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# **Does bank size affect the value relevance of accounting data? The evidence from Poland**

## **Introduction**

The linkages between the reported accounting numbers and the market value of listed companies have been continuously explored in the financial literature since the pioneering study of Ball and Brown (1968). Amongst many factors that might influence this relationship firm size appears to be of crucial importance as it is commonly considered an effective proxy for firm-specific risk (Fama, French, 1992).

Numerous empirical studies in the relevant literature identify size as an important conditioning variable when testing the informativeness of accounting variables in relation to the market values of listed companies (see e.g. Petroni and Wahlen, 1995; Echer et al., 1997; Collins et al., 1997). The available international evidence on the direction of this impact is, however, mixed.

Intuitively, since larger firms tend to have a greater market following, more information is usually demanded from them, and therefore more information becomes publicly available. This in turn should increase the ability of the equity investors to evaluate firm's future prospects on the basis of current and past data more accurately and make the financial reporting of larger firms more value-relevant. Similarly, a lower intensity of market following might render the disclosure of accounting information of smaller firms less relevant. On the other hand, as smaller firms tend to provide the market with less information, the value relevance of their financial reporting might be higher (Brickner, 2003). Additionally, as large firms have greater possibilities of collecting, processing, and communicating value relevant information to the equity investors, a significant part of their financial disclosures should be already anticipated on the basis of previous announcements,

which might result in the lower responsiveness of stock returns to the reported accounting numbers (Dimitropoulos et al., 2010).

Although the literature investigating the impact of size on the financial performance and market value of banks is quite abundant, the explicit evidence on its relation to the value relevance of accounting information seems rather modest and mixed. Moreover, to the best of author's knowledge, no prior study has investigated this particular issue in the context of the Polish capital market. Therefore the paper attempts to fill this gap.

The study aims at the empirical evaluation of the impact of bank size on the value relevance of two key accounting variables, i.e. book values of equity and net earnings, in terms of both their joint explanatory power in the regression model and the responsiveness of bank market values to the changes in those variables. Although gauging the size of banks is often a complex task, the majority of current academic research and official-sector documents focus on balance sheet totals (Schildbach, 2017), therefore in line with this approach, the size of banks in the present study is proxied by the value of their median total assets measured over the analysed period.

The remainder of the paper is composed of four sections. The next section provides a review of the relevant literature on the impact of size on the value relevance of accounting information and other firm-specific characteristics in the banking industry. The details of the research design and data collection procedures are presented in Section 3. The results of the empirical research are reported and discussed in Section 4. The paper closes with conclusions recapitulating its key findings and offering some suggestions as to the directions of future research and potential regulatory changes.

## 1. Literature review

The importance of company size for stock valuation and portfolio management was demonstrated by Fama and French (1992; 1993) in their three-factor model designed to explain stock returns. In particular they argue that firm size and the ratio of book-to-market value proxy for sensitivity to firm-specific risk factors that capture common variation in stock returns. Since smaller firms are naturally perceived as riskier investments compared to larger ones, the returns on smaller firms are expected to be relatively higher. Moreover, firm size appears to be directly related to its profitability, since after controlling for the book-to-market ratio, small market capitalization stocks typically exhibit lower earnings on book equity than larger ones (Fama and French, 1995).

Although to date many studies have explored the diverse linkages between the size of companies and their performance or market values, the impact of firm size on the value relevance of financial reporting is still undetermined, since there

appears to be no consensus in the literature about its direction. This issue regards in particular the banking sector where the impact of company size on the value relevance of reported accounting information, and in particular the book values of equity and earnings, remains largely unexplored as the available evidence in the international literature is quite modest and ambiguous.

In an extensive international study covering over 800 banking institutions from 38 countries Anandarajan et al. (2010) argue that the impact of bank size on the value relevance of book values and earnings is generally not significant. On the other hand, they do find evidence of the marginal statistical significance of a bank's multinational status which suggests that the equity investors appear to treat the accounting numbers reported by multinational banks as more value-relevant, probably trusting that the reputation of these banks improves the reporting quality.

