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Long and Short-term Investments by European Banks – Trends Since the IASB Published IFRS 9

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IFRS 9 was introduced by the IASB in 2014 with a mandatory application in 2018. Three years later the IASB started a post-implementation review project. Major concerns at a political level and from the (insurance) industry were raised about long-term investment strategies that appear less favourable due to new measurement categories and impairment rules. Furthermore, it was expected that the new rules on categorisation would create more profit or loss (P/L) volatility. We show that concerns about banks' decreasing maturity investment behaviour and increased profit or loss volatility since the publication of IFRS 9 in 2014 could not be verified until 2020. Additionally, banks hardly use the fair value option in practice, which suggests it can be abolished. Finally, the paper finds that the fair value through other comprehensive income option for equity instruments has almost no importance for banks. The IASB should, therefore, abolish this category as well. Hence, the measurement categories could be reduced by two categories reducing complexity and increasing the decision usefulness of financial instruments accounting rules for investors.

Introduction

Background

In the aftermath of the financial crisis in 2008, the International Accounting Standards Board (IASB) drafted IFRS 9 *Financial Instruments* to recognise credit losses promptly and remedy the complexity of the previous standard, IAS 39 *Financial Instruments: Recognition and Measurement*. In July 2014, the due process resulted in the issuing of the final version of IFRS 9, which became effective in the European Union (EU) – and other countries – in January 2018 (Pickard 2007; IASB 2014; ECB 2017). Banks are affected significantly by the new standard, as their balance sheets consist mainly of financial instruments. Although the objective of the new standard was to simplify the accounting of financial instruments while increasing 'too little, too late' loan loss provisions (IASB 2014, p. 14; EBA 2017, p. 10; Gomaa et al. 2019, p. 310), it nevertheless triggered controversies regarding the expected impact on the investment behaviour of banks (EFRAG 2015a; Pavlović 2015; Maggi et al. 2017; Pucci and Skaerbaek 2020). A change in financial intermediaries' investment behaviour could reduce the real economy's loan supply and lead the market economy into disequilibrium (Arestis et al. 2015; Lhuissier 2017).

Notably, it is claimed that long-term investment strategies would appear less favourable as a result of the new measurement categories and impairment rules. There are concerns that losses would only be recognised in a trigger event under the incurred loss model, whereas

loan loss provisions on debt instruments are recognised earlier under IFRS 9. As the expected credit loss model (ECL model) under IFRS 9 requires estimating potential future losses from the time of initial recognition, it was expected that loan maturities would be reduced in some cases, especially for low credit ratings and, as a result, there would be less support for borrowers in financial distress (EFRAG 2015a; Krüger et al. 2018; Pucci and Skaerbaek 2020).

Furthermore, while IAS 39 allowed measurement at fair value through other comprehensive income (FVOCI) and reclassification through profit or loss (recycling) for equity instruments, IFRS 9 now provides an initial option to measure equity instruments at FVOCI. However, such an option is unlikely to be attractive to long-term investors as recycling is prohibited (LTI 2015; Petchchedchoo and Duangploy 2017; EFRAG 2018; EFRAG 2020). It is mainly insurance companies that are concerned about whether the FVOCI category under IFRS 9 accurately reflects the performance of their long-term equity instruments (EFRAG 2015a; Hoogervorst 2019). On the other hand, the alternative measurement of these long-term equity investments at fair value through profit or loss (FVPL) could lead to higher profit or loss (P/L) volatility over time. Additionally,

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concerns were already expressed that the measurement categories combined with the sole interest and principal payments (SPPI) test under IFRS 9 would result in an increased proportion of financial instruments being measured at fair value, also causing P/L volatility (EFRAG 2015a; Pavlovi  2015; Maggi et al. 2017; PwC 2017). This volatility could increase risk premiums for banks due to reduced forecasting ability. Consequently, this could have negative consequences for reporting companies, such as rating downgrades and increased refinancing costs (Murray et al. 2005; Jung et al. 2013).

Research question

The EU has questioned the impact of IFRS 9 and asked the European Financial Reporting Advisory Group (EFRAG) to examine how the regulation will affect long-term business and P/L volatility (EFRAG 2015a, 2015b, 2018, 2020). However, since EFRAG evaluations have been conducted qualitatively and not quantitatively, further research is still relevant.

Nonetheless, at the time of first-time application in 2018, it could not be concluded that banks would have changed their portfolios to the detriment of long-term exposures due to the new impairment rules. A significant impact on P/L volatility due to the new categories' allocation has not been verified (EBA 2018; L w et al. 2019), especially for equity instruments (EFRAG 2020). Since previous studies refer to first-time application effects in 2018, two research gaps must be addressed. Firstly, a long-term reduction in exposure may already have occurred since the standard was published in 2014. Banks were allowed to prepare structurally from this point in time to anticipate a first-time adoption effect in 2018. Secondly, three years of financial statements applying IFRS 9 have been published, which allows a more detailed analysis of the effects of IFRS 9 and a comparison with IAS 39 (IASB 2014). The contribution of this paper is to fill these two research gaps and thereby examine the following research questions.

1. To what extent can a trend towards decreasing maturity investment behaviour of banks be observed since the publication of IFRS 9? Did banks change their investment behaviour even in the years before the mandatory application under IAS 39 to avoid potential adverse effects due to the introduction of the new impairment rules? Is there a change in investment behaviour after the mandatory application of IFRS 9?
2. Do we see an increased amount of financial instruments being categorised into FVPL as an indicator of increased future P/L volatility? Does the comparison between the usage of IAS 39 and the application of IFRS 9 lead to a higher percentage or absolute amount of financial instruments being fair valued?

Research design

Given that there has been limited analysis of the maturity of investments in previous research, our paper takes an in-depth look at how European banks' investment structure has changed from 2014 to 2020. For this purpose, a sample was drawn based on banks directly supervised by the European Central Bank (ECB) within the framework of the Single Supervisory Mechanism as of May 2021 (114 banks) (ECB 2021). In the first step, we excluded banks from our sample if they prepared their accounts following national regulations or if their financial statements were published after 1 July 2021. Subsequently, all subsidiaries with parents supervised by the ECB have been removed to avoid multiple considerations.

For the remaining 87 banks, data from the financial statements from 2014 to 2020 were hand collected. Table 1 provides an analysis of the sample by country. Our analysis is based on the financial statements published on the banks' websites. Balance sheet classifications of European banks are partly structured according to legal-business characteristics and partly according to measurement categories. IFRS 7 Financial Instruments: Disclosures require liquidity risk disclosures. According to IFRS 7.39(c) and IFRS 7.B11E, a residual maturity classification is required for financial assets if it is relevant for understanding the liquidity risk – which can be assumed for credit institutions (Nadia and Rosa 2014). Nevertheless, only 63 of the 87 banks had a breakdown of financial assets divided into short-term, mid-term and long-term for all observed years from 2014 to 2020. The IASB should consider implementing respective requirements in IFRS 7 and define short-, mid- and long-term time categories to better allow comparisons for the stakeholders.

Since the categories in both IAS 39 and IFRS 9 provide information on P/L volatility and are partly linked to holding intentions, which are the first indicator for the maturity of investments, the next central part of our work evaluates the changes in categorisation. In addition, we assess the measurement category FVOCI for equity instruments under IFRS 9 to determine for what purpose the banks use this category. Afterwards, we investigate trends regarding the maturity of investments in general and on selected instruments.

To outline visible trends and understand the severity of the impact of IFRS 9 thereafter, we conduct a detailed analysis by clusters such as size, profitability, country, credit risk model and Common Equity Tier 1 (CET1). In particular, we use descriptive methods and single-factor regressions to explain the regularity between the new standard and the investment maturities for different clusters. In addition, we perform a panel regression analysis to test for significance, as it considers dynamic relationships and heterogeneity between the

Table 1 Setting of the sample by country

Country	<i>n</i>	Country	<i>n</i>	Country	<i>n</i>
Austria	6	Germany	12	Luxembourg	2
Belgium	6	Greece	4	Malta	3
Cyprus	2	Ireland	3	The Netherlands	5
Estonia	2	Italy	9	Portugal	2
Finland	3	Latvia	3	Slovenia	1
France	10	Lithuania	3	Spain	11
Total					87

banks. Based on our findings, we will offer certain recommendations to the IASB. After examining the results, our paper concludes with a summary that outlines the key findings, identifies the limitations of this study and proposes suggestions for future research.

Measurement Categories – Transition from IAS 39 to IFRS 9

IFRS 9 was introduced in three phases as a response to the limitations of IAS 39. In the first phase, classification and measurement were amended. Secondly, the impairment model was revised, and in the last phase, hedge accounting was redesigned (IASB 2014; PwC 2017). Our study did not examine the effects of the new impairment rules nor of hedge accounting because most European banks have used the transitional option for the analysis period to continue applying IAS 39 for hedge accounting (EBA 2018; M uller 2020).

Under IAS 39, all financial assets are classified into one of the following categories: available for sale (AfS), held to maturity (HtM), loans and receivables (LaR), held for trading (HfT) or fair value option (FVO). According to IFRS 9, financial assets are divided into five different measurement categories: amortised cost (AC), fair value through profit or loss (FVPL) and fair value through other comprehensive income with recycling (FVOCI) as well as without recycling (FVOCI Equity). Additionally, IFRS 9 allows the option of measurement at a designated fair value (FVO) (IASB 2014). In contrast to IAS 39, where classification and measurement are based on management's intention and AfS is used as a residual category other than trading and held to maturity instruments, IFRS 9 provides a fundamental principle of classification. Decisive for the respective classification is the basis of the business model and the character of the cash flows (EY 2017; Petchchedchoo and Duangploy 2017).

