment predict 16.25 percent of customer cross-buying intentions and 55.47 percent of customer intentions to continue the relationship with their bank.

Tenenhaus *et al.* (2005) propose a GoF criterion to assess the global model. The GoF measure: ($GoF = \sqrt{\overline{AVE} \times \overline{R^2}}$) uses the geometric mean of the average communality and the average R^2 (for endogenous constructs). Wetzels *et al.* (2009) suggest the following cut-off values for assessing the results of the GoF analysis: $GoF_{\text{small}} = 0.1$; $GoF_{\text{medium}} = 0.25$; $GoF_{\text{large}} = 0.36$. For the complete model, we obtain a GoF value of 0.40, which indicates that our model has a very good global model fit.

5.1.2 Main effects and path coefficients. The following analysis investigates the main effects of customer familiarity with and knowledge about a bank's fraud prevention measures on customer relationship quality as well as the effect of customer relationship quality on customer loyalty intentions. Figure 2 shows path coefficients and significance levels. In line with *H1-H3*, the results show positive associations between the degree to which customers feel well informed and knowledgeable about the bank's anti-fraud measures and all relationship quality constructs. Precisely, a 1 SD increase in customer fraud knowledgeability leads to a 37.31 percent SD increase in customer satisfaction ($f^2 = 0.16$, $p < 0.01$), a 35.13 percent SD increase in customer trust ($f^2 = 0.14$, $p < 0.01$), and a 30.22 percent SD increase in customer commitment ($f^2 = 0.10$, $p < 0.01$). Effect sizes are of moderate magnitude and are calculated as in Henseler and Chin (2010): $f^2 = \frac{R^2_{\text{included}} - R^2_{\text{excluded}}}{1 - R^2_{\text{included}}}$.

In line with *H4-H9*, we also find positive associations between the relationship quality and customer loyalty constructs. The effects on customers' intention to continue the relationship are considerably larger and stronger than the effects on customers' cross-buying intentions. In detail, a 1 SD increase in customer satisfaction leads to a 35.84 percent SD increase in customers' continuation intentions ($f^2 = 0.14$, $p < 0.01$) and a 10.82 percent SD increase in customers' cross-buying intentions ($f^2 = 0.01$, $p < 0.01$). A 1 SD increase in customer trust triggers a 17.58 percent SD rise in customers' continuation intentions ($f^2 = 0.03$, $p < 0.01$) and a 15.25 percent SD rise in customers' cross-buying intentions ($f^2 = 0.01$, $p < 0.01$). Finally, a 1 SD increase in customer commitment causes a 31.81 percent SD rise in customers' continuation intentions ($f^2 = 0.14$, $p < 0.01$) and a 0.21 percent SD rise in customers' cross-buying intentions ($f^2 = 0.03$, $p < 0.01$).

5.2 Moderation analysis

We now examine the effects of several variables as potential moderators of the relationship between customers' familiarity with and knowledge about fraud prevention and their satisfaction, trust, and commitment. In this context, we either create interaction terms or conduct group comparisons, depending on the variable's scale level (Henseler and Chin, 2010).

5.2.1 Personal fraud affection. As a direct result of the data collection design, about half of the respondents (716 out of 1,491) were previously affected by third-party fraud. In accordance with *H10*, we examine whether the effects on the relationship quality constructs are higher for fraud-affected (yes) than for non-affected (no) customers. We neither find significant differences in the importance assigned to this topic, nor in the indicated knowledge about and familiarity with the bank's fraud prevention measures between affected and non-affected customers. However, when comparing both groups in two separate SEM models, we find a stronger effect of knowledgeability about a bank's fraud prevention measures on the relationship quality constructs for fraud-affected customers. Differences for satisfaction ($\beta_{\text{yes}} = 0.37$, $\beta_{\text{no}} = 0.21$, $f^2 = 0.11$) and commitment ($\beta_{\text{yes}} = 0.30$, $\beta_{\text{no}} = 0.19$, $f^2 = 0.06$) are significant at the 5 percent level, the difference for trust ($\beta_{\text{yes}} = 0.34$, $\beta_{\text{no}} = 0.21$, $f^2 = 0.08$) is significant at the 1 percent level.

5.2.2 Socio-demographics. We test the moderating effect of various socio-demographic variables. For each variable, we first examine the direct effect on customer knowledgeability regarding the bank's fraud prevention measures and, next, include it in the SEM model as a moderator of the relationship between customer knowledgeability about fraud prevention and customer relationship quality.

Age. Age is a metric variable derived from the respondents' year of birth. To check whether age has a moderating impact, we split the sample into four equally sized groups and conducted a group comparison. The results showed that the youngest respondents (< 36 years) consider themselves significantly less knowledgeable about their bank's fraud prevention measures ($M = 3.05$) than all other age groups (37-45 years: $M = 3.20$, $p < 0.05$; 46-53 years: $M = 3.22$, $p < 0.01$; > 54 years: $M = 3.26$, $p < 0.01$). To include age as a moderator in the SEM analysis, we constructed an interaction variable using standardized indicators to avoid collinearity problems and to make coefficients comparable (Henseler and Chin, 2010). SmartPLS automatically calculates this interaction variable (Ringle *et al.*, 2005). The analysis reveals negative path coefficients for all relationship quality constructs, which means that a high age reduces the effect of customer knowledgeability regarding fraud prevention on customer satisfaction ($\beta_{\text{age} \times \text{knowledgeability}} = -0.18$, $f^2 = 0.04$, $p < 0.01$), trust ($\beta_{\text{age} \times \text{knowledgeability}} = -0.15$, $f^2 = 0.05$, $p < 0.01$), and commitment ($\beta_{\text{age} \times \text{knowledgeability}} = -0.08$, $f^2 = 0.02$, $p < 0.05$).

