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# How Fair Value Regained Its Importance after the Crisis: Empirical Evidence from the European Banking Sector

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**Abstract**

This study investigates the effects of fair valuation on investor decisions, especially concentrating on the differences between fair value accounting and historical cost accounting as well as on the effects of the 2008-2009 financial crisis. Authors examine data of 20 European large banks between 2006 and 2015. Results show that, while no relationship can be found between banks' financial performance and stock prices in the crisis years, EPS determined with fair valuation is a significant predictor of the share price in the 2010-2015 period. This leads to the conclusion that, after the hard times of 2008-2009, fair value regained its importance in investor decisions.

**Keywords:** fair valuation, net income, other comprehensive income, earnings per share, net assets per share, European banking sector, stock price
**JEL Classification:** G11, G15, G21, M41

## 1. Introduction

Investors in the stock market judge companies' financial position and business risk based on publicly available financial statements. The result of their valuation creates the basis of decisions to buy or sell shares. For the most accurate determination of the firms' net assets and earnings it is inevitable to use a correct and reliable valuation mechanism. From the mid- 1980's, international accounting systems started to shift from traditional cost-based valuation to market-based (or fair) valuation. *Schaffer (2012)* points out that, due to the complexity of financial markets, in inflationary environment the cost model is not suitable for appropriate valuation as it records information in a retrospective way. Therefore, the fair value model should be used under such circumstances. The role of fair valuation is especially strong under International Financial Reporting Standards (IFRS), which can be regarded as the official accounting system of the European Union.

In the early stages of the transition to fair valuation, the aim was to correct the presentation model of certain financial assets, but later this valuation model became dominant for all financial instruments. Now it is also used for some non-financial assets such as investment property (IAS 40). The greatest advantage of fair valuation is that is takes into consideration the time value of money and the price of risk, which are neglected by the cost model. *Barth et al (2012)* argues that, while historical

cost accounting (HCA) is unable to handle the effects of 'good news' and 'bad news', fair value accounting (FVA) takes all these into consideration when valuing balance sheet items. Authors also state that the fair value model recognizes the potential of 'good news' in generating higher income, dividends or management bonuses.

One of the first authors to be opposed to fair valuation was *Beneish (1999)*, stating that fair value is an efficient tool to manipulate financial statements, and the positive valuation differences recorded in the books generate unsubstantiated increases in stock prices. More than a decade later *Shaffer (2012)* explained in details the main reasons of this phenomenon: fair valuation can only work well under certain criteria. In the lack of active and liquid markets or during financial crises fair valuation often results in values that are not objective, understandable and transparent, which may mislead investors.

After the outburst of the 2008-2009 financial crisis, several authors published studies to investigate the role of fair valuation, representing two main standpoints. One group of researchers and practical experts suggested that fair valuation was one of the main factors that caused the crisis. Another group stated that this valuation model had operated as an alarm-bell, showing the tendencies that led to it. *Allan and Carletti (2008)* as well as *Gorton (2008)* argue that the main problem with fair valuation is that measuring fair value is quite difficult in an illiquid market environment and in many cases it provides unreliable results. In other words, the reliability of fair valuation depends on the liquidity level of the market. Another criticism by *Gorton (2008)* against fair valuation is that, in certain situations, it puts a pressure on banks to record huge impairments, which results in significantly undervalued assets. Based on the remarkable amount of critical studies it seems that the 2008-2009 crisis has worsened the trust in fair valuation. However, some later studies such as that of *Evans et al (2014)* reported research results indicating that, after the crisis, fair value became a relevant factor again in investors' decisions.

The current study examines data of 20 European large banks between 2006 and 2015, investigating the role of fair valuation (the changes in investors' trust in this valuation model) during and after the financial crisis. The main hypothesis stated by the authors is that the credibility of fair value has fallen or rather disappeared in the crisis years, while in the following non-crisis period this valuation model regained its relevance in the decisions of stock market investors, which is manifested in a stochastic relationship between companies' financial indicators and stock prices. Although several earlier research articles dealt with this topic, these works did not specifically concentrate on the European banking sector or on the period of 2006-2015. During the literature survey, the authors did not find any other study which examines this question with the same statistical methodology on a similar database. In this wise, this research adds new empirical results to the existing literature.

