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Process landscape and efficiency in non-life insurance claims management

An industry benchmark

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Abstract

Purpose – In view of the fact that claim payouts account for about 70 per cent of annual direct costs in non-life insurance companies and that claims-handling staff sums up to 10-20 per cent of all employees, an optimal claims management environment is of strategic importance. The purpose of this paper is twofold, i.e. on the one hand, the authors introduce a standardized claims management process model and, on the other hand, they apply process benchmarks to various operational parameters.

Design/methodology/approach – The proposed claims management process landscape comprises current industry standards for claims handling from a theoretical perspective, supported by practice insights from the industry. Our model aims to reflect the most important claims processing activities. The claims-handling work flow is structured into five core steps, namely, notification, registration, coverage audit, settlement and closing of the claim. For these core steps, the authors differentiate between three claim complexity categories and their associated back-office levels. In the second part of the paper, the authors assess the industry's claims-handling efficiency. The authors benchmark industry processes with reference to detailed claims management data from 11 insurers in Germany and Switzerland.

Findings – The benchmarks are based on the previously defined claims management model and are applied separately to the three retail business lines of car, property and liability insurance. We measure claim process times (cycle times) as well as claim quantities and average claim payouts at different levels. Overall, within each business line, more than 30 data points are gathered from each respondent insurer. This allows us to compare the process performance of different insurance companies and to describe significant differences in their process patterns. Furthermore, principal findings are derived from descriptive statistics as well as *ad hoc* data analyses.

Originality/value – The paper seeks to contribute to the discussion of how different insurance companies perform in claims management and to define best practice. Our findings are relevant to academics and practitioners alike.

Keywords Process efficiency, Claims management model, Industry benchmark, Non-life insurance

Paper type Research paper

1. Introduction

In recent years, insurance companies have been facing increasing competition for clients. This is especially true of the non-life retail business lines that are attractive in

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offering higher profitability with lower risk exposure. These developments have been catalyzed by the problems that insurers have to solve in their life business. In this context, best practice in claims management has been widely discussed. The core driver is the fact that claim payouts often account for around 60-70 per cent of all expenses in the retail segments[1]. Thus, the claims management and its efficiency is at the center of attention. Furthermore, overall insurer operating expenses amount to between 10 and 30 per cent of all expenses. Depending on the organization of the companies, between 10 and 20 per cent of all employees work in claims handling[2]. Hence, each claim payout that insurers are able to reduce in amount (optimization of payouts), together with improvements in their processes (efficiency in operations), has an immediate impact on the companies' profitability, i.e. their costs and combined ratios[3].

The increasing importance of claims management is reflected by a rising number of related publications. The OECD (2004) published guidelines for good practice for claims management and provided a general framework. The guidelines offer operational recommendations for the most important process steps in claims-handling procedures. Dab *et al.* (2007) state that insurers are currently scarcely aware of their actual processes. For example, there is often no transparency surrounding actual settlement resources for different claims categories. The lack of transparency results in inadequate resource allocation. The identification of performance potentials through the use of innovative claim settlement methods is discussed by Accenture (2003). The authors name excellent claims triage, alternative adjustment methods and deepened vertical process integrations as important levers for optimization. Butler and Francis (2010) and Bart (2012) stress the importance of excellence in process knowledge and the necessity of companies exerting direct control over each step in the settlement process. Despite the number of publications from practitioners, there are hardly any quantitative analyses covering the field in a comprehensive manner.

The aim of our paper is to contribute to the debate concerning insurance claims operations in terms of strategic and operational aspects. We seek to do so by introducing a model describing the process flows, identifying industry best practice and discussing success factors in operations by means of an industry survey. In the first step, we outline a model for the process landscape. It consists of five consecutive stages and three handling units for claims of different complexity. The core process steps comprise the notification, registration, audit, settlement and closing of claims. Along these stages, we define detailed work flows for payout, standard and complex claims cases. Our model is fleshed out by input from practitioners. In the second step, we conduct an industry survey with car, property and liability insurers from Germany and Switzerland. The survey focuses on process quantities, times, organizational design, personnel capacities and strategic aspects. To ensure the comparability of our results among the participants, all process data are evaluated with reference to the proposed model. In the 11 participating companies, more than 30 data points in each of the business lines are gathered. Finally, we provide statistical analysis and benchmarking results.

We observe that insurers operate on very different efficiency levels. This becomes apparent, for example, when looking at claims work and cycle times or at the claims adjustment allowances of agents and brokers. Such insights indicate that there is no generally accepted best practice operating model in use. We also derive strategic insights; for example, that companies granting adjustment allowances to their agents appear to face higher fraud occurrence, while this does not apply to brokers. Further, we

identify a tendency for shorter cycle times to lead to an increased level of detected fraud (especially in property insurance). Insurers also manage to reduce cycle times with the introduction of lump-sum adjustment allowances. To the best of our knowledge, our study is the first of its kind in academic insurance claims management research.

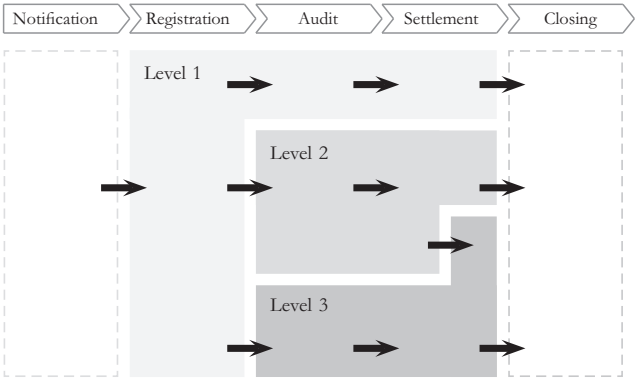
In Section 2, we introduce the concept and core elements of the claims management process model. The work flows are described in Section 3. In Section 4, we outline the research methodology, the panel of participants with their key characteristics and we summarize the questionnaire[4]. The empirical findings are reported and discussed in Section 5. We conclude in Section 6.

2. Claims management model framework and literature review

The idea behind proposing a claims management model is to create a paradigm representing the principal process steps for the most commonly occurring types of claims cases. Although in practice, claims operations differ significantly between insurers, a standard model serves to boost operational efficiencies (Bart, 2012). In our context, the model provides a basis for discussions and enables us to collect data from practitioners. Our model concerns retail claims in the non-life business area. Given that overcomplexity in the processes has been identified as one of the key issues (Postai, 2006), we propose a simplified model derived from theoretical considerations and industry input. The OECD (2004) guidelines provide the initial basis (Figure 1).

2.1 Core process stages

The segmentation of the value chain into five core process stages follows the reports from academics and practitioners (Müller and Küfner, 2003; McFarland and Knipp, 2001; Little, 2006 and Capgemini, 2011). In addition to these sources, practical input has



Notes: Core elements include five process steps for claims-handling procedures and three levels of claim complexity and back-office levels. The core process stages are described in Section 2.1. Incoming claims are categorized as "payout" claims (level 1), "standard" claims (level 2) or "complex" claims (level 3) and are handled by the corresponding back-office level, see Sections 2.2 and 2.3

Figure 1.
Outline of a standard claims management process model with its core elements

been gathered from expert hearings which allowed us to fine-tune the model[5]. Aggregating all the information, we define five stages.

(1) *Notification*: The operational starting point of the claim case is when the client notifies the insurer of the claim occurrence (Maas and El Hage, 2006). It allows to define claims cycle times, which is a key measure for process benchmarking. Cycle times can, for example, be applied to test correlations between efficient operations (short cycle times) and the occurrence of fraud (Bearing Point, 2008, Fenn and Rickmann, 2001). Furthermore, the inbound channel of the claim notification may also yield insights (Section 3.1).

(2) *Registration*: The insurer transfers the case in its claims system and segments the claim according to its complexity (cf. Section 2.2). We separate the claim's registration from the notification to place special emphasis on the segmentation procedure (Amoroso, 2011). Claims segmentation is of major importance, as it determines the overall process efficiency (Brunauer *et al.*, 2011; Butler and Francis, 2010).

(3) *Audit*: At this stage, the insurer determines if the claim is covered by a contract. If this is not the case, the insurer can still settle the claim through a goodwill handling (e.g. in borderline cases). Otherwise, the claim is rejected. Insurers with high amounts of goodwill claims are often building customer satisfaction (driven by voluntary claim payouts) at the expense of an increase in total claim payouts (Huysentruyt and Read, 2010). We address both adjustment types separately.

