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Get the Balance Right: A Simultaneous Equation Model to Analyze Growth, Profitability, and Safety

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Abstract

Extant literature suggests that the relationships among growth, profitability, and safety are reciprocal. Consequently, we develop a simultaneous equation model to test the three relationship pairs. Analyzing eleven years of data for 1,988 European insurance companies, we find that moderate firm growth has a positive impact on profitability; however, extremely high growth reduces profitability. Moderate firm growth also reduces firm risk. In addition, we document that less profitable companies are risk-seeking, a result in line with prospect theory. The longitudinal analysis illustrates that firms initially prioritizing profitability over growth are more likely to reach the ideal state of "profitable growth".

Keywords

firm performance, simultaneous equation model, goal conflicts, financial services, insurance

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1. Introduction

Growth, profitability, and safety are three common business goals. However, goal conflicts can constrain the maximization of all three dimensions at the same time. Thus, managers prioritize some goals at the expense of others. In this paper, we analyze the interdependencies among growth, profitability, and safety in the context of the insurance industry, in which the management of the three goals is of utmost importance and draws much attention senior managers.[1]

The review of the 2014 annual reports of the 15 largest European insurance companies reveals that 11 of them claim "profitable growth" as a strategic goal. This illustrates that insurers are looking for a balance between profitability and growth. The prioritization of strategic goals depends on the state of the market and institutional features.[2] In line with life cycle considerations, many organizations in emerging markets focus on growth (Berry-Stölzle, Hoyt, & Wende, 2010), while profitability is often more important in mature markets. During economic crises, risks rise and safety might have a higher priority, while profitability and growth become more dominant in booming times. An analysis of the relationships among the three strategic goals, their determining factors, and their development over time is useful for firm management to find the right balance between these three dimensions. Moreover, the analysis is helpful for the performance assessments of other stakeholders, especially that of analysts, investors, and regulators.

The extant studies in financial services have either focused on two of the three strategic goals or have not fully considered the interdependencies among growth, profitability, and safety (risk). With respect to the insurance industry, Hardwick and Adams (2002) examine the impact of profitability on organic growth in the United Kingdom (UK) life insurance sector. Leverty and Grace (2010) analyze the impact

[1] Compared to manufacturing, safety is particularly important in (banking and) insurance, due to regulatory requirements, and because customers are sensitive to firm risk. Unlike most other industries, firm risk determines product quality (Eling & Schmit, 2012). Growth is important, as it might help to improve risk diversification. However, growth might also deteriorate profitability and safety while loosening the underwriting discipline (D'Arcy & Gorvett, 2004; Barth & Eckles, 2009). The latter point is similar to granting loans in banking. Thus, we believe that our results are not only relevant for insurance companies, but also for other financial services.

[2] Among such institutional features are the degree of regulation, the organizational form, and the structure of employee incentives. In highly regulated industries (e.g., financial services), the trade-off between risk and returns is heavily shaped by regulations. Stock companies typically focus more on profitability than mutual firms, because the main goal of a mutual firm is to fulfill the demand of its members (Martínez, Albarrán, & Camino, 2001; Erhemjamts & Leverty, 2010); this is usually interpreted as a growth target. The compensation and incentive structure of the sales force and management also steers the focus of the organization among growth, profitability, and safety.

of premium growth on profitability in the United States (US) property-liability market; these authors also control for the capital-to-assets ratio, which is frequently considered a risk measure. However, they do not explicitly analyze the interactions among all three goals.

Fields, Gupta, and Prakash (2012) investigate the impact of growth and risk taking on underwriting profitability in a global sample of publicly traded insurers. Moreover, they study the impact of growth and profitability on risk taking. Fok et al. (1997) analyze the impact of growth and risk on profitability, as well as the impact of growth on risk in the US property-casualty insurance sector.[3] Although the extant literature implicitly suggests that the relationships among growth, profitability, and safety (risk) are reciprocal, none of these studies simultaneously analyzes all three interdependencies. This literature gap may be due to the endogenous nature of the strategic goals, which makes statistical modeling and inferences challenging.

To our knowledge, this study is the first to simultaneously analyze the interdependencies among growth, profitability, and safety in the business and finance research. In this context, we also test for non-linear relationships to better understand potential goal conflicts. We contribute to the research on firm performance that has attracted general interest in the literature (see, e.g., Browne, Carson, & Hoyt, 2001; D'Arcy & Gorvett, 2004; Barth & Eckles, 2009; Casu et al., 2009). In particular, our study extends Goddard et al.'s (2004) analysis of the two-directional links between growth and profitability. We follow Mankaï and Belgacem (2016) and develop a simultaneous equation model (SEM) to overcome potential endogeneity and capture the interactions of the three strategic goals, while accounting for firm characteristics and market conditions.[4]

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3 With respect to the banking industry, García-Herrero, Gavilá, and Santabárbara (2009) analyze the impact of loan growth on bank profitability. Delis and Kouretas (2011) analyze the impact of bank profitability on its risk taking. Goddard, Molyneux, and Wilson (2004) analyze the two-directional link between growth and profitability in European banking.

4 An SEM is especially suitable for two reasons: First, it allows us to explicitly consider the reciprocal nature of the three strategic goals by fully modelling the interactions among growth, profitability, and safety (risk). Second, it is the only reliable way to make statistical inferences about the impact of any of these dimensions on the other two dimensions, because it holds the reverse impacts constant. Not controlling for the reverse impacts may yield biased and inconsistent results (Wooldridge, 2010). Studies from other fields that analyze the reciprocal relationships between multiple performance dimensions include Schendel and Patton (1978; profitability, market share, and efficiency), Oviatt and Bauerschmidt (1991; risk and return), and Miller and Leiblein (1996; risk and return). SEM's are widely used in the financial services research (see, e.g., Magri, 2010).

Our sample consists of data from 1,988 life and non-life insurance companies from 16 European countries during the 2002–2013 period (9,298 firm-year observations). We focus on the European market, because of its relative homogeneity in terms of economic development and because its maturity leads to comparable challenges in managing the triangle of growth, profitability, and safety.[5] Our analyses are also relevant for other financial services sectors, with comparable management challenges (e.g., banking with respect to regulation and credit discipline (Dell'Ariccia, Igan, & Laeven, 2012)[6] or other markets outside Europe that have similar management considerations, such as the US.

Our findings reveal that the impact of firm growth on profitability is two-fold: moderate growth improves profitability, while extremely high growth rates reduce profitability. These results underline the importance of underwriting discipline (D'Arcy & Gorvett, 2004). In addition, we find that profitability has a positive impact on growth. The findings also show that moderate growth reduces firm risk. Furthermore, extremely high levels of risk are not rewarded with corresponding returns: beyond a certain threshold, the positive risk-profitability relationship diminishes and a further increase of risk reduces profitability, as Bowman (1982) discussed. In addition, we find evidence that insurers with relatively low profitability seek higher risk, as predicted by prospect theory (Jegers, 1991).

We also analyze the interactions among growth, profitability, and safety over time following Davidsson, Steffens, and Fitzsimmons (2009). This analysis reveals that firms that initially prioritize profitability over growth are more likely to reach the ideal state of profitable growth. Moreover, companies which focus on profitability at the expense of current safety are more likely to reach high safety levels in the future. This result emphasizes that superior profitability reflects competitive advantage, which secures not only high growth, but also high and stable economic rents (Davidsson et al., 2009). The analysis also demonstrates that insurers that initially focus on safety are more likely to achieve above average growth, as policyholders tend to choose insurers with high safety levels (Eling & Schmit, 2012) and

[5] The 1994 deregulation of the financial services industry and challenges (e.g., internationalization, low interest rates) imply significant profitability pressure for European financial service firms. For example, Bikker and Van Leuvensteijn (2008) emphasize the shrinking profit margins in the Dutch life insurance sector. In addition, many European financial service firms continuously seek higher growth opportunities abroad. Schoenmaker and Sass (2016) document the increasing levels of the cross-border activities of European insurers since 2000. Finally, the European financial service sector is highly regulated, and thus, companies are required to ensure high safety levels (Eling, Schmeiser, & Schmit, 2007).

