

# Value Relevance of Life Insurers' Embedded Value Disclosure and Implications for IFRS 4 Phase II

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## ABSTRACT

Many insurers disclose Embedded Value reports, a 'capital market-consistent' valuation framework for their life insurance business, to provide investors with additional information. We examine the incremental and relative information content of Embedded Value components in comparison to the existing mandatory accounting standards. Our findings can help to predict the capital market effects of the new insurance accounting standard IFRS 4 Phase II, which will be introduced in 2018 and is based on similar principles as the EV framework. Our results show that the incremental information content of the EV framework is limited and even decreasing since 2009. The current IFRS framework seem to have more explanatory power for insurers' stock prices and returns in the current economic environment which casts doubt about benefits of IFRS 4 Phase II. Our comprehensive analysis of the incremental value relevance of EV and EV earnings subcomponents shows that investors would profit from an explicit valuation of options and guarantees and a presentation scheme of earnings which differentiates between inforce and new business.

**Keywords:** Life Insurance; Embedded Value; Value Relevance

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# 1 Introduction

Although insurance companies have the obligation to report to a multitude of institutions, some companies decide to disclose additional information voluntarily. They aim to reduce the information asymmetry between informed and uninformed investors (Healy and Palepu, 2001; Beyer et al., 2010), to lower their cost of capital (Barth et al., 2013) and to improve stock liquidity (Serafeim, 2011). In particular, life insurers have often complained in the past that capital markets do not value their business operations appropriately (De Mey, 2009). Since life insurance policies are usually long-term and complex financial contracts including options and guarantees, the exact valuation of a life insurer's book of business is not straightforward. As a consequence the CFO Forum, a group of CFOs of major European insurance companies, developed the voluntary Embedded Value (EV) reporting framework. The predominant goal was to take the shareholders' perspective and value the insurers' life insurance operations in a capital market consistent manner.

This paper aims to test whether the EV is consistent with the market valuation of insurance companies and hence, provides relevant information for investors. We examine the incremental and relative information content of components of the EV and compare it with the currently existing accounting standards. As the International Accounting Standards Board (IASB) intends to transform insurance accounting standards to a more capital market-oriented approach with the IFRS 4 Phase II project, an analysis of the closely related EV reporting could provide valuable insights into the effects of the new accounting standard. The key principle of the IASB is providing decision-useful information to investors. Our study allows to assess whether IFRS 4 Phase II is likely to achieve this goal.

Prior studies on the information value of EV reporting find predominantly confirming evidence for favorable capital market effects (Wu and Hsu, 2011; Serafeim, 2011; El-Gazzar et al., 2013). In general, these studies focus on the aggregated EV. However, the EV and the EV earnings consist of a large set of subcomponents that provide detailed information on the development of an insurers' life insurance portfolio. The importance of disaggregated components of accounting measures for investors is a well-documented fact in the accounting literature (Lipe, 1986; Hirst et al., 2007; Jones and Smith, 2011; Amir et al., 2014). Hence, we argue that the disaggregated components of the EV framework provide additional information value. Limiting the analysis to aggregated measures could lead to

incomplete or incorrect conclusions about the effect of IFRS 4 Phase II. Thus, this paper aims to evaluate the incremental information content of each EV subcomponent.

Our paper extends prior studies by covering a large share of the European life insurance market between 2005 and 2014, the period after the financial crisis. Including this period of market turmoil has two advantages. Firstly, these years could be seen as stress testing the value relevance of the competing reporting frameworks and secondly, a more standardized version of EV was widely adopted by the insurance industry in 2008.

In contrast to prior studies, our results show that the information content of both frameworks does not differ strongly. We find no evidence for a superior explanatory power of the EV framework. Our findings even indicate that the current IFRS framework may provide a slightly better fit. The value relevance of the EV have decreased in particular since 2009 as life insurers face unprecedentedly low interest rates as a consequence of the financial crisis in 2008. We conclude that replacing the existing accounting standards with a more capital-market focused framework is unlikely to disseminate more information to investors in the current economic environment. Our detailed analysis on the information value of the EV components shows that only a subset of the components is value-relevant. Other components may even dampen the information value of the aggregated measures. Our findings on the value relevance of disaggregated EV components may provide guidance for standard-setters by identifying crucial components for the value relevance of an accounting framework.

The paper proceeds as follows. We outline the existing literature on capital market effects of EV reporting, provide background information on the conceptual discussion of IFRS 4 and highlight the importance of disaggregated accounting data for an assessment of the information content in section 2. In section 3, our research methodology for measuring EV's value relevance is introduced. Our hypotheses and data are described in section 4 and 5. We outline the results of our value relevance analysis in section 6. Section 7 contains several robustness checks to ensure the reliability of our findings and section 8 discusses the implications for IFRS 4 Phase II and concludes.

## 2 Literature review

### 2.1 Empirical research on Embedded Value reporting

The existing academic literature shows favorable capital market effects of EV reporting. Serafeim (2011) and Hail (2011) claim that the information asymmetry between investors is reduced as indicated by smaller bid-ask spreads of an insurer's share after the insurer decided to provide EV reports. In addition, El-Gazzar et al. (2013) show that investors use information provided by EV reports as indicated by abnormal high trading volume around the publication date compared to the non-announcement period of the reporting insurer and to the same time period of non-reporting insurers. Furthermore, they find that insurer who provides EV reports the first time outperforms the market average insurer of its country in the respective year.

Besides these directly observable effects on information asymmetry, trading volume and stock performance, the explanatory power of accounting information for stock prices and stock returns over a longer time horizon is an important criteria to assess the usefulness and quality of these information.<sup>1</sup> The research question of value relevance studies is how much of stock returns and stock prices of an insurer can be explained by accounting information. In these studies, a higher association between accounting information and the development of the stock market is considered as favorable. The existing value relevance studies analyzing EV reporting, which are summarized in table 1, indicate that EV disclosure has a higher association with the development of the stock market than do local Generally Accepted Accounting Principles (GAAP) and IFRS. EV disclosure is therefore considered as more value-relevant for investors compared to IFRS and local GAAP. The incremental value relevance is confirmed for European as well as Taiwanese insurers (Wu and Hsu, 2011), before and after mandatory IFRS adoption (Forte et al., 2011; Almezweq and Liu, 2012) and for unstandardized forms of EV reporting before 2005 (Klumpes, 2002; Horton, 2007) and standardized forms of EV reporting after 2005 (Almezweq and Liu, 2013).

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<sup>1</sup>Barth et al. (2001) argues that value relevance studies allow to operationalize and test whether accounting information fulfills the definition of decision-usefulness and the quality criteria of relevance as defined in the Conceptual Framework of the standard-setters of IFRS and US-GAAP.

**Table 1:** Sample of prior EV value relevance studies

<b>Authors</b>	<b>Country</b>	<b>Entities</b>	<b>Time Period</b>	<b>Observations</b>
Klumpes (2002)	Australia, UK	35	1994-1996	105
Horton (2007)	UK	10	2000-2004	44
Forte et al. (2011)	Europe	28	2005-2010	157
Wu and Hsu (2011)	Europe, Taiwan	not indicated	2005-2008	not indicated
Serafeim (2011)	worldwide	93	1991-2009	347
Hail (2011)	worldwide	93	1991-2009	347
Almezcwez and Liu (2012)	UK	9	2000-2009	62
Almezcwez and Liu (2013)	Europe	34	2005-2010	169
El-Gazzar et al. (2013)	worldwide	53	2000-2008	329

However, earlier studies (Klumpes, 2002; Horton, 2007; Almezcwez and Liu, 2012) use relatively small samples which do not allow to control for insurer heterogeneity and period effects. In addition, these studies focus mainly on non-standardized EV reporting before 2005 which is not comparable between insurers and prone to biases as argued by the CFO Forum and large life insurers.<sup>2</sup> Later more comprehensive studies use larger but inhomogeneous samples lacking consistency (Serafeim, 2011; Hail, 2011; El-Gazzar et al., 2013). On the one hand these samples cover countries with a weaker governance and compliance culture to enforce comparable and consistent reporting and on the other hand these samples include standardized and non-standardized EV reporting. Currently, no study examines the value relevance of the most recent version of EV reporting, the MCEV, over a longer time horizon. Furthermore, no sample covers the low interest rate period after the financial crisis which is challenging for life insurers in particular.<sup>3</sup>

In general, a relative comparison of the explanatory power of IFRS and EV reporting might

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<sup>2</sup>Unstandardized forms of EV reporting follow company specific principles and assumptions which differ widely between insurers and limit the comparability of EV reports. Therefore, the CFO Forum was formed by 20 European insurers in 2002, focusing on improving insurance reporting. In May 2004, the CFO Forum provided finally principles for the reporting of a standardized European Embedded Value (EEV) which were first applied in 2005 and developed further to the Market-Consistent Embedded Value (MCEV) reporting starting in 2009. The principles include the calculation methodology and assumptions as well as the minimum amount of disclosure. The reporting of this standardized types is still voluntary but the calculations follow well specified principles which have to be disclosed and reviewed by audit firms (CFO Forum, 2004, 2009).

<sup>3</sup>An exception is Wilson and Hristova (2015) who analyze the information content of the MCEV of seven major European insurers between 2009 and 2013.

be misleading because insurers provide not only life and health, which is covered by the EV framework, but also property and casualty insurance and partly banking and other financial services. Thus, we also examine the information content of the Group EV, which covers all business units of an insurer, and the IFRS life and health segment report, which is more comparable to basic EV framework.

