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## **The impact of the global financial crisis on the value relevance of earnings in the Polish banking sector**

### **Introduction**

The global financial crisis that hit European capital markets in 2008 not only has caused a serious and prolonged contraction of economic activity in developed and emerging economies around the world, but also significantly increased overall level of risk aversion of equity investors and their attitudes towards the available value-relevant information.

Conventionally, valuation of companies and subsequent investment decisions are based on fundamental data from financial reports. Therefore, an interesting research question is whether the crisis changed the investors' perception of disclosed accounting information. This issue seems particularly worth examining in relation to the basic and most comprehensive measure of firms' overall performance – their earnings.

An industry where the crisis actually began and exerted the most pronounced impact was the banking one. First, banks in many countries suffered severe losses on their portfolios of financial assets exposed to the U.S. subprime credit market risks (CDOs, credit default swaps and subprime mortgage securities). Next, a spreading recession led to deterioration of loan portfolios quality, while increasing risk aversion strongly constrained possibilities of banking activity growth. These unfavourable conditions affected in turn both banks' earnings and market values.

The Polish banking sector, due to its conservative banking activity model and a negligible exposure to the U.S. subprime market risks, was relatively unaffected by the direct impact of the first stage of the global financial crisis. Mo-

reover, high profitability and capital adequacy served as a protective cushion against adverse shocks from the global environment. The impact of the crisis manifested itself initially through a significant (nonetheless transitory) increase of risk aversion and decrease in liquidity in the local and regional interbank money and FX markets. In the long run the major impact of the crisis on the Polish banking sector was, however, exerted by the economic downturn that worsened creditworthiness of borrowers and thus deteriorated the quality of banks' loan portfolios [Kościński 2010].

Both international and domestic studies have demonstrated that earnings announced by banks are value-relevant [Anandarajan et al. 2011, Escraffe and Sefsaf 2011, Bolibok 2015]. However, due to a natural delay in recognition of changes in financial position of borrowers in banks' accounting ledgers, affecting the value of impairment provisions and finally earnings [Bolibok 2014], higher share of transitory components and volatility of earnings during the periods of adverse macroeconomic conditions [Kane et al. 2015], as well as simultaneous increase in risk aversion and stronger impact of investors' emotions on banks' stock prices, it can be expected that the crisis might have weakened the association between banks' earnings and market values.

Given the above intuition, the paper aims at investigating the impact of the global financial crisis on the value relevance of earnings reported by banks in the specific context of the Polish capital market. According to Author's this issue has not been yet directly examined empirically, therefore the present study attempts to fill this apparent gap and enhance the existing value relevance literature regarding the banking sector in emerging markets.

The remainder of the paper is organised in four sections. The next section provides a review of relevant literature regarding the impact of economic downturns on the value relevance of earnings. The third section describes the methodological framework of the paper and the data selection procedures. The main findings of the study are presented and discussed in the fourth section. The paper is closed with conclusions and some suggestions on the directions of the future research.

## Literature review

The periods of economic downturn cause higher risk of business activity and worsen overall performance of enterprises. A logical consequence of such conditions is an increased number of firms reporting losses. Additionally, a transitory nature of recessions leads to a marked increase in the share of non-recurring components of earnings, which in turn makes them less useful for

prediction and valuation purposes. The results of many studies demonstrate that such conditions tend to deteriorate the value relevance of reported earnings [Hayn 1995, Elliott and Hanna 1996, Basu 1997].

The results of a study by Johnson [1999] demonstrated that value relevance of accounting earnings is sensitive to the business cycle, as the association between earnings and stock returns tends to be higher during expansion periods and lower in times of contraction.

A considerable body of literature attempted to investigate the impact of Asian financial crisis of 1997 on the value relevance of accounting data. Graham et al. [2000] found that the total value relevance of book values and earnings in Thailand decreased in the aftermath of recession following the depreciation of Thai currency. In the post-crisis period the incremental explanatory power of book values over earnings increased, while that of earnings over book values decreased, mostly due to high volatility of foreign exchange gains and losses. Ho et al. [2001] examined the impact of the crisis on the value relevance of accounting items in South Korea. Their findings also indicate a significant drop in the value relevance of earnings, which, however, was not compensated by the increasing value relevance of book values. Similarly, Eng et al. [2005] investigated the effects of the Asian crisis on the markets of Hong Kong, Malaysia, Singapore and Thailand and demonstrated a positive association between earnings and future excess stock returns in the periods before and after the crisis suggesting that investors might have undervalued these accounting items. In contrast, during the crisis this association became negative indicating an overvaluation of earnings.