[6] This paper is also linked to the context of market discipline in banking (Chen & Hasan, 2011), insurance (Epermanis & Harrington, 2006), and other industries (Ramezani, Soenen, & Jung, 2002), which, among other aspects, considers the risk and return implications of extremely high growth rates.

safe insurers might be able to charge higher premiums. Thus, firms prioritizing profitability and safety over growth are more likely to reach profitable growth with safe operations, than firms that prioritize growth over profitability and safety. Our findings underline the goal conflicts among growth, profitability, and safety and emphasize that the three dimensions need to be jointly considered in a multi-period context to evaluate firm performance.

The remainder of the paper is organized as follows. In Section 2, we discuss the theoretical background and develop our hypotheses. In Section 3, the measures, sample, and methodology are presented. Section 4 presents the empirical results. In Section 5, we conduct multiple robustness tests. Finally, we conclude in Section 6.

2. Theoretical background and hypothesis development

Like Goddard et al. (2004), we bring classical and behavioral theories together to develop our hypotheses. The relationships among growth, profitability, and safety are formalized in three pairs of hypotheses (see Table 1 for an overview of the hypotheses and Table A1 in the Appendix for the reviewed literature).[7] Representing the reciprocal nature of these relationships, each pair of hypotheses presents two impact directions. For example, we hypothesize the impact of growth on profitability as an inverted-U shape (H1a), while the impact of profitability on growth exhibits a U-shape (H1b). We discuss each of our hypotheses in Table 1.

[7] The primary intention of this paper is not to write down a comprehensive model considering all interactions among growth, profitability, and safety; rather, we want to empirically test these relationships. In fact, the theories to derive our hypotheses have different origins. A unified theoretical framework does, to our knowledge, not exist; hence, developing such a framework goes beyond the scope of this paper. We refer to the theoretical models presented in the literature to formalize the relationships, including the Capital Asset Pricing Model (CAPM), prospect theory, and agency theory. Thus, we follow the conceptual approach of Goddard et al. (2004) to bring different sets of theory together and test them empirically.

Table 1 Hypotheses

Relationship		Main theoretical arguments
Growth and profitability		
H1a:	The impact of firm growth on profitability is non-linear (inverted U-shape).	Scale economies vs. moral hazard
H1b:	The impact of firm profitability on growth is non-linear (U-shape).	Expansion in response to reduced profit margins vs. additional internal and external financial resources and the efficient structure hypothesis
Safety (risk) and profitability		
H2a:	The impact of firm risk on profitability is non-linear (inverted U-shape).	CAPM vs. insolvency risk decreases demand and price
H2b:	The impact of firm profitability on risk is non-linear (U-shape).	Prospect theory vs. CAPM
Growth and safety (risk)		
H3a:	The impact of firm growth on risk is non-linear (U-shape).	Risk diversification vs. loose underwriting discipline increases underwriting and insolvency risks
H3b:	The impact of firm risk on growth is non-linear (inverted U-shape).	Take risk to grow vs. insolvency risk decreases the demand

Growth helps firms establish a stronger market position (e.g., through scale economies), and thus, increases profitability (Davidsson et al., 2009). Yuengert (1993) documents that larger life insurers have superior cost efficiency, which consequently improves profitability (Greene & Segal, 2004). Furthermore, moderate growth driven by increasing price levels reduces the loss ratio, on average, thereby yielding a positive impact on profitability (Barth & Eckles, 2009).

However, extremely high growth might also be harmful to profitability. Agency theory suggests that management may seek growth as a primary goal by sacrificing profitability to meet their personal ambitions and excessive perquisite consumption (Eisenhardt, 1989). Such moral hazard behavior by management may lead to unintended changes in capital decisions (Mankaï & Belgacem, 2016), indirectly affecting profitability. In addition, high growth increases the complexity of organizations (Nicholls-Nixon, 2005), leading to rising costs and reduced profitability (Williamson, 1966). Furthermore, Fuller and Jensen (2002) claim that management may respond to short-term growth pressure from outside the firm with actions that cause damage in the long run. Excessive inorganic growth strategies bearing unpredicted and inflating costs provide one example.

D'Arcy and Gorvett (2004) suggest that high growth of insurers may only result from pricing tactics that reduce profit margins. Charging prices below the technical price in the competition for customers causes profitability reductions, since claim expenditures and other expenses, *ceteris paribus*, remain unchanged (Jia & Wu, 2017). Similarly, loose underwriting discipline, as a growth strategy, may not only boost sales, it may also attract unprofitable risks. As a consequence, risks that would not be accepted when the underwriting standards were higher enter the insurance portfolio (Eling & Schmit, 2012). Furthermore, new and unfamiliar business often generates losses in excess of premiums in the first years (i.e., the so-called aging phenomenon (D'Arcy & Gorvett, 2004)), meaning that the profitability of rapidly growing firms may decline. In most cases, the loss ratio decreases as books of businesses go through renewal cycles (e.g., because initial errors in the underwriting are remedied).

The foregoing arguments indicate that moderate growth drives profits up to a certain threshold, while beyond this level, excessive growth may be harmful to profits. In other words, both negative and extremely high firm growth are potentially harmful to profitability. This relationship is empirically documented in Ramezani et al. (2002), with a sample of US companies from various industries. Thus, our first hypothesis is:

H1a: The impact of firm growth on profitability is non-linear (inverted U-shape).

The growth ambitions of a firm may depend on the current market profitability (Andersen & Kheam, 1998). If profit margins are tight, firms may need to diversify to seek growth opportunities. These arguments suggest a negative impact of profitability on growth at low levels of profitability. On the other hand, good firm profitability may motivate business expansion and enable the management to pursue growth opportunities with more internal[8] and external financial resources (Whittington, 1980). Davidsson et al. (2009) argues that high profitability reflects the competitive advantages of the firm; thus, also helping it to achieve growth.

The so-called efficient structure hypothesis also explains the profitability impact on growth. More efficient insurers gain market shares through consolidation or organic growth (Choi & Weiss, 2005; Weiss & Choi, 2008), because they can charge lower prices without sacrificing profitability (Biener, Eling, & Jia, 2017). For these reasons, high firm profitability should have a positive impact on growth. The existing empirical evidence is ambiguous. Hardwick and Adams (2002) cannot confirm that higher levels of profitability (in either the current or previous period) motivate growth in the British life insurance

[8] Here, we assume that earnings are retained and reinvested in sales-growth activities.

industry. Fok et al. (1997) find a significantly positive impact in the US property-casualty insurance sector. Consequently, our second hypothesis is:

H1b: The impact of firm profitability on growth is non-linear (U-shape).

Arguments for a positive impact of risk on profitability can be found across several disciplines. In finance, the Capital Asset Pricing Model (CAPM) assumes a linear positive relationship between risk and return (Sharpe, 1964). More specifically, riskier investments should be compensated with higher returns. Fairley (1979) illustrates that profit margins in property-liability insurance equal returns estimated from the CAPM. Hill (1979) argues that a fair profit rate in insurance prices can be estimated by the CAPM. Therefore, insurers having riskier assets and insurance portfolios should exhibit higher profit margins. These arguments imply a positive impact of risk on profitability.