## 2.2 Conceptual discussion of IFRS 4 Phase II

The results derived from voluntary EV reporting are also useful for deriving predictions for the effects of a more fair value oriented mandatory IFRS reporting.<sup>4</sup> In 2018, the current IFRS standard which specifies the measurement of insurance contracts, IFRS 4 Phase I, will be replaced by IFRS 4 Phase II which introduces a new measurement model based on principles related to the current EV framework.<sup>5</sup> Therefore, empirically based insights from EV reporting can contribute and extend the existing qualitative discussion of potential effects resulting from IFRS 4 Phase II (Duverne and Le Douit, 2007; Aigrain, 2009).

The current standard for insurance contracts, IFRS 4 Phase I was developed in 2005 after the decision to adopt IFRS in the European Union for all consolidated accounts of companies listed on the stock market. However, disagreements about the measurement of insurance contracts led only to a preliminary standard called therefore IFRS 4 Phase I which allowed insurers to continue previous accounting practices for insurance contracts until a final decision on IFRS 4 Phase II will be reached. Insurers, regulators and academics disagree whether fair values provide relevant and reliable information about an insurers business model. As insurance contracts are not traded on the capital market, fair values are not observable and need to be derived using models and assumptions. The academic literature and the insurance industry mainly agree that fair value measurement will provide more relevant and comparable information but stress the risk that investors are unable to

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<sup>4</sup>IFRS reporting is mandatory for all capital market oriented insurers in Europe. Although EV reporting is voluntary, almost all major European insurers decided to provide standardized EV reports and therefore the results derived from EV reporting are a good prediction for mandatory IFRS reporting.

<sup>5</sup>Wagner and Zemp (2012) and Lippl and Paetzmann (2013) compare both frameworks and stress the similar market-consistent principles.

cope with the new concepts (De Mey, 2009; Duverne and Le Douit, 2009). Flamee (2008) emphasizes that fair values derived from models and assumptions imply difficulties to ensure that the information provided to investors is reliable and auditable. In contrast, Post et al. (2007) reason that the concerns of the insurance industry about unfavorable capital market effects resulting from a higher earnings volatility are exaggerated.

EV reporting can add to this conceptually based discussion in several aspects. The analysis of the relative information content of EV reporting compared with the current IFRS reporting helps to predict whether the new accounting information fulfills the favorable quality criteria of relevance and reliability to a larger extent than the currently reported information. The addressee of accounting information can currently use two main information sources to assess the performance and the future prospects of insurance companies. This includes the mandatory IFRS reporting and the voluntary EV reporting. After the introduction of IFRS 4 Phase II only the new fair value based accounting information will be available for investors to assess the company's future prospects. In addition, the analysis of the incremental information content of subcomponents may provide insights on the favorability of the new presentation and disaggregation scheme of earnings under IFRS 4 Phase II.

### **2.3 Information content of disaggregated EV disclosure**

To provide insights on the presentation and disaggregation scheme of earnings and on the unbundling of insurance contracts, the subcomponents of EV and EV earnings have to be considered in an empirical analysis. However, prior EV studies focus only on the aggregate measures which show the consolidated value of shareholders' interests in the covered business and the total EV earnings driven both by economic and operating factors. This simplified approach dismisses arguably useful additional information including whether changes in the EV are driven by mergers and acquisition, by the current interest rate or by model and assumption changes and which part of the EV earnings is recurring and non-recurring. Recurring parts of the EV earnings such as the expected contribution of the existing business and the value of business written in the last year allow investors to predict next year's earnings and growth potential by assessing an insurer's ability to write profitable new business. In contrast, non-recurring parts of the EV earnings, such as, operating and non-operating assumptions changes are at best random and should provide



no insights for future earnings or are even distorted due to management's discretion and might reverse in future periods.

The limited insights of value relevance studies focusing only on the aggregated measure have been recognized in the general accounting literature. Lipe (1986) shows that the decomposition of earnings explains significantly more of the variation in returns than can be explained by earnings alone. Furthermore, Hayn (1995) shows disaggregation becomes even more important if a company reports losses. He argues that investors assign more weight to subcomponents to evaluate the firm's prospects when analyzing losses. Recent accounting research of Amir et al. (2014) shows that investors profit especially from disaggregation if accounting items differ in their sensitivity to biases and manipulation and vary in their signs because disaggregation allows investors to detect earnings management. This is in line with Hirst et al. (2007) who shows that disaggregation enhances the credibility and the perceived financial information quality of management's earnings forecasts. Analyzing disaggregated EV data is therefore especially relevant because certain EV and EV earnings subcomponents are prone to model errors, bias and manipulation. The limitations of the traditional approach focusing only on aggregate measures led to a growing number of studies which apply more advanced approaches and consider disaggregated balance, income and cashflow statement information (Livnat and Zarowin, 1990; Giner and Reverte, 1999; Hand, 2005; Jones and Smith, 2011) and additional disclosure, for example, on pensions, taxes and fair values of investments (Venkatachalam, 1996; Barth and Beaver, 1996; Ayers, 1998; Chuk, 2013). However, to our best knowledge there is no study which analyzed the EV reporting using a more advanced approach and considers information besides aggregated EV and changes in aggregated EV.

Recognizing that disaggregation is helpful for valuation and to detect earnings management, the accounting standard-setters of IFRS and US-GAAP started the Financial Statement Presentation project which promoted disaggregation and should improve the quality and transparency of the reported items. Part of this project is to require more disaggregation in the cashflow statement. Lim (2014) analyzes this reform and finds a significant incremental information content of subcomponents which supports the favorability of disaggregation to assess a company's profitability. Similarly, whether and which part of insurers' earnings should be disaggregated and reported separately played a key role in the development of IFRS 4 Phase II because the presentation and disaggregation of earnings is especially relevant if fair values are not directly observable and therefore earnings

are more prone to manipulation and biases. One key issue of the ongoing discussion is whether insurance contracts should be unbundled and options and guarantees should be valued separately. In addition, it was discussed whether inforce and new business and the respective earnings should be reported separately. Furthermore, there were disagreements during the development process how to distinguish between and how to report economic and non-economic changes and how to deal with current and expected future changes in the profitability of insurance contracts written in the past.<sup>6</sup>

### 3 Research methodology

In order to evaluate the informational value of EV reporting comprehensively and to develop predictions on the capital market effects of the novel IFRS 4 accounting standard, we compare the value relevance of the EV report to the currently existing IFRS framework. A comparable approach was applied in prior studies to assess the effects of changing accounting standards (Barth, 1994; Holthausen and Watts, 2001). In general, these association studies test if an accounting figure is useful for valuing a firm by explaining stock prices or stock returns. The literature distinguishes between two fundamental concepts of information value: Relative versus incremental association (Biddle et al., 1995; Holthausen and Watts, 2001). Relative association studies show which of two accounting frameworks provides greater overall information content. In contrast, incremental association studies examine whether one framework adds additional information content given the information of another framework.

We assess the relative and incremental value relevance of the current IFRS principles and the voluntary EV for stock prices and stock returns. Firstly, we examine the value relevance of aggregated IFRS and EV figures in comparison to each other. In a second step we analyze whether subcomponents of the EV framework have incremental value relevance in addition to the aggregated measures.

We compare the information content of the EV reporting relative to the current IFRS reporting framework by running separate panel data regression models for both measures.

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<sup>6</sup>Differing opinions and consultations with stakeholders, board deliberations and changes during the development process are summarized by the IASB (2015).

Stock prices or stock returns of each insurer  $i$  in year  $t$  are regressed on IFRS measures  $X_{IFRS}$  (Model (1)) or EV figures  $Z_{EV}$  (Model (2)) respectively.

$$y_{it} = \beta_0 + \sum_{j=1}^l \beta_j X_{IFRS} + \eta_i + \delta_t + \epsilon_{it} \quad (1)$$

$$y_{it} = \gamma_0 + \sum_{k=1}^m \gamma_k Z_{EV} + \eta_i + \delta_t + \epsilon_{it} \quad (2)$$

Using ordinary least squares (OLS) to estimate panel data can result in biased estimates because of unobserved heterogeneity: the variation between and within cross-sections (Greene, 2003). To correct for this bias, either fixed- or random-effects models can be used. An advantage of using these designs is that they control for omitted (unobservable) company-specific effects and/or period-specific effects. The Breusch-Pagan Lagrangean multiplier test indicates that the null hypothesis of no firm-specific or period-specific effects is rejected ( $p - value < 0.01$ ), suggesting that fixed-/random-effects models are more efficient than a pooled cross-sectional model. Hausman  $\chi^2$  test statistics reject the null hypothesis that random effects are appropriate ( $p - value < 0.01$ ), indicating that fixed effects are preferred to random effects. Hence, we control for year-fixed effects and insurer-fixed effects in all models. To account for potential within-firm correlation over time, we also adjust standard errors for clustering on insurer-level.

In order to choose the superior model specification, the literature suggests several test procedures for non-nested models. A first approach for examining the explanatory power of different non-nested models with the same dependent variable is a comparison of the adjusted  $R^2$ s. According to Brown et al. (1999), the size of  $R^2$  depends on the one hand on the model fit but on the other hand on scale differences between observations. A common remedy to scale effects in value relevance studies is to use per-share figures (Barth and Clinch, 2009). Thus, we deflate all variables by the "number of shares" of each insurer. Brown et al. (1999) show that this approach reduces scale effects but cannot offset them completely. Because of these methodological issues, model selection based on a simple comparison of  $R^2$ s is often not sufficient. The Akaike Information Criterion and the Bayesian Information Criterion are also measures for the relative quality of model specifications (Akaike, 1974; Schwarz et al., 1978). Both measures are theoretically more appealing than the  $R^2$  because they are based on information theory and indicate which information is lost

when the respective model is used. However, all previously described criteria provide only a relative ranking for several model specifications. They do not show whether differences between models are statistically significant.