For financial assets in the category of equity instruments, IFRS 9.4.1.4 allows an option to use the category fair value through other comprehensive income (FVOCI). This differs from the AfS measurement under IAS 39 as only the dividend income has to be recognised in profit or loss under IFRS 9. Even at the time of disposal, gains and losses remain in other comprehen-

sive income, whereas under IAS 39, there is a 'recycling' to the income statement (Petchchedchoo and Duangploy 2017; EFRAG 2018; EFRAG 2020). Hoogervorst explained that the recycling prohibition under IFRS 9 fulfils the prevention of earnings management, without which companies could cover their weak performance by selling their financial assets at AfS and recycling accumulated gains in the years with modest net profits like under IAS 39 (Lloyd 2018; Hoogervorst 2019). In 2015, EFRAG acknowledged that IFRS 9 provides an option to measure some equity instruments in FVOCI. However, EFRAG emphasised that such an option is unlikely to be attractive to long-term investors as no recycling to profit or loss is allowed. In this regard, EFRAG noted that the prohibition on recycling the FVOCI category gains/losses reduces the decision usefulness. However, a recycling model is only consistent with impairment models for equity instruments (EFRAG 2015b).

According to IFRS 9.4.1.1, debt instruments can only be accounted for at AC or FVOCI if the expected cash flows of the debt instrument follow two criteria. First, they have to represent purely interest payments and repayments of the principal amount outstanding (SPPI test). Interest payments have to be equivalent to the time value of money and the credit risk inherent in the instrument. It means that only plain vanilla instruments will meet those criteria. Consequently, a financial asset that does not meet the SPPI test requirement will be measured at FVPL. In summary, banks will inevitably fail the SPPI test for a specific portion of assets, as the contractual cash flows of these instruments will not solely consist of principal and interest payments on the outstanding principal. For example, convertible bonds would fail the SPPI test due to the option right, which refers to share price risks. Thus, it is expected that banks have taken precautions to address this effect of IFRS 9 (Lejard 2016; Petchchedchoo and Duangploy 2017; PwC 2017).

While the IAS 39 model tended to recognise impairments perceived as 'too little, too late', the ECL model is intended to be more forward-looking. In addition, since the expected credit loss model under IFRS 9 requires the recognition of credit losses on an ongoing basis, it addresses the objective of enhancing the decision usefulness on expected losses (EL) in financial statements

(IASB 2014). Therefore, the impairment model has been divided into three main stages. While the expected loss is equal to a 12-month expected credit loss in the first stage (at initial recognition), an entity shall recognise a loss allowance for the lifetime expected credit losses in the other stages (after a significant deterioration in credit quality (stage 2) or after a loss has been incurred (stage 3).

Compared to the incurred loss model, where impairment losses are only recognised on the occurrence of an incurred loss (even for portfolios), loss allowances are recognised in a more timely manner under IFRS 9, mainly due to the lifetime EL for assets assigned to stage 2 (Camfferman 2015; Novotny-Farkas 2016; Seitz et al. 2018), which could be determined according to the following formula:

$$EL_{0,T} = \sum_{t=1}^T (PD_t \cdot LGD_t \cdot EAD_t) \quad (1)$$

The expected loss (EL) is thus the product of the probability of default (PD), the loss given default (LGD), and the exposure at default (EAD) for the respective period (t). In the above formula, $t = 1, \dots, T$ to represent future years. Accordingly, PD corresponds to the probability of no default in the previous years 1 to $t-1$ and a resulting default in the specific year t (Kund and Neitzert 2020; Gubareva 2021). Therefore, no loss identification period has to be assessed under IFRS 9.

Consequently, IFRS 9 will lead to an earlier impairment due to changes from stage 1 to stage 2 according to a significant deterioration in credit quality with calculating lifetime expected losses earlier than under IAS 39 and due to the inclusion of foreseeable developments and their impact on expected future cash flows. Furthermore, a longer maturity leads to a cumulation of more periods and could result in a higher expected credit loss or increased uncertainty about repayment (Krüger et al. 2018; Pucci and Skaerbaek 2020). On the one hand, it was expected that some banks would shorten loan maturities, especially for those loans with low credit ratings and less willingness to support borrowers in distressed situations (EFRAG 2015a). On the other hand, given that the demand for long-term loans remains constant, EFRAG implies that competitive forces might constrain the banks from shortening loan maturities. This is because failing to meet the demand for loans with longer maturities would harm the bank's market share and its ability to establish long-term client relationships (EFRAG 2015b).

Literature Review

Before IFRS 9, analyses of the expected application effects were conducted (Seitz et al. 2018; EFRAG 2015a;

Onali and Ginesti 2014). Since then, three periods of annual financial statements have been published under the application of IFRS 9. Much research in recent years has focused on the differences in the impairments and regulatory capital impact (ECB 2017; EBA 2018; Lów et al. 2019; Kund and Neitzert 2020; Oberson 2021; Caruso et al. 2021). Although a partial increase in average impairment per loan has been perceived, predominantly more adequate recognition over time has been observed (EY 2018; Gomaa et al. 2019; Buesa et al. 2020; Kund and Neitzert 2020). Kund and Rugilo suppose that IFRS 9 leads to a decrease in the 'cliff effects'¹ and a sudden increase in impairments as it 'front-loads'² the recognition of losses. Hence, the authors assume impairment volatility declines (Kund and Rugilo 2018). Based on a sample of 69 IFRS banks across 24 countries, Oberson deduces that the timeliness of loan impairment improved and that bank managers exercise more of their accounting discretion to smooth earnings by way of loan loss provision since IFRS 9 (Oberson 2021).

Prospectively, the literature also examines how the borrower's environmental, social and governance (ESG) criteria can be more effectively considered in the expected credit loss model. The studies suggest that the higher ESG performance of the borrower leads to lower volatility and fewer surprises (Khan et al. 2016; Henisz and McGlinch 2019).

This literature review elaborates on banks' decreasing maturity investment behaviour and increased P/L volatility. The increased P/L volatility is primarily a result of the new classification (fewer instruments qualifying for amortised cost) and the impairment model (EFRAG 2015a; Pavlović 2015; Maggi et al. 2017; PwC 2017).

For classification and measurement effects, in a European Banking Authority (EBA) survey, banks estimated movements towards FVPL due to instruments failing the SPPI assessment. However, it was found that the impact on most banks would be limited, depending on their business model and investment portfolio (EBA 2017).

In a subsequent study of 54 European banks, the EBA was able to identify that the proportions of measurement at amortised cost and FVPL differed only marginally between IAS 39 and IFRS 9. While, on average, under IAS 39, 76% of financial assets are measured at amortised cost and 14% at FVPL, the amounts change under IFRS 9 to AC 80% and FVPL 11%. Meanwhile, the FVOCI portion has decreased slightly from 10% to 9%. However, the study emphasises that it was carried out too early after the first application of IFRS 9 to make clear conclusions regarding changes in P/L volatility (EBA 2018).

Preliminary work concluded that banks have a trade-off between the benefit of a higher expected lending profit and the cost of elevated insolvency risk if banks

can decide between historical-cost and fair-value accounting. Hence, banks tend to select historical-cost accounting for intense capital requirement levels and extremely elastic lending return curves (Corona et al. 2018).

In research about financial stability, Tommaso et al. (2021) conduct a panel regression for Single Supervisory Mechanism (SSM) banks from 2014 to 2019 with IFRS 9 as a dummy variable. While their random-effects model between estimates concludes a negative correlation between the z-score and IFRS 9, the fixed effects model detects an increase in z-score with a *p*-value of less than 0.1. Furthermore, the random-effects model across time detects a positive correlation between z-score and IFRS 9 with a *p*-value of less than 0.001 (Corona et al. 2018). The z-score is an indicator of financial stability and measures the banks' capital level to variability in returns. It is calculated as the ratio of return on assets combined with the capital-asset ratio to the five years standard deviation of return on assets. Hence, the higher the z-score, the lower an institution's insolvency risk (Caprio et al. 2014; Li et al. 2017). A decreasing z-score would mean increased earnings volatility assuming a constant numerator. Combining this with Tommaso et al.'s results, it implies that across banks, increased P/L volatility of results could be assumed for IFRS 9 but observing the impact across time P/L volatility will be reduced in the short term by IFRS 9.

L w et al. (2019) compared the financial statements of 78 European banks between 2017 and 2020 to analyse the first-time application effects of IFRS 9. They found that the financial instruments within IAS 39 categories are mostly designated to their comparable measurement categories under IFRS 9 (Caprio et al. 2014; Li et al. 2017). Furthermore, the study analysed the composition of loans and debt securities. No significant changes in the long-term nature of investments could be identified. According to the study, long-term debt instruments decreased from 34% in 2017 to 31% in 2018, while the short and medium-term investments increased by one percentage point each. Overall, banks' investments in loans and debt securities decreased by 9% in 2018 compared to the previous year (L w et al. 2019).