Gender. With an independent samples *t*-test we checked for significant differences between males and females regarding how well they feel informed and how knowledgeable they consider themselves regarding their bank's fraud prevention measures. Male respondents score significantly higher ($M = 3.26$) with respect to knowledgeability regarding fraud prevention measures than female respondents

($M = 2.97$) ($t(1,420) = 6.4$, $p < 0.01$). Yet, when extending the SEM model for a moderating effect of gender, we find no significant effects.

Education. Respondents' level of education was measured through their self-categorization into three different educational groups. Customers indicated whether they finished middle school, graduated from high school, or graduated from university. Middle school graduates were considered the comparison group. No differences were detected with regard to the level of knowledgeability about the banks' fraud prevention measures. Next, education is included as a moderator in the SEM model. The analyses show that there are no differences in the effects of customers' knowledgeability on the relationship quality constructs between middle school and high school graduates. However, compared to university graduates (UNI), middle school (MS) graduates exhibit significantly stronger effects on satisfaction ($\beta_{MS} = 0.31$, $\beta_{UNI} = 0.21$, $f^2 = 0.06$, $p < 0.10$), trust ($\beta_{MS} = 0.33$, $\beta_{UNI} = 0.22$, $f^2 = 0.07$, $p < 0.10$), and commitment ($\beta_{MS} = 0.33$, $\beta_{UNI} = 0.22$, $f^2 = 0.07$, $p < 0.10$).

Income. Income was measured by asking respondents to indicate their belonging to one of four monthly net income classes: first, <1,500 euros; second, 1,501-1,800 euros; third, 1,801-2,500 euros; fourth, >2,500 euros. Using the lowest income group (<1,500 euros) as comparison group, we found no significant differences between the specified groups, neither regarding self-indicated familiarity with and knowledge about their bank's fraud prevention measures, nor regarding the effects of this knowledgeability on customer relationship quality.

6. Discussion and conclusion

6.1 Discussion of results

To the best of our knowledge, the current study is the first to establish an empirical link between customer familiarity with and knowledge about their bank's fraud prevention measures, customer relationship quality, and customer loyalty. The results enhance our understanding of the impact of fraud prevention and show how its scope exceeds the mere reduction of fraud-induced operating costs (Gates and Jacob, 2009). In particular, the results show that there is a positive association between customer familiarity with and knowledge about their bank's fraud prevention measures and customer relationship quality. Customer relationship quality, in turn, positively affects customer loyalty intentions. The prior effects are stronger when customers have been affected by third-party banking fraud before. Presumably, such negative experiences sharpen customers' attention for the fraud prevention mechanisms employed by their bank. An effective communication about such measures therefore has a higher potential to trigger positive effects in terms of relationship quality and customer loyalty for fraud-affected than for non-affected customers. Furthermore, age has a moderating influence on the previously described association. Older customers indicate to be more familiar with and have a better knowledge about their bank's fraud prevention measures than younger ones, while the positive effects of knowledgeability on customer relationship quality are significantly lower for the older age group. These findings suggest that perceptions of being well informed and knowledgeable may make older customers more sceptical about the anti-fraud measures employed by their bank than younger customers. Finally, the moderation analyses regarding customers' socio-demographics show that fraud prevention is a crucial aspect in bank relationships for customers across all education and income levels. The analyses revealed no significant differences between income groups and only a slight tendency of lower-educated customers to appreciate fraud protection less than higher-educated customers, as expressed by significantly lower path coefficients.

6.2 Managerial implications

The results stress the importance and potential of (effective communication about) fraud prevention for retail banks. While for many banks, fraud prevention may mainly serve to reduce the operating costs related to refunding affected customers (Gates and Jacob, 2009), this study contributes to a more comprehensive understanding of the importance of fraud prevention. The results show that creating customer awareness, understanding, and knowledge about fraud, and the measures which banks take to prevent it, carries a substantial potential to enhance relationships with retail bank customers and to enhance these customers' value to the bank by triggering re-buying and cross-buying. Recognizing this potential of effective fraud prevention should lead bank managers to rethink their current strategies in fighting fraud and communicating it. To establish high-quality customer relationships, banks should try to get customers on board when it comes to reducing fraud. First, well-informed customers are less likely to put their confidential data in danger. Second, knowledgeable customers value the initiatives banks take to protect them more than unaware customers do. Banks are advised to focus on customers who have been a fraud victim before, as for them, effective fraud management has a particularly strong effect on relationship quality. Accordingly, communicating the presence of a well-designed fraud management system may help to retain such clients or even win them as new clients. Also older customers, who may be more sceptical about a bank's fraud prevention measures, are a key target group to focus on.

6.3 Limitations and future research

This study has several limitations which should be considered when evaluating the results, but which also provide interesting avenues for future research. First, the analyses were conducted with a sample obtained from only one German retail bank. Although this bank is large and has a considerable market share, the results are not necessarily generalizable across other banks and other countries. Future research might address this concern and examine whether retail bank customers of other banks and in other countries react similarly to effective fraud prevention communication. Second, future research could address the question of which anti-fraud tools contribute most effectively to customers' feeling of safety. Especially from a management perspective, it is important to identify the tools which customers consider as a minimum requirement and those which make them truly value the relationship and be a loyal customer to their bank. Third, the findings of this study are limited by its focus on attitudinal loyalty. We measured customers' intention to remain with their bank as well as their cross-buying intentions, rather than their actual re-purchasing and cross-buying behavior. As prior work shows that both dimensions are important (Al-Hawari *et al.*, 2009), future research might also examine the impact of fraud prevention measures on behavioral loyalty.

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