To receive more reliable results, formal statistical test are required. The Davidson and MacKinnon (1981) J-test is one well-established method for model selection. However, the results of the J-test can be ambiguous and do not always identify one model as superior. Thus, the most common test for model comparisons in the accounting literature is the Vuong (1989)-test (Dechow, 1994; Barth et al., 1998).

The Vuong (1989)-test shows which of two models is closer to the "true" data generating process. It is based on the assumption that error terms are independent and identically distributed which is often not true for accounting data. Hence, we use all model specification criteria to compare the relative value relevance of both frameworks.

The second type of association studies is concerned about the incremental value relevance of different accounting figures. We run a third regression containing both reporting frameworks in one equation to examine this question.

$$y_{it} = \theta_0 + \sum_{j=1}^l \beta_j X_{IFRS} + \sum_{k=1}^m \gamma_k Z_{EV} + \eta_i + \delta_t + \epsilon_{it} \quad (3)$$

The goal of these studies is to test whether a specific accounting figure adds informational value given the information of other measures. The decomposition of  $R^2$  is often used in the accounting literature to identify the incremental explanatory power of an specific set of variables (Easton, 1985; Collins et al., 1997). We receive the adjusted  $R^2$  that is unique to the regression of stock price/return on EV measures by subtracting the adjusted  $R^2$  of regression (1) from the adjusted  $R^2$  of the complete regression model (3).<sup>7</sup>

$$adj.R_{EV}^2 = adj.R_{(3)}^2 - adj.R_{(1)}^2 \quad (4)$$

If we compare the unique adjusted  $R_{EV}^2$  attributed to the EV Reporting with the unique adjusted  $R_{IFRS}^2$  attributed to the IFRS reporting, we will receive a preliminary indicator for the incremental value relevance of each model specification. Our study analyzes whether and which EV figures contribute informational value beyond components of the existing IFRS framework. To extract the incremental value relevance of EV measures, we run

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<sup>7</sup>We compute the unique adjusted  $R^2$  of the IFRS framework in a similar manner.

regression model (3) and test the statistical significance of the slope coefficients  $\gamma$ . Because Bowen et al. (1987) point out that the interpretation of coefficients of single variables might be difficult if several variables are highly correlated, we conduct t-tests on individual coefficients and in addition joint F-tests to test the null hypothesis:

$$H_0 : \gamma_1 = \gamma_2 = \dots = \gamma_m = 0 \quad (5)$$

As prior accounting literature shows superior value relevance of disaggregated IFRS figures in comparison to aggregated measures for insurance companies (Nissim, 2013), we are also interested in the relative value relevance of EV subcomponents compared with the aggregated EV figures. Hence, we use the above mentioned model specification tests for a comparison of aggregated and disaggregated EV figures, too. In addition, we examine whether subcomponents of the EV add incremental information given the aggregated EV figures. We regress stock prices and stock returns on the aggregated EV figures (EV and EV earnings, respectively) combined with a set of subcomponents to highlight the incremental information value of each component.

## 4 Hypotheses

The EV framework has been introduced to evaluate an insurers' life insurance operations from a shareholder's point of view and to provide a fair value estimate of insurance contracts written. The superiority of fair value measurement to alternative measurement models like historical cost measurement has been shown by Barth (1994) and Venkatachalam (1996) for banks' investment securities and for derivatives, respectively. However, Song et al. (2010) show that the value relevance is higher if fair values are directly observable on the capital market (level 1) or are based on quoted prices from either similar financial instruments or from financial instruments traded in inactive markets (level 2). In addition, they show that if fair values are derived from methods requiring unobservable inputs and assumptions (level 3) the value relevance of fair values is reduced. Fair values of insurance contracts are not traded on the capital market and need therefore derived using models, unobservable inputs and assumptions. However, several studies like Wu and Hsu (2011); Almezweq and Liu (2013) find still a relative and incremental value relevance of the EV

framework to the IFRS framework using less homogeneous and relatively small samples as discussed in the literature review. Arguing conceptually the EV is not prone to delayed recognition and distribution of profits in contrast to the current IFRS accounting framework and should therefore exhibit a higher association with insurers' stock returns and stock prices compared with IFRS figures. We assess both the relative and the incremental value relevance of fair value information as described in the research methodology section. The relative information content compares the information content of the EV framework to the information content of the IFRS framework whereas the incremental value relevance allows insights which additional information the EV framework can provide given investors can already use information of the IFRS framework. Thus, our first hypothesis is:

### **H 1: Relative and Incremental Value Relevance of fair value information**

*The fair value based EV and EV earnings provide more relevant information for investors than the equity and earnings of the current IFRS framework.*

- i) The relative information content of aggregated EV measures is larger than the information content of comparable IFRS measures.*
- ii) Aggregated EV measures provide incremental information content for investors beyond aggregated IFRS measures.*

In addition to the analysis of the aggregated EV measures we analyze the disaggregated EV and EV earnings to identify which subcomponents of the EV framework drive the additional value relevance of fair values. Furthermore, as the EV framework and the future IFRS framework after the completion of IFRS 4 Phase II are not completely identical, a more comprehensive analysis of the relative and incremental value relevance of EV subcomponents compared with the aggregated EV figures is necessary to make more precise predictions about the effect of the reform. In particular, we expect insights whether options and guarantees should be value separately and whether the presentation scheme and additional disaggregation of earnings is helpful for investors. We expect that decomposition provides additional information content to investors as shown in general by Lipe (1986); Hayn (1995). In addition, we expect to identify recurring EV earnings subcomponents which provide information content beyond the aggregated EV because as outlined in the literature review, some subcomponents might be affected by earnings management

and confound the aggregated EV figures (Hirst et al., 2007; Amir et al., 2014). Thus, we compare the information content of the EV and EV Earnings with a set of subcomponents of both figures.

## **H 2: Relative and Incremental Value Relevance of disaggregated fair value information**

*The disaggregation of EV and EV earnings provide relevant information for investors.*

- i) The full set of EV subcomponents provides significantly more information content than the aggregated EV measures.*
- ii) EV subcomponents and recurring EV earnings subcomponents provide incremental information content beyond aggregated EV measures.*

## **5 Data**

Our data set is a blend of three data sources. We compiled IFRS accounting data and aggregated EV figures of a European sample of life insurers from SNL. Stock market data of the companies in our sample were retrieved from Datastream. Additionally, we append our data set with manually collected disaggregated EV components from insurers' annual EV reports. The data set is an unbalanced panel which covers the time period 2005 to 2014 and contains information of 33 different insurers. In total, we use 256 insurer-year observations for our analysis as shown in table 2. In a first step, we identified 35 European insurers providing EV reports in line with the principles of the CFO Forum (CFO Forum, 2004, 2009) using the database SNL. In a next step, we excluded 36 insurer-year-observations because EV subcomponents could not be collected manually from the published EV reports. In addition, we excluded 7 insurer-year-observations because stock market data was not available for the complete financial year because of an IPO or an insurers' delisting within the financial year.

The following table shows the distribution of EV reporting firms in our sample by country. In general, our sample is a good representation of the European life insurance market and all major European countries are included. The UK is slightly overweighted in our sample for

**Table 2:** Sample selection

	<b>Insurer-year- observations</b>
Initial SNL sample	299
excluded because of missing EV subcomponents	36
excluded because of missing stock prices	7
Final Sample	256

two reasons. The first EV measures for life insurers were developed in the United Kingdom. Thus, the local insurers are more familiar with this voluntary accounting framework.<sup>8</sup> In addition, firms in the UK are more capital market-oriented compared with Continental-European firms and hence, they have more incentives to provide investors with additional information.

**Table 3:** EV-Reporting Insurers by Country

<b>Country</b>	<b>Number</b>	<b>Percent</b>
Austria	19	7
Belgium	6	2
France	27	11
Germany	33	13
Italy	19	7
Netherlands	14	5
Norway	10	4
Poland	5	2
Spain	10	4
Switzerland	25	10
United Kingdom	88	34
Total	256	100

The number of EV-reporting insurers is increasing over time as indicated by table 4. In addition, there is a trend to switch from the EEV framework to the more standardized MCEV framework. The EEV principles have been published in 2005 and MCEV principles

<sup>8</sup>EV reporting emerged in Great Britain in the early 1990s to value insurance portfolios and to provide information about profitability to investors. See Klumpes (2002) for an overview of unstandardized EV reporting.



in 2009. However, some insurers started even before 2009 to apply market-consistent principles and therefore, fulfilled the requirements of an MCEV report even before 2009.<sup>9</sup>

**Table 4:** Type of Embedded Value by Year

<b>Type of EV</b>	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
EEV	12	17	17	14	12	13	13	12	12	13	135
MCEV	3	3	7	9	15	16	16	17	18	17	121
Total	15	20	24	23	27	29	29	29	30	30	256

Our data set includes the following variables as described in table 5. We can group our variables in three classes: stock data, IFRS data and EV data. We received stock prices for all insurers in our sample from Compustat and calculated the respective returns on year-by-year basis. Not surprisingly, yearly stock returns exhibit a fairly large variation, in particular, as our data set covers the financial crisis in 2008 and the subsequent European sovereign debt crisis. To account for size effects, both IFRS and EV figures are deflated by number of shares (Barth and Clinch, 2009). IFRS shareholders' equity and IFRS operating profit exceed the corresponding EV measures as the EV framework intends to value only company's life insurance operations. Interestingly, IFRS segment figures of the life insurance business (Total Equity (Life), Operating Profit (Life)) are also larger than the EV figures.<sup>10</sup>

The EV consists of the adjusted net worth (ANW) which includes required capital and free surplus allocated to but not required for the covered business and the value of inforce business which considers expected future profits arising from the covered business. The ANW is lower than the IFRS total equity of the life and health segments because goodwill and deferred acquisition costs are deducted from total equity in the EV framework to avoid double counting.<sup>11</sup> The value of inforce business consists of a projection of discounted future

<sup>9</sup>The database SNL provides information whether an EV report fulfills the requirements of an MCEV report in a certain year.