However, if the risk exceeds a certain threshold, particularly when risk endangers the investment grade rating, or even the solvency of a firm, the classical CAPM prediction (i.e., the positive risk impact on returns) may not hold anymore. Wakker, Thaler, and Tversky (1997) illustrate that an increase in the insolvency risk drastically reduces the willingness to pay for insurance. Sommer (1996) finds that the insolvency risk negatively affects prices in property-liability insurance. Also, Phillips, Cummins, and Allen (1998) show that insurance prices in multiple line insurance are negatively affected by the insolvency risk, where the effect is stronger for long-tail business. Falling output prices, and all other things (e.g., input prices) being unchanged, leads to a decrease in profitability (Lawrence, Diewert, & Fox, 2006). Therefore, at very high levels endangering the solvency, the impact of the risk on the return may be negative. Hence, firms cannot unlimitedly and linearly increase returns by increasing risk. Rather, there is a critical point up to which the relationship is positive and beyond which it is reversed. Thus, the third hypothesis is defined as follows:

H2a: The impact of firm risk on profitability is non-linear (inverted U-shape).

Prospect theory predicts that managers of relatively unprofitable firms seek higher risks by implementing corrective processes to improve profitability (Jegers, 1991). The lower the actual return is, the more managers are willing to take risks and are considered to be risk-seeking. In this situation, the impact of profitability on risk is negative (Bowman, 1982). On the flip side, when the actual return of a firm is relatively high, the management tends to be risk-averse. Risk-averse management will only undertake risky decisions if they are rewarded with appropriate returns, as is also suggested by the CAPM (Nickel & Rodriguez, 2002). In this sense, the impact of profitability on risk is positive (Fiegenbaum, 1990).

The predictions of prospect theory imply that the actual profitability of a firm influences the risk-taking decisions of that firm and the impact of firm profitability on risk exhibits a U-shape (Figure A4 in the Appendix). Chang and Thomas (1989) confirm the U-shaped impact of risk on profitability for US manufacturing firms. Fiegenbaum and Thomas (1988) illustrate that this relationship holds within and across industries, as well as over time. To the best of our knowledge, the implications of prospect theory have not been empirically tested at the organizational level in the financial services sector. Hence, we define our fourth hypothesis as:

H2b: The impact of firm profitability on risk is non-linear (U-shape).

Growth, to a larger scale of operation, makes risk pooling more effective (Cummins & Rubio-Misas, 2006). In this way, the law of large numbers and the potential risk diversification effect are considered, which stabilize the underwriting results and reduce the firm risk. Furthermore, an increasing firm size may consequently increase safety, as larger insurers tend to have lower failure rates (Cheng & Weiss, 2012). Positive and reasonable growth indicates a healthy and active operation and reflects the attractiveness of the firm to its clients and investors; such firms are more likely to stay financially stable (Zhang & Nielson, 2015).

However, rapid premium growth in insurance, for example, driven by an aggressive sales and underwriting strategy, is generally regarded as a cause of increased risk (Kim et al., 1995; Fok et al., 1997; Rauch & Wende, 2015). Barth and Eckles (2009) emphasize that insurers using inadequate pricing as a growth strategy may face solvency issues, when claims are due and reserves were not formed sufficiently high. Furthermore, rapid growth adds a high volume of new and potentially unfamiliar business to the insurance company bearing various risk sources (Barth & Eckles, 2009).

According to Zhang and Nielson's (2015) evidence, the impact of growth is two-fold: while a positive and reasonable growth rate shows that the insurer is in good shape, the authors warn that insurers which grow too quickly might experience trouble. Following this, we define our fifth hypothesis as:

H3a: The impact of firm growth on risk is non-linear (U-shape).

Higher risk-taking activities, for example, exploring new distribution channels, may surge sales. As the nature of financial services is assuming new risks, growth is only possible when risk taking is accepted. In turn, no risk taking means no business. Thus, it is intuitive that increasing risks leads to growth. However, when the risk is as high as endangering the solvency or investment grade rating of an insurer, the insurance demand may be adversely affected.

Eling and Schmit (2012) find negative premium changes after rating downgrades. Similarly, Epermanis and Harrington (2006) illustrate significant premium declines after financial strength downgrades, thus demonstrating the risk sensitivity of insurance demand. Baranoff and Sager (2007) also show that demand for life insurance declines after downgrading. Furthermore, Zanjani (2002) finds a significant positive relationship between the default risk and lapses in life insurance. Therefore, risk taking activities may boost growth, to a certain point, but when risk endangers the solvency, the demand and consequent firm growth are expected to decline. Thus, we define our last hypothesis:

H3b: The impact of firm risk on growth is non-linear (inverted U-shape).

3. Measures, data, and methodology

3.1. Measures and data

Our sample contains life and non-life insurer data from Best's Insurance Reports (2002–2013). Data was obtained for insurers domiciled in the following countries: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Sweden, Spain, Switzerland, and the UK.[9] The 16 countries were selected because of good data availability. In addition, these countries are relatively homogenous, in terms of economic development and insurance market maturity, which leads to comparable challenges in managing growth, profitability, and safety.

We use accounting data[10] on a firm-year basis to measure growth, profitability, and safety. In line with

9 We exclude composite insurers, because they are mainly parental companies of life and non-life insurers whose information is already considered in the subsidiaries in our sample. In addition, we exclude insurers in run-off and in liquidation, as their business activities are not comparable with the strategies of the other insurance companies in our sample. Other European countries are not considered, because the database lacks enough years of observations for these countries.

10 Stock market data may be a complement to accounting data, but using stock data would drastically reduce the sample size. This is because, only a minority of the stock insurance companies are publicly traded and those few which are publicly traded often exhibit no liquid stocks. Therefore, accounting data is preferred over stock market data in this analysis.

the previous literature (Barth & Eckles, 2009; Ma & Ren, 2012; Cole et al., 2015), we measure growth for firm i in year t by the inflation-adjusted change in gross written premiums, as shown in Equation (1); in robustness tests, we also consider the inflation-adjusted changes in net written premiums and total assets as alternative growth measures.

$$Growth_{i,t} = \frac{Gross\ Written\ Premiums_{i,t}}{Gross\ Written\ Premiums_{i,t-1}} - 1 \quad (1)$$

Profitability is commonly measured with the return on equity (ROE) (Greene & Segal, 2004; Leverty & Grace, 2010), as shown in Equation (2). In robustness tests, we also consider the return on assets (ROA) as an alternative profitability measure. The ROA is less favorable than the ROE when analyzing life and non-life insurers in one sample, because the business model of life insurers is different from that of non-life insurers, resulting in much higher leverage ratios, and thus, significantly smaller ROA values (Eling & Jia, 2016). In Equation (2), we use profit (or loss) before taxes to account for country differences in tax rates. Equity includes both capital and surplus.

$$Profitability_{i,t} = \frac{Profit_{i,t}}{(Equity_{i,t} + Equity_{i,t-1})/2}. \quad (2)$$

Safety is captured by the level of firm risk. It is frequently assessed by the moving standard deviation of annual firm profitability in the empirical research (Cheng, Elyasiani, & Jia, 2011; Ho, Lai, & Lee, 2013; Upadhyay, 2015).[11] In the core model, we consider a four-year period, as shown in Equation (3). In the robustness tests, we alternatively consider five- and six-year periods.

$$Risk_{i,t} = \sqrt{\frac{1}{(t-(t-3))} \sum_{x=t-3}^{t} (Profitability_{ix} - \emptyset Profitability_i)^2}, \quad (3)$$

where x denotes an index and $\emptyset Profitability$ denotes the mean firm profitability from $t - 3$ to t.

In later regression analyses, we control for firm characteristics and market conditions that influence firm growth, profitability, and risk. We account for the organizational form with a binary variable, where 1 indicates that the insurer is a mutual firm and 0 indicates that it is a stock. We also control for the line of business with a binary variable, where 1 indicates a life insurer and 0 indicates a non-life

[11] Alternatively, risk (safety) could be measured in accordance with regulation practices (e.g., the Insurance Regulatory Information System (IRIS) and the Financial Analysis and Surveillance Tracking (FAST) system in the US) (Chen & Wong, 2004) or the solvency ratios, according to Solvency II in the EU or the RBC standards in the US. However, due to data limitations and the calculation burden, we cannot apply these approaches.

insurer. In addition, we account for the firm size by the natural logarithm of total assets.