The remainder of the study is structured as follows: first a literature survey is conducted, which is followed by the presentation of the methodology applied. Then the appropriate regression models are developed. Finally, the article is ended with the presentation of the empirical results and conclusions.

## 2. Literature Survey

The first relevant studies proving a relationship between accounting earnings and stock prices were published in the early 1990's. *Easton, Harris and Ohlson (1992)* analysed more than 1000 companies and showed a correlation between earnings and market capitalization. Furthermore, they found that R square can be improved by using the accumulated earnings of more than one year as explanatory variable. *Graham, Pope and Rees (1992)* as well as *Harris, Lang and Möller (1994)* found similar relationship between profits and stock market performance on samples of German and US firms.

Other authors used different financial ratios (instead of absolute earnings) as independent variables on the stock price. Several country-specific research articles concluded that earnings per share (EPS) can be used as a good predictor of the share price. This relationship has been shown,

among others, by *Maditinos et al (2007)* on a sample of companies in Greece, by *Chang et al (2008)* on Taiwan panel data, and also by *Wang, Fu and Luo (2013)* in the Shanghai Stock Market.

Similarly to the earnings-price question, significant research has dealt with the price relevance of fair valuation from the mid 1990's. *Barth (1994)*, *Bernard et al (1995)*, *Barth et al (1995)* and *Barth and Clinch (1998)* investigated the effects of Historical Cost Accounting (HCA) and Fair Value Accounting (FVA) on stock prices. All of the cited articles concluded that FVA can significantly explain share prices, while no relationship was statistically proven between HCA and the stock price. These findings were confirmed more than a decade later by *Song et al (2010)* and *Li and Kyu (2010)* using US and Chinese company data, respectively. *Yao et al (2015)* examined Australian companies, concentrating on the effect of revaluation reserves (recorded in shareholders' equity as a result of fair valuation) on future earnings. They found that these reserves have the highest impact on the accounting profits of the following 1-2 years.

Beyond studies dealing with manufacturing, servicing and merchandising companies, many research articles concentrated specifically on banks and other financial institutions. *Kolev (2008)* used a sample of 172 US financial institutions to examine the relevance of the different levels of fair value and concluded that investors regard quoted prices of active markets much more important than values based on estimations. *Sun (2014)* used Australian banks' data to prove that fair valuation contributes to extreme market volatility, and concluded that investors have to understand the trade-offs between value relevance and market volatility in order to make the right decisions. *Evans et al (2014)* analysed data of US banks and proved a stochastic relationship between the fair value of assets and the stock price. Furthermore, they found that the explanatory power of assets' fair value is higher on future share prices than on contemporaneous prices.

*Bagna, Martino and Rossi (2014)* examined a database of 120 European banks for the period 2008-2012. Similarly to *Kolev (2008)*, they investigated the effects of the different levels of fair value on stock prices with OLS regression models. The theoretical framework of their study was based on the IFRS 7 standard, which defines three levels of fair value (called the fair value hierarchy). The first level is Mark to Market, which refers to perfectly objective information (quoted prices of active markets). The second level is Mark to Matrix (partly objective information, such as prices from non-active markets), while the third is Mark to Model (subjective value based on estimations). Based on the Price/Book Value (P/BV) ratio, their main conclusion was that the explanatory power of the Mark to Market valuation on share prices is significantly higher than those of the Mark to Matrix or the Mark to Model values.

The literature survey has identified two main research directions in this field. On one hand, the relationship between accounting indicators (earnings, asset value) and stock prices has been proved by several research papers since the 1990's. On the other hand, many authors have shown that fair valuation makes a significant effect on investor decisions, and as a result, on share prices. However, most of the cited works did not focus on the banking sector or on the European region. An exception from this is the study of *Bagna, Martino and Rossi (2014)*, but they examined a relatively short period and did not analyse the differences between the crisis years and the post-crisis period. The current study addresses this research gap in order to add new empirical results regarding the role of fair valuation in investor decisions during and after the crisis of 2008-2009.