Bertsatos et al. (2017) report that large U.S. bank holding companies are usually overvalued relative to the fundamentals in the short term, as the equity investors tend to be overoptimistic about their future performance expected on the basis of the disclosed accounting information. Although this regularity disappeared temporarily during the last global financial crisis, it returned just after the economy started to recover. This in turn, might reflect the shifts in investors' expectations regarding the potential government bailouts that large, often systemically important, financial institutions would benefit from. In contrast, Manganaris et al. (2015) investigate a sample of banks from 15 European countries and find that smaller, less-leveraged and quickly growing banks are more value-relevant compared to bigger, high-leveraged and non-growing ones. Finally, using the example of the Greek banking sector, Dimitropoulos et al. (2010) argue that in a less developed capital market, bank size might not affect the value relevance of earnings disclosures due to the underdevelopment of alternative information processing channels such as analyst forecasts or earnings pre-announcements. The above findings allow to infer that the impact of bank size on the value relevance of disclosed accounting information might be largely determined by the contextual factors, reflecting the specificity of a given capital market and its regulatory environment.

The specificity of banking activities suggests that the value relevance of diverse accounting items might also be affected by the bank size in different ways. In particular, given the fact that the book value of equity is often considered as a rough proxy for liquidation or abandonment value (Subramanyam, Venkatachalam, 1998), in line with the findings of Collins et al. (1997), its value relevance should be higher for relatively smaller, more risky and less sound banks. In turn, the market value of larger, less risky and more sound banks should be less sensitive to the variations in the book value of equity.

Larger banks are also expected to have less risky asset portfolios as they typically employ more advanced risk-management solutions and have more access to information (Papadamou, Tzivinikos, 2013). Additionally, they may benefit from

more diversified portfolios of borrowers and a broader deposit base, which allow them to further mitigate some key risks of banking activity and renders them less susceptible to the fluctuations in the business cycle (Wilson, Williams, 2000). Finally, large banks, especially those systemically important ones, are often perceived as ‘too-big-to-fail’ and being likely to be bailed-out in the event of serious financial distress, which might reduce the value relevance of their book values of equity even further. Given the above, larger banks are expected to exhibit lower responsiveness of their market values to the changes in book values of equity.

The aforementioned reasons might also be responsible for the likely divergence between the banks of different sizes in the responsiveness of their market values to reported earnings and their key components. In general, smaller firms are more likely to report losses than larger ones (Hayn, 1995). Smaller banks are also more inclined to undertake more risk in pursuance of higher earnings and growth rates (Papadamou, Tzivinikos, 2013). In line with these notions, De Haan and Poghosyan (2012) use a panel of U.S. bank holding companies to demonstrate that bank size generally reduces earnings volatility. Given the above, the equity investors might be inclined to perceive the earnings of larger banks as being more consistent than those of their smaller peers, which should result in the greater sensitivity of large banks’ market values to the reported earnings. Additionally, the results of a study on the U.S. banking industry by Chiou et al. (2014) demonstrate that larger banks appear to be punished more severely by the capital markets for the impairment of assets, as they exhibit a higher value relevance of loan loss provisions, which typically significantly affect banks’ earnings.

Another line of value relevance studies in the banking sector is devoted to the investigation of the impact of bank size on the sensitivity of bank market values to fair value estimates and their disclosures in financial reports. According to Petroni and Wahlen (1995), larger banks are more likely to invest in less frequently traded assets, which might impede the development of precise fair value estimates and provide these banks with an informational advantage over the equity investors. This might reduce the reliability and thus the value-relevance of the fair value estimates reported by them. Contradictory results are, however, reported by Brickner (2003) who demonstrates the statistically significant positive impact of bank size on fair value disclosures for net loans and long-term debt in the U.S. banks. His findings indicate that that equity investors discount the fair value disclosures for relatively smaller banks and tend to view the disclosures for larger banks as more value-relevant, apparently believing in the ability of larger banks to develop more accurate fair value estimates.