(4) Settlement: The most important task is the definition of the settlement amount. Depending on the complexity, this assessment is done with or without the assistance of claims auditors (insurers have in-house as well as contracted auditors). This stage is crucial for the efficiency of operations. There is a trade-off between a higher level of manually audited claims which correlates with increased administration and personnel expenses and a lower level of manual handling which correlates with lower costs.

(5) *Closing*: The adjustment process ends when the customer receives the payout and the closing notice. Depending on the adjustment method, either a cash payment or a replacement in kind is issued. It is important to track the closing times to determine cycle times and the performance (IBM, 2006).

2.2 Claim complexities

Adequate claims segmentation patterns have an immediate impact on process speed (cycle times) and proper claims handling (relation of audit intensity to complexity). Among practitioners, state-of-the-art segmentation models are often discussed (Butler and Francis, 2010). According to current discussions, there is no clear best practice with regard to the number of segmentation categories, patterns and targets. We introduce three levels of claim complexities:

(1) *Payout claims*: This segment represents a large share of retail claims. The idea is to group claims that can be relatively quickly adjusted either on a lump-sum basis or with reduced auditing patterns. Lump-sum adjusted claims are usually settled if the claim is below a defined amount. Determining this threshold is crucial, because if customers identify this limit, insurance fraud is eased. These claims have the shortest cycle times because of their lower handling

complexities. All claims are settled immediately if the claim is covered and all information available. Because of the high costs associated with inspections, these claims are not further audited.

(2) *Standard claims*: Standard claims often account for the largest proportion of all claims. Unlike payout claims, standard claims trigger a more detailed settlement procedure in the back-office. Depending on the complexity, internal or external auditors are engaged. Often, more internal than external audits are performed because of the lower adjustment costs and closer supervision if done internally.

(3) *Complex claims*: Complex claims are mainly handled by specialists in the back-office and represent a smaller share of all cases. All claims are inspected to determine the settlement amount. These inspections differ significantly from inspections in the other claims categories, thus resulting in higher cycle times.

2.3 Back-office levels

From our interviews, we found that three back-office levels are most commonly involved in claims-handling units. These levels are assigned to settle claims along the three complexity categories. The different personnel capacities and ability levels entail financial considerations. Our model makes the following assumptions regarding the levels.

(1) *First level*: This level is responsible for the settlement of payout claims. Because of the lower complexity, the personnel in this unit are less specialized. Usually, this level is centrally located in the claims management organization. The personnel usually have no direct contact with the insurance divisions. Because of the higher homogeneity of cases, these operations are most appropriate for outsourcing (Khiruddin, 2011; Hoying *et al.*, 2014).

(2) *Second level*: Here all standard claims are processed. Given the higher complexity, the second back-office level makes decisions as to whether to use claims auditors. Either the back-office personnel or the claims auditor is responsible for the determination of settlement amounts. If the claim case appears to be more complex than estimated, it is rerouted to level three. Outsourcing of second-level operations is less common.

(3) *Third level*: This level handles claims with the highest complexity. Personnel liaise closely with the insurance divisions. Process outsourcing for third levels rarely occurs. Personnel in these units have the highest level of specialization of all employees.

3. Workflows in the process model

Using the model introduced above, we define the workflows in Figure 2 and provide an understanding of which data points are relevant for measurement in the empirical study.

3.1 Notification

This stage includes activities that take place during the time from when the policyholder sustained the loss until he reports it to the insurer. Two different points in time are defined: the time when the loss occurred and the time when the customer first discovered it. The first definition is appropriate for our purpose, as we analyze time periods between

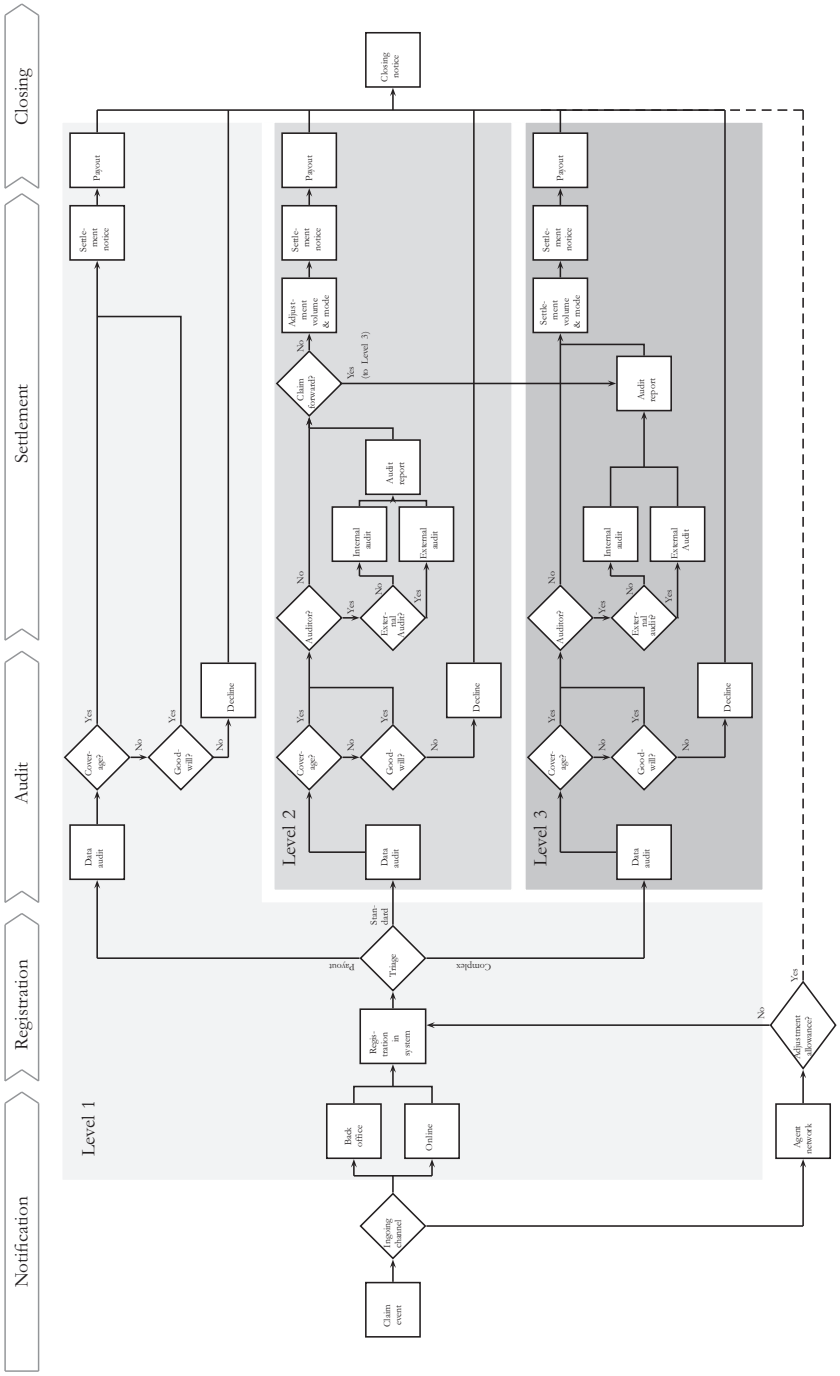


Figure 2.
Illustration of the work flows in the standard claims management model (extension of the outline in Figure 1)

loss occurrence and reporting. Our model differentiates three claims reporting channels. First, customers can report losses via the insurer agent network comprising the company's tied agents and independent brokers. The second channel represents various online access points, like e-mail, homepage and mobile-device-apps. A third channel includes all other means of reporting to the back-office (e.g. telephone, fax and letter). Claim reports via the online and back-office channels are initially handled in the first-level back-office unit. Claims filed through the agent network are either handled through agents or transferred into the back-office. The latter is the case if the claim amount exceeds the agent's adjustment allowance.

3.2 Registration

The registration step spans from the moment when the claim is received until the case is categorized into the adequate complexity segment. When claims are routed to the back office, notifications are consolidated and clerks are responsible for the registration in the central system. For this process, we do not differentiate between the reporting channels and media. After the initial registration, the clerk completes any required information. This completion is typically done by re-contacting the customer. Once the claim file has been completely registered, claims are automatically segmented into three categories (cf. Section 2.2) by standardized procedures in one single step. Remaining claims are segmented manually.