## 3. Methodology

### 3. 1. Fair Valuation and Its Effects on Earnings and on Shareholders' Equity

The general framework of fair valuation has been set by the IFRS 13 standard published in May 2011. The fair value defined in this standard is applicable for financial instruments and also for non-financial assets. Fair value is 'the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date'. Financial instruments are divided into two main groups. The first group are financial assets valued with the 'fair value through

profit or loss' (FVTPL) technique, where all changes in fair value are directly recorded in the income statement of the current year. The other group of financial assets are those valued with the 'fair value through other comprehensive income' (FVTOCI) approach, where at the initial measurement the difference between the fair value and the historical cost is recorded in the income, however, later positive changes in fair value are shown in the balance sheet as 'revaluation reserve' under shareholders' equity. In case of negative tendencies in the fair value, impairment should be recorded for these assets, which appears as an expense in the income statement.

To summarize, the correct application of fair valuation makes an effect on the company's income statement through the gains and losses recorded due to the changes in fair value and through the impairment recorded for assets, and it also influences the balance sheet in the form of revaluation reserves. By eliminating these effects, the difference between Fair Value Accounting and Historical Cost Accounting becomes visible in terms of profits and net asset value.

### 3. 2. Sampling and Data Sources

The basis of the empirical research was a panel database of 200 company-years built up by the authors, containing data of 20 European large banks for the period between 2006 and 2015. The authors' decision to focus on the banking sector was motivated by three important arguments. First, the majority of items in banks' balance sheets are financial instruments measured at fair value, therefore, the effect of fair valuation on profits and on shareholders' equity is the most significant in this industry. Second, banks were the parties most affected by the 2008-2009 crisis, so using banks' data makes it possible to examine the effect of the crisis on the relevance of fair valuation. Third, as a result of strict regulation, much more detailed information is available about fair valuation in the financial statements of banks compared to the statements of manufacturing, servicing or merchandising companies.

When building up the database, authors concentrated on European banks that have total assets of more than 500 000 million EUR and are quoted on a European stock exchange. Based on a random selection, 20 banks that fulfil the above criteria have been selected in the sample, as shown by Table 1 (in an alphabetical order).

**Table 1:** Structure of the sample

| No. | Name of the bank | No. | Name of the bank |
|---|---|---|---|
| 1 | Banco Santander Group | 11 | ING Group |
| 2 | Banco Bilbao Vizcaya Argentaria Group | 12 | Intesa Sanpaolo Group |
| 3 | Barclays PLC | 13 | Lloyds Banking Group |
| 4 | BNP Paribas Group | 14 | Natixis Bank Group |
| 5 | Commerz Bank Group | 15 | Nordea Bank Group |
| 6 | Crédit Agricole Group | 16 | Royal Bank of Scotland Group |
| 7 | Credit Suisse Group | 17 | Societe Generale Group |
| 8 | Danske Bank Group | 18 | Standard Chartered Plc |
| 9 | Deutsche Bank Group | 19 | UBS Group AG |
| 10 | HSBC Holdings | 20 | UniCredit Group |

From the IFRS-based annual reports available on the websites of the chosen banks, all balance sheet and income statement data were collected. In all cases, consolidated figures were used. All values were determined in EUR. Figures available in other currencies were converted to EUR using the annual average exchange rates available on fxtop.com. Then, using the collected financial data, four main financial performance indicators were computed for each year (2006-2015) of each bank, which can be applied as explanatory variables on stock prices in the regression models:

- *EPS including fair valuation:* the basic earnings per share, that is, net income presented in the income statement divided by the annual average number of shares outstanding,
- *EPS excluding fair valuation:* net income less the income from fair valuation plus impairment recorded, divided by the same denominator (average number of shares),
- *Shareholders' equity (net assets) per share, including fair valuation:* shareholders' equity presented in the balance sheet, divided by the average number of shares,
- *Shareholders' equity (net assets) per share, excluding fair valuation:* shareholders' equity less the revaluation reserve less the accumulated income from fair valuation, divided by the average number of shares.

EPS is an indicator of profitability, while shareholders' equity (in other words: the value of net assets) is a signal of the company's size. As explained above, both indicators were determined in two versions (including and excluding fair valuation), which makes it possible to examine the differences in Fair Value Accounting and Historical Cost Accounting on the stock market performance. Finally, for each company-year, the weighted average share price was determined based on public information available on shareprices.com.