<sup>10</sup>The figures indicate that in our sample a market-consistent valuation is on average lower than the equivalent book value. However, the business considered as covered business in an EV report might differ from the business allocated to the life and health segment in the annual report. In addition, the EV figures are reported after consolidation adjustments whereas the IFRS figures are on a segment basis commonly reported before consolidation adjustments.

<sup>11</sup>The IFRS framework allows only in certain cases that expected future profits are recorded as current assets. The exceptions include goodwill arising from acquisitions and deferred acquisition costs of insur-

profits, the present value of these future profits (PVFP), which is reduced by the time value of options and guarantees (TVOG) and by an allowance for the cost of capital.<sup>12</sup> In our sample, the TVOG reduces the PVFP on average by 12 %. The high standard deviation of the TVOG indicates on the one hand that the life insurance business mix differs between insurers and on the other hand that the TVOG increases over time driven by decreasing interest rates which make guaranteed returns more valuable for customers.

**Table 5:** Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max	Median
Stock Price	256	34.681	51.503	.57	259.237	11.617
Stock Return	249	7.675	34.506	-75.91	182.347	6.834
Number of Shares in Mio.	256	1221.652	1570.35	32.081	6505.955	449.91
Shareholders' Equity	256	34.058	53.583	.336	330.696	10.349
Operating Profit	256	5.323	8.48	-15.138	34.401	1.564
Net Income	256	3.625	5.997	-8.29	29.107	.796
Total Equity (Life)	211	26.16	46.842	.345	332.632	7.057
Operating Profit (Life)	248	2.516	4.512	-16.163	30.305	.994
EV	256	24.063	35.918	.744	287.005	11.985
<i>ANW</i>	256	10.581	15.119	-21.15	97.345	5.04
<i>TVOG</i>	256	2.339	6.638	0	66.631	.317
<i>Cost of Capital</i>	256	3	5.163	0	27.117	.9
<i>PVFP</i>	256	18.822	30.811	.151	226.447	8.265
EV Earnings	256	2.335	8.253	-48.777	62.27	.719
<i>Operating Assumption Chg.</i>	256	.546	3.373	-6.418	37.281	.026
<i>Experience Variance</i>	256	.111	.778	-6.744	4.319	.025
<i>Expected Contribution</i>	256	1.461	2.736	.012	21.502	.683
<i>Economic Variance</i>	256	-.658	7.492	-81.525	37.899	.068
<i>Economic Assumption Chg.</i>	256	-.018	.41	-2.04	2.613	0
<i>Value of New Business</i>	256	.894	1.31	-.003	7.342	.394
Group EV	163	37.634	61.065	1.225	334.446	13.826

**Notes:** Stock returns are expressed in percent, All IFRS and EV variables are deflated by number of shares and converted into Euro using the corresponding exchange rate. Variable definitions: ANW = adjusted net worth; TVOG = time value of options and guarantees; PVFP = present value of future profits

ance contracts. By contrast, the EV framework tries to consider all expected future profits consistently. However, expected future profits are not shown in the ANW but in the value of inforce business. Further differences between the ANW and the IFRS total equity arise from revaluation adjustments, in particular. In addition, the ANW includes consolidation adjustment whereas insurers mainly disclose segment-specific equity without consolidation adjustments.

<sup>12</sup>The cost of capital encompass frictional costs of required capital and an allowance for residual non-hedgeable risks (CFO Forum, 2004, 2009).

The EV earnings consist of six main subcomponents. The new business value shows value created for shareholders through the activity of writing new business and contributes on average about 38% to the Total EV earnings. The expected contribution of existing business shows the return earned in the last year which was expected from the management. The expected contribution is stable over time and contributes on average about 63% to the total EV earnings of a company. The component experience variance captures the deviation of the operating assumption experienced in the last period and exhibits a high standard deviation and a slightly positive mean. The economic variance is driven by changing interest rates, spreads and volatilities affecting an insurers assets. The volatile capital market and decreasing interest rates explain the high standard deviation of this part of the EV earnings and the on average negative economic variance. In addition, the components operating assumption changes<sup>13</sup> and economic assumption changes show changes in the EV resulting from adjusted assumptions and methodologies. Insurers' adjustments of operating assumptions increased the EV earnings on average by 31% and contributed in some years significantly to the EV earnings.

Table 6 presents Pearson correlation coefficients of stock prices/returns, the aggregated EV and IFRS figures of our regressions. Not surprisingly, all accounting measures are significantly positively correlated with stock prices. Interestingly, Operating Profits exhibit the highest correlation with stock prices whereas Total EV Earnings are only moderately positively correlated with insurers' share price. Although, results of correlation analyses lack any control variables, they could provide a first preliminary indication for the value relevance of an accounting figure. In contrast to the stock price results, the correlation of the IFRS and EV measures with stock returns is fairly weak and except for Total EV earnings insignificant. Among the EV and IFRS figures, we observe the highest correlation between covered business EV and shareholders' equity. This could indicate that both variables respond fairly similar to changes in company's value. In contrast, Total EV Earnings and Operating Profit exhibit only a moderate positive correlation.

Besides the correlation of the aggregated figures, we examine the linear relationship between the covered business EV and its subcomponents (table 7). Due to the conceptual definition of the EV, we observe a very high correlation between most subcomponents. TVOG is an exception with a moderate to high correlation of 0.574.

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<sup>13</sup>The component operating assumption includes the partially separately disclosed component Other operating variance which accounts for model changes and the impact of modeling future management reactions.

**Table 6:** Correlation matrix covered business EV and IFRS

	Price	Return	EV	Total EV Earnings	Shareholders' Equity	Operating Profit
Price	1					
Return	0.110	1				
EV	0.751***	0.0921	1			
Total EV Earnings	0.419***	0.311***	0.656***	1		
Shareholders' Equity	0.882***	0.0828	0.922***	0.527***	1	
Operating Profit	0.943***	0.104	0.728***	0.445***	0.853***	1

Significance level: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 7:** Correlation matrix covered business EV and subcomponents

	EV	ANW	TVOG	Cost of Capital	PVFP
EV	1				
ANW	0.930***	1			
TVOG	0.574***	0.633***	1		
Cost of Capital	0.834***	0.866***	0.714***	1	
PVFP	0.973***	0.875***	0.694***	0.869***	1

Significance level: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The Pearson correlation coefficients of Total EV Earnings and its subcomponents exhibit higher variation as presented in table 8. The components Experience Variance and Economic Assumption Changes have no significant linear relationship with the aggregated measure. The remaining subcomponents are moderately to highly correlated with Total EV earnings. Interestingly, Operating Assumption Changes have a moderate negative relationship to the Economic Variance and Economic Assumption Changes are weakly negatively correlated with the Experience Variance. The correlation between discretionary components capturing assumption changes with economic and experience variance lacks a direct economic rationale.

**Table 8:** Correlation matrix EV earnings and subcomponents

	EV Earnings	Operating Assumption Chg.	Experience Variance	Expected Contribution	Economic Variance	Economic Assumption Chg.	Value of New Business
EV Earnings	1						
Operating Assumption Chg.	0.302***	1					
Experience Variance	-0.114	-0.0419	1				
Expected Contribution	0.560***	0.546***	-0.127*	1			
Economic Variances	0.691***	-0.378***	-0.149*	-0.0987	1		
Economic Assumption Chg.	-0.00739	0.110	-0.264***	0.210***	-0.181**	1	
Value of New Business	0.466***	0.345***	0.00240	0.608***	-0.0457	0.109	1

Significance level: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

## 6 Results

We determine the information content of both IFRS and EV on three levels. First, we compare the covered business EV and EV earnings which are reported by all insurers in our sample with IFRS shareholders' equity and the IFRS operating profit from the annual reports. As the covered business EV is limited to insurers' life insurance business, we level the playing field in a second step by examining the information content of the Group EV which accounts for insurers' non-covered business including property and casualty business and other financial services. Hence, we compare the information content of this more comprehensive figure with the IFRS framework. Lastly, we evaluate the information value of the IFRS segment figures of the life insurance business and show the incremental and relative value relevance compared with the covered business EV. The second part of our analysis highlights the value relevance of subcomponents of the covered business EV and the EV earnings. In particular, we test whether subcomponents add additional explanatory power to the aggregated figures and which components are the key drivers of the value relevance of the EV framework.

### 6.1 Value Relevance of covered business EV and IFRS

To compare the relative value relevance of both competing reporting frameworks, we regress stock prices and stock returns on IFRS and EV figures in separate panel data regressions. The results of the comparison between the covered business EV and the IFRS framework are shown in table 9. If we regress stock prices (stock returns) on the EV figures separately, we receive significant coefficients for both (EV earnings). However, in a joint regression model of EV and IFRS measures operating profit seems to be the only significant variable.

The first indication of favorable properties of the IFRS framework is supported by our model specification analysis which is shown in table 10. The adjusted  $R^2$  of the separate IFRS figures is larger if stock price is the dependent variable. In contrast, the  $R^2$ s do not differ in the stock return models. Similarly, the Akaike Information Criterion and Bayesian Information Criterion indicate that the IFRS framework is superior to the EV framework for explaining stock prices but not stock returns. As mentioned in the methodology section, none of these measures are statistical tests to determine significant differences between model specifications. Nevertheless, they provide a first indication for the quality of both

models.