EFRAG observed in several reports the effects of IFRS 9 on long-term investing activities, especially for equity instruments (EFRAG 2015b, 2018, 2020). Therefore, EFRAG surveyed the performance and risks of equity and equity-type instruments held in long-term investment business models ('LTIBM') finding mixed results. Over 60% of respondents supported a change in accounting for long-term equity investments. In this context, 57% of the respondents considered long-term equity investments to be correctly recognised neither

at FVPL because this increases short-term P/L volatility nor at the FVOCI category with the recycling prohibition. Non-recycling implies that the cumulative gains and losses at the time of disposal of equity instruments are not economically part of the financial performance. Consequently, insurance companies claim that they are prevented from adequately reflecting their investment performance in equity instruments due to the long-term nature of their contracts and asset-liability management purposes (EFRAG 2020; LTI 2015), not expressing that the internal management of those assets in their treasury department is based on (changes) of net present values which, in accounting terms, would mean at fair value through P/L.

Previous studies focused on first-time application effects, and only a few addressed whether the banks anticipated the application effects before 2018. Moreover, further work is needed on subsequent application effects, which would allow a more detailed analysis of the effects of IFRS 9 and a comparison with IAS 39.

Descriptive Findings

Categorisation of financial assets and P/L volatility

The categorisation of the financial instruments could provide an insight into whether more financial assets being measured at FVPL could cause higher P/L volatility. Furthermore, the categorisation criteria could provide the first implication of maturity. For instance, particular categories focus on a more short-term investment intention like the held for trading category under IAS 39 or the other business model under IFRS 9.B4.1.5, which both lead to FVPL measurement. In contrast, other categories are only applicable if the investment is intended to be held for a longer time, for example, held-to-maturity or the business model 'held to collect' according to IFRS 9 B4.1.2C.

As expected, our findings for the total sample of 87 banks show that the majority of financial assets under IAS 39 are classified in their residual measurement category under IFRS 9:

Table 2 analyses the classification to measurement categories of financial assets from 2014 to 2020. It illustrates that the expectation of increased P/L volatility caused by the classification rules cannot be observed as there is a decreasing portion of financial assets allocated to the category of FVPL. In this regard, the average for financial instruments measured at FVPL decreased from 17.41% (average of the years 2014–2017) under IAS 39 to 16.42% (average of the years 2018–2020) under IFRS 9. Additionally, financial assets designated at fair value (FVO) have decreased from 4.96% (on

Table 2 Classification of measurement categories from 2014 to 2020

IAS 39						
	LaR (AC)	HTM (AC)	HfT (FVPL)	FVO	AfS (FVOCI)	Other
2014	59.77%	1.49%	20.26%	4.97%	13.00%	0.52%
2015	61.75%	1.36%	17.73%	4.98%	13.69%	0.49%
2016	63.00%	1.51%	16.82%	4.84%	13.42%	0.41%
2017	64.96%	1.60%	14.85%	5.06%	13.13%	0.40%
IFRS 9						
	AC	FVPL	FVO	FVOCI with Recycling	FVOCI without Recycling	Other
2018	73.99%	16.27%	0.65%	8.46%	0.24%	0.39%
2019	74.49%	16.09%	0.65%	8.21%	0.23%	0.34%
2020	72.81%	16.89%	0.54%	9.17%	0.25%	0.35%

LaR – Loans and Receivables, HTM – Held to Maturity, HfT – Held for Trading, FVO – Fair Value Option, AfS – Available for Sale, Other – not clarified in the financial statements, AC – Amortised Cost, FVPL – Fair Value through profit or loss, FVOCI – Fair Value through Other Comprehensive Income.

average from the years 2014–2017) under IAS 39 to 0.61% (on average from the years 2018–2020) under IFRS 9. This result indicates that banks have used the chance of a reclassification due to the change from IAS 39 to IFRS 9 to dramatically reduce their position in the FVO. The disadvantages of using the FVO are first, that designated assets have to remain in the category until derecognition (that is, no reclassification) and second, that compared to fair value hedge accounting, all fair value changes will be reflected in P/L, whereas fair value hedge accounting only requires changes of the hedged risk to be included in P/L. Due to a lack of information in the notes, it cannot be observed whether at least some of the instruments in the FVO were allocated to fair value hedge accounting.

A second reason for a decrease of the FVO under IFRS 9 could result from abolishing the usage of instruments with an embedded derivative that otherwise would have to be separated under IAS 39. Practically, those instruments will have to be shown in FVPL as it can be expected that those instruments will not pass the SPPI test, for example, a convertible bond.

At the same time, the financial assets measured at an amortised cost position increased from 61.26% (59.77% LaR plus 1.49 HTM) in 2014 to 72.81% in 2020.

The percentages figures in our study differ slightly from those of the EBA study, probably due to the expansion of the sample from 54 to 80 banks and the different years of data observation. However, the results and trends are mostly aligned with the EBA results, which could also trace a slight reduction in the FVPL proportion and a rise in the AC proportion.

Table 2 reveals a clear trend that the FVPL has systematically decreased from 2014 to 2017, while the LaR and HTM have increased simultaneously. After apply-

Table 3 Comparison of Return on Assets

	Mean	Standard Deviation
IAS 39	0.3698%	0.9594
IFRS 9	0.3981%	0.5479

ing IFRS 9, the AC and the FVPL proportion no longer have observable trends. The trend in the last years before IFRS 9 could be related to an anticipation of a first-time adoption effect, but it also could be a result of the financial crises and a decrease in the usage of highly complex products with embedded derivative components.

The financial assets in FVPL and the FVO positions are not broken down in maturity scales within the notes of the banks. Therefore, for our analysis, the FVPL and FVO positions are assumed to be short-term investments. Compared to IAS 39, on average 4% fewer financial assets are classified at FVOCI under IFRS 9.

As mentioned before, increased P/L volatility caused by the new categorisation seems to be unlikely. Certainly, this is the first indicator, but to develop an understanding of changes in P/L volatility, we compared the return on assets between IAS 39 and IFRS 9. The mean and standard deviation of the Return on Assets (ROA) show the following results for both groups.

Table 3 compares the ROA between IAS 39 and IFRS 9. It illustrates that the average of ROA slightly increased under IFRS 9. Nonetheless, the standard deviation decreased from 0.959 to 0.548. Thus, it could not be concluded that there was an elevated level of P/L volatility. However, given that these findings are based on a limited number of years and do not consider other variables like the economy, share prices or interest rates, the results should be read with caution.

Table 4 Categories and maturities of debt instruments

	IAS 39								
	< 1 y		1-5 y		> 5y		< 1 y	1-5 y	> 5y
	LaR (AC)	HTM (AC)	LaR (AC)	HTM (AC)	LaR (AC)	HTM (AC)	Afs (FVOCI)		
2014	36.80%	16.72%	27.58%	47.22%	35.62%	36.07%	25.94%	36.18%	37.88%
2015	34.75%	20.39%	28.66%	43.57%	36.59%	36.04%	24.39%	35.05%	40.56%
2016	34.04%	15.17%	28.71%	43.06%	37.25%	41.77%	24.12%	35.30%	40.58%
2017	33.74%	17.26%	29.00%	41.03%	37.26%	41.72%	23.05%	34.42%	42.53%
Average	34.83%	17.39%	28.49%	43.72%	36.68%	38.90%	24.38%	35.24%	40.39%

	IFRS 9					
	< 1 y	1-5 y	> 5y	< 1 y	1-5 y	> 5y
	AC	AC	AC	FVOCI with Recycling		
2018	31.98%	29.69%	38.33%	23.53%	39.70%	36.77%
2019	31.92%	30.02%	38.06%	21.58%	40.91%	37.51%
2020	31.61%	31.07%	37.32%	22.94%	37.08%	39.98%
Average	31.84%	30.26%	37.90%	22.68%	39.23%	38.09%

Short-term, medium-term, and long-term maturities of categories

As previously mentioned, only 63 of the 87 banks provided a breakdown of financial assets that were divided into short-term (less than one year), mid-term (between 1 and 5 years), and long-term (more than 5 years) for all observed years from 2014 to 2020. Table 4 outlines the categories' changes in maturities for the 63 banks that provided the necessary information.

Overall, we observe an extended maturity in all categories in 2020 compared to the residual categories in 2014. During the time in preparation of IFRS 9 between 2014 and 2017 when IAS 39 still was applicable, neither in the LaR and HtM categories nor the AfS category do we see a reduction in long-term investments. Instead, the long-term investments expanded steadily in both categories of AC as well as in AfS (from 35.62% to 37.26% in LaR, from 36.07% to 41.72% in HTM, and from 37.88% to 42.53% in AfS). It is, therefore, obvious that the introduction of IFRS in 2014 did not lead to a pull-forward effect against long-term investments (on the contrary).

After the application of IFRS 9 in 2018, we see that the portion of long-term investments in the AC category slightly decreased from 38.33% to 37.32% with a shift towards medium-term investments, whereas it increased in the category of FVOCI with recycling from 36.77% to 39.98%.

To compare the long-term investments measured at amortised cost under IAS 39 with respective investments under IFRS 9 it has to be considered that the LaR proportion in 2018 was 64.96%, whereas the HtM was only 1.60% of the total financial assets (as we showed in Table 2). Hence, a weighted average of investments in LaR

and HtM shows a total increase of long-term investments measured at AC from 2017 37.36% (IAS 39) to 38.33% in 2018 (IFRS 9).

Observation of equity instruments in FVOCI since IFRS 9

The IASB, in its meeting regarding the post-implementation review of IFRS 9, stated that it wants to examine further the FVOCI option for equity instruments and for which types of instruments it is used, as well as the impact on entities' investment decisions (IASB 2021).