We capture the market effects by industry growth, industry profitability, and industry risk, represented by the country-year averages of the firm growth, profitability, and risk measures, respectively. Furthermore, to proxy the overall economic well-being, we control for the annual real GDP growth, the long-term interest rate (government bonds maturing in ten years), and the inflation rate. We measure market competition by the concentration ratio at the four-firm level (Cummins & Weiss, 2004; Fenn et al., 2008; Huang & Eling, 2013). The higher the concentration level is, the less competitive the market is. As stated previously, insurers adapt their strategic goals to the state of the market. Thus, we control for the maturity of the insurance market with the penetration ratio. Except for inflation, the market condition measures are given for non-life and life insurers separately. All absolute values are deflated to 2002 using the consumer price index. The macroeconomic factors are obtained from the AXCO Insurance Information Services and/or the Organisation for Economic Co-operation and Development.

The sample is truncated at the 1st and 99th percentiles of the growth, profitability, and safety measures to reduce the impact of outliers (Kanagaretnam, Lim, & Lobo, 2011; Fields et al., 2012; in later robustness tests, the threshold values for trimming will be varied, yielding consistent results). The final sample consists of 1,988 insurance companies (9,298 firm-year observations). Among these companies, 34% operate in the life insurance industry and 66% in the non-life insurance industry; 23% are mutual companies and 77% are stock companies. Table 2 summarizes our sample by country and line of business.

Table 2 Sample by country and by line of business

Country	Life	Non-life	Total	Firm-year observations
Austria	3	11	14	75
Belgium	10	41	51	257
Denmark	41	89	130	551
Finland	25	21	46	252
France	45	100	145	673
Germany	233	228	461	2,609
Ireland	38	94	132	525
Italy	40	59	99	416
Luxembourg	9	13	22	71
Netherlands	36	130	166	735
Norway	13	38	51	185
Portugal	11	14	25	103
Spain	56	129	185	953
Sweden	28	92	120	373
Switzerland	21	83	104	408
United Kingdom	62	175	237	1,112
Total	671	1,317	1,988	9,298

Table 3 presents the summary statistics for the three strategic goals, firm characteristics, and market conditions used in later regression analyses.

Table 3 Summary statistics (N= 9,298)

Variable/statistic	Mean	Std. Dev.	Min.	25th	Median	75th	Max.
Strategic goals							
Growth	0.049	0.251	-0.686	-0.057	0.027	0.117	3.311
Profitability	0.123	0.173	-0.723	0.034	0.111	0.208	0.806
Risk (safety)	0.107	0.103	0.005	0.041	0.076	0.137	0.876
Firm characteristics							
Organizational form (mutual=1, stock=0)	0.225	0.418	0	0	0	0	1
Line of business (life=1, non-life=0)	0.337	0.473	0	0	0	1	1
Firm size (millions USD)	4,905	16,844	0,000	0,091	0,504	2,877	537,494
Market conditions							
Industry growth	0.049	0.099	-0.298	-0.015	0.038	0.104	1.634
Industry profitability	0.123	0.063	-0.307	0.090	0.126	0.160	0.467
Industry risk	0.107	0.041	0.029	0.083	0.094	0.123	0.416
GDP growth	0.010	0.025	-0.085	0.002	0.011	0.031	0.066
Long-term interest rate	0.035	0.014	0.006	0.026	0.037	0.042	0.106
Inflation	0.020	0.012	-0.045	0.014	0.022	0.026	0.049
Concentration ratio	0.505	0.143	0.340	0.380	0.440	0.600	0.920
Penetration ratio	0.039	0.021	0.015	0.029	0.032	0.038	0.148

3.2. Methodology

To test our hypotheses, we specify a SEM as follows:[12]

$$Growth_{i,t} = \gamma_{1,1}Profitability_{i,t} + \gamma_{1,2}Profitability_{i,t}^2 + \gamma_{1,3}Risk_{i,t} + \gamma_{1,4}Risk_{i,t}^2 + \gamma_{1,5}Growth_{i,t-1} + \gamma_{1,6}Industry\ growth_{i,t} + \gamma_{1,7}CV + \varepsilon_{i,t} \quad (4)$$

$$Profitability_{i,t} = \gamma_{2,1}Growth_{i,t} + \gamma_{2,2}Growth_{i,t}^2 + \gamma_{2,3}Risk + \gamma_{2,4}Risk_{i,t}^2 + \gamma_{2,5}Profitability_{i,t-1} + \gamma_{2,6}Industry\ profitability_{i,t} + \gamma_{2,7}CV + \epsilon_{i,t} \quad (5)$$

$$Risk_{i,t} = \gamma_{3,1}Profitability_{i,t} + \gamma_{3,2}Profitability_{i,t}^2 + \gamma_{3,3}Growth_{i,t} + \gamma_{3,4}Growth_{i,t}^2 + \gamma_{3,5}Risk_{i,t-1} + \gamma_{3,6}Industry\ risk_{i,t} + \gamma_{3,7}CV_{i,t} + \vartheta_{i,t}, \quad (6)$$

where γ_{gj} is the coefficient for variable j in equation g, CV represents a matrix of all other control variables (Table 3), and $\varepsilon_{i,t}$, $\epsilon_{i,t}$, and $\vartheta_{i,t}$ are the error terms.[13]

[12] An alternative approach is to take safety as a limited decision-making variable, assuming insurers mainly focus not to undercut regulatory solvency requirements (or a target rating) and only analyze the links between growth and profitability. Table A5 in the Appendix illustrates this case. In the main body of the paper, we use the SEM with three dimensions because, in reality, insurers actively manage their safety levels in addition to the fulfillment of regulatory requirements, for example, to achieve certain financial strength ratings. Empirically, many insurers also keep their solvency ratios way above the trigger of regulatory interventions.

[13] The Hausman specification test suggests endogeneity concerns for the SIZE control variable in the growth equation. To address these concerns, we lag this variable by one period in all regression equations. We are not able to control for country fixed effects in our 2SLS estimation due to multicollinearity (Rhoads, 1991).To check whether our results depend on variations across countries, we repeat the analyses for a subsample of countries (i.e., Denmark, Ireland, the UK) having comparable fair value oriented accounting practices (Herrmann & Thomas, 1995; Post et al., 2007) and a subsample of the remaining countries having rather amortized cost oriented accounting approaches. The results allow consistent inferences, when compared to the full sample (Tables A2 and A3 in the Appendix).

We use two-stage least-squares (2SLS) to estimate the non-recursive SEM,[14] subject to the following four tests. First, we test whether growth, profitability, and risk are indeed endogenous. The Hausman specification test rejects the null hypotheses of no endogeneity. Therefore, simultaneous equation techniques (e.g., 2SLS) should be used. Second, we calculate the order and rank identification conditions. In the SEM, all control variables are identical in all equations, except for industry growth, industry profitability, and industry risk, which are only included in the growth, profitability, and risk equations, respectively. We also include the one-period lagged dependent variable to account for the persistence of firm growth, profitability, and risk.[15] Thus, all three equations in the model are over-identified, as also suggested by the order and rank conditions. This indicates that 2SLS, a limited information (single-equation) approach, can be used (Greene, 2009).[16] Third, we test for problems with weak instruments. The F-tests reject the null hypothesis of the existence of weak instruments, thus supporting the choice of instruments (i.e., industry levels, lagged values of growth, profitability, risk). Lastly, we apply the Levin, Lin, and Chu (2002) test, which rejects the null hypothesis that all our panels contain a unit root.

To test for the impact of the non-linear terms, we apply a hierarchical regression analysis (Lechner, Frankenberger, & Floyd, 2010). We first estimate Equations (4) to (6) without the quadratic terms of the right-hand side endogenous variables and denote this as Model (1). We then include the quadratic terms, as presented in equations (4) to (6), and call this Model (2).