**Table 9:** Panel-data regression results: Value relevance of covered business EV and IFRS

Variable	(1) Price	(2) Price	(3) Price	(4) Return	(5) Return	(6) Return
EV	0.287*** [0.052]		0.057 [0.258]	0.002 [0.072]		-0.124 [0.102]
Total EV Earnings	0.491*** [0.062]		0.201 [0.143]	0.369* [0.216]		0.223 [0.238]
Shareholders' Equity		0.163 [0.139]	0.106 [0.318]		-0.018 [0.046]	0.058 [0.092]
Operating Profit		2.128*** [0.452]	1.846*** [0.358]		1.022*** [0.328]	0.949** [0.426]
Constant	30.745*** [2.784]	21.552*** [2.178]	23.211*** [5.004]	30.502*** [7.842]	27.118*** [7.518]	26.528*** [7.774]
Observations	256	256	256	249	249	249
Number of Insurers	33	33	33	32	32	32
Insurer FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Adj. $R^2$	0.459	0.539	0.543	0.487	0.489	0.486
F value	264.1	68.65	171.7	42.99	42.29	71.51

Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Notes:** Stock returns are computed on calendar-year basis and expressed in percent. The linear panel-data regression models include year indicators which are not reported here to conserve space. Standard errors in brackets are robust to heteroscedasticity and clustered at the firm level. All independent variables are deflated by number of shares.

To test for statistically significant differences in the quality of both models, we conduct a Davidson-MacKinnon J-test for the two model specifications. In both specification, the IFRS model is identified as superior. In addition, we conduct a Vuong-test to compare the value relevance of both frameworks. Based on the Vuong-test z-statistics, we are not

able to identify one model as superior.<sup>14</sup> Overall, our preliminary conclusion based on the aggregated IFRS and EV data is that both frameworks have comparable relative value relevance and it seems unlikely that the EV framework provides superior information for investors.

**Table 10:** Covered business EV and IFRS - Relative Value Relevance

	Stock Price IFRS	Stock Price EV	Stock Return IFRS	Stock Return EV
<b>adj. R2</b>	.539	.459	.489	.487
<b>AIC</b>	1886.697	1927.889	2291.502	2292.793
<b>BIC</b>	1925.694	1966.886	2330.194	2331.485
<b>Davidson-MacKinnon J-Test</b>				
t-statistic	4.85***	1.08	2.08**	0.75
p-value	0.000	0.290	0.046	0.457
<b>Vuong-Test</b>				
z-statistic	1.1243		0.5220	
p-Value	0.2609		0.6017	
<b>Observations</b>	256	256	249	249

Significance level: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Besides the relative information content of both frameworks we are also interested to what extent the information of both frameworks are overlapping. Thus, we examine the incremental value relevance of IFRS and EV given the information of the other framework. We run a panel data regression containing the information of both reporting frameworks as independent variables. Interestingly, the operating profit is the only significant variable both in the joint stock price and stock return regression model. Additionally, we conduct F-tests to analyze the joint-significance of all variables of one framework. The results of our incremental value relevance tests are summarized in table 11. The IFRS and EV figures are both jointly significant in the combined stock price and stock return model.

A second approach for determining the unique explanatory power of both frameworks is the decomposition of the adjusted  $R^2$ s as shown in table 11. We calculate the part of the  $R^2$ s that is unique to IFRS and EV using the approach suggested by Theil (1971) and used in several accounting studies (Easton, 1985; Collins et al., 1997). When stock price is the

<sup>14</sup>The positive z-statistics indicate a non-statistically significant superiority of the IFRS framework.



dependent variable about 0.084 of the adjusted  $R^2$  is unique to the IFRS model and about 0.004 is unique to the EV model. Thus, a considerable part of IFRS's information content is unique to this framework. In contrast, in the return equation none of the explanatory power can be solely attributed to the EV or IFRS figures.

**Table 11:** Covered business EV and IFRS - Incremental Value Relevance

	Stock Price IFRS	Stock Price EV	Stock Return IFRS	Stock Return EV
<b>Joint F-Test</b>				
F-Value	65.32***	309.58***	6.01***	3.17*
p-Value	(0.0000)	(0.0000)	(0.0062)	(0.0560)
<b>unique adj. R2</b>	0.0840	0.0040	-0.0010	-0.0030

Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

## 6.2 Value relevance of Group EV and IFRS

As mentioned before, the covered business EV only accounts for insurers' life insurance business, hence, inferior relative value relevance compared to the IFRS framework could be explained by the missing property and casualty business within the EV framework. In contrast to prior literature on the value relevance of EV reporting, we also test the information content of the Group EV, which includes the non-covered business. However, as not all insurers report the Group EV, our sample is reduced to 163 insurer-year observations. Our results in table 12 on the model quality of both frameworks are less clear if we compare the Group EV with the IFRS benchmark. Both Group EV and shareholders' equity have significant explanatory power for insurers' stock prices in addition to the operating profit. However, no IFRS or EV figure has explanatory for the stock returns.

The model specification analysis summarized in table 13 shows a higher adjusted  $R^2$  of the Group EV framework in the price and a almost identical adjusted  $R^2$  in the return specification. In addition, both Akaike and Bayesian Information criteria favor the EV framework at least in the price equation. However, the Davidson-MacKinnon J-test provides inconclusive results. No model specification is rejected in the stock price model but both are rejected in the stock return models. The negative z-statistics of Vuong-test indicate a slightly better model fit of the EV framework but the differences are not statistically

**Table 12:** Panel-data regression results: Value relevance of Group EV and IFRS

Variable	(1) Price	(2) Price	(3) Price	(4) Return	(5) Return	(6) Return
Group EV	0.572*** [0.118]		0.776*** [0.111]	-0.026 [0.102]		-0.118 [0.109]
Total EV Earnings	0.087 [0.144]		-0.097 [0.087]	0.406 [0.254]		0.318 [0.280]
Shareholders' Equity		0.160 [0.153]	-0.307*** [0.067]		-0.009 [0.064]	0.030 [0.060]
Operating Profit		2.307*** [0.460]	0.902* [0.444]		0.884*** [0.234]	0.718 [0.521]
Constant	19.505** [8.450]	20.326*** [2.729]	15.157** [6.025]	44.774** [17.057]	40.050** [17.601]	43.051** [17.655]
Observations	163	163	163	158	158	158
Number of Insurers	24	24	24	23	23	23
Insurer FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Adj. $R^2$	0.628	0.546	0.688	0.523	0.522	0.518
F value	2163	348.7	3328	81.59	132.7	131.2

Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ 

**Notes:** Stock returns are computed on calendar-year basis and expressed in percent. The linear panel-data regression models include year indicators which are not reported here to conserve space. Standard errors in brackets are robust to heteroscedasticity and clustered at the firm level. All independent variables are deflated by number of shares.

significant. Hence, we conclude that both models have a similar relative information content and neither the Group EV nor the IFRS framework is superior to the other one. Table 14 summarizes the results of the incremental value relevance of the IFRS and Group EV framework given the information of the other framework. The IFRS figures and EV figures are both jointly significant in the stock price and stock return model. The explanatory power that is unique to the IFRS framework is 0.06 of the adjusted  $R^2$  whereas 0.142 is unique to the Group EV model when stock price is the dependent variable. In contrast, in the return equation none of the explanatory power can be solely attributed to the Group EV or IFRS figures.

**Table 13:** Group EV and IFRS - Relative Value Relevance

	Stock Price IFRS	Stock Price Group EV	Stock Return IFRS	Stock Return Group EV
<b>adj. R2</b>	.546	.628	.522	.523
<b>AIC</b>	1218.432	1186.125	1456.060	1455.841
<b>BIC</b>	1252.463	1220.157	1489.749	1489.530
<b>Davidson-MacKinnon J-Test</b>				
t-statistic	1.94*	8.73***	1.31	1.03
p-value	0.065	0.000	0.205	0.315
<b>Vuong-Test</b>				
z-statistic	-1.1323		-.1192	
p-Value	0.2575		0.9051	
<b>Observations</b>	163	163	158	158

Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table 14:** Group EV and IFRS - Incremental Value Relevance

	Stock Price IFRS	Stock Price Group EV	Stock Return IFRS	Stock Return Group EV
<b>Joint F-Test</b>				
F-Value	109.20***	863.51***	9.34***	2.90*
p-Value	(0.0000)	(0.0000)	(0.0012)	(0.0760)
<b>unique adj. R2</b>	0.0600	0.1420	-0.0050	-0.0040

Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

### 6.3 Value relevance of covered business EV and IFRS Life and Health Business

Another approach to increase the matching of the IFRS framework with the EV figures is to use the IFRS life insurance segment report and compare its information content with the covered business EV. As life insurance segment information were not available for all insurers, we have to rely on a slightly smaller subsample of 211 insurer-year observations.

**Table 15:** Panel-data regression results: Value relevance of covered business EV and IFRS (Life Business)

Variable	(1) Price	(2) Price	(3) Price	(4) Return	(5) Return	(6) Return
EV	0.276*** [0.045]		0.400*** [0.062]	0.009 [0.075]		-0.116 [0.111]
Total EV Earnings	0.503*** [0.052]		0.216 [0.173]	0.322 [0.226]		0.163 [0.262]
Total Equity (Life)		0.031 [0.062]	-0.252** [0.101]		0.020 [0.065]	0.090 [0.102]
Operating Profit (Life)		2.270*** [0.278]	1.429*** [0.475]		0.924*** [0.290]	0.867* [0.485]
Constant	31.634*** [3.197]	28.234*** [3.078]	32.383*** [2.983]	30.770*** [9.769]	28.307*** [9.928]	27.815** [10.616]
Observations	211	211	211	205	205	205
Number of Insurers	28	28	28	27	27	27
Insurer FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Adj. $R^2$	0.458	0.430	0.516	0.466	0.469	0.465
F value	317.1	143.5	421.7	39.78	77.40	142.5

Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Notes:** Stock returns are computed on calendar-year basis and expressed in percent. The linear panel-data regression models include year indicators which are not reported here to conserve space. Standard errors in brackets are robust to heteroscedasticity and clustered at the firm level. All independent variables are deflated by number of shares.