The OCI option was applied only for a quarter of a percent of all financial assets from 2018 to 2020. This indicates that the use of the OCI option for equity instruments in the banking sector is almost of no importance at all and should, therefore, be abolished as a result of the post-implementation review. Even more, as seen in Figure 1, the relevance of the OCI option is continuously diminishing for equity instruments.

While in 2018, 28.49% of equity instruments were measured at FVOCI, the OCI option was only used for 17.80% of equity instruments in 2020. Nevertheless, an increase from 2018 of €43.2 billion to €47.3 billion for equity instruments at FVOCI can be observed in absolute values. The increase should not lead to the direct conclusion that in absolute values more instruments are designated to FVOCI because the observation could also be related to an increase in the market values of equity instruments (which would be in line with the development of worldwide stock price indices). The decreasing proportion of equity instruments at FVOCI aligns with the statement of the EFRAG that, especially for long-term investments, equity instruments at FVOCI would

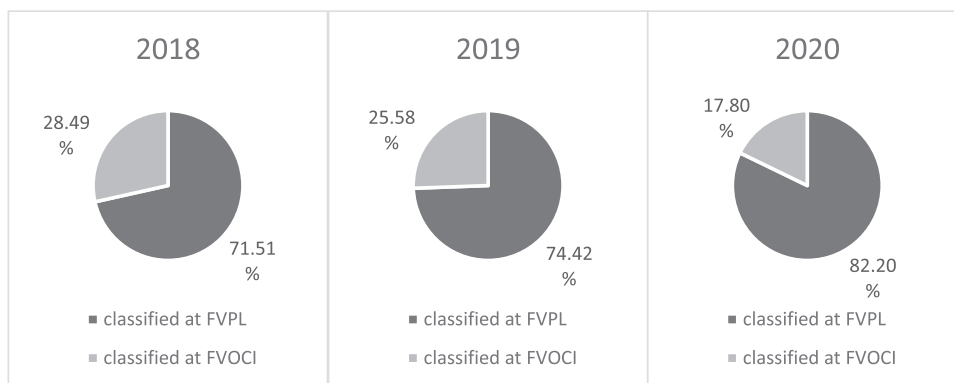


Figure 1 Decreasing importance of the classification of equity instruments at FVOCI over time

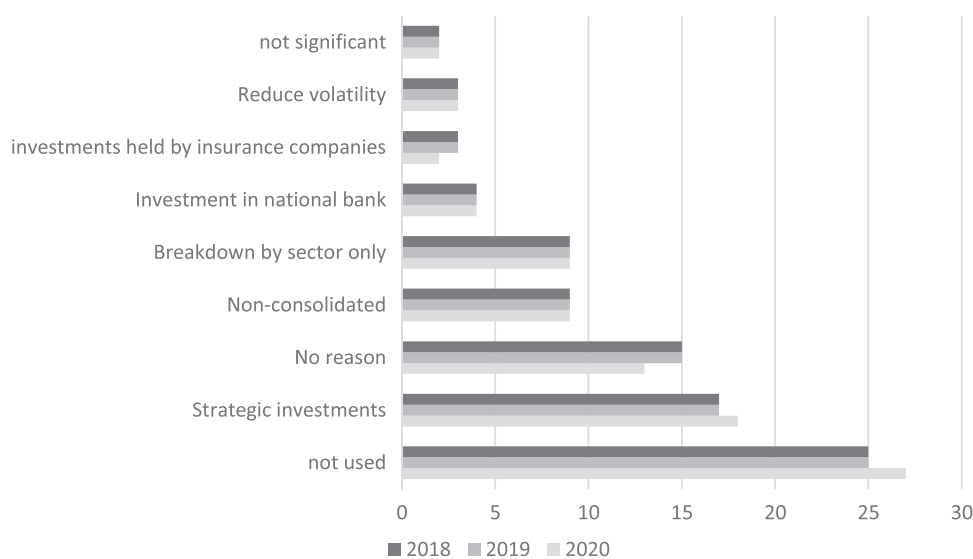


Figure 2 Why some banks use the OCI option for equity instruments from 2018 to 2020

never impact the P/L and makes a designation into the option less favourable.

This raises the question of what are the banks’ motives for choosing the OCI option for equity instruments. Hence, we evaluate the reasons provided for the use of the OCI option.

Figure 2 shows whether the 87 sampled banks used FVOCI without recycling and their primary reasons for applying the OCI option.

From 2018 to 2019, 62 of 87 banks used the OCI option, while in 2020 the OCI option was only applied by 59 of 87 banks in the sample. It is noticeable that the banks only rarely changed the qualitative description in all three years. Figure 2 shows that of the 59 banks that applied the OCI option in 2020, 13 did not elaborate on the composition or motive. This information is seemingly not provided by some banks due to its immaterial-

ity. While 15 banks did not provide any information in 2018, there is a slight trend towards greater transparency in 2020, with only 13 banks not providing any information. Furthermore, nine banks only give a quantitative breakdown by sector. Hence, only 37 of 59 banks give a qualitative reason for choosing the OCI option for equity instruments in 2020.

Between 2018 and 2020, three banks mentioned that they chose this category for equity instruments to keep the consolidated net income free from measurement volatility.

Moreover, in 2020 two banks elected to measure the equity instruments held by insurance companies at FVOCI. These investments are held neither for trading nor to generate returns. The question remains open as to why those insurance companies invest in equity instruments if not for generating profit (at least via divi-

dend payments). One bank stated that the measurement at FVPL would be inappropriate for the investment of insurance companies (DZ Bank 2021). This echoes the statement of EFRAG mentioned above that investments of insurance companies are too volatile in the P/L (EFRAG 2020; LTI 2015) but does not refer to the actual internal asset management activity.

In 2020, 18 of the banks noted that their primary motive for taking the OCI option was related to strategic investments. It is striking that among these 18 banks, certain countries are more strongly represented: France with five banks, Austria and Belgium with three banks each, followed by the Netherlands, Malta and Greece with two banks, and Germany with just one bank. The BPCE S.A. stated in the notes that for FVOCI Equity in 2020, 'Shares and other equity securities include strategic equity interests and certain long-term private equity securities. As these securities are not held for sale, their classification as equity instruments designated at fair value through other comprehensive income is appropriate' (Group BPCE 2021). Therefore, it can be concluded that these banks intend a long-term holding period for their FVOCI equity instruments.

Furthermore, nine banks said their primary motive was related to non-consolidated investments. For example, Helaba commented, 'The consolidated financial statements do not include 27 subsidiaries, 17 joint ventures and ten associates that are of minor significance for the presentation of the financial position and financial performance of the Helaba Group. The shares in these entities are reported under financial assets measured at fair value through other comprehensive income if they constitute material strategic equity investments' (Helaba 2021). Thus, the motive is also a long-term respective strategic reason with a described higher share of participation (subsidiaries, joint ventures and associates but no other type of investment). Therefore, it can be surmised that at least 27 of 39 banks chose the OCI option for strategic long-term investments in 2020 (usually not actively managed by their treasury department). Although the importance of the FVOCI category has declined for equity instruments, the remaining instruments appear to be held with long-term investment intent. Thus, the IASB may have been successful in reducing banks' earnings management activities via equity instruments according to AfS under IAS 39. Nevertheless, as the category is of almost no importance for banks, where (active) investments in equity instruments due to their business model play a much more prominent role than for non-banks, it should be abolished as a result of the post-implementation review project. That would reduce the number of categories and, therefore, the complexity and the application of IFRS 9. For investors, it would make analysis much easier and increase the decision usefulness of the financial statement.

Short-term, Medium-term, and Long-term Investments by Banks in Detail

Changes in the maturities of the overall investments

To determine whether long-term investments have been reduced due to IFRS 9, we examined the financial statements of the 63 banks with maturity details in their notes. As mentioned previously, the measurement categories can be at least partially associated with the maturities. Nevertheless, the IASB should include disclosure requirements in IFRS 9 that allow investors to better compare the maturities of banks' investments. Hence, it is necessary to define respective maturity categories.

In the following maturity analysis, we examined measurement categories differently. Here, we had to make some basic assumptions due to the lack of precise information in the notes. All measurement categories that result in measurement at FVPL tend to be more short-term. Furthermore, equity instruments measured at FVOCI have different intentions regarding maturity, and exact maturities are not mentioned in the notes. In this regard, the equity instruments measured at FVOCI and, likewise, the AfS under IAS 39 were deselected from the maturity analysis, especially as a comparison between IAS 39 and IFRS 9 would not have been appropriate in our view.

Comparing the maturities from 2014 to 2020, a diminishing long-term maturity of total investments cannot be detected.

Whereas we can observe a decrease in total investment in 2018 according to Figure 3, the total investment recovered in later application years of IFRS 9 and peaked in 2020. According to L w et al. (2019), the reasons for the decrease in 2018 could be the macro-economic environment and a shift of loan activities to institutions outside the sample, the higher impairments and the first-time cliff effect (L w et al. 2019). The short-term maturity shows a declining trend from 2014 to 2020, whereas the long-term maturity investment increases from €4110 billion in 2014 to €4790 billion in 2020.

Figure 4 provides an overview of the average maturity of a bank's financial assets according to IAS 39 (years 2014–2017) and IFRS 9 (years 2018–2020).