3.3 Audit

During the coverage audit, the insurer decides if the claim is covered by the customer's contract. At this stage, claims are handled for the first time according to their complexities in the back-office levels. All claims-related documents are integrated in the system: the reporting document contains all basic data and a detailed description, the settlement quote initially reports the client- and case-specific claim amount. If anything is incomplete, the back-office clerk completes the data. Depending on the internal process automation, the audit may be supported by information technology systems. Claims that are technically declined in the first step are audited for goodwill coverage in a second step. Whether a non-covered claim can be adjusted through goodwill is decided by the clerk. Usually, in each back-office level, there is a predefined amount up to which claims can be settled under goodwill.

3.4 Settlement

Following the audit, the settlement amount and mode are determined. Depending on the complexity, both parameters are determined in-house, with or without claim surveyors, or with the assistance of external auditors. The settlement stage technically ends with the clearance. In our model, payout claims handled in the first back-office level are not further audited. Those claims are settled immediately after the claim coverage audit. Standard and complex claims can be settled without claim surveyors and with internal or external auditors. After the claim report is processed, the clerks evaluate the report. In the proposed model, each case is assessed only once. In practice, claim cases may be assessed more often.

3.5 Closing

In this stage, the payout of the claim amount and the adjustment are initiated. The model assumes that the claim is paid out via the back-office level that handled it. In practice,

claim payouts are either made directly as cash settlements or indirectly. The latter is the case if a contractor or the insurer handles the loss item and is responsible for repair or replacement. The process formally ends with the claim closing note sent to the customer.

4. Methodology and description of questionnaire

4.1 Methodology and survey participants

Data were gathered over a period of four months from August to December 2013. Initially, we contacted 57 C-level representatives of insurers from Germany (52) and Switzerland (5). As our study focuses on the non-life retail customer segment, we only considered companies with significant market shares in that segment. The companies had a combined market share of 87 per cent for Germany and 68 per cent for Switzerland[6]. To guarantee a maximum level of attention and practical knowledge, we mainly contacted board members or division managers of the claims units with our questionnaire.

We conducted the study in two steps with each participant. In a first step, we sent out the questionnaire accompanied by documentation on the process model to lay the basis for a common understanding (see Section 2). We had interviews and feedback loops with all potential participants to help with any difficulties and to guarantee accurate answers for our study. Issues arose mainly out of the fact that relevant numerical parts of our survey had not been completed in a comparable manner in the past by those insurers. Several companies reported that they underestimated the time required to obtain the data. On average, insurers needed two to three working days to produce the necessary figures. By the end of this step, a total of 11 representatives of different companies (8 from Germany and 3 from Switzerland) had returned a completed questionnaire. This corresponds to a response rate of 19 per cent. The lower rate can be explained by the extensive involvement required from respondents. The second step of data collection consisted of individual interviews with each participant. We discussed the figures entered in the questionnaire to ensure their adequateness. The individual results were also compared with other participating insurers to confirm and to try to account for any outliers already at the earliest stage. On average, each insurer was contacted three times until the data set was finalized.

In Table I we summarize market shares and numbers of participating companies. We grouped insurers in respect of company size (small and large) and country of main business activity. Premium volume was used for each insurer to identify the size as having premiums below (respectively above) the median level of all participants, that is €942m. For the latter, the premium value of Swiss insurers is converted into euros[7]. For Germany (Switzerland), our study covers a market share of 18 per cent (46 per cent).

Country	Small insurers	Large insurers	Total
Germany (%)	5.3 (4)	13.1 (4)	18.4 (8)
Switzerland (%)	10.8 (1)	35.0 (2)	45.8 (3)
Number of firms	5	6	11

Notes: Market shares are calculated on the basis of gross written non-life premiums; small/large insurers have premiums below/above the median premium level of all participants, that is €942m; values in brackets reflect the absolute number of answers received

Table I. Categorization of participating insurers in the survey according to their total market share per country and company size

Large insurers contribute the biggest share with 13 per cent (35 per cent) for the German (Swiss) market.

4.2 Description of the questionnaire

4.2.1 Company data. We collected basic data to characterize the participants with regard to company size and performance (Table II). For the retail segment of the three business lines, i.e. car, property and liability, we consider the number of contracts, the volume of premiums and the amount of claim payouts in the period 2010-2012. The number of contracts and the premium volume allow us to evaluate the size of each business segment. The amount of payouts reflects the total claims volume that the insurer paid. All volumes are considered in line with the claims year definition assuming that all reported losses for the respective year are considered. This includes "late" claims reported after the end of the reporting year. For the analyses, currency values are converted into euro[6].

4.2.2 Process quantities and times. According to Naujoks and Venohr (1998), improvements in processing speed tend to be an important success factor (Butler and Francis, 2010; McFarland and Knipp, 2001). Consequently, data were collected for the purpose of measuring process times and relating them to processed quantities. For process times, we differentiate between *cycle times* and *work times*. In characterizing the cases, we are interested in *claim quantities* (number of cases) and the corresponding *claim amounts*. Definitions for each element of data are provided below. Figure 3 gives an illustration.

Each of the metrics is differentiated with regard to the claim complexity categories (cf. Section 2.2). Further, we consider the effects of auditing on cycle and work times. We collect data on the claims quantities and amounts in the different segments. Table III provides an overview of the data collected. In line with the other parts of the survey, each

Metric	2010	2011	2012
Number of contracts	[#]	[#]	[#]
Gross written premiums	[*C.U.*]	[*C.U.*]	[*C.U.*]
Claim payouts	[*C.U.*]	[*C.U.*]	[*C.U.*]

Notes: In the retail segment of each of the three business lines car, property and liability information on the number of contracts, the premiums and claims volume data are gathered for the period 2010-2012; in brackets [·], the format of the required input is given as follows: # stands for numerical input; *C.U.* stands for input with currency unit, i.e. euro or Swiss franc

Table II.
Excerpt from the questionnaire: collection of company data in the business lines car, property and liability

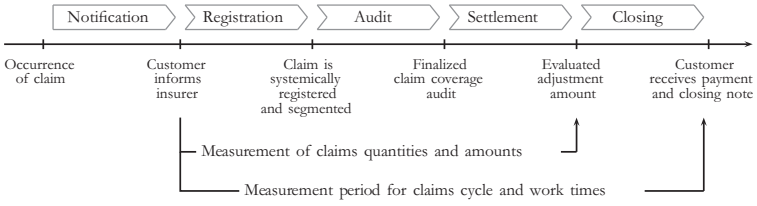


Figure 3.
Illustration of the measurement of process times and quantities along the core stages of claims management (compare with Figures 1 and 2)

Claims category	Cycle time	Work time	Claims quantity	Claims amount
Payout claims				
With auditor	[*days*]	[*hh:mm*]	[#]	[*C.U.*]
Without auditor	[*days*]	[*hh:mm*]	[#]	[*C.U.*]
Standard claims				
With auditor	[*days*]	[*hh:mm*]	[#]	[*C.U.*]
Without auditor	[*days*]	[*hh:mm*]	[#]	[*C.U.*]
Complex claims				
With auditor	[*days*]	[*hh:mm*]	[#]	[*C.U.*]
Without auditor	[*days*]	[*hh:mm*]	[#]	[*C.U.*]

Notes: Cycle time, work time, claims quantity and claims amount are determined for the three claims complexity categories in the year 2012 (see also Figure 3 for the measurement along the core process stages and Section 2.2 for the claims categories); in brackets [·], the format of the required input is given as follows: *days* stands for input in days, *hh:mm* for input in hours and minutes, # stands for numerical input, *C.U.* stands for input with currency unit, i.e euro or Swiss franc

Table III. Excerpt of the questionnaire: collection of process quantities and times in the business lines car, property and liability

measurement is considered separately for the three retail business lines car, property and liability. Thus, for each insurer, a total of 72 data items for the year 2012 are gathered:

- *Claims cycle times*: This measure reflects the time elapsing from when the customer informs the insurer of the occurrence of the loss until the claim is closed and settled. We measure cycle times in days. For comparative reasons, we set the rule that all days except Sundays and holidays are included in the calculation of cycle times. For all cycle times, average values are used.
- *Claims work times*: Unlike cycle times, work times are a measure of the actual time that the insurer needs to perform the process steps from registration until the closing of the claim. We measure work times in hours and minutes. Work times reflect the average times over all claims cases.
- *Claims quantities*: Quantities are measured from the start of registering the claim to its settlement. Each claim filed is counted, i.e. counting can potentially result in more than one claim per customer contract. Using the quantities, the segmentation patterns and the business composition of different insurers can be assessed.
- *Claims volumes*: The claims volume is defined as the total accumulated claims expenses reported by the insurer for the year 2012. To be consistent with the historical claims data gathered in the previous part of the survey, we apply the claims year definition (Section 4.2.1).