In turn, Davis-Friday and Gordon [2005] provided an evidence of a negative impact the 1994 Mexican currency crisis on the value relevance of accounting data. They found that in the presence of more frequent losses the valuation coefficient and incremental explanatory power of earnings declined during the crisis period. On the other hand, they observed no significant change in the valuation coefficient on book values of equity, although their incremental explanatory power increased.

According to Jenkins et al. [2009] the information content of accounting numbers may vary across the business cycle since it reflects both the impact of general economic conditions and the effects of the company's business activities. In particular, during recessions company's growth prospects captured by current accounting earnings may be perceived by investors as more uncertain. Contrary to Johnson [1999], however, they found that after controlling for firm's growth, the responsiveness of stock prices to variation in earnings tends to increase during recessions.

The results of an extensive study by Persakis and Iatridis [2015] covering over 137 thousand firm-year observations of non-financial enterprises from

18 developed countries indicate a decline of earnings quality during the recent global financial crisis (2008–2012). Their findings also suggest that adverse economic conditions incline managers to recognise potential positive events more frequently than they normally would, thus increasing the share of accruals and lowering the earnings' predictability.

Kane et al. [2015] examined the impact of the economic recessions on the value relevance of earnings and book values of equity of non-financial enterprises in the U.S. capital market over the period 1970–2012. Their results indicate that recessions, being transitory in nature, reduce persistence of reported earnings' numbers, thus decreasing their value relevance. On the other hand, as recessions induce higher risk into business operations of companies, they tend to increase the value relevance of book values of equity.

The empirical evidence on the impact of crises on the value relevance of earnings in the banking sector itself is scarce, as the aforementioned studies usually excluded banks from examined samples due to the specificity of their operations. The majority of related studies discussing the banking sector are focused mainly on the impact of recessions on the quality of banks' earnings and their earnings' management practices. For instance, Cohen et al. [2014] examined publicly traded U.S. banks over the period 1997–2009 and found that those using more aggressive earnings management prior to 2007 exhibited substantially higher stock market risk as measured by the incidence of extreme declines in stock prices. Also, Ma and Song [2016] investigated U.S. commercial banks from 1996 to 2009 and demonstrated that earnings' management increases banks' contribution to systemic crash risk and systemic distress risk due to higher information opacity, stimulation of bad news hoarding and co-movement with macroeconomic conditions.

The conducted literature review implies therefore that the impact of adverse macroeconomic conditions (and in particular the recent global financial crisis) on the value relevance of earnings in the banking sector remains largely unexplored. Moreover, apparently no prior study has directly examined this issue in the context of the Polish banking sector. Therefore, the present study attempts to fill this gap and thus contribute to the existing value-relevance literature on the banking sector.

## **Research design**

The results of prior studies on the impact of financial crises on the value relevance of earnings and the apparent lack of related studies in the specific context of the Polish capital market, led to formulation of the following key hypothesis of the present study:

HYPOTHESIS 1. The global financial crisis caused a decrease of the value relevance of earnings reported by the banks listed on the Warsaw Stock Exchange.

The research was based on a modified version of the Ohlson [1995] model framework, which has a well documented track record in the value relevance studies. In order to capture and evaluate the changes in the value relevance of earnings reported by banks caused by the global financial crisis, a following linear regression model was constructed:

$$\tilde{p}_t = \alpha_0 + \alpha_{D0}D_t + \alpha_1BVPS_t + \alpha_2EPS_t + \alpha_3(D_tBVPS_t) + \alpha_4(D_tEPS_t) + \varepsilon_t$$

where:

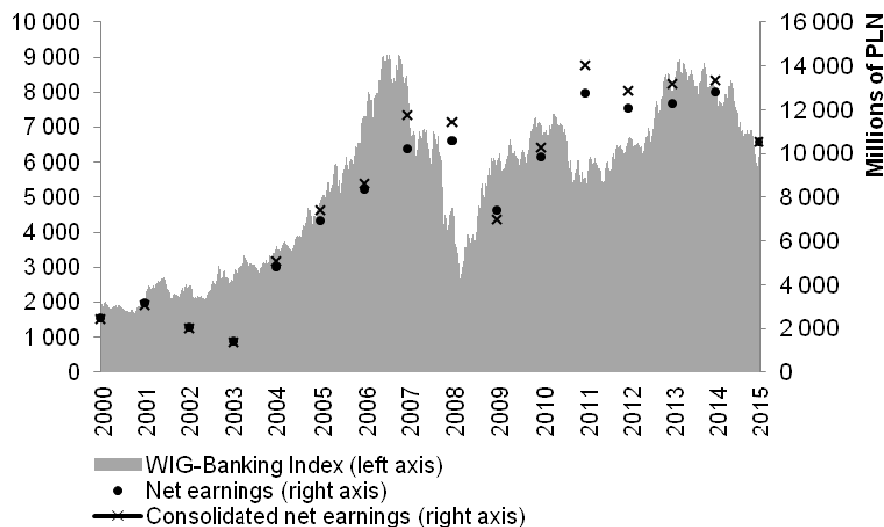
|   |  |
|---|--|
| $p_t$   | – closing price of a bank's share at the end of period $t$ ;         |
| $\alpha_0$  | – intercept;   |
| $D_t$   | – dummy variable equal 0 for $t \leq 2007$ and 1 for $t \geq 2008$ ; |
| $\alpha_{D0}, \alpha_1, \alpha_2, \alpha_3, \alpha_4$ | – structural parameters;   |
| $BVPS_t$  | – book value per share at the end of period $t$ ,                    |
| $EPS_t$   | – net income per share for the period $(t-1; t)$ ,                   |
| $\varepsilon_t$                                       | – error term.  |

Other things equal, increases in both  $BVPS$  and  $EPS$  should correspond with higher prices of banks' stocks, which allows to expect positive values of the estimates of parameters  $\alpha_1$  and  $\alpha_2$ . Parameters  $\alpha_3$  and  $\alpha_4$  represent the changes in values of regression coefficients for  $BVPS$  and  $EPS$ , respectively, after the repercussions of the global financial crisis reached the Polish capital market. The positive (negative) values of these estimates indicate increase (decrease) of the value relevance of corresponding accounting data in the aftermath of the crisis.

The expected sign of the parameter's  $\alpha_3$  estimate seems harder to predict. On the one hand, as indicated by the results of prior studies, during the times of increased economic instability and risk aversion, book value of equity might become more value relevant, as it is considered to be a proxy for company's liquidation value and systematic risk sensitivity [Kane et al. 2015]. On the other hand, higher uncertainty, risk aversion and a stronger impact of investors' emotional reactions could drag banks' stock prices further away from their intrinsic values, rendering book values less relevant, just like any other accounting data. Given the hypothesised adverse impact of the global financial crisis on the value relevance of earnings reported by banks, the estimate of parameter  $\alpha_4$  is expected to be negative. The error term serves for capturing the influence of potential factors not included in the model.

The analyses were conducted separately for two periods centred at the year 2008 – a longer one: 2000–2015, covering symmetrically the maximum available range of annual financial reports, and a shorter one: 2003–2012 covering

5 years before and after the beginning of the crisis, as in the years 2008–2012 the volatility of banks' stock prices and discrepancies between movements in banks' earnings and market values were most pronounced (Fig. 1).



**Figure 1**

WIG-Banking Index and aggregate earnings of banks listed on the Warsaw Stock Exchange over the period 2000–2015

Source: Own elaboration.

In each of the selected periods individual estimations of the model were run on the basis of the data from both separate and consolidated financial statements. In order to assess the statistical significance of changes in the regression parameters the Chow test for structural break was employed [Dougherty 2011].

The examined sample covered all domestically-based commercial banks listed on the Warsaw Stock Exchange. After taking into account the results of mergers and acquisitions within the sector, the final sample comprised of 19 banks. The data on annual financial statements were collected from the Notoria Serwis SA database provided by ISI Emerging Markets<sup>1</sup> while the data on historical stock prices were acquired from the database of the Brokerage House of Bank Ochrony Środowiska SA<sup>2</sup>. The combined data on book values of equity, net earnings and stock prices yielded the pooled samples of 214 and 135 bank-year observations for separate financial statements in the periods 2000–2015 and

<sup>1</sup>Emis Intelligence, Stock Companies, [https://www.emis.com/cgi-bin/Canp\\_profiles](https://www.emis.com/cgi-bin/Canp_profiles) [accessed: 15.09.2016].