For this purpose, we first calculated each bank's proportional short-, medium- and long-term investment and then an average value for all banks. As illustrated in Figure 4, the short-term investment decreased from 40.89% under IAS 39 to 35.37% under IFRS 9. On the other hand, the mid-term investments increased by 267 basis points (bps) and the long-term investments by 282 bps to 36.30%. As a result, the standard deviation of the proportionate maturity of investments fell slightly under IFRS 9. For example, the standard deviation for

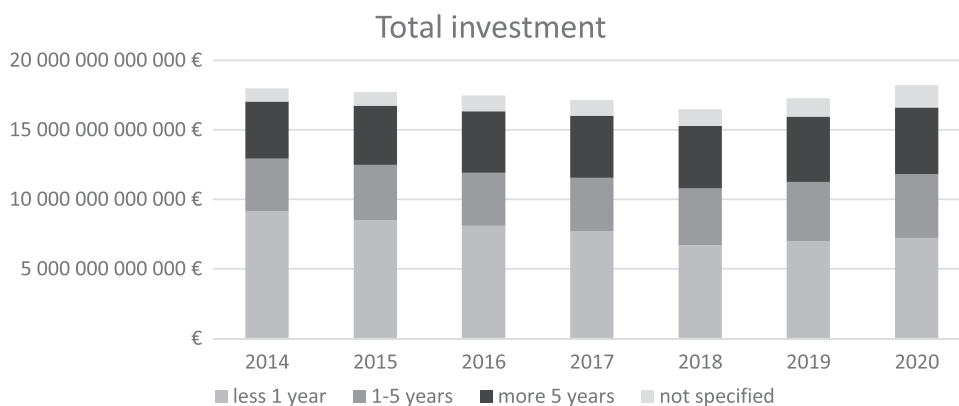


Figure 3 Total investment volume by maturity from 2014 to 2020

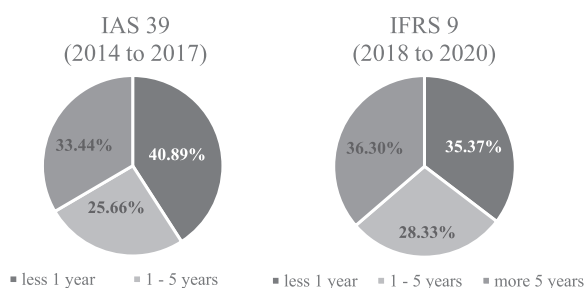


Figure 4 Outstanding investments by maturities

proportionate long-term investments under IAS 39 is 0.1714, while under IFRS 9, it amounts to 0.1589.

Maturity of selected financial instruments – loans and debt securities

To better understand the aforementioned trend for increasing long-term investments, we analysed the composition of outstanding bonds and loans from 2014 to 2020. The population here is slightly different from before, as some banks have only reported the maturities for measurement categories or the product type. Therefore, the IASB might consider requiring a breakdown by categories via a slight expansion of the disclosure requirements within IFRS 7 for the future.

Bonds have been broadly consistent from 2014 to 2020, with only minor fluctuations in all residual maturity classes, as can be identified in Figure 5.

Long-term debt securities rose from €627 billion in 2014 to €808 billion in 2020. Under IAS 39, the average growth rate of long-term debt securities amounted to 4.76% and increased under IFRS 9 by approximately 24 bps to 5.00%.

It is also evident in Figure 5 that short-term loans have fluctuated from 2014 to 2020 with only minor variations around €3 000 billion. During this interval, mid-term and long-term loans have increased steadily from 2014 to 2020. The sharpest rise could be observed for

mid-term loans, increasing from €2220 billion in 2014 to €3040 billion in 2020, amounting to an approximate 5% average yearly increase. On the one hand, long-term loans increased from €3140 billion in 2014 to €3600 billion in 2020. On the other hand, the growth rate of long-term loans declined from on average 2.89% under IAS 39 to 1.72% under IFRS 9.

Whether these developments are related to bank characteristics, regulatory issues or other macroeconomic factors such as the low-interest-rate environment is questionable. Busch et al. explain with their model a negative correlation between the interest rate and long-run pass-through (Rajan 2005; Busch et al. 2021).

Maturity Impact by Banks' Characteristics

Effects by size

Previous studies have shown that small banks, especially, have, on average, a higher allocation in stage 3 and higher impairment effects than larger banks, and hence a higher credit risk (EBA 2018; Löw et al. 2019). Connecting these results with the expectation of shortening loan maturities due to IFRS 9, especially those with low credit ratings and less willingness to support borrowers in distressed situations (EFRAG 2015a), mainly smaller banks, would be expected to reduce their long-term investments.

To interpret the results, three groups are clustered in three different sizes. Since the observation period begins in 2014, we performed a one-time allocation of a bank to a size cluster (see Table 5).

It was determined how the averages and standard deviations of long-term investments differed between the groups. Thus, we calculated an average of long-term investments for IAS 39 from 2014 to 2017 and for IFRS 9 from 2018 to 2020. The maturity of investments was derived as described earlier.

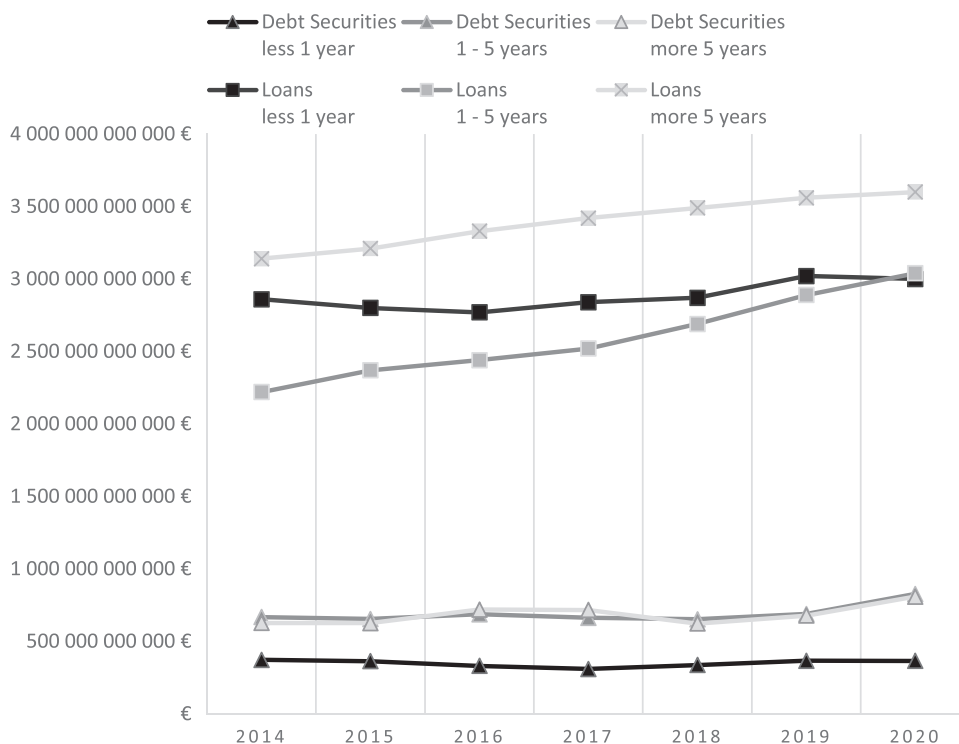


Figure 5 Total outstanding loans and bonds from 2014 to 2020

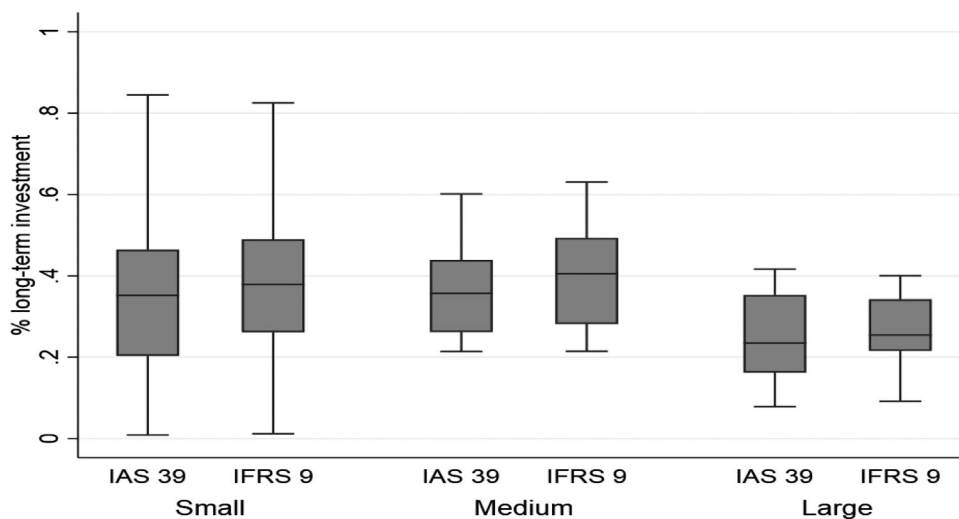


Figure 6 Overview of long-term investment effect per institution size

Table 5 Size cluster

	Size €	Category	n
≤	200 000 000 000.00	Small	64
≤	1 000 000 000 000.00	Medium	17
>	1 000 000 000 000.00	Large	6

Figure 6 illustrates that the average of long-term investments for all size clusters has increased since the introduction of IFRS 9. Medium-sized banks have the

highest investment with extended maturities as well as the highest increase in long-term investments, increasing by 497 bps to 40.65%. Meanwhile, small banks under IFRS 9 show a slight increase from 35.01% to 37.88%. These results are contradictory to the expectations of decreasing maturities.