Based on the results obtained from a sample of U.S. banks, Ehalaiye et al. (2017) argue that bank size has a significant impact on the relationship between banks’ net asset fair values and future operating cash flows, which in turn might affect their valuation by the capital market. They demonstrate that while for the large banks the association between the net asset fair values and future operating

cash flows is rather weak, for the small ones it turns out to be highly significant and positive. According to Ehalaiye et al. (2017) these findings might reflect the differences in the speed of realization of the cash flows generated by the banks' net assets, since smaller banks are likely to realize cash flows quicker, using them for funding their continuing operations, whereas larger banks exhibit a more relaxed attitude towards the cash flow timing, relying on their size as a protective cushion against potential liquidity problems.

Apart from the value relevance studies, the importance of company size as a conditioning variable in the banking industry is investigated by the fairly abundant literature devoted to its impact on banks' financial performance, growth, risk, and market values. Yet again, the empirical evidence in those areas appears to be mixed.

A considerable amount of studies document the positive impact of size on bank profitability resulting from economies of scale (see e.g. Smirlock, 1985; Bourke, 1989; Molyneux and Thornton, 1992; Muldur and Sassenou, 1993; Akhavein et al., 1997; Bikker and Hu, 2002; Shehzad et al., 2013; Miklaszewska and Kil, 2016). From this viewpoint larger banks are able to benefit from both relatively lower costs and greater ability to diversify products and risk. In particular, the positive influence of bank size on the returns on equity is reported for global systemically important banks and their subsidiaries by Iwanicz-Drozowska and Witkowski (2016) who examine a sample of 44 G-SIB subsidiaries and their parent companies from 15 Central, Eastern and South-Eastern European countries over the period of 2006–2012.

However, according to Goddard et al. (2004), the association between bank size and profitability is not strictly linear. Moreover, the higher efficiency of larger banks might in fact result not from the size itself, but from the emulation of the industry's best practices in the areas of applied technology and management structure (Berger, Humphrey, 1997). In contrast, Tregenna (2009) argues that economies of scale may be achieved only by relatively smaller banks since the larger ones are frequently suffering from diseconomies of scale resulting from higher costs of management, agency costs and costs of bureaucracy. This view seems to be consistent with the findings of Christopoulos et al. (2002) who document the lower cost efficiency for relatively larger banks in Greece. Lastly, some studies fail to find any statistically significant impact of size on bank financial performance (see e.g. Heffernan, Fu, 2010). Similarly as in the case of the value relevance studies, the mixed empirical evidence suggests that the actual impact of size on bank performance might be largely dependent on contextual factors.

Several studies examine the relationship between bank size and growth rates. The early evidence from the U.S. banking sector suggests that on average, smaller banks tend to grow faster than larger ones (see e.g. Alhadeff, Alhadeff, 1964; Rhoades, Yeats, 1974). In turn, in an investigation of large international banks Tschoegl (1983) finds that the initial size of a given institution is unrelated to its final size, and that growth generally declines with size. Moreover, Wilson

and Williams (2000) report that the link between bank size and growth differs across countries, as in Italy smaller banks tend to grow faster than the larger ones, whereas no such relationship is detectable in France, Germany, or the U.K. It is also worth noting that in the case of banking sectors oriented primarily on traditional commercial banking operations, as for example the Polish one, banks sizes and their dynamics are closely linked to the dynamics of banks' lending activity, which in turn depends, amongst other factors, on the central bank's interest rate policy (see Pyka and Nocoń, 2016). Again, in the light of the above findings, the influence of size on bank growth appears to be dependent on the country-specific, contextual factors.