### 3. 3. Model Development

The first model designed for empirical testing examines the relationship between the four financial performance indicators, introduced earlier, and the share price. As all of the examined banks publish quarterly interim reports, it is a realistic assumption that investor reactions to any changes in financial performance are immediately manifested in share prices. Therefore, contemporaneous stock prices were used as the dependent variable. Furthermore, based on the structure of the database, it can be assumed that certain unobserved, company-specific factors exist in the database that are different for each bank, however, for the same bank their effect is constant in time (or at least their deviation is insignificant). Under these circumstances, the relationship between the variables can best be analysed with a fixed effect model. Therefore, the original model is the following:

$$P_{it} = \alpha_i + \beta_1 EPS_{it}^{FVincl} + \beta_2 EPS_{it}^{FVexcl} + \beta_3 SE_{it}^{FVincl} + \beta_4 SE_{it}^{FVexcl} + u_{it} \quad (1)$$

where $P_{it}$ :weighted average share price for bank $i$ in year $t$

$EPS_{it}^{FVincl}$: earnings per share for bank $i$ in year $t$, including fair valuation

$EPS_{it}^{FVexcl}$: earnings per share for bank $i$ in year $t$, excluding fair valuation

$SE_{it}^{FVincl}$: shareholders' equity per share for bank $i$ in year $t$, including fair valuation

$SE_{it}^{FVexcl}$: shareholders' equity per share for bank $i$ in year $t$, excluding fair valuation

There might be two distorting factors in model (1). The first is the company-specific fixed effect represented by the intersection ($\alpha_i$), which was eliminated by a within transformation (by demeaning the variables with the group averages), which led to the following transformed model:

$$P_{it} - \overline{P_i} = (\alpha_i - \overline{\alpha_i}) + \beta_1 (EPS_{it}^{FVincl} - \overline{EPS_i^{FVincl}}) + \beta_2 (EPS_{it}^{FVexcl} - \overline{EPS_i^{FVexcl}}) +$$

$$+ \beta_3 (SE_{it}^{FVincl} - \overline{SE_i^{FVincl}}) + \beta_4 (SE_{it}^{FVexcl} - \overline{SE_i^{FVexcl}}) + (u_{it} - \overline{u_i}) \quad (2)$$

Leaving the eliminated $\alpha_i$ parameter and using a simplified form often applied in the related literature, model (2) can also be written as follows:

$$\ddot{P}_{it} = \beta_1 E\ddot{P}S_{it}^{FVincl} + \beta_2 E\ddot{P}S_{it}^{FVexcl} + \beta_3 \dot{S}\dot{E}_{it}^{FVincl} + \beta_4 \dot{S}\dot{E}_{it}^{FVexcl} + \ddot{u}_{it} \quad (3)$$

An important consequence of the transformation is that the relationship between the transformed variables can be analysed with an ordinary least squares (OLS) regression. The second possible distortion is the unobserved time factor. In order to examine whether a time effect (which makes an influence on the dependent variable) exists in the model, time dummies expressed by $\delta_j$ were added to model ($\delta_j = 1$ in year $j$ and 0 otherwise), leading to the final model:

$$\ddot{P}_{it} = \beta_1 E\ddot{P}S_{it}^{FVincl} + \beta_2 E\ddot{P}S_{it}^{FVexcl} + \beta_3 \dot{S}\dot{E}_{it}^{FVincl} + \beta_4 \dot{S}\dot{E}_{it}^{FVexcl} + \gamma_2\delta_2 + ... + \gamma_{10}\delta_{10} + \ddot{u}_{it} \quad (4)$$

If testing results prove that there is no relevance of the time dummies and at least one of the explanatory variables are significant, then the direct effect of the significant variable(s) can be analysed with the appropriate (transformed) single variable model(s):

$$\ddot{P}_{it} = \beta_1 E\ddot{P}S_{it}^{FVincl} + \ddot{u}_{it} \quad (5)$$

$$\ddot{P}_{it} = \beta_2 E\ddot{P}S_{it}^{FVexcl} + \ddot{u}_{it} \quad (6)$$

$$\ddot{P}_{it} = \beta_3 \dot{S}\dot{E}_{it}^{FVincl} + \ddot{u}_{it} \quad (7)$$

$$\ddot{P}_{it} = \beta_4 \dot{S}\dot{E}_{it}^{FVexcl} + \ddot{u}_{it} \quad (8)$$

## 4. Testing results

The empirical analysis was started with testing model (4), the original multivariable regression model on the total sample of 20 banks for 2006-2015. Results are presented in Table 2.