<sup>2</sup>Bossa.pl, [http://bossa.pl/index.jsp?layout=mstock&page=0&news\\_cot\\_id=706&pkind=metastock](http://bossa.pl/index.jsp?layout=mstock&page=0&news_cot_id=706&pkind=metastock) [accessed: 16.09.2016].

2003–2012, respectively, and analogously 207 and 133 bank-year observations for the consolidated data.

## Results

Table 1 presents the results of estimations of the constructed regression model for the separate and consolidated financial statements of examined banks over the period 2000–2015.

**Table 1**

Estimations of the model's parameters and the Chow test for the period 2000–2015

| Model: $\tilde{p}_t = \alpha_0 + \alpha_{D0}D_t + \alpha_1BVPS_t + \alpha_2EPS_t + \alpha_3(D_tBVPS_t) + \alpha_4(D_tEPS_t) + \varepsilon_t$ |                     |               |                 |                         |               |                 |
|--|---------------------|---------------|-----------------|-------------------------|---------------|-----------------|
| Parameter/<br>statistic  | Separate statements |               |                 | Consolidated statements |               |                 |
|  | estimate/<br>value  | std.<br>error | <i>p</i> -value | estimate/<br>value      | std.<br>error | <i>p</i> -value |
| $\alpha_0$   | −0.603              | 7.514         | 0.936           | 1.790                   | 7.770         | 0.818           |
| $\alpha_{D0}$  | −10.045             | 11.034        | 0.364           | −6.981                  | 10.999        | 0.526           |
| $\alpha_1$   | 1.647               | 0.124         | 0.000           | 1.627                   | 0.124         | 0.000           |
| $\alpha_2$   | 5.490               | 0.787         | 0.000           | 5.119                   | 0.758         | 0.000           |
| $\alpha_3$   | −0.114              | 0.223         | 0.611           | −0.337                  | 0.210         | 0.110           |
| $\alpha_4$   | −2.716              | 1.588         | 0.089           | −1.200                  | 1.465         | 0.414           |
| $R^2$  | 87.0%               |               |                 | 87.6%                   |               |                 |
| <i>Adj. R</i> <sup>2</sup>   | 86.7%               |               |                 | 87.3%                   |               |                 |
| <i>F</i> -statistic  | 277.931             |               | 0.000           | 284.146                 |               | 0.000           |
| <i>Chow test statistic</i>   | 11.573              |               | 0.000           | 12.974                  |               | 0.000           |
| $N_1$ (2000-2007)  | 105                 |               |                 | 96                      |               |                 |
| $N_2$ (2008-2015)  | 109                 |               |                 | 111                     |               |                 |

Source: Own elaboration.

For both separate and consolidated financial statements the estimated regressions turned out to be statistically significant. The variability of the selected determinants was able to explain about 87% of total variation in banks' stock prices over the analysed period. Consistent with expectations and results of the prior investigations in the context of the Polish banking sector [Bolibok 2015] the changes in both book values of equity and net earnings were positively correlated with banks' market values. Additionally, the estimates of parameter  $\alpha_2$  were markedly higher than those of  $\alpha_1$ , indicating that over the analysed period

banks' stock prices were much more sensitive to variation in net earnings than book values of equity.

The results of the Chow test indicate that there was a structural break in regression parameters between the examined sub-periods (2000–2007 and 2008–2015). The negative estimates of parameters  $\alpha_3$  and  $\alpha_4$  suggest that after the crisis reached the Polish market in 2008, the value relevance of both book values of equity and net earnings decreased.

The estimations based of the data from separate financial statements clearly demonstrate that the aforementioned deterioration of value relevance was particularly strong in the case of net earnings, as their regression coefficient dropped almost by half in comparison to the pre-crisis period. The observed decline in the value relevance of earnings in the aftermath of the crisis turned out to be statistically significant at the 10% level. In contrast, the decrease in the coefficient for book values was much smaller and statistically insignificant. The above findings seem to support the key hypothesis of the present study.

The results obtained for consolidated data turned out to be somewhat different. Even though, just like in the case of separate statements, the global financial crisis appeared to decrease the value relevance of both examined accounting variables, the drop in regression coefficient for net earnings was much less pronounced, and in fact statistically insignificant. In turn, consolidated book values of equity revealed a clearly stronger decrease of value relevance, however slightly exceeding the 10% level of significance ( $p$ -value equal to 0.110).