Bank size is also considered to be an important determinant of systemic and bank-specific risk. In a study covering a sample of 117 financial institutions from 15 European countries, Haq and Heaney (2012) demonstrate the positive relationship between banking sector systemic risk (proxied bank equity market beta) and bank size. Thus their findings suggest that large banks conducting diversified business activities might be more exposed to the shifts of broad market sentiments than smaller banks focused on traditional banking credit-deposit operations. In turn, Olszak and Kowalska (2016) use a sample of over 1,100 banks from 67 countries to demonstrate that large banks tend to decrease their liquidity funding risk as they grow in size and that they exhibit a statistically significant positive association between leverage and liquidity funding risk, whereas their smaller peers do not seem to reveal such properties. Moreover, they find the extent of leverage in large banks to be significantly pro-cyclical, especially during periods of crisis.

Another strand of literature attempts to explore the impact of bank size on the market value and stock returns. Once again, however, the conclusions of these investigations are ambiguous. For instance, an early study by Peltzman (1968) reports that the market-to-book value in the U.S. rises with bank size. In line with these findings, Fiordelisi and Molyneux (2010) examine a sample of European banks and demonstrate that size is a statistically significant driver of their economic profits and shareholder value. In turn, Wang (2014) finds a statistically significant positive relationship between bank size and market value in Thailand. Consistent with these results, Fu et al. (2014) report the significantly positive relationship between bank asset size and Tobin's  $Q$  for a sample of commercial banks in 14 Asia-Pacific economies. They argue, though, that an analogous association for a one-year lagged asset size is negative. According to Fu et al. (2014) these results suggest that the equity investors may value the expected synergy effects resulting from an increased asset size in the short term, but over time asset expansion or consolidation exerts a negative influence on shareholder value. Finally, the positive association between bank charter values (proxied by Tobin's  $Q$ ) and size are also reported by Bolibok (2016) for the Polish banking sector, however, he points out that this relationship becomes statistically insignificant when controlled for the impact of other bank value drivers.

In contrast, De Nicoló (2000) reports that the impact of size on banks' charter values is generally negative, however this might be the reverse in the case of small banks. In addition, several studies report the strictly negative impact of bank size on Tobin's  $Q$  or market-to-book ratios (see e.g.: Gosh, 2009; Fortin et al., 2011; Chiou et al., 2014) or shareholder value (see e.g. Radić, 2015). Finally, Avramidis et al. (2018) use a sample of US bank holding companies to demonstrate that the relationship between size and bank's market to book value of assets is inverse  $U$ -shaped, as monitoring costs in large banks often offset the benefits resulting from the economies of scale.

To sum up, the conducted review of the international literature indicates that there is still no consensus about the impact of size on the value relevance of accounting information and other firm-specific characteristics in the banking industry. Furthermore, it is likely that the above relationship is strongly influenced by the contextual factors reflecting the specificity of the given capital market and its regulatory environment. Finally, it appears that to date no study has attempted to investigate this issue in the context of the Polish capital market, which makes it an interesting research area.

## 2. Research design

Even though the review of the relevant international literature does not yield unequivocal suggestions on the actual impact of bank size on the value relevance of the key items from financial reporting, the available empirical evidence allows to draw some general inferences regarding the investigated relationships. On the one hand, it appears that larger banks should be able to provide the equity investors with more accurate, consistent and value-relevant accounting information than their smaller peers. On the other hand, however, it is also likely that different size categories of banks might exhibit different responsiveness of their market values to the changes in particular accounting items. Hence for smaller, less sound and more risky banks, book values of equity should be more value-relevant as they proxy for banks' abandonment of liquidation values. As regards the reported earnings their relationship with market values is expected to be stronger in the case of larger banks, since they should exhibit more persistent, less volatile, and higher quality earnings resulting from more diversified operations and the employment of more sophisticated risk management techniques. The above considerations allow to formulate the following set of hypotheses:

- H1: The value relevance of fundamental accounting variables in the Polish banking industry increases with bank size.*
- H2: Bank size affects the responsiveness of market value to changes in book values of equity and net earnings in different ways: book values are more relevant for relatively smaller banks whereas the informativeness of net earnings is higher for larger banks.*

In order to test the formulated hypotheses, a simplified version of the Ohlson (1995) valuation model has been employed. The model is widely used in the value relevance studies, as it is based on the assumption that the firms' market value is determined by the available accounting information, and in particular, their book values of equity and net earnings. Given the fact that companies listed in the modern capital markets are obliged to continuously disclose the relevant financial information, in particular the interim reports, another simplification frequently employed in the construction of the model regards comparing the market values and accounting items for the same date (typically the end of year) even if in fact the actual announcements of the annual reports usually take place with a delay of some weeks.