4.2.3 General topics

4.2.3.1 Organization setup. Organizational topics help to identify which structures are present in claims operations. We differentiate and count main, branch and agent network locations. Main locations are defined as the organizational unit(s), where the insurer sets up its main handling operations. Branch locations provide smaller capacities and are often only responsible for specific claims categories or parts of the process. Under agent (network) locations, all tied agents with own offices and

adjustment allowances are summarized. In addition, we collect data on the degree to which operations are outsourced. We differentiate between outsourced own units (units that are outsourced, but still owned by the respective insurer or group) and outsourced units (not owned). An overview is provided in Table IV.

4.2.3.2 Human resources. To add quantitative results to the discussion surrounding administrative efficiencies (McFarland and Knipp, 2001; Butler and Francis, 2010), we measure personnel quantities in respect of employee role and claims-handling competence. We cover the separate groups of back-office personnel, line managers, claims auditors and fraud personnel. Back-office personnel and line managers typically form the largest group of employees and are responsible for the general claims handling. Claims auditors are the insurer's internal specialists for coverage audits (see Section 3.3). Fraud personnel are responsible for all anti-fraud activities. All of the personnel capacities are measured as full-time equivalents (FTEs) (Table V).

4.2.3.3 Process strategies. In Table VI, we introduce ten survey questions concerning process strategies. The topics can be aggregated into the categories of *claims case steering*, *adjustment process and limits* and *customer service providers*. Topics 1 and 2 cover claims steering aspects with regard to claims automation and fraud detection. Automation reflects the percentage of all claims that are handled without back-office interaction from claims registration until the final adjustment process stage. Closely related to this topic is the automated and manual identification of insurance fraud. Topic 2 reveals which part of incoming claims is identified as fraud. The core adjustment processes and limits are addressed through questions (3) to (7). Topic 3 reflects the willingness of insurers to regulate claims without formal contract coverage. In complement to goodwill settlements, we ask respondents to state the percentage of rejected incoming claims (Question 4). Topics 5 to 7 deal with allowances enabling companies to reduce their own administration burden in claims handling. This can be done through an increase in lump-sum adjustment or by transferring adjustment

Table IV.
Excerpt of the questionnaire: organization setup by location types and legal status of the units

Location type	Own	Outsourced own	Outsourced
Main locations	[#]	[#]	[#]
Branch locations	[#]	[#]	[#]
Agent locations	[#]	n.a.	n.a.

Notes: Number of own, outsourced own and outsourced units for each type of location (main, branch, agent); as agent (network) locations cannot be outsourced, they are prefilled with the reference "not applicable" (n.a.); [#] stands for numerical input

Table V.
Excerpt from the questionnaire: personnel quantities by back-office level and type of personnel

Level	Back-office	Line manager	Claims auditors	Fraud personnel
Level 1	[*FTE*]	[*FTE*]	[*FTE*]	[*FTE*]
Level 2	[*FTE*]	[*FTE*]	[*FTE*]	[*FTE*]
Level 3	[*FTE*]	[*FTE*]	[*FTE*]	[*FTE*]

Notes: Personnel quantities are measured as the sum of full-time-equivalents (*FTE*) for back-office, line managers, claims auditors and fraud personnel; to reflect capacity requirements for different claim complexities, results are reported for the back-office levels 1 to 3

Topic	Unit	Survey question
Claims case steering		
(1) Black-box operation	%	What share of all claims is processed automatically?
(2) Fraud volume	%	What proportion of incoming claims is classified as fraud cases?
Adjustment process and limits		
(3) Goodwill adjustment	%	What share of claims cases is adjusted on a goodwill basis?
(4) Claims rejection	%	What proportion of claims cases is rejected?
(5) Lump-sum adjustment	€	Up to what amount are claims adjusted on a lump-sum basis?
(6) Agent adjustment	€	What is the claims adjustment limit for tied agents?
(7) Broker adjustment	€	What is the claims adjustment allowance for brokers?
Customer service providers		
(8) Service providers	#	How many services providers are contracted to the insurer?
(9) Service provider obligation	%	What proportion of contracts carries a service provider obligation?
(10) Service provider usage	%	What proportion of customers use service providers voluntarily?

Table VI.
Excerpt of the questionnaire: claims management process strategies in the business lines car, property and liability

allowances to either tied agents or brokers. As tied agents are selling contracts exclusively as intermediaries on behalf of one insurer, the insurer is liable *vis-à-vis* the agent. Brokers have the freedom to sell contracts from any company. Unlike tied agents, brokers are acting on behalf of the customer and are thus obliged to advise him in the best way, which may have an impact on adjustment procedures. The last Topics 8 to 10 consider aspects of service provider usage. Service providers allow insurers to better control the adjustment patterns of their customers. For example, in car insurance, damages may be repaired by a selected repair shop network only. Such repair shop networks are considered service providers. We ask for the number of service providers (Question 8), current insurance contracts with service provider obligations (Question 9) and the level of voluntary service provider usage (Question 10).

5. Results and discussion

5.1 Industry benchmark: descriptive statistics of the survey results

The presentation of the descriptive statistics closely follows the structure of the survey described in Section 4.2[8]. Throughout the different parts of the descriptive statistics, our discussion focuses on the following questions:

- Is there an established best practice in the industry or do we observe heterogeneous levels of efficiency? Key measures considered are the work and cycle times, the allocation of human resources and the integration of agents with adjustment allowances.
- What differences can be observed between the business lines? Is claims handling in car business much more standardized than in the property and liability lines?
- How do the strategies compare among the companies? What differences can be observed in the case steering, the processes and the usage of service providers?
- Do insurers from Germany and Switzerland show different efficiency levels?

5.1.1 Characteristics of the data panel. In Table VII, we summarize key data for the characterization of the survey participants. We provide results for the aggregate panel and the firm levels. Company data are reported for the business lines car, property and liability from the retail segment for the year 2012. A final column reports the total values for the three lines. In each item, we differentiate between German ("DE") and Swiss companies ("CH"). For Germany (Switzerland), our study covers €7.03bn (€3.16bn) in cumulative annual premiums. In both countries, the largest parts of premiums come from car insurance, followed by property and liability lines. Looking at claims volumes, we see a slightly different distribution among the business lines (see below).

Data at the firm level are reported for premiums, claims and key growth ratios. Numbers reflect average values for the participating insurers. For the *premiums*, we notice that Swiss insurers (€1,053m premiums) are on average slightly larger than German companies (€879m). The distribution of premiums among business lines differs. For example, car insurance premiums for German insurers account for around 62 per cent (€542m against €879m), while Swiss companies have higher shares (77 per cent, €812m of €1,053m). The average policy premium of Swiss insurers is two to three times higher than the one in German companies. The main reasons for this are linked to higher competition in the German retail market and to higher production costs in Switzerland. Looking at *claims* figures, we find that German insurers have slightly higher average claims volumes than Swiss insurers. This is an important finding, in view of the fact that Swiss insurers have higher average premiums than German companies. Claims ratios, i.e. claims volume divided by premium volume, are higher for German (75 per cent) than for Swiss insurers (62 per cent). This finding holds true for car (80 vs 62 per cent) and property insurance (72 per cent against 58 per cent), while the reverse applies to liability insurance (CH: 84 per cent, DE: 60 per cent). We notice the largest spread (18 per cent) in claims ratios between German and Swiss insurers for car insurance, which is at the same time the segment with the largest premium shares[9]. *Key growth ratios* reveal a stronger premium growth among German insurers for the period 2010-2012 than for Swiss companies. The compound annual growth rate measured on the basis of retail premiums reveals that German (Swiss) companies grew by 3.8 per cent p.a. (0.5 per cent p.a.)[10]. At the same time, total claims volumes also increased, except in Switzerland, where car insurance claims were decreasing slightly (−0.6 per cent).