Conclusions about the non-linear (U-shape or inverted U-shape) relationships, if any, are drawn as follows. We plot the bivariate relationship if the SEM results suggest a U-shape or inverted U-Shape

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14 The 2SLS proceeds as follows. In the first-stage, the observed values of growth, profitability, and risk are separately regressed against all exogenous variables appearing in the model by OLS (Wooldridge, 2010). In the second-stage, equations (4) to (6) are estimated; the fitted values from the first-stage replace the observed values of growth, profitability, and risk, appearing anywhere on the right-hand side of the equations. We use the square of the fitted values from the first-stage as the instruments for the quadratic terms of growth, profitability, and risk (Wooldridge, 2010). In Equations (A1) to (A18) in the Appendix, we show the full 2SLS estimation procedure.

15 Because the industry levels and lagged values of growth, profitability, and risk function as instruments for the corresponding firm measures, they have to fulfill two conditions (Wooldridge, 2010). First, they must be uncorrelated with the error terms. Second, they must be partially correlated with the endogenous variable for which the instrument serves. The industry levels are good instruments, because they only influence the respective growth, profitability, and risk of the individual firms. In our sample, no firm has enough substantial market power to fundamentally change the industry results. The lagged values are also good instruments, because growth, profitability, and risk should be persistent over time (Goddard, Molyneux, & Wilson (2011) review profit persistence in banking). Thus, the instruments are expected to be positively correlated with the endogenous variables (Table A6 in the Appendix), but unrelated to the error terms.

16 Alternatively, a system approach (e.g., 3SLS and system GMM) could be used, but the advantage of a limited information approach is that one incorrectly specified equation does not spoil the other equations. Furthermore, the calculation burden is extremely heavy for full information approaches, especially if the non-linear effects of endogenous variables are included.

(Haans, Piters, & He, 2015). Next, we follow the three steps proposed by Lind and Mehlum (2010): first, we examine the sign and significance of the coefficients of the linear and quadratic terms. Second, we perform slope tests at the lower and upper data range. Third, we analyze whether the turning point is located within the data range and use the Fieller method to construct the 95% confidence interval (Haans et al., 2015).

We also conduct a non-parametric analysis following Davidsson et al. (2009).[17] This approach takes advantage of the long sample period and demonstrates how firms move in two-dimensional performance spaces (i.e., growth-profitability, safety-profitability, growth-safety spaces) over various time windows. In each space, firms are classified into five groups, based on their relative performance in each time period, as illustrated in Figure 1. We are especially interested in how firms transit into the "superior in both dimensions" and "poor in both dimensions" groups during the chosen time periods. We test the significance of our results using standard z-tests (Davidsson et al., 2009).

Figure 1 Sample classification by performance groups

Performance dimension 2: Growth / Profitability / Safety	Quartile	Performance dimensions 1: Growth / Profitability / Safety			
		1	2	3	4
	1	Poor in both dimensions		Superior in dimension 1, poor in dimension 2	
	2		Middle		
	3				
	4	Poor in dimension 1, superior in dimension 2		Superior in both dimensions	

4. Results

4.1. Simultaneous equation model (SEM)

Table 4 presents the 2SLS regression results. Model (1) only considers the linear terms of the strategic goal measures. In Model (2), we also include the quadratic terms.

H1a: The impact of firm growth on profitability is non-linear (inverted U-shape).

Table 4 illustrates a positive and significant coefficient on the linear growth term in the profitability

[17] Alternatively, we analyze Granger causality among growth, profitability, and safety (Granger, 1969). The results suggest that feedback relationships exist (i.e., causal relationships in both directions) among the three dimensions and are consistent with our hypothesis development and the empirical analyses (Table A7 in the Appendix).

equation in both Models (1) and (2). The coefficient of the quadratic growth term is negative and significant in Model (2). The results indicate a non-linear (inverted U-shape) impact of firm growth on profitability. The slopes at both ends of the data range are sufficiently steep. In addition, the turning point (164% = [-0.276/(2*-0.084)]), after which the positive impact of growth becomes negative, is located within the data range, supporting the inverted U-shape (Haans et al., 2015).[18] Figure 2 plots growth against profitability and illustrates a quadratic fit, also supporting the inverted U-shape.

According to the turning point and Figure 2, insurers operate in the situation of profitable growth up to considerably high growth rates. Only for extremely high growth rates, does the positive impact of growth not hold anymore. Table A8 (Appendix) demonstrates that firms' average profitability increases up to the ninth growth decile in our sample. Only in the tenth decile is the average profitability significantly lower than that in the preceding decile.

The drawbacks of an extremely high firm growth may explain its negative impact on profitability. For example, high growth may result from M&A activities (i.e., inorganic growth). Obstacles (e.g., increased complexity) that come with high growth and lead to perceptible rising costs are especially concise here. Cummins and Weiss (2004) document average negative abnormal returns for the acquirer in a European insurer sample. Rapidly growing firms may also encounter profitability difficulties, due to the aging phenomenon (D'Arcy & Gorvett, 2004). Furthermore, high growth may result from underpricing, which comes at the expense of profitability if the claim requirement remains unchanged.[19] Overall, the results support H1a and underline the empirical findings of Ramezani et al. (2002). However, the negative impact of additional firm growth on profitability only results from 10% of the insurers in our sample with extremely high growth rates (Table A8 in the Appendix).

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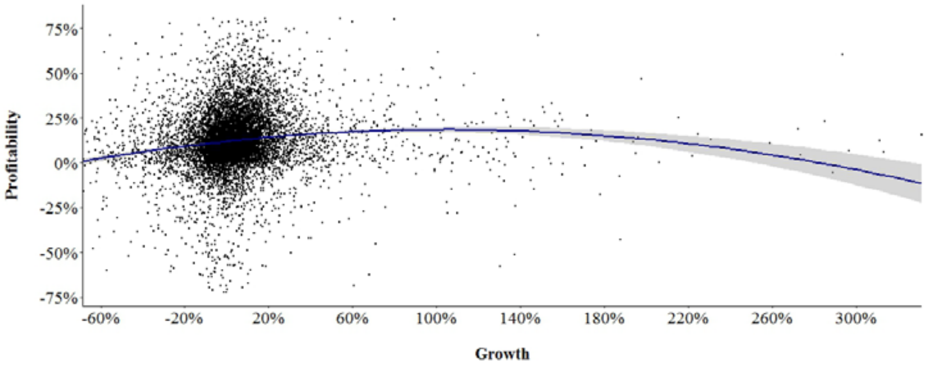
[18] The turning point should not be interpreted as the optimal growth rate. Testing for non-linearity in the SEM only allows inferences about the existence of goal conflicts. The location of the turning point is heavily influenced by the distribution of the observations. Multiple robustness tests (e.g., alternative trimming) validate the inverted U-shape, but the range of the turning points is relatively wide. The maximum turning point is 255%; it is based on the trimming at the 99.5/0.5 percentiles. The minimum is 93%; it is based on the trimming at the 98.5%/1.5% percentiles. In Table A8 in the Appendix, we follow Cummins and Xie (2013) and Biener, Eling, and Wirfs (2016) to analyze average profitability by growth deciles.

[19] German motor insurance can be used as an example for the economic damage due to underpricing in the competition for customers (Eling & Luhnen, 2008). In German motor insurance, premiums generally do not reflect the actual loss requirements; hence, the pricing is not necessarily based on actuarial aspects. Instead, the pricing is rather oriented to strategic aspects (e.g., distribution and marketing considerations). As a consequence, the underwriting results have deteriorated over time.

Figure 2 Relationship between growth and profitability.



Notes: The chart plots firm growth against profitability in the bivariate space. The curve represents the quadratic fit; the grey shaded area illustrates the 95% confidence interval.

H1b: The impact of firm profitability on growth is non-linear (U-shape).