Since the results of the  $F$ -test and Breusch-Pagan Lagrange multiplier test have not revealed the presence of either fixed or random effects in the examined sample, the research has been based on the ordinary least-squares pooled linear regression model given by the following formula (henceforth: 'Model 1'):

$$p_{it} = \beta_0 + \beta_1 BVPS_{it} + \beta_2 EPS_{it} + \varepsilon_{it} \quad (1)$$

where:

- $p_{it}$  – the price of bank  $i$  stock at the end of the year  $t$ ,
- $BVPS_{it}$  – book value per share of bank  $i$  at the end of the year  $t$ ,
- $EPS_{it}$  – net earnings per share of bank  $i$  for the period  $(t - 1, t)$ ,
- $\beta_0$  – intercept,
- $\beta_1, \beta_2$  – regression coefficients,
- $\varepsilon_{it}$  – error term.

Given the evidence in the prior studies (see e.g. Anandarajan et al., 2010), both regression coefficients are expected to be positive as higher book values of equity and earnings should contribute to higher market values. The presence of the error term serves for capturing the influence of the factors potentially omitted in the specification of the model.

Following the approach most frequently adopted in the current academic research and official-sector documents (see Schildbach, 2017) the size of the examined banks has been gauged on the basis of the median total assets (henceforth:  $MTA$ ) measured over the analysed period. In the first stage of the research the examined sample was divided into two subsamples determined by the distribution of  $MTA$ . The banks with  $MTA$  below or equal to the median for the entire sample were categorized as 'Small', whereas the remaining ones as 'Large'. The key statistics for the pooled sample and the investigated subsamples are reported in Table 1.

Table 1.  
Summary characteristics of the examined sample/subsamples

Sample/ subsample	Variable	Mean	Median	Min	Max	SD	N
Pooled	Stock price [PLN]	110.60	54.90	1.08	926.5	153.30	271
	Total assets [bln PLN]	45.59	32.18	0.25	272.96	47.80	
	BVPS [PLN]	61.59	43.16	-0.72	417.99	71.76	
	EPS [PLN]	6.32	2.72	-17.77	53.98	10.02	
Small	Stock price [PLN]	59.54	24.90	1.09	926.5	116.18	143
	Total assets [bln PLN]	21.02	18.56	0.25	71.90	19.12	
	BVPS [PLN]	37.52	24.72	-0.72	234.62	44.98	
	EPS [PLN]	3.02	1.16	-17.77	52.46	7.57	
Large	Stock price [PLN]	167.65	107.47	1.32	894.00	169.29	128
	Total assets [bln PLN]	73.04	58.95	5.58	272.96	54.85	
	BVPS [PLN]	88.49	59.98	3.02	417.99	85.47	
	EPS [PLN]	10.00	7.19	-16.51	53.98	11.11	

Source: own elaboration.

Next, Model 1 was estimated both for the pooled sample and each of the subsamples. This allowed to assess and compare its relative descriptive power, as measured by the coefficient of determination, in each size category. Since the accounting data reported by larger banks is hypothesized to be more value-relevant than in the case of their smaller peers, the subsample of 'Large' banks should, therefore, exhibit a higher descriptive power of the model.