The comparison of the results of estimations obtained for separate and consolidated accounting data suggests therefore, that the decrease in the value relevance of earnings triggered by the global financial crisis was most pronounced in the very area of banking operations. It seems that over the period following the beginning of the crisis equity investors in the Polish banking sector started to treat earnings announced by banks with higher caution, which is likely to result from increased volatility of earnings caused in particular by erratic and largely unpredictable recognition of impairment provisions for loan portfolios in the first years of the crisis. On the other hand, the statistical insignificance of the drop in the value relevance of consolidated earnings might be attributable to the fact that they reflected much larger scope of business activities, in particular those of the subsidiaries controlled by banks (e.g. brokerage houses, leasing and insurance companies) that could partially offset the negative impact of more opaque earnings from the core banking activity.

In the next step of the research the examined time span was narrowed down in order to compare the period of highest volatility of banks' stock prices and earnings, i.e. 2008–2012, with the preceding period of the same length (2003–2007). The results of these analyses are shown in Table 2.



Similarly, as in the period 2000–2015, all estimated regressions were statistically significant. Interestingly, in the 5-year period directly preceding the crisis (2003–2007) the sensitivity of banks' stock prices to variations in book values of equity was slightly higher than in 2000–2007, whereas that of earnings somewhat decreased.

For both separate and consolidated data the results of Chow test indicate statistically significant break in the regression coefficients between the periods 2003–2007 and 2008–2012.

The estimations based on the data, from separate financial statements revealed a strong and statistically significant fall in the value relevance of net earnings in the aftermath of the global financial crisis, as indicated by a large, negative estimate of coefficient  $\alpha_4$ . In the period 2008–2012 the estimate of regression coefficient for EPS decreased by about 85% (from 4.543 to 0.690) compared to that of 2003–2007 and in fact became statistically insignificant ( $p$ -value of 0.578), which provides some additional support for the key hypothesis of the present study.

Once again the regression based on consolidated data demonstrated a statistically insignificant drop in the value relevance of net earnings since 2008 ( $\alpha_4$  estimated at  $-1.785$  with  $p$ -value of 0.341). In the period 2008–2012, howe-

**Table 2**

Estimations of the model's parameters and the Chow test for the period 2003–2012

| Model: $\tilde{p}_t = \alpha_0 + \alpha_{D0}D_t + \alpha_1BVPS_t + \alpha_2EPS_t + \alpha_3(D_tBVPS_t) + \alpha_4(D_tEPS_t) + \varepsilon_t$ |                     |               |            |                         |               |            |
|--|---------------------|---------------|------------|-------------------------|---------------|------------|
| Parameter/<br>statistic  | Separate statements |               |            | Consolidated statements |               |            |
|  | estimate/<br>value  | std.<br>error | $p$ -value | estimate/<br>value      | std.<br>error | $p$ -value |
| $\alpha_0$   | 4.253               | 9.701         | 0.662      | 6.048                   | 9.784         | 0.538      |
| $\alpha_{D0}$  | -16.189             | 13.920        | 0.247      | -12.678                 | 13.989        | 0.366      |
| $\alpha_1$   | 1.957               | 0.167         | 0.000      | 1.936                   | 0.169         | 0.000      |
| $\alpha_2$   | 4.543               | 0.980         | 0.000      | 4.065                   | 0.966         | 0.000      |
| $\alpha_3$   | -0.144              | 0.279         | 0.606      | -0.432                  | 0.276         | 0.120      |
| $\alpha_4$   | -3.853              | 1.876         | 0.042      | -1.785                  | 1.866         | 0.341      |
| $R^2$  | 89.1%               |               |            | 89.1%                   |               |            |
| Adj. $R^2$   | 88.7%               |               |            | 88.7%                   |               |            |
| $F$ -statistic   | 211.465             |               | 0.000      | 208.642                 |               | 0.000      |
| Chow test statistic  | 15.702              |               | 0.000      | 15.087                  |               | 0.000      |
| $N_1$ (2003-2007)  | 66                  |               |            | 64                      |               |            |
| $N_2$ (2008-2012)  | 69                  |               |            | 69                      |               |            |

Source: Own elaboration.

ver, the  $p$ -value of the estimate of regression coefficient for EPS exceeded the 5% threshold and equalled 0.079, which might suggest that also consolidated net earnings became then less relevant to equity investors.