**Table 2:** Testing results for model (4) on the total sample (2006-2015)

| *Model:* (4)<br>$n$ = 200 (20 banks, 2006-2015)<br>*Dependent variable:* $\ddot{P}_{it}$ | | | | |
|---|---|---|---|---|
| **Variable** | **Coefficient** | **Std. error** | **t value** | **p value** |
| $E\ddot{P}S_{it}^{FVincl}$ | −32,3613 | 27,5759 | −1,1735 | 0,2421 |
| $E\ddot{P}S_{it}^{FVexcl}$ | 24,2789 | 18,8786 | 1,2861 | 0,2000 |
| $\dot{S}\dot{E}_{it}^{FVincl}$ | 32,797 | 19,4303 | 1,6879 | 0,0931 |
| $\dot{S}\dot{E}_{it}^{FVexcl}$ | −19,8648 | 14,0127 | −1,4176 | 0,1580 |
| $\delta_2$ | −75,2815 | 219,563 | −0,3429 | 0,7321 |
| $\delta_3$ | −403,543 | 239,889 | −1,6822 | 0,0942 |
| $\delta_4$ | −515,649 | 228,781 | −2,2539 | 0,0254 |
| $\delta_5$ | −438,412 | 223,553 | −1,9611 | 0,0514 |
| $\delta_6$ | −469,544 | 229,158 | −2,0490 | 0,0419 |
| $\delta_7$ | −500,461 | 230,72 | −2,1691 | 0,0313 |
| $\delta_8$ | −451,58 | 231,556 | −1,9502 | 0,0527 |
| $\delta_9$ | −480,021 | 228,065 | −2,1048 | 0,0367 |
| $\delta_{10}$ | −500,116 | 227,268 | −2,2006 | 0,0290 |

One of the important information in the table is that none of the time dummies are significant on a 1% level, which confirms that the unobserved time factor does not influence the dependent variable, so there is no distorting time effect. On the other hand, none of the p values are acceptable in the lines of the four explanatory variables. Based on this it can be concluded that, independently of whether fair valuation is applied or not, neither EPS nor the equity per share can explain the stock price on the total sample. A logical reason for this might be the 2008-2009 financial crisis, where the

relevance of fundamental values on stock prices drastically fell, and prices were driven by several other factors. In order to back this supposition, in the next step the pre-crisis years (2006-2007) and the crisis years (2008-2009) were excluded from the sample, and the same model was tested again on this 'post-crisis' sample of 2010-2015. Table 3 shows the results obtained.

**Table 3:** Testing results for model (4) on the 'post-crisis' sample (2010-2015)

| ***Model:* (4)**<br>**$n$ = 120 (20 banks, 2010-2015)**<br>***Dependent variable:* $\ddot{P}_{it}$** | | | | |
|---|---|---|---|---|
| **Variable** | **Coefficient** | **Std. error** | **t value** | **p value** |
| $E\ddot{P}S_{it}^{FVincl}$ | 22,6395 | 6,80453 | 3,3271 | 0,0012*** |
| $E\ddot{P}S_{it}^{FVexcl}$ | −16,6684 | 6,54153 | −2,5481 | 0,0122 |
| $\dot{S}\dot{E}_{it}^{FVincl}$ | −4,69871 | 3,66273 | −1,2828 | 0,2022 |
| $\dot{S}\dot{E}_{it}^{FVexcl}$ | 2,6037 | 2,75165 | 0,9462 | 0,3461 |
| $\delta_2$ | −7,74303 | 18,7261 | −0,4135 | 0,6801 |
| $\delta_3$ | −8,69802 | 19,3299 | −0,4500 | 0,6536 |
| $\delta_4$ | −2,1542 | 18,9211 | −0,1139 | 0,9096 |
| $\delta_5$ | −22,8225 | 18,6703 | −1,2224 | 0,2242 |
| $\delta_6$ | −35,5873 | 18,9544 | −1,8775 | 0,0631 |

Similarly to the previous case, all time dummies are insignificant, so a distortion caused by the unobserved time factor can be excluded again. However, from the four explanatory variables, *EPS including fair valuation turned out to be significant,* while the other three (EPS excluding fair valuation and both shareholders' equity per share variables) did not show any correlation with the stock price.