Furthermore, we conducted the same test for short-term investment proportions, revealing corresponding trends. All size groups show lower short-term investments under IFRS 9. While we observe a decrease in the short-term investment of 6 percentage points among the

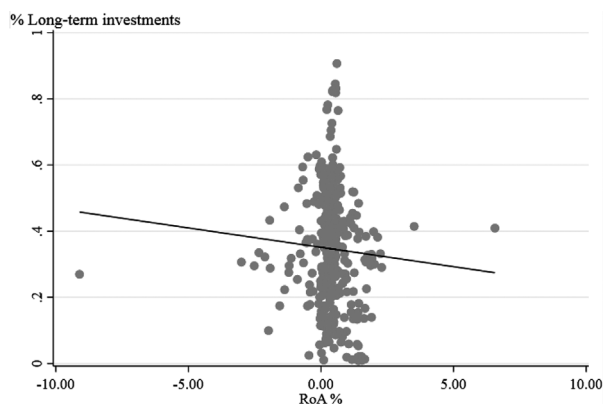


Figure 7 Overview of long-term investment effect and ROA

small banks, even a decrease of 9 percentage points can be seen among the medium-size cluster under IFRS 9. In the next step, we regressed the maturity of the investment against the dummy variable IFRS 9 for different size clusters. The results confirm the correlations mentioned above for the various size clusters and the long-term investment, but with p -values above 0.05, these are insignificant. For the same regression with short-term investment ratio as the dependent variable, we even found the decline in short-term investment significant with a p -value of 0.013 for the small clusters and a p -value of 0.008 for the medium clusters. We tested for significance with additional variables separately to determine if size impacts maturity.

Effects by profitability

Busch et al. concluded that banks that suffer income losses tend to expand their mortgage lending (Busch et al. 2021). Rajan describes a ‘search for yield’ in a low-interest environment, whereby higher risks, including maturity risk, are taken to counteract decreasing profits (Rajan 2005). Consequently, with the given low-interest environment in the observation period, very unprofitable banks may hope to improve by investing for the long term at higher interest rates. Figure 7 plots ROA (net income divided by total assets) to conduct the maturity analysis, a standard measure of profitability (Drechsler et al. 2021).

Figure 7 reveals that there is high variance and only low explanatory power. Additionally, the ROA was divided into lower performance ($<0\%$), performance ($0\%–1\%$) and high-performance ($>1\%$). For each performance group, a one-variable regression between the maturity of the investment and the dummy variable IFRS 9 was conducted for the different ROA groups to examine whether a severe level of IFRS 9 has impacted banks with lower performance. We found the strongest correlation with a coefficient of 0.0564 in the

group of lower-performance banks. This means that lower-performing banks have tended to increase their long-term investments more intensely since the IFRS 9 years, which, generally, is in line with prior literature. However, with a p -value of 0.215, there is no significant extension of maturities. Our analysis also reveals fewer short-term investments under IFRS 9 for all ROA clusters. The reduction in short-term investments under IFRS 9 by the coefficient -0.056 is even significant for the middle-performance group (p -value 0.002). It is unknown why the middle-performance cluster, in particular, experienced the greatest and most statistically significant decrease in short-term investments. However, a reduction in short-term investments could be detected in all groups.

Effects by country

Prior research has found that the first-time application effects between countries with different cultural backgrounds can differ in the level of implementation of accounting standards (EY 2018; L w et al. 2019). IFRS adopters in more individualistic countries tend to be more risk-oriented and optimistic compared to more uncertainty avoidance countries where a more cautious approach is evident (Liao et al. 2011; Gray et al. 2015). Therefore, the differences between Germany (12 banks in the sample), Italy (nine banks), Spain (12 banks), France (10 banks), Belgium (six banks) and the residual group on the maturity of investments are analysed. The remaining 13 countries were grouped, as the sample size (banks per country) is too small to draw representative conclusions (see Table 1).

As indicated in Figure 8, more long-term investments under IFRS 9 can be observed for all countries. The lowest increases in long-term maturity are in Germany (an increase of 1.60% to a median of 37.25%) and Spain (an increase of 0.37%–48.33%).

Figure 8 shows that the highest increases in long-term maturity were in Italy (an increase of 23.91%–29.40%) and Belgium (an increase of 37.67%–47.91%). The study by Gray et al. attributed this phenomenon to individualistic scores. They claimed that Italy and Belgium tend to be more risk-oriented (Gray et al. 2015). The growth of investment maturities to a greater degree could be a characteristic of a higher risk appetite, as they have high individualism scores. However, because Belgium shows the highest standard deviation and has the smallest observation number in our sample (six banks), the significance is likely to be limited. Using a one-variable regression, the model verification detected the statistical significance of the parameter IFRS 9 only for Italian banks (0.037 p -value). The sharp increase in long-term investments by Belgian banks shows a p -value

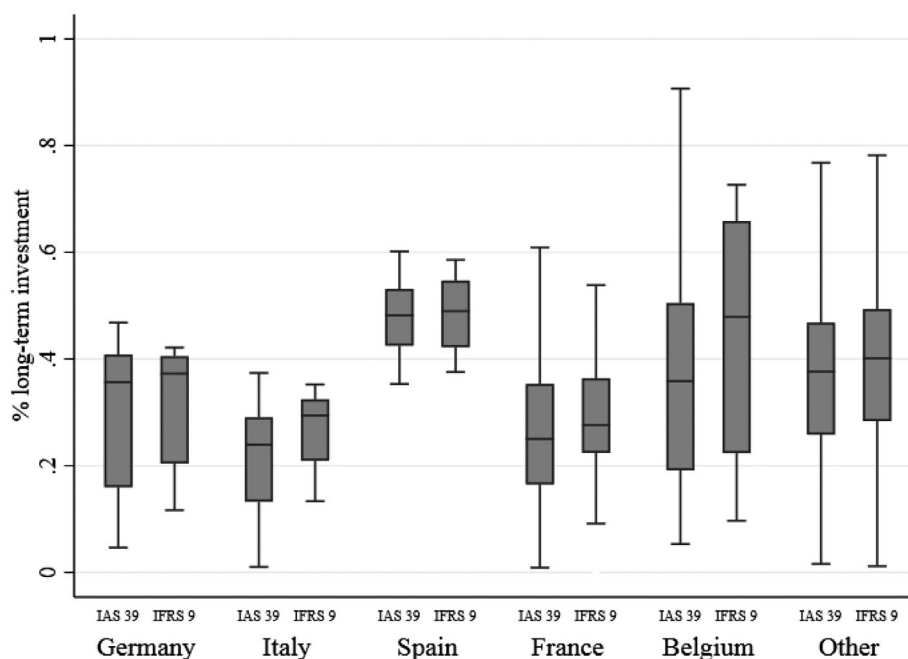


Figure 8 Overview of long-term investment effect per country

of 0.490, which is not considered significant. Short-term investments show a reduction in all country clusters. Italy and Belgium are also the countries with the most material reduction in short-term investments. Similarly, Italy has significantly reduced short-term investments since IFRS 9 (p -value 0.008). Furthermore, short-term investments in the group Other have also decreased significantly under IFRS 9 (p -value 0.011).

Effects by CET1

The Common Equity Tier 1 ratio (CET1 ratio) indicates a bank's capital adequacy. It is calculated as equal to the common equity capital divided by total risk-weighted assets (De Spiegeleer et al. 2017).

The CET1 is expected to decline due to the conversion to an expected credit loss model (Novotny-Farkas 2016). This expectation could at least be verified for the first-time application (EBA 2018; L ow et al. 2019). However, the relationship between the CET1 ratio and the maturity of investments has not yet been investigated. According to Gupta et al. (2013) it can be assumed that banks tend to have mean-reverting behaviours for CET1 ratios. On the one hand, if the CET1 ratio plummets to a low level, it is expected that the bank's management will attempt to re-establish the CET1 ratio by decreasing risk-weighted assets. On the other hand, whenever the CET1 ratio is significantly higher than the bank's comfort levels, management tends to increase risky assets and consequently raise the denominator (Gupta et al. 2013).

In our analysis, we explore the relationship between the CET1 ratio and long-term investments and we present it in a logarithmic form in Figure 9.

In Figure 9, we observe a positive relationship between long-term investments and the CET1 ratio. Despite this, Figure 9 also indicates a high standard deviation and only low explanatory power (R-squared 0.008).

Furthermore, we divide the CET1 ratio into three groups to determine whether the investments have changed differently under IFRS 9. Low means less than 12% CET1 ratio, Elevated serves as an intermediate value, and High represents more than 20% CET1 ratio. In our regression between long-term investment and IFRS 9 for the different CET1 clusters, we find a positive correlation between long-term investment and IFRS 9 for all of them. However, this change is not significant. For short-term investments, we determine only declining values under IFRS 9 for all CET clusters. The decline is strikingly more pronounced in the Low and High clusters, by a coefficient of nine percentage points. In contrast, in the middle group, Elevated, there is a coefficient of three percentage points. However, these are not considered to be significant reductions in short-term investment under IFRS 9 with a p -value of 0.122.