5.1.2 Process quantities and times. The results in Table VIII are key metrics of our benchmark: they are reported for the claims complexities payout ("P"), standard ("S") and complex claims ("C") and for the business lines with their average values (column "mean") and standard deviation (column "sd").

For claims *volumes and quantities*, we analyze the claims volumes, number of claims (quantity) and the claims size (volume per case). Both the average claims volume and the average quantity show that standard claims are the dominant claims category. In terms of volume, standard claims account for 66, 47 and 55 per cent of the total claims in the business lines. In terms of number of cases, standard claims account for 63, 64 and 68 per cent of all cases in the three business lines. Overall, a 30–60–10 distribution of payout–standard–complex claims can be identified for the quantities. In the segmentation, liability insurance has the lowest share of complex claims (3 per cent), followed by car insurance (6 per cent) and property insurance (8 per cent). Claim payouts are very similar for all participants (cf. lower standard deviations). This may indicate that insurers are segmenting payout claims with similar patterns. For standard claims, especially in the

Aggregation level	Measure	Unit	Country	Car		Property		Liability		Total	
Panel (all firms)	Premium volume	€ bn	DE	4.34		2.13		0.57		7.03	
			CH	2.44		0.57		0.15		3.16	
	Claims volume	€ bn	DE	3.48		1.52		0.28		5.28	
			CH	1.51		0.33		0.13		1.96	
	Number of firms	#	DE	8		6		6		8	
			CH	3		3		3		3	
Firm level (averages per firm)	*Premiums*										
	Avg. premium amount	€ m	DE	542	(445)	354	(291)	95	(65)	879	(615)
			CH	812	(183)	190	(106)	50	(19)	1 053	(291)
	Avg. number of policies	# m	DE	1.88	(1.32)	2.02	(1.33)	1.10	(0.97)	4.22	(3.09)
			CH	0.89	(0.20)	0.55	(0.27)	0.52	(0.26)	1.96	(0.67)
	Avg. policy premium	€	DE	289		175		86			
			CH	612		640		182			
	Claims										
	Avg. claims amount	€ m	DE	435	(333)	254	(198)	57	(34)	661	(425)
			CH	502	(110)	110	(49)	42	(33)	654	(120)
	Avg. number of claims	# thd	DE	204	(169)	141	(65)	68	(48)	360	(264)
			CH	249	(59)	57	(24)	52	(40)	357	(87)
	Avg. claims case size	€	DE	2,135		1,802		835			
			CH	2,019		1,934		822			
	Avg. claims ratio	%	DE	80		72		60		75	
			CH	62		58		84		62	
	Key growth ratios										
	Premium CAGR (10-12)	%	DE	5.0	(3.5)	2.4	(1.1)	1.3	(2.9)	3.8	(2.2)
			CH	0.3	(1.4)	1.9	(1.5)	0.1	(2.7)	0.5	(1.4)
	Claims CAGR (10-12)	%	DE	2.0	(4.8)	3.4	(6.9)	–4.1	(8.1)	3.7	(3.7)
			CH	–0.6	(1.6)	9.1	(1.3)	–2.5	(5.8)	0.9	(1.8)

Notes: Basic company data of all participating companies for the year 2012 are reported on the panel and firm levels; summarizing figures on panel level consider cumulated premium and claims volumes of all participants; data on firm level reflects average values on the single company level; the following abbreviations are used: "Avg." for average, "DE" stands for Germany, "CH" for Switzerland and "CAGR" for the compound annual growth rate; the values shown in brackets are the standard deviation on the average figures

Table VII.
Characteristics of the data panel for the business lines car, property and liability

Table VIII. Benchmark of average process quantities and process times in the three claims complexity categories for the business lines car, property and liability

Metric	Unit	Category	Car Mean	Car (SD)	Car d/r	Property Mean	Property (SD)	Property d/r	Liability Mean	Liability (SD)	Liability d/r
Amounts and quantities (number of claims)											
Average amount	€ m	P	43	(44)	10%	13	(12)	6%	5	(4)	8%
		S	286	(184)	66%	106	(63)	47%	30	(15)	55%
		C	105	(113)	24%	105	(120)	47%	20	(19)	37%
Average quantity	# thd	P	65	(52)	31%	34	(32)	28%	17	(19)	29%
		S	134	(101)	63%	78	(53)	64%	39	(30)	68%
		C	13	(21)	6%	10	(7)	8%	2	(2)	3%
Average amount	€	P	629	(198)		889	(328)		316	(253)	
		S	2,337	(1,006)	×4	4,167	(3,030)	×5	872	(392)	×3
		C	24,803	(24,784)	×11	102,291	(175,522)	×25	20,409	(22,652)	×23
Times											
Average cycle	*days*	P	7.0	(6.0)		1.8	(2.0)		2.5	(3.4)	
		S	62.4	(13.2)	×9	69.7	(6.9)	×38	66.4	(17.9)	×27
		C	410.3	(431.6)	×7	120.6	(70.2)	×2	294.0	(304.9)	×4
Average work	*h*	P	0.4	(0.1)		0.2	(0.0)		0.2	(0.0)	
		S	1.7	(0.3)	×4	1.4	n.a.	×7	1.2	n.a.	×6
		C	12.2	(2.8)	×7	7.1	n.a.	×5	10.0	n.a.	×8

Notes: The three claims complexity levels are abbreviated as follows in column “category”: “P” = payout, “S” = standard, “C” = complex; for each metric average values (column “mean”) and standard deviations (column “SD”) are shown. Further in column “d/r”, the distribution of the volumes/quantities is given in % or the ratio or factor (value followed by the sign ×) between the values of categories payout vs standard and standard vs complex are calculated; “n.a.” stands for not applicable

car and property insurance lines, we see increased levels of variance. In contrast, complex claims have very different claim payouts reflected by the much higher values of the standard deviation. This is not surprising, as complex claims are characterized by smaller numbers of cases and events with high occurrence volatilities. We furthermore indicate the multiplication factor driving the claims payout from the payout claims to the standard claims category, and from the latter to the complex claims category. These ratios show how far the complexity category is driven by payout amounts.

In the remaining, claims cycle and claims work *times* are analyzed. Although the cycle times for standard claims are at a similar level for all business lines, we see larger variations for payout and complex claims between the business lines. For car insurance, the average cycle time is around 7 days for payout claims, which is around two to three times the length of cycle times for property and liability claims cases. From our discussions with industry experts, we conclude that the reason for this spread lies in intensified auditing strategies for car insurances because of higher claims ratios (especially in Germany) and the occurrence of fraud. Note, that claims cycle times for payout claims in all lines differ significantly between the survey participants (higher standard deviations). Cycle times for standard claims range from 62.4 days in car insurance to 69.7 days in property insurance. According to our interpretation, these cycle times have a low level of variance for each business line (see the lower values of the standard deviation ranging from 6.9 to 17.9 days). Because of the higher level of claims specificity, cycle times for complex claims are difficult to interpret. Especially for car insurances, cycle times exceed one year. Only two participants provided us with information on work times in car insurance, only one in property and liability insurance. Like cycle times, the reported work times for car insurances are higher than for property and liability.

5.1.3 Organization setup. Table IX reports the number of claims units by location types (main, branch and agent) and legal status (own, outsourced own and outsourced). We identify one trend that is also supported by earlier findings: outsourcing of claims handling is at a low level, as it is a core part of an insurer's value chain (Mahlow and Wagner, 2015). This becomes apparent when looking at figures for outsourced own and outsourced units. Participants with maximum outsourcing efforts have only one fully outsourced main location. Slightly greater efforts seem to be made regarding outsourcing to outsourced own units. These units are legally run by the insurer but are not part of the core business, which allows the insurer, for example, to use labor agreements other than those in force for the core company. Here we find that insurers have one outsourced main location on average. Further, insurers have three main locations and five branch locations on average. Especially large numbers of branch locations reflect insurance companies' efforts to achieve better control of claims-handling processes by being closer to their customers. Historically, insurers often relied on their agent networks in claims adjustments, hence the large number of agent locations.