In both Models (1) and (2), the coefficients of the linear profitability term in the growth equation are positive and significant. In Model (2), the coefficient of the quadratic profitability term is significantly positive. This finding reveals an upward impact of profitability on growth (i.e., the impact is positive and greater than a linear increase). Hence, there is no evidence for the expected U-shape.[20] This result illustrates that profitable firms have more resources to invest in growth; without profitability, the firm cannot use internal resources without selling assets and may only attract costly external capital. The increase may be more than proportional, because a firm has higher incremental internal resources if dividend payments do not increase proportionally with the level of profitability. Overall, we find evidence for the positive impact of firm profitability on growth. This results concurs with that of Fok et al. (1997).

[20] To save space, we do not present the bivariate relationship in a figure if the SEM results do not provide support for a U-shape or inverted U-shape. However, the figures are available upon request.

Table 4 2SLS regression results

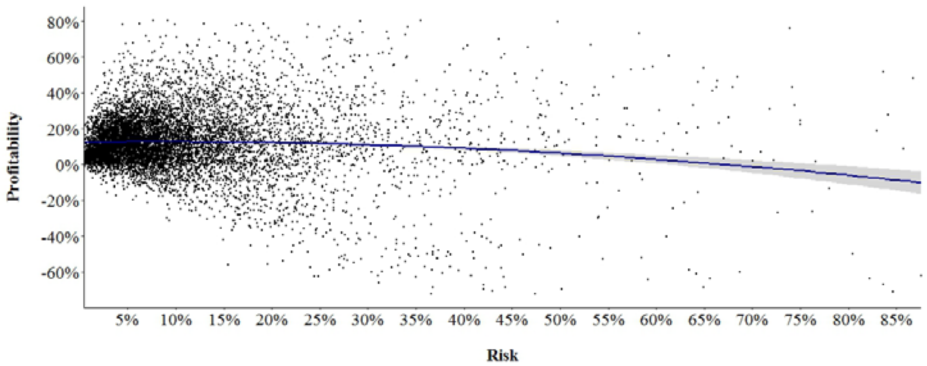
	Model (1)			Model (2)		
	Growth	Profitability	Risk	Growth	Profitability	Risk
Growth		0.228*** (0.019)	-0.029** (0.012)		0.276*** (0.021)	-0.042*** (0.013)
Growth^2					-0.084*** (0.022)	0.020** (0.009)
Profitability	0.199*** (0.030)		0.043** (0.018)	0.129*** (0.043)		-0.316*** (0.027)
Profitability^2				0.238** (0.114)		1.218*** (0.074)
Risk	-0.043 (0.036)	0.058* (0.031)		0.024 (0.091)	0.318*** (0.072)	
Risk^2				-0.190 (0.171)	-0.532*** (0.140)	
Growth$_{t-1}$	-0.008 (0.007)			-0.008 (0.007)		
Profitability$_{t-1}$		-0.014 (0.011)			-0.014 (0.011)	
Risk$_{t-1}$			0.015 (0.011)			0.014 (0.010)
Organizational form (mutual=1, stock=0)	-0.022*** (0.006)	-0.046*** (0.006)	0.002 (0.005)	-0.021*** (0.006)	-0.045*** (0.005)	0.005 (0.004)
Line of business (life=1, non-life=0)	0.016** (0.008)	-0.026*** (0.007)	0.007 (0.004)	0.016** (0.008)	-0.022*** (0.007)	0.002 (0.004)
Ln(Firm size)$_{t-1}$	-0.004*** (0.001)	0.007*** (0.001)	0.001 (0.001)	-0.004*** (0.001)	0.007*** (0.001)	0.001 (0.001)
Industry growth	-0.013 (0.025)			-0.015 (0.025)		
Industry profitability		-0.053 (0.047)			-0.058 (0.047)	
Industry risk			-0.004 (0.044)			0.00004 (0.040)
GDP growth	0.886*** (0.116)	0.390*** (0.079)	-0.315*** (0.046)	0.881*** (0.116)	0.358*** (0.079)	-0.316*** (0.043)
Long-term interest rate	-0.149 (0.202)	-0.021 (0.174)	0.210* (0.112)	-0.202 (0.203)	-0.008 (0.176)	-0.002 (0.103)
Inflation	-2.174*** (0.266)	-0.672*** (0.198)	0.591*** (0.121)	-2.204*** (0.267)	-0.618*** (0.200)	0.379*** (0.111)
Concentration ratio	0.035* (0.019)	-0.012 (0.020)	0.075*** (0.012)	0.033* (0.019)	-0.018 (0.020)	0.062*** (0.011)
Penetration ratio	0.149 (0.153)	-0.127 (0.142)	0.406*** (0.086)	0.138 (0.153)	-0.139 (0.142)	0.318*** (0.077)
Observations	9,298	9,298	9,298	9,298	9,298	9,298
Number of firms	1,988	1,988	1,988	1,988	1,988	1,988
Adjusted R^2	0.030	0.051	0.033	0.031	0.056	0.131
F Statistic	21.157***	43.115***	26.781***	18.680***	40.431***	100.167***
Main conclusions				No evidence for H1b (P→G: no U, but positive) No evidence for H3b (R→G: insignificant)	Evidence for H1a (G→P: inverted U-shape) Evidence for H2a (R→P: inverted U-shape)	Evidence for H2b (P→R: U-shape) No evidence for H3a (G→R: No U, but linear neg.)

Notes: ∗∗∗, ∗∗, and ∗ represent significance at the 1%, 5%, and 10% levels, respectively; the numbers in parentheses are robust standard errors clustered at the firm level. A constant term is included, but not reported. Growth=G, Profitability=P, Risk=R.

H2a: The impact of firm risk on profitability is non-linear (inverted U-shape).

The coefficient of the linear risk term is positive and significant in the profitability equation of both Models (1) and (2), as shown in Table 4. The negative and significant coefficient of the quadratic risk term in Model (2) provides further evidence for the expected inverted U-shape. Although Figure 3 reveals that the curve may exhibit a "sideways j", rather than an inverted U-shape, the analyses of the slopes and the turning point (30%=[-0.318/(2*-0.532)]) support the existence of the inverted U-shape.[21] Thus, we find evidence in favor of H2a, with regard to the fact that insurers cannot unlimitedly and linearly increase returns by increasing risk. Although insurers underwriting riskier business and/or investing in riskier assets are rewarded with higher returns, at high levels of firm risk, profitability tends to decline, probably due to the reduced willingness of the policyholders to pay for insurance from high-risk insurers (Sommer, 1996; Wakker, Thaler, & Tversky, 1997; Phillips, Cummins, & Allen, 1998). According to Table A8, the average profitability decreases significantly in the ninth and tenth risk deciles, thus underlining the claim that the negative impact only concerns less than 20% of the risky insurers.

Figure 3 Relationship between risk and profitability.



Notes: The chart plots firm risk against profitability in the bivariate space. The curve represents the quadratic fit, and the grey shaded area illustrates the 95% confidence interval.

H2b: The impact of firm profitability on risk is non-linear (U-shape).