In general, the Operating Profit of the life insurance segment is still value-relevant in both regression models as shown in table 15. Using stock prices as dependent variable Total Equity (Life) and covered business EV do provide significant explanatory power.

Our model specification tests do not identify one framework as unambiguously superior. Based on the information criteria (adj.  $R^2$ , AIC, BIC) and the Davidson-MacKinnon J-test the EV framework seems slightly superior in stock price model whereas the IFRS framework has marginally higher explanatory power for stock returns. The Vuong-test does not favor one of the models. In terms of incremental value relevance, we receive a similar picture. Slightly more incremental value relevance of the EV framework in the stock price model and in the stock return model vice versa.

**Table 16:** Covered business EV and IFRS(Life) - Relative Value Relevance

	Stock Price IFRS (Life)	Stock Price EV	Stock Return IFRS (Life)	Stock Return EV
<b>adj. R2</b>	.430	.458	.469	.466
<b>AIC</b>	1624.622	1614.282	1908.221	1909.256
<b>BIC</b>	1661.492	1651.153	1944.774	1945.809
<b>Davidson-MacKinnon J-Test</b>				
t-statistic	1.67	6.80***	1.76*	0.37
p-value	0.106	0.000	0.091	0.715
<b>Vuong-Test</b>				
z-statistic	-0.3592		0.4824	
p-value	0.7194		0.6295	
<b>Observations</b>	211	211	205	205

Significance level: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 17:** Covered business EV and IFRS(Life) - Incremental Value Relevance

	Stock Price IFRS (Life)	Stock Price EV	Stock Return IFRS (Life)	Stock Return EV
<b>Joint F-Test</b>				
F-Value	46.40***	252.49***	11.12***	2.22
p-Value	(0.0000)	(0.0000)	(0.0003)	(0.1291)
<b>unique adj. R2</b>	0.0580	0.0860	-0.0010	-0.0040

Significance level: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 6.4 Information content of EV and EV earnings subcomponents

As covered business EV and Total EV earnings are highly aggregated figures, a detailed analysis of the information value of their subcomponents could be insightful. Some subcomponents are more subject to managerial discretion than others. Thus, the aggregation of the subcomponents may reduce the information value of the EV framework. We compare the information content of the EV and its subcomponents in table 18. We regress stock prices and stock returns on the covered business EV, its subcomponents and in a third model on the EV and its components (ANW is dropped due to perfect multicollinearity of EV and its subcomponents). Based on our results, two EV components seem to be most value-relevant for stock prices, the TVOG and the PVFP. Interestingly, both components are still incrementally value-relevant in the joint regression model with the aggregated EV. A first comparison of the adjusted  $R^2$ s indicates a higher explanatory power of the disaggregated values for the stock prices. However, disaggregation does not provide additional information content for explaining stock returns. Hence, the poor explanatory power of the covered business EV for stock returns is confirmed by our component analysis.

Our preliminary results on the relative value relevance of the disaggregated measures compared with the aggregated EV are confirmed by our model specification test. Table 19 shows that the information criteria, AIC and BIC, indicate a superior model fit of the disaggregated framework for stock returns. Although, the Davidson-MacKinnon J-Test is not able to reject one model, the results of the Vuong-test unambiguously favor the disaggregated model for stock prices. In contrast, the model specification tests on the stock return models are less clear. A comparison of the adjusted  $R^2$ s and the information criteria marginally favor the aggregated framework. In addition, the Davidson-MacKinnon J-Test rejects the disaggregated model. However, the negative sign of the Vuong-test's z-statistic indicates a preference for the disaggregated figures but the results are not significant at all. We conclude that some EV components are highly value-relevant for stock prices, so that disaggregation increases the information value of the EV for investors. However, the information content of other EV components seem to be fairly limited.

**Table 18:** Panel-data regression results: Value relevance of covered business EV and subcomponents

Variable	(1) Price	(2) Price	(3) Price	(4) Return	(5) Return	(6) Return
ANW		0.176 [0.131]			-0.092 [0.228]	
TVOG		-1.304*** [0.374]	-1.127** [0.487]		-0.295 [0.222]	-0.387 [0.330]
Cost of Capital		-1.035 [1.190]	-0.859 [1.087]		0.780 [0.728]	0.688 [0.732]
PVFP		0.584*** [0.070]	0.407*** [0.131]		0.070 [0.140]	0.162 [0.334]
EV	0.394*** [0.039]		0.176 [0.131]	0.084* [0.046]		-0.092 [0.228]
Constant	30.432*** [2.944]	29.011*** [1.756]	29.011*** [1.756]	30.256*** [7.903]	29.816*** [8.568]	29.816*** [8.568]
Observations	256	256	256	249	249	249
Number of Insurers	33	33	33	32	32	32
Insurer FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Adj. $R^2$	0.426	0.554	0.554	0.485	0.480	0.480
F value	37.54	136.4	136.4	35.16	56.36	56.36

Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Notes:** Stock returns are computed on calendar-year basis and expressed in percent. The regressions include year indicators which are not reported here to conserve space. Standard errors in brackets are robust to heteroscedasticity and clustered at the firm level. All independent variables are deflated by number of shares. Variable definitions: ANW = adjusted net worth; TVOG = time value of options and guarantees; PVFP = present value of future profits

**Table 19:** Covered business EV and EV Components - Relative Value Relevance

	Stock Price EV	Stock Price EV Comp.	Stock Return EV	Stock Return EV Comp.
<b>adj. R2</b>	.426	.554	.485	.480
<b>AIC</b>	1942.045	1880.109	2292.542	2297.921
<b>BIC</b>	1977.497	1926.197	2327.716	2343.647
<b>Davidson-MacKinnon J-Test</b>				
t-statistic	2.75**	10.32***	9.06***	1.35
p-value	0.010	0.000	0.000	0.185
<b>Vuong-Test</b>				
z-statistic	-2.5635**		-0.4419	
p-value	0.0104		0.6586	
<b>Observations</b>	256	256	249	249

Significance level: \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**Table 20:** Covered business EV and EV Components - Incremental Value Relevance

	Stock Price EV	Stock Price EV Comp.	Stock Return EV	Stock Return EV Comp.
<b>Joint F-Test</b>				
F-Value	100.39***	64.68***	3.26*	2.05
p-Value	(0.0000)	(0.0000)	(0.0807)	(0.1123)
<b>unique adj. R2</b>	0.0000	0.1280	0.0000	-0.0050

Significance level: \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Similarly, we examine the value relevance of EV Earnings' subcomponents and compare it with the information content of aggregated EV Earnings. Our results are summarized in table 21. First of all, the recurring items of EV Earnings, Expected Contribution and Value of New Business, seem to be incrementally value-relevant. Value of New Business is statistically significant on the 1 percent / 5 percent level in the stock price regression models. In contrast, we receive p-values for the Value of New Business coefficients slightly above the 10 percent significance level (p-value: 0.103 / 0.124) in the stock return regressions. The Expected Contribution variable has a negative sign in all regression models and is incrementally value-relevant in both joint regressions (3)/(6). Two non-recurring items are value-relevant in different model specifications. The Economic Variance is incrementally



value-relevant in the EV components regression with stock prices as dependent variable (2). In contrast, the subcomponent Experience Variance has significant coefficients on the 1 percent level in the stock return regressions (5)/(6).

**Table 21:** Panel-data regression results: Value relevance of EV Earnings and subcomponents

Variable	(1) Price	(2) Price	(3) Price	(4) Return	(5) Return	(6) Return
Operating Assumption Chg.		0.493 [0.460]			-0.166 [0.564]	
Experience Variance		1.522 [1.690]	1.031 [1.326]		-4.215*** [1.339]	-4.051*** [1.033]
Expected Contribution		-1.009 [0.691]	-1.505*** [0.541]		-3.299*** [0.883]	-3.134*** [0.949]
Economic Variance		0.822*** [0.121]	0.327 [0.364]		0.218 [0.254]	0.382 [0.392]
Economic Assumption Chg.		-1.224 [3.028]	-1.719 [2.987]		4.404 [3.835]	4.569 [3.752]
Value of New Business		6.323*** [2.026]	5.824** [2.310]		9.564 [5.687]	9.728 [6.161]
Total EV Earnings	0.882*** [0.058]		0.496 [0.461]	0.372** [0.160]		-0.164 [0.564]
Constant	33.222*** [2.113]	34.120*** [1.798]	34.121*** [1.798]	30.522*** [8.153]	33.944*** [8.688]	33.944*** [8.689]
Observations	256	256	256	249	249	249
Number of Insurers	33	33	33	32	32	32
Insurer FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Adj. $R^2$	0.386	0.478	0.478	0.489	0.525	0.525
F value	53.27	451.7	454.6	46.45	25.75	25.72

Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Notes:** Stock returns are computed on calendar-year basis and expressed in percent. The linear panel-data regression models include year indicators which are not reported here to conserve space. Standard errors in brackets are robust to heteroscedasticity and clustered at the firm level. All independent variables are deflated by number of shares.