In the final stage of the research, in order to test the second hypothesis of the present study and assess the impact of banks' size on the relative responsiveness of their market values to the changes in book values and net earnings, Model 1 was modified by the introduction of a dummy variable differentiating between the 'Small' and 'Large' banks, yielding the following formula (henceforth: 'Model 2'):

$$p_{it} = \beta_0 + \beta_{0D}D_i + \beta_1BVPS_{it} + \beta_2EPS_{it} + \beta_3(D_iBVPS_{it}) + \beta_4(D_iEPS_{it}) + \varepsilon_{it} \quad (2)$$

where:

$D_i$  – a dummy variable equal 0 for the banks categorized as 'Small' and 1 for those categorized as 'Large'.

Following the evidence provided by Collins et al. (1997), the estimate of the regression coefficient  $\beta_3$  is expected to be negative since the value relevance of book values should decrease with bank size as the equity investors tend to attribute greater importance to book values when valuing relatively smaller banks, and because larger banks are more likely to be perceived as 'too-big-to-fail'. In turn, the implied higher quality and persistence of earnings reported by larger banks allows to expect a positive estimate of the coefficient  $\beta_4$ .

The examined sample covered all domestically-based commercial banks listed on the Warsaw Stock Exchange over the period 1998–2017. Due to numerous mergers and acquisitions in the industry the final sample comprised 18 banks. The accounting data from banks' separate annual financial reports have been extracted from the Notoria Serwis S.A. database provided by the Emerging Markets Information Service (2018), whereas the data on stock prices have been collected via the website of the Brokerage House of Bank Ochrony Środowiska S.A. (2018). The combined data on stock prices, total assets, book values, and net earnings yielded the final pooled sample of 271 bank-year observations.

### 3. Results

The results of the estimations of Model 1 for the pooled sample as well as the size-based subsamples of banks are reported in Table 2.

Table 2.

Estimations of Model 1 for the pooled sample and the size-based subsamples of banks

Parameter	Model 1: $p_{it} = \beta_0 + \beta_1 BVPS_{it} + \beta_2 EPS_{it} + \varepsilon_{it}$					
	Sample/subsample					
	Pooled					
	Estimate/ value	Std. Error	<i>p</i> -value			
$\beta_0$	-4.015	4.989	0.422			
$\beta_1$	1.382	0.093	0.000			
$\beta_2$	4.674	0.667	0.000			
<i>F</i> -statistic	693.44		0.000			
<i>R</i> <sup>2</sup>	0.838					
<i>Adj. R</i> <sup>2</sup>	0.837					
<i>N</i>	271					
	Small			Large		
	Estimate/ value	Std. error	<i>p</i> -value	Estimate/ value	Std. error	<i>p</i> -value
$\beta_0$	-18.534	6.187	0.003	8.607	8.423	0.309
$\beta_1$	1.754	0.140	0.000	1.203	0.136	0.000
$\beta_2$	4.058	0.833	0.000	5.259	1.044	0.000
<i>F</i> -statistic	235.60		0.000	354.49		0.000
<i>R</i> <sup>2</sup>	0.771			0.850		
<i>Adj. R</i> <sup>2</sup>	0.768			0.847		
<i>N</i>	143			128		

Source: own elaboration.

All the estimated regressions turned out to be statistically significant. Consistent with the results of prior investigations in the Polish banking sector (see e.g. Bolibok, 2015), the book values of equity and net earnings were found to positively affect the market value of the listed banks. Both in the pooled sample and each of the size-based subsamples the estimates of the coefficients  $\beta_1$  and  $\beta_2$  are positive and statistically significant at all conventional levels.