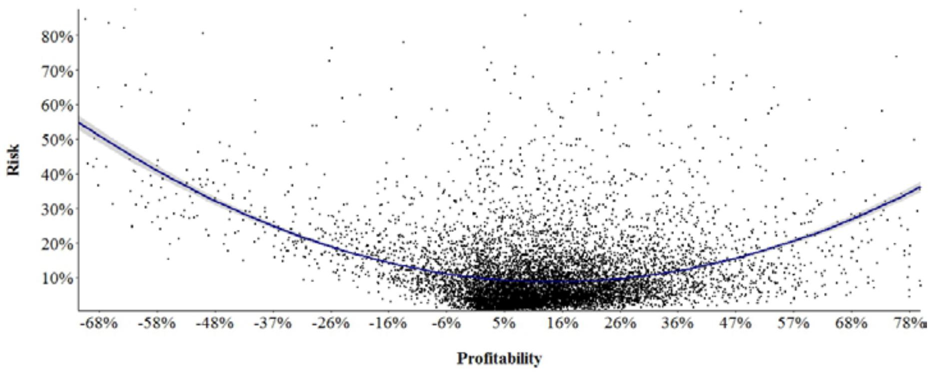
In Table 4, the coefficient of the linear profitability term is positive and significant in the risk equation of Model (1). The coefficient of the quadratic profitability term in Model (2) illustrates a significantly positive sign, while the coefficient of the linear term is now significantly negative. This is evidence of a U-shaped impact of profitability (Figure 4 for an illustration), which is further supported by the slope-

[21] The turning point may deviate from the turning point in Figure 3, because the figure only illustrates the bivariate relationship. The estimated turning point is a result of the regression, including the control variables.

and turning point-tests (13%=[0.316/(2*1.218)]). Thus, our results suggest that insurers' management tends to take relatively high risks if the profitability is relatively low, which reveals a negative return-risk relationship and supports prospect theory. By contrast, firms that are located on the upward-sloping part of the curve tend to have risk-averse management (i.e., risks are rewarded with appropriate returns, as also predicted by the CAPM). From the regression results, we derive a proxy for a so-called "target" return (Jegers, 1991), which could be used as a benchmark to classify insurers as relatively low and high profitable, respectively. The management literature often argues that it corresponds to the mean or median industry return (Nickel & Rodriguez, 2002).

Our regression results suggest a target return of 13.0% for the time period under consideration, which is only slightly higher than the mean (12.3%) and median (12.6%) industry profitability (Table 3). The average risk by profitability deciles (Table A8) also suggests a target profitability around 11%. Based on this result, approximately 50% of European insurers have a higher risk profile than is justified by their profitability. Our findings, for the European insurance sector, are in line with the theoretical suggestions of prospect theory and the empirical evidence for the U-shaped impact of risk on profitability documented for various industries by Chang and Thomas (1989), as well as Fiegenbaum and Thomas (1988). Overall, we find support for H2b.

Figure 4 Correlation between profitability and risk.



Notes: The chart plots firm profitability against risk in the bivariate space. The curve represents the quadratic fit. The grey shaded area illustrates the 95% confidence interval.

H3a: The impact of firm growth on risk is non-linear (U-shape).

Table 4 shows a negative and significant coefficient of the linear growth term in the risk equation of both Models (1) and (2). In addition, the quadratic growth term is positive and significant in Model (2).

This combination of coefficients indicates the expected U-shaped impact. However, although the negative slope at the lower end of the data range is significant, the slope at the higher end of the data range is insignificant. In addition, the estimated confidence interval of the turning point is not located within the data range. Thus, we reject the hypothesis of a non-linear impact of growth on risk and rather see a negative linear impact, as suggested by Model (1): firm growth tends to decrease risk. Thus, we find support for the view that moderate growth reduces fluctuations in the underwriting results, but we cannot confirm that high growth increases firm risk. The latter may be because of time delays, until the drawbacks of high growth materialize; for example, because of insufficient reserves (Barth & Eckles, 2009).

H3b: The impact of firm risk on growth is non-linear (inverted U-shape).

In both Models, the risk coefficients in the growth equations are insignificant. Thus, we cannot confirm the expected non-linear (inverted U-shape) impact of firm risk on growth (H3b). Because the SEM reveals neither a linear, nor a non-linear, impact of risk, we further examine whether extremely low and high risk impact growth.

Figure A9 in the Appendix illustrates the tail dependence between the inverse firm risk measure and growth (Patton, 2012) for different quantiles. It illustrates that the tail dependence for lower quantiles is slightly higher than for higher quantiles; for example, the tail dependence for the 10th (20th) percentile is approximately 0.15 (0.24), whereas the tail dependence for the 90th (80th) is only approximately 0.07 (0.17). Thus, the tail dependence analysis concludes that growth is especially sensitive to high risk. This concurs with the results in the literature (Zanjani, 2002; Epermanis & Harrington, 2006; Baranoff & Sager, 2007; Eling & Schmit, 2012).

Firm characteristics and market conditions

Table 4 reveals a significantly negative coefficient for the organizational form variable in the growth and profitability equations. Thus, stock insurers tend to grow, on average, faster than mutual insurers; they also tend to be more profitable. The latter result is in line with the results in Leverty and Grace (2010), emphasizing the so-called expense preference hypothesis, which predicts that stock insurers are more efficient than mutual insurers (Cummins, Rubio-Misas, & Zi, 2004). Life insurers tend to grow faster than non-life insurers, but are, on average, less profitable. The first result reflects that European life insurers showed considerably higher average growth rates than non-life insurers in the pre-crisis period; by contrast, non-life insurers, on average, grew slightly more post-crisis (Swiss Re, 2014). Regarding the impact of firm size, smaller insurers tend to grow at a higher rate than larger ones. Larger companies tend to be more profitable. This finding is in line with the results in Leverty and Grace (2010), indicating that larger companies benefit from economies of scale (Biener, Eling, & Jia, 2017).

The overall economic well-being, measured by real GDP growth, positively influences growth and profitability and reduces risk. Opposed to GDP growth, higher levels of inflation decrease growth. For life insurance, higher inflation may reduce demand, because most life insurance products have benefits that are fixed in nominal terms (Eling & Schaper, 2017). Furthermore, higher inflation decreases profitability and increases risk. Interestingly, the significant and positive coefficient of the concentration ratio in the risk equations suggest that less competitive national insurance markets with higher concentration levels tend to exhibit higher firm risk. In general, market structure theory assumes that market power lowers risk, because firms have more control over prices to maintain profits (Hurdle, 1974). Similarly, the positive and significant coefficient of the penetration ratio in the risk equations suggests that more developed and mature national insurance markets have higher risks.

4.2. Dynamic analysis

The literature illustrates that, in a dynamic environment, firms may first choose to become successful in one performance dimension (e.g., high growth) and then thrive to also become successful in another dimension (e.g., profitability) (Davidsson et al., 2009). Thus, the non-linear growth impact on profitability in Table 4 may be driven by rapidly growing firms only caring about profitability in the future. However, Davidsson et al. (2009) demonstrates that firms which first focus on growth more likely end up in the situation of both low growth and low profitability; by contrast, firms which first focus on profitability are more likely to reach the profitable growth state. We apply the analysis of Davidsson et al. (2009) to the European insurance sector and expand it to the safety-profitability and growth-safety dimensions. The results are reported in Table 5.

Panel A illustrates that insurers that initially focus on profitability (with low levels of growth) are more likely to reach a state of profitable growth, than insurers who initially focus on growth (at low levels of profitability); the results are stronger for shorter transition periods. Furthermore, insurers with a focus on growth are more likely to develop a situation of both low growth and low profitability; the only exception is the transition period of 2006–2013, in which a lower proportion of growth-firms transit to this group.[22] This result emphasizes the robustness of Davidsson et al.'s (2009) result across industries. Thus, we conclude that the strategy of focusing first on high growth (e.g., M&A or looser underwriting discipline) and then obtain gains from financial synergies or price increases is, on average, less successful than focusing first on reaching high profitability and then increasing market share. The fact that the desired effects of high growth do not materialize may be due to the soaring costs after M&A or due to the long-term problems caused by a looser underwriting discipline.

Panel B illustrates that insurers that initially focus on profitability and do not consider safety, for the time being, more likely reach high safety levels in the future, instead of vice versa. One explanation for this result might be that superior profitability is based on a firm's competitive advantage, which secures stable economic rents that reduce profitability fluctuations (Davidsson et al., 2009). Regarding the likelihood to end up in the situation of low safety and low profitability, no clear trend for the two strategies can be noted. In some time periods, more safety-focused firms transit to this state; in other time periods, the converse is true.