5.1.4 Human resources. To analyze the efficiency of personnel allocation, we introduce the personnel efficiency ratio (*PER)*. This ratio is calculated as the required personnel measured in FTE per 1 000 claims cases processed. Looking at the efficiency of the different back-office levels, we find large differences between the three levels. The largest differences occur for Level 3, where the most efficient insurer (*PER* of 1.38) outperforms the least efficient company (*PER* of 14.56) by a factor of about 11. For

Table IX. Benchmark of the organization setup by location types and legal status of the units

Location type	Own unit Minimum	Own unit Mean	Own unit Maximum	Outsourced own unit Minimum	Outsourced own unit Mean	Outsourced own unit Maximum	Outsourced unit Minimum	Outsourced unit Mean	Outsourced unit Maximum
Main locations	1	3	6	0	1	4	0	0	1
Branch locations	0	5	26	0	0	1	0	0	0
Agent locations	0	935	3,000	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Notes: Number (#) of own, outsourced own and outsourced units for each type of location (main, branch, agent); minimum (column "min"), average (column "mean") and maximum (column "max") number of locations in each combination for all participants in the panel are reported; agent locations include all agent units with claims adjustment allowances (agent locations without claims adjustment allowances are not considered); agent (network) locations cannot be outsourced (n.a. = not applicable)

Levels 1 and 2, we find less significant differences. For Level 2, the least efficient insurer needs around twice as much personnel as the most efficient company. These findings reappear for the other three types of personnel considered. Taking a closer look at fraud personnel capacities, we find very low numbers especially for the first back-office level. From our raw data, we find that all but one insurer allocate no fraud personnel at all to the first level. Given that industry executives perceive fraud prevention strategies as highly important (Mahlow and Wagner, 2015), this finding is surprising (Table X).

5.1.5 Process strategies. In Table XI, we report the responses obtained in the questions on process strategies. In the area of *claims cases steering*, we note that the degree to which companies have black-box operations depends largely on the business line. For car insurance, the automation level is 17.9 per cent, whereas for property and liability insurances, this level is below 10 per cent. This observation meets our expectations, as car insurance claims stem from a simpler product. This is not the case for property and liability insurances with significantly higher specificities and claims complexities. As regards the levels of detected fraud, survey participants estimate the level of fraud in car and liability insurance to be around 2.3 per cent, while the fraud level in property insurance is about 1.7 per cent.

Regarding the *adjustment process and limits*, the survey reveals that insurers adjust claims on a goodwill basis more often for property and liability insurances (5 per cent of all claims) than for car insurances (1 per cent, Topic 3). This finding is indicative of the tendency for payouts in property and liability lines to be more difficult to estimate, which may then result in higher goodwill. According to the answers in Topic 4, 27.2 per cent of liability claims are rejected, while this holds only for 9.4 per cent (16.2 per cent) of car (property) insurance claims. The high rejection level in liability insurance is unexpected. In the interviews, we were told that there should be no significant difference in the rejection levels for property and liability business lines. The larger standard deviations on the values obtained partly reflect these different perceptions. Four out of ten companies make claim adjustments on a lump-sum basis. The limits for lump-sum adjustments are at relatively equal levels through the business lines (highest in liability insurance). In all, 60 per cent of the insurers allow their own agents to make claim adjustments, while only 20 per cent give adjustment allowances to their broker network. On average, claims in car insurance see the lowest adjustment allowances of about €2 900, followed by property and liability insurance with €3 300. We interpret the lower limit in car insurance as a countermeasure for higher fraud occurrence. Comparing adjustment allowances to average claim payouts per case (Table VIII), we see that, payout and standard claims cases for car and liability insurances are covered by insurance agent claims adjustment allowances. For property insurance with a higher average claims case payouts, this does not hold true. With an average broker claims adjustment allowance of €3 750, insurers are offering higher adjustment allowances to their broker network than to their own agents. A reason for this difference may stem from the fact that insurance brokers demand higher adjustment allowances from insurers to better meet customer expectations. As a result, companies meet these demands to attract the brokers for distribution purposes. In contrast to this finding is that only 20 per cent of the companies provide claim adjustment allowances to brokers at all. This underlines the tendency that insurers try to centralize their adjustment competencies.

Table X. Benchmark of personnel efficiency ratios by back-office level and type of personnel

	Back-office			Line Manager			Claims auditors			Fraud personnel		
Level	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum
Level 1	0.27	0.50	1.11	0.01	0.03	0.05	0.00	0.09	0.24	0.00	0.01	0.02
Level 2	0.57	0.90	1.32	0.02	0.08	0.17	0.00	0.20	0.50	0.00	0.03	0.08
Level 3	1.38	16.77	95.96	0.00	2.37	11.78	0.00	3.57	10.86	0.01	1.49	5.30

Notes: For each combination of back-office level (1 to 3) and type of organizational unit, the *PER* is calculated as the number of personnel (in FTEs) required to handle 1,000 claims; minimum (column "min"), average (column "mean") and maximum (column "max") *PER* values in each combination for all participants in the panel are reported

Topic	Unit	Car Mean	Car (SD)	Property Mean	Property (SD)	Liability Mean	Liability (SD)
Claims case steering							
(1) Black-box operation (%)	%	17.9	(23.2)	9.5	(25.1)	7.7	(20.5)
(2) Fraud volume (%)	%	2.3	(2.0)	1.7	(1.1)	2.3	(1.6)
Adjustment process and limits							
(3) Goodwill adjustment (%)	%	1.0	(1.5)	5.7	(10.7)	5.3	(6.4)
(4) Claims rejection (%)		9.4	(2.4)	16.2	(7.2)	27.2	(15.2)
(5) Lump-sum adjustment							
With (four companies)	€	375	(103)	338	(96)	450	(197)
Without (six companies)	€	0		0		0	
(6) Agent adjustment							
With (six companies)	€	2,917	(1,592)	3,300	(1,470)	3,300	(1,470)
Without (four companies)	€	0		0		0	
(7) Broker adjustment							
With (two companies)	€	3,750	(1,250)	3,750	(1,250)	3,750	(1,250)
Without (eight companies)	€	0		0		0	
Customer service providers							
(8) Service providers	#	148	(292)	18	(26)	4	(7)
(9) Service provider obligation	%	5.9	(5.8)	0.0%	(0.0%)	0.0%	(0.0%)
(10) Service provider usage	%	14.4	(7.1)	19.3	(12.4)	0.0	(0.0)

Notes: The numbers reported reflect the average values (column "mean") and standard deviations (column "SD") for the surveyed topics

Table XI. Benchmark of process strategies in the business lines car, property and liability

The number of customer services providers (Topic 8) differs substantially among business lines. For car insurance, companies have on average 148 providers, while there are much less for the property (18) and liability lines (4). Although these figures are not unexpected, the values obtained need to be approached with caution. Given the high standard deviations, we conclude that not all participants interpreted the question consistently. Further, the participants reflect that around 5.9 per cent of all car insurance contracts contain a service provider obligation (Topic 9). In property and liability insurance, there is no significant number of policies with such obligations. Comparing this result with the voluntary usage of providers shows that in car and property claims cases, customers use service providers to a high degree. This supports a finding from our previous research (Mahlow and Wagner, 2015), where we concluded that not the provider usage obligations but increased service levels lead to higher usages.

5.2 Further results and management implications

In the remainder, we address selected strategic aspects. Thereby we focus on the following questions:

- What differences can be observed in the claim segmentation in terms of number of cases and payout amounts? (Section 5.2.1)
- What is the influence of auditor engagement on claims cycle times? (Section 5.2.2)
- Does the claim adjustment allowance to agents and brokers have an influence on the fraud levels? (Section 5.2.3)

- Can a link between efficiency and correct settlement of claims be observed? How do speedy processes, i.e. shorter cycle times relate to the fraud levels? (Section 5.2.4)
- What is the effect of lump-sum adjustments on cycle times? (Section 5.2.5)

5.2.1 Segmentation of claims. In Figure 4 we illustrate how claims cases and payouts break down across the three complexity categories. For each of the business lines, the first bar reflects the distribution of the number of claims and the second bar shows the distribution of the claim payouts in each category. In all three business lines, we see reversing shares for payout and complex claims when switching from the case numbers to the payouts perspective. For example, in car insurance, payout claims account for 31 per cent of all claims, while the payouts account for only 10 per cent. For complex claims, the relationship between quantities and payouts reverses and the levels differ across the business lines. Complex claims in property insurance (8 per cent of the cases) account for nearly half (47 per cent) of total claim payouts. Complex cases in car (6 per cent of the cases) and liability insurance (4 per cent) still account for 24 and 37 per cent of total payouts. These figures indicate how important dedicated handling strategies for the different categories are. Insurers often underestimate the negative impact that payout claims can have on the firms' claims ratio. In our survey, we cover several aspects that indicate that companies have very different strategies for handling payout and complex claims. Some companies allow, for example, lump-sum adjustments, while others do not (Table XI).