In the pooled sample of banks the variance in both *BVPS* and *EPS* was able to explain nearly 84% of the variation in stock prices. The results of the separate estimations for ‘Small’ and ‘Large’ banks indicate, however, that the ability of the selected independent variables to explain the variation in the bank market values clearly differs across these subsamples. In the case of ‘Small’ banks, the model’s coefficient of determination equals 77.1%, whereas for the ‘Large’ ones it is about 8 p.p. higher. The joint value relevance of book values and net earnings of the relatively smaller banks appears, therefore, to be noticeably lower than that reported by larger entities. It seems that the equity investors in the Polish banking sector find the financial data announced by larger banks more informative and more suitable for valuation purposes than that reported by their smaller peers. On the one hand, this observation might be attributable to the higher volatility and lower quality of smaller banks’ accounting numbers which limits their usefulness for the preparation of financial forecasts employed in the fundamental analysis of stocks. On the other hand, the empirical evidence suggests that the investors tend to perceive the financial reporting of larger banks as more consistent, more credible and therefore more value-relevant, which potentially reflects better quality of assets, a broader and more stable deposit base, more diversified operations, and the deployment of more advanced risk management techniques. The above discrepancy in the joint value relevance of book values and earnings between smaller and larger banks might also result from the generally more intensive market following of the larger banks and the higher turnover of their stocks. The difference in the estimates of the coefficients of determination for the compared subsamples suggest that, in general, bank size positively affects the value relevance of reported book values of equity and net earnings, which supports the first hypothesis of the present study (*H1*).

The next stage of the research involved the estimation of Model 2 in order to test the hypothesis on the diverse impact of bank size on the responsiveness of bank stock prices to changes in book values and net earnings per share (*H2*). The results of the estimation are given in Table 3.

Consistent with ex-ante expectations, the estimate of the coefficient  $\beta_3$  turned out to be negative and statistically significant, which suggests that the responsiveness of bank stock prices to changes in the book values of equity decreases with size. The changes in the book values of equity reported by larger banks appear, therefore, to exert a relatively smaller impact on their market values. In contrast, the book values of smaller banks seem to be significantly more informa-

tive. These findings appear to justify the view that the capital market participants find larger banks more sound and hence less likely (or virtually ‘too big’) to fail, since they place a relatively lower weight on the reported book values of equity, which are often considered as proxies for banks’ liquidation or abandonment values. In turn, the higher responsiveness of smaller banks’ market values to changes in the book values of equity suggests that this particular accounting item is deemed more important for stock valuation purposes than in the case of larger banks. A significantly higher weight placed by the investors on the fluctuations of equity capital in smaller banks allows to infer that such banks might be perceived as more risky and more likely to fail, due to the lower potential of effective portfolio diversification or the possibilities of the deployment of advanced risk-management solutions.

Table 3.  
Estimation of Model 2 (pooled sample)

Parameter	Model 2: $p_{it} = \beta_0 + \beta_{0D}D_i + \beta_1BVPS_{it} + \beta_2EPS_{it} + \beta_3(D_iBVPS_{it}) + \beta_4(D_iEPS_{it}) + \varepsilon_{it}$		
	Pooled sample		
	Estimate/ value	Std. error	<i>p</i> -value
$\beta_0$	-18.534	6.735	0.006
$\beta_{0D}$	27.142	10.283	0.009
$\beta_1$	1.754	0.153	0.000
$\beta_2$	4.058	0.907	0.000
$\beta_3$	-0.551	0.198	0.006
$\beta_4$	1.200	1.323	0.365
<i>F</i> -statistic	288.60		0.000
$R^2$	0.845		
<i>Adj.</i> $R^2$	0.842		
<i>N</i>	271		

Source: own elaboration.

As expected, the estimate of the coefficient  $\beta_4$ , capturing the impact of bank size on the responsiveness of market values to variation in net earnings turned out to be positive, yet not significant. Therefore the empirical evidence does not allow to unambiguously deem net earnings reported by larger banks as more informative in comparison to their smaller peers. It is likely that even if the equity investors do perceive the earnings announced by larger banks as being of better quality and more constant than those of the smaller ones, much of this effect might be offset by the higher availability of value-relevant interim financial information in larger banks. In turn, even though smaller banks might in fact report more volatile

and less persistent earnings, the typically lower intensity of their interim reporting renders the annual earnings more relevant and thus decreases the statistical significance of the difference in the sensitivity of market values to variations in earnings between them and the larger banks.