Additionally, despite the narrowing down of the analysed time span to the most volatile period of the crisis, in each of the examined sub-samples book values remained relevant at the 1% level of significance. Simultaneously, none of the observed changes (decreases) in their value relevance turned out to be statistically significant, even though the  $p$ -value for the estimate of parameter  $\alpha_3$  for consolidated data (0.120) was fairly close to the cut-off threshold.

## Conclusions

The results of conducted analyses support the key hypothesis of the present study and indicate that the value relevance of earnings announced by the banks listed on the Warsaw Stock Exchange decreased in the aftermath of the global financial crisis. This negative impact was most pronounced and statistically significant in the 5-year period directly succeeding the beginning of the crisis (2008–2012) and in the case of separate earnings, whereas for consolidated ones the empirical evidence is not entirely unequivocal. This discrepancy suggests that the drop in the value relevance was largely attributable to the banking activity itself, in particular the erratic and unpredictable recognition of impairment provisions on loan portfolios. In contrast, more diversified composition of consolidated earnings mitigated the deterioration of their value relevance to the equity investors.

Additionally, the results of investigation demonstrated that banks' book values of equity remained significantly positively related to market values even after the beginning of the crisis in 2008 and exhibited only statistically insignificant loss of value relevance.

Given a pioneering nature of the present study in the context of the Polish banking sector, future research might focus on investigation of the impact of the crisis on the value relevance of particular earnings components, above all those of accrual nature, such as impairment provisions.

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## **Abstract**

The paper aims at empirical investigation of the impact of global financial crisis on the value relevance of earnings in the Polish banking sector. The examined sample covered all domestically-based banks listed on the Warsaw Stock Exchange over the period 2000–2015. The methodological framework of the study draws on the Ohlson model with multiple linear regression analysis. The results of the investigation are consistent with the findings of the majority of prior international studies and indicate that the value relevance of earnings decreased in the aftermath of the global financial crisis. This negative impact was most pronounced and statistically significant in the period directly succeeding the beginning of the crisis (2008–2012) and for separate earnings, whereas the results for consolidated ones are not unequivocal. This discrepancy suggests that the drop in the value relevance was largely attributable to the banking activity itself and reflected, in particular, high volatility of impairment provisions on loan portfolios. In turn, more diversified composition of consolidated earnings mitigated the deterioration of their value relevance to the equity investors.

**Key words:** banks, value relevance, earnings, global financial crisis

## **Wpływ globalnego kryzysu finansowego na znaczenie wyników finansowych dla wartości rynkowej w polskim sektorze bankowym**

### **Abstrakt**

Celem artykułu jest weryfikacja empiryczna wpływu globalnego kryzysu finansowego na znaczenie wyników finansowych dla wartości rynkowej podmiotów w polskim sektorze bankowym. Badaniem objęto wszystkie banki z siedzibą w Polsce notowane na Giełdzie Papierów Wartościowych w Warszawie w latach 2000–2015. Ramy metodyczne opracowania bazowały na modelu Ohlsona z wykorzystaniem analizy wielorakiej regresji liniowej. Uzyskane wyniki są spójne z rezultatami poprzednich badań w literaturze międzynarodowej i wskazują na spadek znaczenia wyników finansowych dla wartości rynkowej

w następstwie kryzysu. Ten negatywny wpływ był najbardziej widoczny i istotny statystycznie w okresie następującym bezpośrednio po rozpoczęciu kryzysu (lata 2008–2012) oraz dla jednostkowych wyników finansowych, podczas gdy dla danych skonsolidowanych rezultaty nie były jednoznaczne. Powyższa rozbieżność sugeruje, że spadek znaczenia dla wartości rynkowej można w przeważającej mierze przypisać samej działalności bankowej, co przypuszczalnie odzwierciedlało silne wahania odpisów aktualizujących wartość należności kredytowych. Z kolei bardziej zdywersyfikowana struktura skonsolidowanych wyników finansowych najwyraźniej ograniczyła spadek ich znaczenia dla wartości rynkowej w oczach inwestorów.

**Słowa kluczowe:** banki, znaczenie dla wartości rynkowej, wyniki finansowe, globalny kryzys finansowy