5.2.2 Influence of auditor engagement on claims cycle times. Table XII reports the average cycle times and claims sizes across claims categories and business lines. Each figure is given separately for cases where auditors are or are not employed. These figures allow us to discuss the efficiency and effectiveness of handling activities.

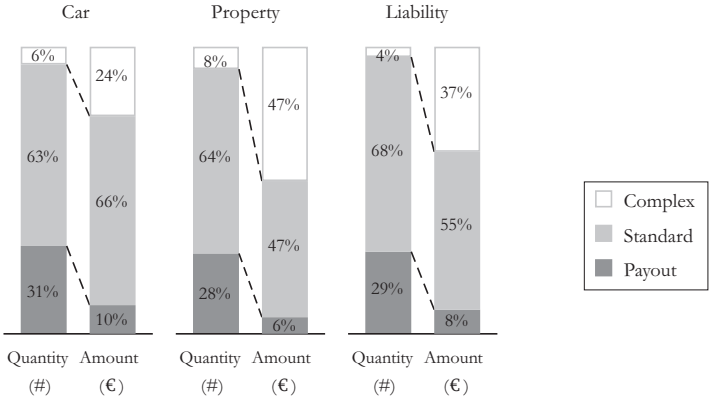


Figure 4.
Graphical illustration of the distribution of claims cases in terms of quantity (number of cases) and amount (total payouts) in the three claims complexity categories for the business lines car, property and liability

Notes: The distribution into the different claims categories is illustrated as follows: payout claims = dark gray boxes, standard claims = light gray boxes and complex claims = white boxes. The values of the shares in per cent reflect the average values for all participants in the panel

For car insurance claims, significant differences in cycle times for payout claims emerge when comparing adjustments with and without auditors. On average, adjustments with auditors (1) result in twice the length of cycle times than without auditors (2), showing an absolute difference of $\Delta^{(1)\rightarrow(2)} = 7.3$ days. For the relevance check, it should be borne in mind that the total underlying number of payout claims with auditor adjustments is much lower than the number of cases settled without. In fact, payout claims are typically settled without claims auditors. Cycle times for standard car claims vary little between the two adjustments scenarios (difference of 3.2 days). This finding might be indicative for the fact that insurers have developed operations that allow time-efficient employment of auditors. We assume that claim complexities in standard claims do not increase to any great extent, for cases with auditor employment. This also suggests that auditing patterns for car claims even without auditors must be on a higher average level (compare the 50+ days for standard claims to the order of magnitude of 10 days for payout claims). For complex claims, the interpretation is subject to some uncertainty. Our results show higher average amounts for claims settled without auditors (€23 235) as compared with auditor settlements (€32 775). At the same time, the cycle times are lower when not using auditors. Naturally, as in the case of the payout and standard claims, we would expect larger claims amounts for auditor-handled claims. These inconsistencies may be explained by the smaller total number of underlying complex claims that are settled without auditors and the already higher average claims sizes in that category.

In the property and liability business lines, the payout claims differences in cycle times are much smaller. For standard claims, cycle times increase by 19.8 days for property insurance claims and by 10.2 days for liability claims when auditors are employed. These increases can be interpreted through significantly higher complexities within the standard category. When comparing these findings to the ones obtained for car claims, the higher degree of claim individuality in property and liability cases may also play a role. High differences in cycle times between the two settlement methods for

	Car		Property		Liability	
Claims category	Cycle time (in days)	Claim size (in €)	Cycle time (in days)	Claim size (in €)	Cycle time (in days)	Claim size (in €)
Payout claims						
(1) With auditor	13.8	1,412	2.4	1,181	3.1	185
(2) Without auditor	6.5	579	1.8	364	2.5	340
Difference $\Delta^{(1)\rightarrow(2)}$	7.3	833	0.6	817	0.6	−155
Standard claims						
(1) With auditor	55.8	3,864	84.6	4,284	66.6	2,165
(2) Without auditor	52.6	1,848	64.8	814	56.4	370
Difference $\Delta^{(1)\rightarrow(2)}$	3.2	2,016	19.8	3,470	10.2	1,795
Complex claims						
(1) With auditor	248.1	23,135	97.5	16,734	146.8	24,623
(2) Without auditor	96.0	32,775	55.6	4,794	109.6	7,846
Difference $\Delta^{(1)\rightarrow(2)}$	152.1	–9,640	41.9	11,940	37.2	16,777

Table XII. Average claims cycle times and sizes in the three claims complexity categories with or without the use of auditors for the business lines car, property and liability

complex claims in property and liability insurance are in line with what could be expected.

5.2.3 Influence of claim adjustment allowances on the occurrence of fraud. The impact of agent and broker settlement allowances on fraud has often been focal in discussions among practitioners. We compare the fraud ratios of companies with claim settlement allowances for agents and brokers with the ratios of insurers without such allowances. The average fraud levels are reported in Table XIII. We observe a tendency for insurers granting settlement allowances to their agents to report higher fraud levels than insurers without allowances. This finding is most pronounced in car and liability insurance, where the fraud ratio increases by 2.61 and 1.79 per cent for firms with agent settlement allowances. The same does not appear to be the case for broker allowances. Only in the property business line, fraud levels show a distinct increase (2.39 per cent) if brokers are entitled to claim settlements. One has to bear in mind that insurance agents often have a close relationship to their customers, and that such relationships might lower their resistance to fraudulent claims. Furthermore, insurance agents are often aware of the fact that their insurer is dependent on their sales performance. This is far more pronounced among agents than individual brokers.

5.2.4 Influence of cycle times on the occurrence of fraud. The motivation behind this section stems from discussions as to whether insurers are able to establish fast operations with short cycle times and maintain efficient auditing patterns at the same time. We compare average cycle times with the shares of detected fraud in Figure 5. For the analysis, complex claims are omitted because of their high complexity, cycle time volatility (Table VIII) and lower level of comparability between insurers. No statistically significant relationship between cycle times and fraud occurrence can be detected. The results from car and property claims are suggestive of a tendency for companies with shorter cycle times to have higher rates of detected fraud. A decrease in cycle time of about 30 days is linked to an increase in detected fraud of more than 3 per cent.

5.2.5 Cycle times and lump-sum adjustment. Finally, we consider the influence of lump-sum adjustments on the speed of operations. Companies tend to introduce such allowances to reduce cycle times and increase customer satisfaction (Kumar, 2005; Macgard, 1990) and to minimize operating expenses through reducing auditing and handling complexities. Insurers usually define a limit up to which claims are adjusted

Table XIII.
Average fraud levels in % as share of all claims for different settlement modes in the business lines car, property and liability

Settlement mode	Car	Property	Liability
Agent settlement			
(1) With adjustment allowance	3.43	2.47	3.41
(2) Without adjustment allowance	0.82	0.77	0.82
Difference $\Delta^{(1)\rightarrow(2)}$	2.61	1.70	2.60
Broker settlement			
(1) With adjustment allowance	2.50	3.60	2.20
(2) Without adjustment allowance	1.99	1.21	2.22
Difference $\Delta^{(1)\rightarrow(2)}$	0.51	2.39	–0.02

Notes: The settlement modes considered are the agents and brokers where we separately consider the companies with (1) and without (2) adjustment allowances in the channels

under reduced auditing. The correlation of reduced expenses using lump-sum adjustments would seem to be indisputable. Considering payout and standard claims, we report the times for both adjustment strategies in Table XIV. In car and liability insurance, cycle times are reduced by 20 per cent when applying lump-sum adjustments. Conflicting results are obtained for property insurance, where times increase. The reduction in car insurance claims reflects the adequacy of such adjustments in that business line. Car claims are typically less complex than property and liability cases. Furthermore, they have a higher frequency, allowing insurers to adjust their operations using economies of scale. The opposite trend in property insurance is because of larger differences in claims volumes.

6. Conclusion

To address current discussions in insurance claims operations, a process model framework is proposed. On that basis, a benchmark survey is used, gathering data from 11 German and Swiss insurers in their car, property and liability business.