Total EV Earnings are not incrementally value-relevant in both joint regression models. Based on the adjusted  $R^2$ s the relative value relevance of the subcomponents seem to be larger for stock prices and stock returns. In addition, for the stock price models the information criteria indicate a better model fit of the disaggregated framework as shown in table 22. While the Davidson-MacKinnon J-test fails to reject one model specification, the Vuong-test results favor the disaggregated model, too. The significance of the test results of stock return model specifications is lower but still indicates higher relative value relevance of the subcomponents compared to the aggregated EV earnings. Hence, we argue that a detailed analysis of EV earnings components seem to be particularly insightful. In line with our expectations, recurring items contribute the lion's share of information value. However, selected non-recurring items are also incrementally value-relevant.

**Table 22:** EV Earnings and Components - Relative Value Relevance

	Stock Price EV Earnings	Stock Price EV Earnings Comp.	Stock Return EV Earnings	Stock Return EV Earnings Comp.
<b>adj. R2</b>	.386	.478	.489	.525
<b>AIC</b>	1959.27	1922.645	2290.793	2277.11
<b>BIC</b>	1994.721	1975.823	2325.968	2329.872
<b>Davidson-MacKinnon</b>				
<b>J-Test</b>				
t-statistic	2.00*	3.93***	0.55	2.15**
p-value	0.054	0.000	0.587	0.039
<b>Vuong-Test</b>				
z-statistic		-2.0609**		-1.1099
p-value		0.0393		0.2670
<b>Observations</b>	256	256	249	249

Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table 23:** EV Earnings and Components - Incremental Value Relevance

	Stock Price EV Earnings	Stock Price EV Earnings Comp.	Stock Return EV Earnings	Stock Return EV Earnings Comp.
<b>Joint F-Test</b>				
F-Value	234.30***	216.92***	5.39**	6.86***
p-Value	(0.0000)	(0.0000)	(0.0270)	(0.0001)
<b>unique adj. R2</b>	0.0000	0.0920	0.0000	0.0360

Significance level: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 7 Robustness Checks

Our results indicate that EV and EV earnings are not clearly superior to the respective IFRS figures. This finding is in contrast to prior literature which emphasized the favorable information properties of the EV framework. Our samples differs from prior literature as it covers the financial crisis, contains the MCEV, a more standardized version of the EV, and includes the period of low interest rates since 2009. Hence, we conduct several robustness checks to identify factors causing the differing results and to ensure the reliability of our findings.

### 7.1 Changing economic environment since 2009

As a consequence of the financial crisis in 2008 and the following expansive monetary policy, interest rates decreased sharply. This caused severe challenges for the business model of life insurers. In particular, those insurers who relied on policies with interest rate guarantees faced significant problems. Consequently, the appropriateness of reporting frameworks which aim to value insurers' life insurance business might have changed, too. We split our sample into two time periods (2005-2008 and 2009-2014) and rerun our value relevance regressions. The results are summarized in table 24 and table 27. Interestingly, the fit of models expressed by the adjusted  $R^2$ s decreased in the second time period sharply. In particular, the model fit of the return regressions is fairly low which can be explained by the large stock market variations in the aftermath of the financial crisis. Based on these results

we might draw a preliminary conclusion that the EV framework performed very well, even better as IFRS, during stable market conditions. However, after the fundamental change of the market environment after 2008 the IFRS framework is at least as accurate as the EV framework.

**Table 24:** Panel-data regressions results: Value relevance of covered business EV and IFRS before 2009

Variable	(1) Price	(2) Price	(3) Price	(4) Return	(5) Return	(6) Return
EV	0.105* [0.061]		0.295*** [0.073]	-0.067 [0.191]		-0.242 [0.244]
Total EV Earnings	1.327*** [0.161]		1.539*** [0.180]	0.434** [0.179]		0.104 [0.277]
Shareholders' Equity		0.774 [0.518]	0.374* [0.212]		-0.084 [0.207]	-0.145 [0.245]
Operating Profit		2.141*** [0.390]	-1.086** [0.461]		1.027*** [0.201]	1.209** [0.538]
Constant	32.779*** [1.443]	2.499 [14.171]	23.235*** [7.452]	31.097*** [4.542]	28.505** [10.212]	32.917*** [10.780]
Observations	82	82	82	81	81	81
Number of Insurers	24	24	24	24	24	24
Insurer FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Adj. $R^2$	0.883	0.727	0.915	0.767	0.770	0.765
F value	52.55	93.76	870.8	73.72	61.46	117.3

Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Notes:** Stock returns are computed on calendar-year basis and expressed in percent. The linear panel-data regression models include year indicators which are not reported here to conserve space. Standard errors in brackets are robust to heteroscedasticity and clustered at the firm level. All independent variables are deflated by number of shares.

To confirm this preliminary observation, we compare the relative and incremental value relevance of both frameworks before 2009 and during the low interest rate period since 2009.

Interestingly, all model specification tests and information criteria indicate a superior model fit of the EV framework for stock prices before 2009. However, the model specification tests cannot unambiguously identify one framework as more appropriate for stock returns. Both models, IFRS and EV, have incremental value relevance for stock prices but not for stock returns.

**Table 25:** Covered business EV and IFRS - Relative Value Relevance **before 2009**

	Stock Price IFRS	Stock Price EV	Stock Return IFRS	Stock Return EV
<b>adj. R2</b>	.727	.883	.770	.767
<b>AIC</b>	558.153	489.000	677.249	678.123
<b>BIC</b>	570.186	501.033	689.222	690.095
<b>Davidson-MacKinnon J-Test</b>				
t-statistic	0.01	8.58***	2.26**	0.46
p-value	0.990	0.000	0.034	0.649
<b>Vuong-Test</b>				
z-statistic	-3.6455***		0.5172	
p-Value	0.0003		0.6050	
<b>Observations</b>	82	82	81	81

Significance level: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 26:** Covered business EV and IFRS - Incremental Value Relevance **before 2009**

	Stock Price IFRS	Stock Price EV	Stock Return IFRS	Stock Return EV
<b>Joint F-Test</b>				
F-Value	44.70***	80.05***	15.36***	5.00**
p-Value	(0.0000)	(0.0000)	(0.0001)	(0.0560)
<b>unique adj. R2</b>	0.0320	0.1880	-0.0020	-0.0050

Significance level: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

We conduct the same tests for the time period of 2009 to 2014 and receive fairly different results. While we cannot classify one framework as superior for stock returns, the IFRS framework has more explanatory power for stock prices than the EV in this sub-sample according to the Davidson-MacKinnon J-Test. Although, the Vuong-test does not indicate statistically significant differences between both models, the AIC and BIC support the

higher relative value relevance of IFRS. We conclude that EV's value relevance decreased in recent years and IFRS seem to have a higher association with stock prices during the current market conditions.

**Table 27:** Panel-data regressions results: Value relevance of covered business EV and IFRS since 2009

Variable	(1) Price	(2) Price	(3) Price	(4) Return	(5) Return	(6) Return
EV	0.537*** [0.054]		0.158 [0.128]	-0.049 [0.080]		-0.203 [0.216]
Total EV Earnings	-0.222** [0.103]		-0.007 [0.116]	0.358 [0.428]		0.444 [0.483]
Shareholders' Equity		0.407*** [0.138]	0.279 [0.232]		-0.019 [0.149]	0.101 [0.296]
Operating Profit		1.858*** [0.621]	1.629*** [0.463]		0.459 [0.463]	0.701 [0.621]
Constant	16.469*** [2.726]	6.365* [3.143]	7.708* [4.511]	37.136*** [9.011]	35.885*** [9.990]	33.541*** [10.309]
Observations	174	174	174	168	168	168
Number of Insurers	32	32	32	31	31	31
Insurer FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Adj. $R^2$	0.548	0.613	0.617	0.307	0.305	0.301
F value	47.22	31.77	55.55	24.34	20.49	21.36

Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Notes:** Stock returns are computed on calendar-year basis and expressed in percent. The linear panel-data regression models include year indicators which are not reported here to conserve space. Standard errors in brackets are robust to heteroscedasticity and clustered at the firm level. All independent variables are deflated by number of shares.

**Table 28:** Covered business EV and IFRS - Relative Value Relevance **since 2009**

	Stock Price IFRS	Stock Price EV	Stock Return IFRS	Stock Return EV
<b>adj. R2</b>	.613	.548	.305	.307
<b>AIC</b>	1234.898	1261.863	1561.167	1560.814
<b>BIC</b>	1257.012	1283.976	1583.034	1582.682
<b>Davidson-MacKinnon J-Test</b>				
t-statistic	3.84***	1.24	0.96	0.82
p-value	0.001	0.226	0.344	0.417
<b>Vuong-Test</b>				
z-statistic	1.0893		-0.2506	
p-Value	0.2760		0.8021	
<b>Observations</b>	174	174	168	168

Significance level: \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**Table 29:** Covered business EV and IFRS - Incremental Value Relevance **since 2009**

	Stock Price IFRS	Stock Price EV	Stock Return IFRS	Stock Return EV
<b>Joint F-Test</b>				
F-Value	42.60***	53.74***	0.61	0.35
p-Value	(0.0000)	(0.0000)	(0.5506)	(0.7081)
<b>unique adj. R2</b>	0.0690	0.0040	-0.0060	-0.0040

Significance level: \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

## 7.2 Financial crisis

Our sample covers the time period of 2005 to 2014. Hence, our results could be driven by the market turmoil during the financial crisis and the subsequent European sovereign debt crisis. In general, we argue that providing value-relevant and reliable information in a period of extreme economic conditions should be a crucial requirement for high-quality accounting frameworks. Hence, we did not remove these years from our main analysis. However, we exclude the years of 2008 and 2011 as a robustness check to make sure that our results were not driven by the stock market turmoils in these years. Table 30 in the appendix shows the results for the value relevance of the EV and the IFRS framework

without the observations of the years of 2008 and 2011. With regard to the relative value relevance of both frameworks, we would still favor the IFRS figures marginally. Most coefficients do not change in terms of size. Total EV earnings seem to be an exception as the sign of the coefficient changes.