Empirical Findings

Regression model

As we have taken the sample from cross-sectional data of European banks ($n_1 = 87$ and for maturity analysis

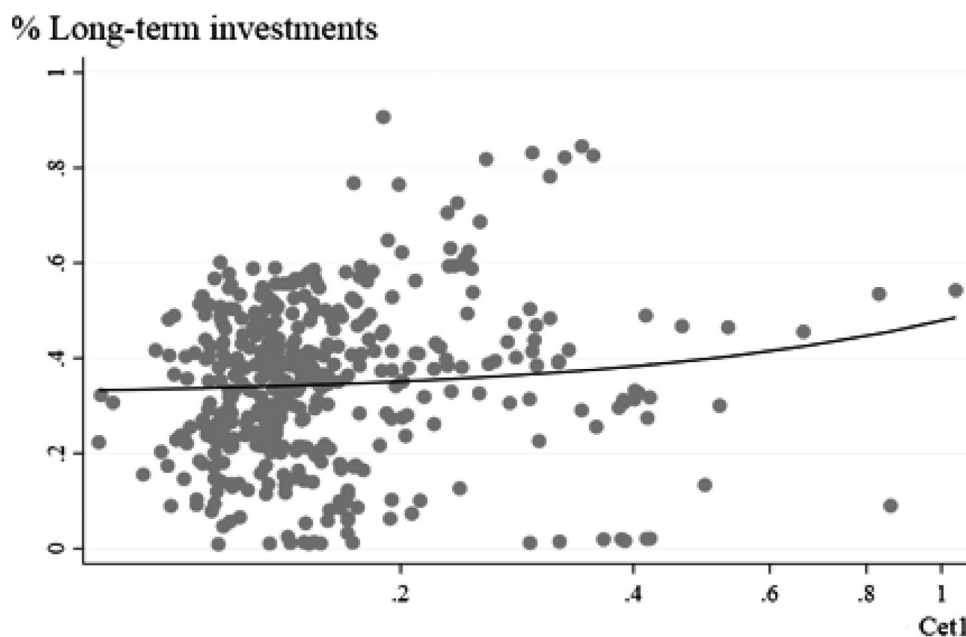


Figure 9 Overview of long-term investment effect and CET1

Table 6 Overview of long-term investments and description of variables

Variables	Description	Hypothesised Relationship with Maturity
y_1 LongTermInvest	Ratio of long-term investment to total investment	NA
x_1 IFRS9	A dummy variable for application of IFRS 9 years 2018 to 2020 (1) and others (0)	(-)
x_2 BankSize	Grouped by balance sheet total as of 2014 (Dummies for cluster Small, Medium and Large as already described).	(+)
x_3 Profitability	Measured as return on assets for each bank i in year t	(-)
x_4 Country	The bank's country of domicile (Dummies)	(+/-)
x_5 CET-Ratio	Regulatory capital size for bank i in year t	(+/-)
x_6 interest rate	Yearly short-term interest rates for the EU by Organisation for Economic Co-operation and Development (OECD) (OECD, 2021), short-term interest rates (indicator)	(-)

$n_2 = 63$) from 2014 to 2020 ($T = 7$), the present data structure reflects panel data. We use a panel analysis to understand the relationship between the investment behaviour regarding the maturity of banks' investments and the impact of IFRS 9 in a temporal analysis, considering other independent variables.

Based on the literature review and previous studies, we performed the mentioned regression models with the dependent variables such as (y_{it}) long-term investments and short-term investments, as well as with the following independent variables (x_i), which we already introduced. Table 6 shows the details of the variables used, and provides a description and the hypothesised relationship with maturity.

We use panel models for different regressions, such as the measurement categories proportion, the maturities in the valuation categories and specific instruments loans and bonds to test the findings for statistical significance.

After conducting the OLS, fixed and random-effects model, we validated the model using the Breusch-Pagan Lagrange Multiplier test (Breusch and Pagan 1980; Halunga et al. 2017, pp. 2–3; Wooldridge 2019, p. 473) and the Hausman test (Hayashi 2000, p. 335; Frees 2004, pp. 247–249). Hence, the random-effects model is applied in the following analysis, as it considers heterogeneity and constant variables.

Discussion

Only 63 of 87 institutions analysed in our research provided a maturity breakdown for less than one year, between this and more than five years of their financial assets consistent in all seven financial statements analysed. The prevailing opinion is that the maturity breakdown is necessary for banks to show the liquidity risk (Nadia and Rosa 2014). In some cases, the maturity bands of

one to five years deviated. Therefore, related information should be standardised for all banks after the post-implementation review project by the IASB in IFRS 7.

As shown previously, concerning disclosures in the notes, a wide variety was also seen concerning the presentation of credit risk, especially under IAS 39. IFRS 9 and the specified stage allocation will make such a credit risk analysis more accessible and comparable in the future.

IFRS 9 is associated with increased earnings volatility (EFRAG 2015a; Pavlović 2015; Maggi et al. 2017; PwC 2017). The reason for this, besides the new impairment model, could be that the financial instrument does not meet the criteria of the SPPI test, or the equity instruments' earnings are not intended to remain in the non-recycling category (Lejard 2016; Petchchedchoo and Duangploy 2017). The current research has only investigated the impacts by measurement categories. Due to the aggregated information, it is impossible to track to what extent instruments that do not meet the SPPI criteria were already disposed of before the innovation. The EBA's 2018 study recorded that the FVPL share in the year of initial application was three percentage points lower overall than in the previous year (EBA 2018, 2017). Our research identified comparable results with a reduction in the proportions for the first-time application with fair value through profit or loss category and the fair value option from 19.91% to 16.92%. In the conducted panel regression for all the years, it could be concluded that under IFRS 9, with a coefficient of -0.0148 , significantly (p -value 0.008) less is measured at FVPL.

It is also notable that larger institutions seem to have higher proportions of their financial instruments at FVPL and a lower proportion at AC than smaller institutions. Comparable results have been found by L w et al. (2019), who concluded that small institutions have a more loan-based business model and hence a higher proportion measured at AC than larger institutions with a diversified business model (L w et al. 2019).

Significantly, German institutions prefer FVPL measurement as indicated by a regression coefficient of 0.1335 compared to other countries as the p -values are less than 0.05. Furthermore, institutions with a higher CET1 ratio have, on average, more of their financial instruments measured at FVPL with a p -value of 0.039. This concurs with the abovementioned observations that banks with a higher CET ratio have a lower insolvency risk and prefer fair-value accounting (Corona et al. 2018).

It was expected that banks would have taken precautions to address this effect of IFRS 9 because banks will inevitably fail the SPPI test for a specific portion of assets. In this regard, our research identified a systematic reduction of the FVPL proportion before the first-time application of IFRS 9, which was also reflected in an

absolute reduction. The implied conclusion that banks have deliberately restricted the HfT category to carry less in fair value through profit or loss is logical but only significantly demonstrable for the absolute values. Since the increased P/L volatility could be due to the effects of IFRS 9 other than the measurement, we performed a variance homogeneity test with ROA as the dependent variable and IFRS 9 as the regressor in the last step. The variance homogeneity test was performed and revealed with a confidence level of 99% that an increased variance in the ROA under IFRS 9 can be rejected.

It was also expected that the long-term investment in the FVOCI Equity category would decrease because the recycling option is missing (Petchchedchoo and Duangploy 2017; EFRAG 2018; EFRAG 2020). We show that this category only accounts for approximately 0.25% of the total investment in banks (see Table 2) (L w et al. 2019). The slight decrease in the use of the OCI option from 62 banks in 2018 to 59 banks, as well as the proportionate decrease from 28.49% in 2018 of all equity instruments to 17.80% in 2020, may confirm that the category without the recycling possibility is not attractive. On the other hand, the conclusion could also be made that banks are engaging in fewer earnings management activities (due to the restrictive requirements of IFRS 9) and are, in fact, only classifying those equity instruments in FVOCI that are not primarily used to generate earnings (like subsidiaries, joint ventures and associates). Due to the lack of information in the notes on the expected holding period of equity instruments, it is only possible to analyse the notes for the FVOCI category of 39 banks. At least 27 of 39 banks chose the OCI option for long-term strategic investments in 2020. A possible new category, 'Held in long-term Investment-Business-Models' ('LTIBM') for long-term equity instruments proposed by EFRAG, would not only make the selection more attractive for banks but could also make its intention appear more transparent (EFRAG 2020). At least, the IASB should abolish the option due to the post-implementation review project.

Before the introduction of the new standard, there was the expectation that the maturity of outstanding total investments could decrease due to IFRS 9, especially for borrowers with higher credit risk (Pucci and Skaerbaek 2020; EFRAG 2015a). This led to the research question about the extent to which the concerns about decreasing maturity investment behaviour of banks can be verified. Previous research could already refute the 2018 effect of the first-time application of IFRS 9 (L w et al. 2019). To this end, we show in the present research that between 2014 to 2017, the long-term nature of the investments increased, which contradicts anticipation of the effects before IFRS 9.