Panel C illustrates that insurers that initially focus on high safety, on average, are more likely to record high growth over time and are less likely to end up in a situation of low growth and low safety. This result emphasizes that policyholders choose insurers with low risk levels (Zanjani, 2002; Epermanis & Harrington, 2006; Baranoff & Sager, 2007; Eling & Schmit, 2012). In addition, higher demand allows price increases to lead to improved profitability. By contrast, high growth firms less frequently reach high safety levels and more likely end in the situation of low growth and safety. This may be because high growth causes financial damage, especially in the future. For example, high growth due to a looser underwriting discipline may cause damage years after the business has been written, when claims are

[22] The results for the 2006–2013 period could be influenced by a relatively small number of observations in 2013. Furthermore, the 2013 claims information may not be final, as, for some countries, these numbers will be updated in the following years.

due and reserves are not sufficiently high or unexpected losses occur.

In the regression analyses, we cannot confirm our expectation that, at very high growth rates, firm risk is increased (H3a). The dynamic perspective, however, reveals that focusing on growth and not considering safety more frequently leads to a situation of low growth and low safety. Thus, the problems (e.g., underserving and unexpected losses) of high growth (e.g., due to looser underwriting discipline) may only emerge with a longer time horizon. A better strategy is to first focus on reducing the riskiness of the firm, which may then attract policyholders that value low-risk insurers, thus leading to firm growth.

Table 5 Non-parametric analysis results

Performance group	*Panel A: Growth and profitability*						*Panel B: Safety and profitability*						*Panel C: Safety and profitability*					
Final	High growth, high profitability			Low growth, low profitability			High safety, high profitability			Low safety, low profitability			High growth, high safety			Low growth, low safety		
Initial High / Low	Growth / Prof.	*z-test*	Prof. / Growth	Growth / Prof.	*z-test*	Prof. / Growth	Safety / Prof.	*z-test*	Prof. / Safety	Safety / Prof.	*z-test*	Prof. / Safety	Growth / Safety	*z-test*	Safety / Growth	Growth / Safety	*z-test*	Safety / Growth
2006–2013	6.604		7.767	5.189	***	9.709	3.731	**	8.759	4.104	*	7.664	11.297		8.120	10.460	**	5.556
2006–2012	11.792		13.592	14.151		11.650	14.493	*	17.059	18.841	***	7.647	8.333	*	13.362	13.426		11.207
2006–2011	8.491	***	15.534	21.226	***	12.136	9.701		20.438	12.687		10.584	15.063		17.094	15.900	***	8.547
2006-2010	11.321		16.019	15.094		12.621	10.145		17.647	26.570	***	3.529	11.111		15.517	9.259		13.793
2006–2009	13.679		14.078	18.396		14.078	6.344	***	14.964	8.209	***	16.058	9.205	***	17.949	16.318	***	8.974
2006–2008	6.604	***	16.505	18.396	**	11.650	11.594		10.588	12.560	***	0.000	8.796		10.345	16.204	***	8.190
2006–2007	9.434	***	22.816	26.415	***	8.252	5.599	***	11.314	6.343	***	14.599	7.113	***	22.650	23.431	***	8.120
Main conclusions	Firms more likely reach profitable growth if they initially prioritize profitability over growth.						Firms more likely reach profitability and safety if they initially prioritize profitability over safety.						Firms more likely reach safety and growth if they initially prioritize safety over growth.					

Notes: The table illustrates percentages of insurers that move from the initial performance group to the final performance group in the specified time period (Davidsson et al., 2009). For safety, the inverse of the risk measure is used. ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively.

4.3. Robustness tests

To test the robustness of our findings, we consider the following variations in the regression and dynamic analyses. The results are consistent with our core models (Appendices A11-A17), unless otherwise specified.

We repeat the regression analyses by trimming at the 0.5th and 99.5th percentiles and at the 1.5th and 98.5th percentiles, the results of which are consistent with our core models. We then use the change in net premiums written and the change in total assets (Hardwick & Adams, 2002) as alternative growth measures. We replace the equity value in Equation (5) with the total asset value to calculate the ROA before taxes (Pasiouras & Gaganis, 2013). Lastly, we alter the time window to calculate the risk measures (moving standard deviation of annual firm profitability) and use five and six year periods of time.

In addition to minor deviations in the magnitude and significance, it is noteworthy that when using the alternative trimming, growth measures, the ROA before taxes, and the six-year window for the risk measure, only a positive linear impact of profitability on growth is revealed (in the core model, the coefficient of the non-linear profitability term is also positive and significant); the unexpected negative non-linear profitability term in the growth equation of Table A15 does not need any further discussion, because the slope-test fails. Thus, the presence of a non-linear impact is rejected (Lind & Mehlum, 2010).

The impact of risk on profitability (H2a) cannot be confirmed when using the alternative risk measures. This result occurs for two reasons. First, the longer the time window of the risk measure, the higher is the correlation between the linear risk and non-linear risk terms. Thus, the coefficients of the linear and non-linear risk terms in the profitability equations of Tables A16 and A17 may only appear to be insignificant, because of the multicollinearity. This is a common and inevitable problem in 2SLS (Rhoads, 1991) and cannot be reduced by centering if the quadratic terms of the endogenous variables are also considered. Second, a longer time frame for calculating the risk measures leads to the exclusion of additional years from the sample, and thus, reduces the sample period. Nevertheless, all other results are consistent with our core models, demonstrating the robustness of our conclusions.

In addition to the evidence from the SEM for prospect theory (H2b), in Table A10, we analyze whether firms that have high risk and low profitability levels (and are thus located on the left part of the curve in Figure A4) are likely to increase profitability and reduce risk over time. This analysis reveals that, although firms may increase their risk taking, because they show low profitability relative to a reference point, they are not more likely to reach a state of high profitability and low risk, as compared to firms with initial high profitability and high risk (i.e., firms located on the right tail of the curve in Figure A4). Moreover, these firms are more likely to persist at high risk and low profitability.

5. Conclusions

Our results reveal that the relationships among growth, profitability, and safety are reciprocal. We analyze these relationships using a new SEM with a sample of data from 1,988 European life and non-life insurers. We also analyze the dynamic interactions of growth, profitability, and safety over time using the non-parametric approach developed by Davidsson et al. (2009). Our conclusions (Tables 4 and 5) emphasize that, due to goal conflicts among growth, profitability, and safety, the three dimensions need to be jointly considered in a multi-period setup to comprehensively evaluate firm performance.

Our conclusions yield important implications for managers and regulators. Firms prioritizing profitability and safety over growth are more likely to reach profitable growth with safe operations, than firms that prioritize growth over profitability and safety. In line with prospect theory, we find that low profitability firms tend to be risk-seeking in both static and dynamic perspectives. Moreover, we demonstrate that customers value the safety of financial services firms in the sense that safe firms attract more business over time. Extremely high growth is dangerous, reducing profitability, while firms that grow moderately are typically in a healthy situation in terms of profitability. For financial services, underwriting and/or credit disciplines with careful risk screening and adequate risk premiums may be the key for the desired state of profitable growth. Our finding also emphasize that the aging phenomenon (D’Arcy & Gorvett, 2004) and inorganic growth (Cummins & Weiss, 2004) may be causes for profitability difficulties among rapidly growing firms. Consistent with our explanation, our results reveal that the majority of firms in our sample grow moderately; only a relatively small portion of firms prioritize high growth over profitability.

The presented analyses offer various directions for future research. Our analysis could be expanded by considering the different sources of extremely high growth (e.g., inorganic vs. organic growth) and their moderating effects on profitability and safety. Alternative measures could also be analyzed, such as embedded value measures for profitability and liquidity measures to capture safety. The management of growth, profitability, and safety may also illustrate different features for public and private firms, as well as for firms from matured and emerging markets. It would also be interesting to compare the results from the insurance industry to that of other financial services and manufacturing firms. On the methodological side, the interactions among growth, profitability, and safety could be further analyzed using a quantile regression approach (Sriram, Shi, & Ghosh, 2016), which takes the distributions of the three dimensions into account; thus, it could be a useful tool to apply to obtain more insight about the tradeoffs.

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