The empirical findings seem, therefore, to partially support the second hypothesis of the present study (*H2*). The results suggest that larger banks exhibit a significantly lower responsiveness of stock prices to the variation in the book values of equity. There is also some weak evidence of the positive impact of bank size on the stock price responsiveness to the changes in net earnings.

## Conclusions

The results of the research largely support the hypothesized impact of bank size both on the value relevance of the book values of equity and net earnings and the responsiveness of stock prices to the changes in these crucial accounting variables in the Polish banking industry. The empirical evidence suggests that the equity investors perceive the joint informativeness of book values and earnings of larger banks as generally more value-relevant in comparison to the analogous accounting numbers reported by their smaller peers. This outcome might result both from the higher quality and consistence of the accounting numbers reported by larger banks, as well as from the fact that they usually have a more intensive market following.

The empirical findings also suggest that the responsiveness of market values to the changes in each of the examined explanatory variables seems to be affected by the size of banks in a different way. As expected, and consistent with the evidence in the earlier literature, the book value of equity has turned out to be significantly more informative for smaller banks, which might reflect the intuitive perception of this accounting item as a rough proxy for bank liquidation or abandonment value. From this viewpoint, smaller banks are likely to be perceived by the capital market participants as more risky and less sound, which naturally inclines the investors to assign a relatively higher importance to their reported book values of equity during the assessment of their stocks' intrinsic values.

As regards the impact of size on the responsiveness of bank market values to changes in net earnings, the obtained empirical evidence is ambiguous. Although larger banks appear to exhibit a higher sensitivity of stock prices to variations in net earnings per share than their smaller peers, the difference between the examined subsamples has turned out to be statistically not significant. These findings suggest that even if annual earnings reported by larger banks are in fact more constant and of higher quality, which makes them more useful for valuation purposes, their informativeness might be somewhat pre-empted by the intensity of large banks' interim reporting. Conversely, in the case of smaller banks the lower quality and constancy of annual earnings might be compensated by the reduced

availability of other financial information throughout the reporting period. Therefore the combination of these circumstances is likely to decrease the statistical significance of the difference in the responsiveness of bank market values to the variation in reported earnings between smaller and larger banks.

The above findings indicate the need for the further investigation of the impact of size on the value relevance of banks' financial reporting. In particular, the future research might examine this matter using higher frequency (e.g. quarterly) data to control for the influence of interim reporting. This, in turn, should enable to explore whether larger banks do exhibit a systematically higher informativeness of the reported earnings in comparison to the smaller ones in the Polish banking sector.

Finally, as the results of the present study suggest that size is an important factor influencing the value relevance of accounting variables reported by banks, the accounting standard-setters might consider whether different disclosure standards or value estimation techniques should be required of banks of different sizes in order to mitigate the differences in the value-relevance of their reported accounting numbers.

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## Does bank size affect the value relevance of accounting data? The evidence from Poland

### Summary

The paper aims at the empirical evaluation of the impact of bank size (as measured by median total assets) on the value relevance of two key accounting variables, i.e. book values of equity and net earnings, in terms of their joint explanatory power in the regression model and the relative responsiveness of bank market values to the changes in those variables. The research is based on the multiple linear regression analysis after controlling for the presence of fixed and random effects. The examined sample covers all domestically-based commercial banks listed on the Warsaw Stock Exchange over the period 1998–2017. The final pooled sample comprises 18 banks and 271 bank-year observations. The findings of the study suggest that the equity investors perceive the joint informational content of book values and earnings of larger banks as more value relevant in comparison to the accounting numbers reported by their smaller peers. The responsiveness of banks' market values to the changes in each of the explanatory variables seems, however, to be affected by their size in a different way. As expected, book values of equity have turned out to be significantly more informative for smaller banks, whereas the evidence regarding the impact of size on the responsiveness of bank market values to the changes in net earnings is ambiguous. Although larger banks appear to exhibit a higher sensitivity of stock prices to variations in net earnings per share than their smaller peers, the difference between the examined subsamples is not statistically significant.

**Key words:** banks, value relevance, size, earnings, book values