### 7.3 Different types of EV reporting

Our sample contains two types of EV reporting systems. The EEV and the MCEV which differ with respect to their conceptual framework and the degree of standardization. To examine whether the two EV types have different information content compared to the IFRS, we run two separate panel regressions on stock prices and stock returns. Table 31 in the appendix shows the results of the EEV sample and table 32 in the appendix contains the MCEV results. In general, the EEV and MCEV framework tend to provide a similar model fit if we compare the adjusted  $R^2$ s of both regression models. Comparing the incremental value relevance of both EV types given the IFRS information, we observe that the EEV provides more incremental information. A first explanation for these differences could be the above mentioned time effects as in the first years of our sample the EEV was the predominant reporting framework and the MCEV has been introduced during capital market turmoils. However, more than one third of the firms in our sample still used the EEV after 2008 and a more detailed analysis shows that these differences are not attributed to the superiority of the EEV in comparison to the MCEV but to a worse model fit of the IFRS framework within the EEV sample. In particular, if we regress the stock price on IFRS data, we receive a significantly lower adjusted  $R^2$ s compared to the MCEV sample.

## 8 Discussion and conclusion

Using our results on the value relevance of the EV framework as a proxy for the new IFRS standard for insurance contracts, it is questionable if the IASB will achieve its goal to provide investors with more relevant and decision-useful information after the completion of the IFRS 4 Phase II project. Our findings show that the current IFRS framework and the capital-market-focused EV framework have comparable information content. However, some of our model specification tests which evaluate the relative value relevance of both frameworks identify the IFRS framework as even more value-relevant. However, our find-



ings are in contrast to prior literature (Wu and Hsu, 2011; Serafeim, 2011; El-Gazzar et al., 2013) which emphasized the favorable information properties of the EV framework. Our results are based on a more homogeneous sample of large European insurers and more standardized reporting frameworks in contrast to prior studies.

The reliability of our findings is confirmed by various robustness checks. We ensured that our results are not biased by the aftermaths of the financial crisis in 2008 and 2011 as excluding both years does not change the outcomes significantly. We can show that the value relevance of the EV framework is significantly higher in the first years of standardized EV reporting (2005-2008) compared to the later years (2009-2014) in the price setting. Using a subsample which covered the period before the financial crisis and before the following low interest environment our model specification tests, that evaluate the relative value relevance of both frameworks tend to identify the EV framework as slightly superior to the current IFRS framework. In contrast, using a subsample including the later years of EV reporting the IFRS framework is indicated as superior to the EV framework. The EV framework provides no longer a higher relative value relevance and in addition, there is no evidence for an incremental value relevance. The decreasing value relevance of the EV framework is not driven by the adoption of the more recent MCEV framework because both EV types provide a similar relative information content over time. The decreasing value relevance of the EV framework in a low interest environment casts doubt whether volatile fair values of insurance contracts derived from models and assumptions capture the life insurers' business model. It seems that factors of the current IFRS framework, like delayed recognition and distribution of profits over the whole contract duration, help to provide relevant information even in times of stress and financial turmoil. Therefore, our empirical results seem to support recent refinements of the current IFRS 4 Phase II draft which requires a market-consistent valuation of expected future profits but does not allow an immediate realization. Insurers are instead required to realize these profits steadily over the whole contract duration and to unlock and recalculate the expected profits in case of unfavorable assumption changes.<sup>15</sup>

As the EV framework covers only companies' life insurance business, one could argue that a comparison of EV's relative value relevance with IFRS's information content is not appropriate. Hence, we also examine the Group EV, which considers all lines of insurance business. We show that the Group EV provides more value-relevant information than the EV but is still not superior to the current IFRS framework. Moreover, comparing the EV

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<sup>15</sup>IFRS 4 Phase II requires insurers to disclose expected future profits in the component service margin.

to IFRS equity allocated to life and health segments and the EV earnings to the operating profit earned in the life and health segments is a similar test for the robustness of our findings. Although, the EV results are more favorable in this analysis, we are still not able to provide evidence for a superior information content of the EV framework in comparison to IFRS.

The analysis of the EV and EV earnings subcomponents shows that part of the reforms of IFRS 4 Phase II might be helpful for investors. The incremental value relevance of the value of new business and of the expected contribution of existing business indicates that the separate disclosure of the inforce business and the new business as required by IFRS 4 Phase II provides additional insights for investors. In addition, the incremental value relevance of both the time value of options and guarantees and the present value of future profits shows that a separate and explicit market-consistent valuation of options and guarantees is useful for investors. This promotes an unbundling of insurance contracts which would include a separate valuation of embedded derivatives like profit-sharing mechanism or interest rate guarantees. However, the final IFRS 4 Phase II standard prohibits unbundling if the embedded derivative is closely related to the host contract whereas IFRS 4 Phase I did not require but allowed unbundling of insurance contracts. If insurance contracts are not unbundled and options and guarantees valued separately investors will lose the significant incremental information content of the subcomponents.

We conclude that the IFRS 4 Phase II project is unlikely to provide more relevant than the existing standards especially in the current market environment. Our information content analysis of the EV subcomponent may provide some suggestions for improving the decision usefulness for investors of the new insurance accounting standard.

## 9 Appendix

### 9.1 Financial crisis

**Table 30:** Panel-data regressions results: Value relevance of covered business EV and IFRS - Excluding the years of the financial crisis 2008 and 2011

Variable	(1) Price	(2) Price	(3) Price	(4) Return	(5) Return	(6) Return
EV	0.411*** [0.036]		0.026 [0.172]	0.019 [0.078]		-0.338 [0.203]
Total EV Earnings	-0.852*** [0.156]		-0.458* [0.242]	-0.135 [0.510]		0.108 [0.591]
Shareholders' Equity		0.168 [0.123]	0.206 [0.195]		0.028 [0.071]	0.271* [0.145]
Operating Profit		2.276** [0.878]	2.091** [0.878]		0.473 [0.858]	1.189 [0.878]
Constant	30.859*** [2.237]	20.624*** [2.042]	20.806*** [3.467]	31.016*** [8.264]	28.361*** [8.254]	22.767** [9.957]
Observations	204	204	204	197	197	197
Number of Insurers	33	33	33	32	32	32
Insurer FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Adj. $R^2$	0.406	0.470	0.480	0.266	0.268	0.266
F value	49.54	30.87	41.24	18.78	23.20	28.59

Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Notes:** Stock returns are computed on calendar-year basis and expressed in percent. The linear panel-data regression models include year indicators which are not reported here to conserve space. Standard errors in brackets are robust to heteroscedasticity and clustered at the firm level. All independent variables are deflated by number of shares.

## 9.2 Different types of EV reporting

**Table 31:** Panel-data regressions results: Value relevance of covered business EV and IFRS - only EEV

Variable	(1) Price	(2) Price	(3) Price	(4) Return	(5) Return	(6) Return
EV	0.064 [0.058]		-0.122 [0.194]	-0.169 [0.238]		-0.607 [0.355]
Total EV Earnings	1.854*** [0.553]		1.876*** [0.640]	1.666 [1.239]		2.138* [1.209]
Shareholders' Equity		0.138 [0.256]	-0.090 [0.120]		-0.376 [0.224]	-0.583*** [0.133]
Operating Profit		1.500* [0.740]	1.345 [1.076]		2.103 [1.790]	3.582** [1.595]
Constant	20.179*** [1.283]	17.894*** [2.837]	20.439*** [1.599]	32.033*** [7.210]	34.318*** [8.452]	36.780*** [7.844]
Observations	135	135	135	132	132	132
Number of Insurers	24	24	24	23	23	23
Insurer FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Adj. $R^2$	0.545	0.398	0.563	0.517	0.516	0.519
F value	37.41	17.50	42.58	18.74	25.97	89.35

Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Notes:** Stock returns are computed on calendar-year basis and expressed in percent. The linear panel-data regression models include year indicators which are not reported here to conserve space. Standard errors in brackets are robust to heteroscedasticity and clustered at the firm level. All independent variables are deflated by number of shares.

**Table 32:** Panel-data regressions results: Value relevance of covered business EV and IFRS - only MCEV

Variable	(1) Price	(2) Price	(3) Price	(4) Return	(5) Return	(6) Return
EV	0.327*** [0.054]		0.177 [0.263]	0.027 [0.092]		-0.147 [0.142]
Total EV Earnings	0.331*** [0.108]		0.109 [0.163]	0.248 [0.233]		0.184 [0.220]
Shareholders' Equity		0.175 [0.119]	0.025 [0.306]		0.031 [0.093]	0.130 [0.187]
Operating Profit		1.930*** [0.385]	1.606*** [0.290]		0.678** [0.318]	0.674* [0.346]
Constant	55.290*** [8.413]	34.212*** [6.042]	40.368*** [10.603]	18.642* [10.500]	11.802 [9.867]	9.205 [11.317]
Observations	121	121	121	117	117	117
Number of Insurers	19	19	19	18	18	18
Insurer FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Adj. $R^2$	0.551	0.602	0.607	0.487	0.490	0.482
F value	1868	236.2	2360	169.2	117.9	137.6

Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Notes:** Stock returns are computed on calendar-year basis and expressed in percent. The linear panel-data regression models include year indicators which are not reported here to conserve space. Standard errors in brackets are robust to heteroscedasticity and clustered at the firm level. All independent variables are deflated by number of shares.

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