The above empirical results lead to two important consequences. First, the size of the bank, represented by the shareholders' equity per share, cannot explain the stock prices, which is true in a non-crisis period, too. Second, the profitability of the bank, expressed by the earnings per share computed with the application of fair valuation, is a significant explanatory variable of the share price. In order to check the direct explanatory power of this variable on the dependent variable, the appropriate single variable regression model – model (5) – should be tested, the results of which can be seen in Table 4.

**Table 4:** Testing results for model (5) on the 'non-crisis' sample (2010-2015)

| *Model:* (5)<br>$n$ = 120 (20 banks, 2010-2015)<br>*Dependent variable:* $\ddot{P}_{it}$ | | | | | |
|---|---|---|---|---|---|
| **Variable** | **Coefficient** | **Std. error** | **t value** | **p value** | **$R^2$** |
| $E\ddot{P}S_{it}^{FVincl}$ | 18,1186 | 5,46247 | 3,3169 | 0,0086*** | 0,057 |

Based on the results of this single variable regression model, it can be stated that EPS determined with the application of fair valuation can explain the contemporaneous stock price with an R square of 5.7%. Synthesizing the results obtained on the sample limited to years 2010-2015, some important conclusions can be drawn:

- In crisis periods, there is no statistically proven relationship between financial performance indicators and the stock market performance, so investor decisions are driven by other factors.
- Under normal (non-crisis) business circumstances, investor decisions are influenced by the banks' profitability (expressed by EPS), while the size of the bank (equity per share) has no relevance in buying and selling decisions.

- Among the two EPS variables, it is the one containing the effects of fair valuation which explains the stock price, so investors regard fair valuation as a relevant measurement tool.

To summarize the empirical results it seems to be proven that, despite the strong criticism generated at the hard times of 2008-2009, *fair valuation has regained its relevance on investor decisions after the crisis*.

## 5. Conclusion

From the 1980's, fair valuation has continuously took the place of traditional cost-based valuation in the dominant international accounting systems. This is especially true for International Financial Reporting Standards (IRFS), which not only allows but explicitly requires fair valuation in case of certain assets. This has an effect on net asset value as well as on profits: applying fair values means that values presented in financial statements reflect the actual market values, which might be remarkably different from historical cost-based measurements. Before the financial crisis of 2008-2009, it seemed obvious that investors regarded fair value as the correct measure for assets and for profits. However, the trust in this valuation model has strongly decreased or even disappeared in those years. Many authors identified fair valuation as a cause of the crisis. This raised the main question of this study: does fair valuation have the same relevance in investor decisions in the 2010's as it had in the early 2000's?

In the current research, authors examined 20 European large banks – presenting their financial statements according to IFRS – in the period between 2006 and 2015, investigating whether earnings per share (profitability) and shareholders' equity per share (size), both determined including and excluding the effects of fair valuation, can explain the contemporaneous prices of the banks' shares. On one hand, empirical results proved that in the crisis period, there was no association between financial performance indicators and stock prices, independently of the application of fair valuation. Furthermore, the relationship between size and share price and between EPS excluding fair valuation and share price remained unproven on the post-crisis sample limited to years 2010-2015. On the other hand, however, EPS determined with fair valuation was identified as a significant explanatory variable of the stock price on the post-crisis sample with an R square of 5.7%. Based on this, authors conclude that, *after the hard times of 2008-2009, fair valuation has regained its importance in investor decisions*.

Among the limitations of this research it can be noted that, strictly speaking, results are only valid for the data of the selected 20 banks and for the 2006-2015 period. A further limitation can be the relatively small sample, which may lower the significance of the results compared to some earlier cited large-sample research works. However, the companies in the examined sample are all large global banks representing the entire European banking sector, furthermore, the sample of 200 company-years is statistically big enough to obtain reliable results. Therefore, authors believe that the empirical findings of this study can be generalized. Nevertheless, it remains a question how results would change if, beyond large banks, medium-sized and small banks were included in the sample, or non-linear models were applied instead of the linear models used in this study. These are subject to further research.

## Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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