We find that insurance companies have different strategic principles with regard to claims operations and an established best practice cannot be observed. Work and cycle times tend to differ strongly among the companies, and about half of the participants grant settlement allowances to their agents and brokers, while the other half do not. Such findings indicate that only few and basic industry-wide standards have been

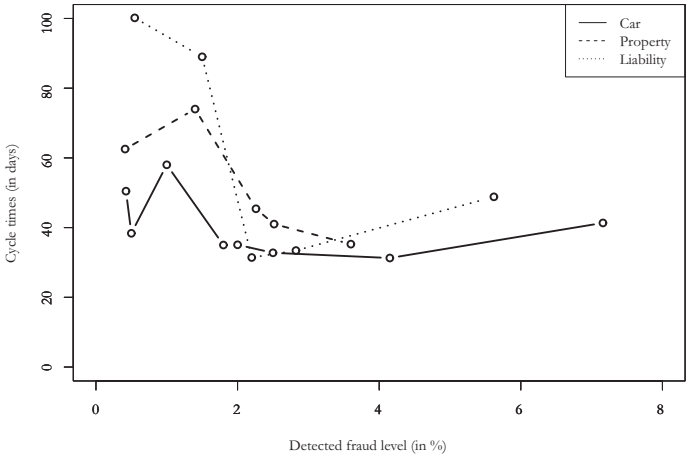


Figure 5.
Graphical illustration of the relationship between claims cycle times and the occurrence of fraud for the business lines car, property and liability for the different participating insurers (points)

Table XIV.
Average claims cycle times in days for claims adjustments with and without lump-sum allowances for the business lines car, property and liability

Adjustment mode	Car	Property	Liability
(1) With lump-sum adjustments	28.4	37.6	31.8
(2) Without lump-sum adjustments	35.9	33.0	38.5
Difference $\Delta^{(1)\rightarrow(2)}$	7.5	–4.5	6.7

established. These include, for example, the segmentation of claims into complexity categories. We observe that car insurance is the most standardized which corresponds to a common industry understanding. Even if several findings mainly confirm the current industry view, our benchmark quantifies the differences for the first time in a structured set up across several companies.

The insights from strategy differences reveal three trends. First, lump-sum adjustments and the employment of claim auditors tend to impact cycle times. Although such adjustments reduce cycle times, the employment of auditors increases cycle times. Second, the transfer of allowances to the insurers' sales force tends to increase fraud, especially in the car and liability claims. For brokers, our data do not indicate this to be the case. Third, we observe no correlation between cycle times and fraud. Thus, fast operations seem not to go at the expense of inaccurate auditing patterns.

Although the number of participants does not always allow for statistically significant results, the survey covers an important share of the market. A key proposition is also the wealth of detail of the data. To the best of our knowledge, our analysis is the first of its kind covering claims management issues empirically in such depth. The area of claims management clearly holds high potential for further research. In the process landscape, more quantities and times could be measured at key points to define the best practice. Furthermore, changes and improvements over time will be useful to follow and analyze.

Notes

1. This figure varies among countries, products and business lines. In this paper, we focus on insurers in Germany and Switzerland where the car, property and liability business loss expenses are typically in that range. However, for example, the ratio of claim payouts to total expenses in health insurance business is typically much higher. Detailed figures can be retrieved from the local supervisory authorities and insurance associations.
2. Detailed figures for the claim handling costs and staff are typically not disclosed. The given figures are based on the numbers obtained from participants in our study and combined with data available from the companies' annual reports.
3. The combined ratio is calculated by dividing the sum of incurred claim payouts and expenses by the premiums.
4. The original questionnaire and survey material is available from the authors upon request.
5. Telephone interviews were held in the context of the initial stage of our data collection (see Section 4.1). Similarly to the panel contacts used in Mahlow and Wagner (2015), the sample consists of more than 20 interviews with C-level representatives of different companies who are also in charge of claims management.
6. Market figures are retrieved from the Swiss Insurance Association (SIA, www.svv.ch) for Swiss companies and from the German Insurance Association (GDV, www.gdv.de) for German insurers. For both countries, the market shares are calculated on basis of non-life annual gross written premiums in 2012 (for all customer segments, retail and non-retail).
7. In currency conversions, the exchange rate €1 = CHF 1.2007 as of 31st December 2012 is utilized.

8. The anonymized survey raw data are available from the authors upon request.
9. This finding underlines the lower profitability of car insurance in Germany. According to the GDV (see Note 6), the claims ratio for the total German car insurance segment averaged 96.6 per cent for the period from 2010 to 2012.
10. The total market growth rate for German non-life insurers was 3.2 per cent (derived from GDV data) for the same period, while the total Swiss non-Life insurance industry grew by 1.2 per cent (SIA data), also see Note 6.

References

Accenture (2003), "Einfach besser regulieren – für Versicherer und Kunden", Technical Report, Accenture, Frankfurt/Zürich/Wien.

Amoroso, R.C. (2011), "Driving operational excellence in claims management", Technical Report, Deloitte.

Bart, P. (2012), "Insurance: improving claims management", available at: www.theactuary.com

Bearing Point (2008), "Fraud management – trends in insurance", Technical Report, Bearing Point, London.

Brunauer, T., Hiendlmeier, S. and Müller, M. (2011), "Aktives Schadenmanagement: optimierung des Schadenservice und Senkung der Schadenkosten müssen kein Widerspruch sein", Technical Report, Horváth & Partners, Stuttgart.

Butler, S. and Francis, P. (2010), "Cutting the cost of insurance claims: taking control of the process", Technical Report, Booz & co, Sydney.

Capgemini (2011), "Capturing Operational efficiency and sustainable value through claims contents", Technical Report, Capgemini & Guidewire.

Dab, S., Frost, I. and Schwarz, G. (2007), "Creating lasting advantage in claims management", Technical Report, The Boston Consulting Group, Brussels/Chicago/Cologne.

Fenn, P. and N., Rickmann (2001), "Asymmetric information and the settlement of insurance claims", *The Journal of Risk and Insurance*, Vol. 68 No. 4, pp. 615-630.

Hoying, T., Platt, J., Bongartz, M. and Sasaki, Y. (2014), "Improve P&C profitability and premium growth", Technical Report, The Boston Consulting Group, Chicago/Tokyo/London/Düsseldorf.

Huysentruyt, M. and Read, D. (2010), "How do People value extended warranties? Evidence from two field surveys", *Journal of Risk and Uncertainty*, Vol. 40 No. 3, pp. 197-218.

IBM (2006), "Claims management for insurance: reduce costs while delivering more responsive service", Technical Report, IBM, Somers.

Khiruddin, R.A. (2011), "Outsourcing: the claims revolution or illusion", *The Malaysian Insurance Institute: Insurance*, October-December 2011, pp. 40-44.

Kumar, P. (2005), "The competitive impact of service process improvement: examining customers waiting experiences in retail markets", *Journal of Retailing*, Vol. 81 No. 3, pp. 171-180.

Little, A.D. (2006), "Schadenmanagement in der Assekuranz – Studie 2006", Technical Report, available at: www.adlittle.ch/uploads/tx_extthoughtleadership/ADL_Studie_Schadenmanagement_2006.pdf

Macgard, J. (1990), "An analysis of customer satisfaction with waiting times in a two-stage service process", *Journal of Operations Management*, Vol. 9 No. 3, pp. 324-334.

Maas, P. and El Hage, B. (2006), "Schadenmanagement als strategischer Erfolgsfaktor von Versicherungsunternehmen", *IVW-HSG Trendmonitor*, Vol. 2, pp. 3-7.

Mahlow, N. and Wagner, J. (2016), "Evolution of Strategic levers in insurance claims management: an industry survey", *Risk Management & Insurance Review*, forthcoming.

McFarland, D.G. and Knipp, S. (2001), "Die 70%-Chance: Schadenbearbeitung und Profitabilität", Technical Report, Accenture, Sulzbach.

Müller, K.W. and Küfner, R. (2003), "Schadenmanagement in der Versicherungswirtschaft", Technical Report, BearingPoint, Frankfurt.

Naujoks, H. and Venohr, B. (1998), "Neugestaltung der Schadenprozesse als strategische Herausforderung", *Versicherungswirtschaft*, Vol. 53 No. 12, pp. 806-812.

OECD (2004), "OECD guidelines for good practice for insurance claim management", available at: www.oecd.org/finance/insurance/33964905.pdf

Postai, B. (2006), "Von Äpfeln und Birnen: Controllen heißt vergleichen", *Versicherungswirtschaft*, Vol. 61 No. 10, pp. 781-784.

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