We analyse the subsequent application effects for maturities in measurement categories, selected instruments and overall investments. We use panel regression from

Table 7 Panel regression (random effects) results of maturity ratio

Independent Variable	Short-term investment ratio			Long-term investment ratio		
	Coefficient	Std. Err.	Prob.	Coefficient	Std. Err.	Prob.
ROA	-0.0034	0.0047	0.465	0.0015	0.0035	0.676
CET-Ratio	0.0252	0.0479	0.599	0.0117	0.0360	0.745
Interest rate	0.0996*	0.0190	0.000	-0.0571*	0.0142	0.000
Size small	-0.0209	0.0575	0.717	-0.0346	0.0530	0.514
Size large	0.1909**	0.0852	0.025	-0.1279	0.0786	0.103
IRBA	-0.0262	0.0807	0.745	0.0132	0.0744	0.859
m. IRBA	-0.0886	0.0705	0.208	0.0831	0.0650	0.201
SA	-0.0140	0.0677	0.836	-0.0195	0.0625	0.755
Germany	0.0286	0.0832	0.731	-0.0754	0.0767	0.326
Italy	0.1338**	0.0624	0.032	-0.1682*	0.0575	0.003
Spain	-0.1504**	0.0679	0.027	0.1199***	0.0627	0.056
France	0.0513	0.0773	0.507	-0.1322***	0.0713	0.064
Belgium	0.0454	0.0848	0.593	-0.0006	0.0782	0.994
IFRS9	-0.0304*	0.0081	0.000	0.0143**	0.0060	0.018
_cons	0.4415	0.0807	0.000	0.3711	0.0744	0.000
R^2		0.2727			0.2911	
F -stat(Wald)		130.72			82.45	
Prob(F -stat)		0.0000			0.0000	

*, **, *** denote significance at the 1%, 5%, and 10% levels.

2014 to 2020 to test for significance for the dummy variable IFRS 9 while also considering other variables such as the short-term interest rate and other variables already described.

First, the proportion of long-term investments measured at AC increased under IFRS 9 and simultaneously decreased for instruments at FVOCI. Assuming a significance level of alpha equals 10%, only a significant negative correlation between a lower proportion of long-term investments at FVOCI and IFRS 9 can be verified. Considering the absolute values, the long-term investment in AC has increased more with the coefficient of €8 600 million than the reduction of FVOCI with the coefficient of -€4 440 million. Consequently, more of an overcompensating shift of the long-term investment from FVOCI to AC may have occurred since IFRS 9 than an intentional shortening of FVOCI maturities.

Second, we examine the maturities of selected instruments such as loans and bonds. The relationship between IFRS 9 shows a negative correlation to the short-term ratio and a positive correlation to the long-term ratio of loans. While for the maturity of debt securities, no significant impact of IFRS 9 could be verified; for the loans, an increased total long-term loan volume with a p -value of 0.056 was noticed for IFRS 9, which under an alpha of 10% is considered significant.

Finally, we examine trends between groups of IAS 39 from 2014 to 2017 compared to IFRS 9 from 2018 to 2020 using a panel regression for overall investments. Figure 4 shows that under IFRS 9, the banks invest more in the long-term overall, with a mean value of 36.30% long-term investment, compared to 33.44% previously. The effects of the transition to IFRS 9 vary for different clusters. Notably, the sharpest increase in the long-term

maturity can be seen for Italian banks from 23.91% to 29.40%, for Belgian banks from 37.67% to 47.91%, and for SA banks from 30.36% to 39.03% under IFRS 9.

The panel regression in Table 7 for the years from 2014 to 2020 shows the relationship between the dependent variables (y_{it}) long-term investments and short-term investments, as well as with independent variables (x_{it}) such as ROA, CET1 ratio, country, short-term interest, size, credit rating and the introduction of IFRS 9 as a dummy for the years since 2018. Thus, the long-term investment ratio shows the proportion of investments with maturities of at least 5 years to all investments.

Notably, large banks tend to prefer more short-term investments compared to smaller banks. This relationship is illustrated by a coefficient of 0.1909 for the ratio and €519 000 million for the absolute values. Both demonstrate significant correlations with p -values of 0.025 and absolute values of 0.000.

SA banks, in particular, showed a substantial increase in their long-term investments under IFRS 9. Despite that, the SA banks generally tend to invest less long-term than banks that apply the mainly IRBA or IRBA credit rating model. These results cannot be statistically verified for the long- or short-term investment ratio. For total long-term investment values, a negative coefficient of -€49 500 million is significant with a p -value of 0.014. We assume that the result could be mainly caused by small banks using the standardised approach, which generally have fewer total investments.

Moreover, the results for the dummy variables of Italy, Spain and Germany show a partially significant influence on the maturity of investments. For Italian banks, Table 9 shows that they tend to invest more in the short term than long term, with p -values of 0.032 and 0.003.

Italy increased its long-term investment from 23.91% to 29.40% under IFRS 9. On the other hand, Spanish banks tend to invest more in the long term with a coefficient of 0.1199 and significantly less in the short term with a coefficient of -0.1504 .

The results of the random-effects model indicate higher long-term investment ratios with a coefficient of 0.0143 under IFRS 9 and lower short-term investment ratios with a coefficient of -0.0304 for relative maturity (see in Table 9). In addition, the test revealed the statistical significance of the IFRS 9 parameter for the long-term investment ratio (0.018 p -value) and the short-term investment ratio (0.000 p -value). The hypothesis of decreasing long-term investments for the relative values is rejected based on these results. Moreover, the model shows a negative interest rate for short-term investments, which leads banks to invest with higher maturities in their search for a yield.

Ultimately, the causality between the observed change and IFRS 9 needs to be verified because in Figure 3 the trend towards increasing long-term investment could already be detected even before IFRS 9 and could therefore have a different origin. EFRAG's implication that the potential of a long-term customer relationship, as well as the mentioned higher interest margins, seems to outweigh the incentive of shortening the loan maturities under IFRS 9. Thus, the higher income potential appears to be more plausible as a causality. Nevertheless, it remains to be stated that for the first three years under IFRS 9, at least no significant reduction in long-term investment can be demonstrated. Table 7 revealed that 36 of 48 banks observed have systematically optimised their credit portfolios to lower credit risks. On the one hand, the trend could be related to the expectation that the willingness to support borrowers with low credit ratings will decrease due to IFRS 9 (EFRAG 2015a). Alternatively, it could also be connected to the increased risk management and regulatory requirements or the general economic situation. In contrast to previous studies, the main focus was on the investment behaviour of banks regarding maturity and the composition of the measurement categories. However, the present research is limited because it could not capture macroeconomic trends due to the lack of a comparison group.

Summary

Our study aims to examine the extent to which the investment behaviour of European banks has changed since the publication of IFRS 9 in 2014. Our research showed that, overall, no significant decrease in investment maturities has been observed since the publication of IFRS 9. Nevertheless, the respective clusters' tendencies and partially significant results could be recognised.

Our research showed that the financial assets measured at FVPL have already been significantly reduced in the years before IFRS 9. However, in the comparison between the years IAS 39 and IFRS 9, an even lower FVPL proportion can be statistically verified for IFRS 9. This, together with the significantly reduced investment return variance under IFRS 9, contradicts the expected increase in return volatility. The concerns and the associated criticism of the IASB that IFRS 9 will lead to increased earnings volatility cannot be ascertained in the observation period. Therefore, the IASB may consider these concerns less relevant when considering measurement categories and classification criteria in the future. In most of our observations of selected instruments and overall observations, only significant values for the reduction of short-term investments towards the increase of long-term investments have been identified. Since a general tendency towards the long-term nature of bank investments can be identified in the observation period and the trend can also be observed in the transition to IFRS 9, the IASB can assume that the associated criticism of the IFRS 9 expected credit loss model concerning the negative impact on the investment maturity is at least not strong enough to disrupt the trend.

A decline in the popularity of the FVOCI category for equity instruments banks was evident. To ensure greater transparency, a standardised and mandatory disclosure of the residual maturity breakdown for financial assets should be included in IFRS 7 by the IASB. Thereby, defined maturity breakdowns such as smaller and larger intervals of 1 to 5 years should be introduced for comparability between banks.

A possible new EFRAG category for equity instruments called LTIBM could also make banks' intentions more transparent. However, as the category is of almost no importance for banks, where (active) investments in equity instruments play a prominent role, it should be abolished as a result of the post-implementation review project. That would reduce the number of categories and, therefore, the complexity and the application of IFRS 9. For investors, it would make analysis much easier and increase the decision usefulness of the financial statement.

Nevertheless, our study still encountered several limitations. Only those banks supervised by the ECB that apply IFRS and disclose the necessary information for specific analyses in the notes to the financial statements for all years are studied here. The shifting effects between the ECB banks and the remaining European banks could not be explored. Furthermore, macroeconomic trends due to the lack of a comparison group and regulatory changes from 2014 to 2020 have been not considered. This paper sheds light on changes and trends in European banks' investment behaviour since IFRS 9. The generalisability of the research findings can be achieved through various replications in the future.

For example, researchers can extend this study to other banks or industries to further explore investment behaviour changes since IFRS 9. Reporting is also evolving towards embracing ESG data, which may allow for more evaluation in the long term and regarding sustainable investments. Looking ahead, there will be greater data accuracy over time, which will require continuous monitoring of the impact of IFRS 9.

Notes

- 1 Sudden increases in impairments occurred under IAS 39 when changing from a portfolio impairment usually based on a 12-month horizon in practice to an individual impairment calculated based on the remaining lifetime. Although under IFRS 9 there is a mitigated version of the 'cliff effect' due to the introduction of stage 2, which already requires a lifetime assessment, a (smaller) cliff effect still applies in the transition from stage 1 to stage 2.
- 2 The front-loading effect describes that the initial impairments under IFRS 9 would be higher than the incurred loss model under IAS 39 due to the earlier recognition of impairments under the ECL approach and the inclusion of an estimation of future losses.

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