

# Efficiency of the Standard Method for Operational Risk at the Broker Dealers Market

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The first Basel Accord adopted in 1988 changed the approach for the capital requirements from static capital threshold towards a dynamic requirement. While making revision of the Basel Accord the Basel Committee on Banking Supervision (hereafter the Basel Committee) enlarged the formerly applied credit and market risk with the recommendation on operational risk<sup>1</sup> (Committee, 2004). The Basel Committee proposed three approaches to the risk measurement: Basic Indicator Approach (BIA), the standardized approach (SA) and the advanced measurement approach (AMA). The BIA and SA are the methods based on a fraction of the gross income, while the AMA allowed for development of own model subject to coverage of the yearly operational risk exposure with a confidence interval of 99.9%.

The investment companies in Poland are to the largest extent exposed to the operational risk. The table one presents the aggregated capital requirement for the broker-dealers market in Poland.

Table 1: Aggregated capital requirement according to the risk class for Polish broker-dealers as of March 2013

<i>Item</i>	<i>March 2013</i>	<i>Share</i>
Total capital requirement	678 834	100%
1. Market risk	110 461	16%
2. Settlement risk and counterparty credit risk	5 148	1%
3. Credit risk	214 752	32%
4. Operational risk	225 318	33%
5. Concentration and high exposures limits	103 502	15%
6. Fix costs requirement	19 653	3%

*Source: own calculation based on PFSA data (Urząd Komisji Nadzoru Finansowego, 2013)*

Operational risk has the highest rate for Polish broker-dealers in terms of the percentage of the total capital requirement. The majority of the Polish broker-dealers use the BIA instead of the standard method. This paper aims to address the phenomenon of the market using a simplified approach, while the aggregated position indicates that the isolated operational risk is the highest risk on the Polish market. The paper reviews on the rationality of the market decision not to use the standard method. The review includes the limited outlook on companies usage of IT

<sup>1</sup> The operational risk defined as “risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk, but excludes strategic and reputational risk.”

tools. The paper is structured as follows: section two provides the literature review on the discussion about broker-dealers market. The third section deals with the methodology. The fourth provides the description of the data, sampling and the results. The fifth section summarizes the conclusions.

## *Literature review*

BIA and SA model are intellectually simplified thus they do not provide the insight into the operational risk drivers in contrary to AMA. This characteristic of BIA and SA provides some help to the risk management process (Chapelle, Crama, Hübner & Peters, 2008). One of the widely used variant of AMA is based on in insurance the often applied loss distribution approach. The implementation of AMA brings to attention some issues such as incorporation of external losses to the model (Frachot & Roncalli, 2002), copula construction for both frequency and severity distribution (Chavez-Demoulin, Embrechts & Neslehova, 2006) and risk allocation procedures in case of the financial groups or syndicates (Staszkiwicz, 2011). The additional investment into risk assessment might allow for less used underpricing in the brokers-dealer self-floatation (Baran & Tuzimek, 2008) or extended utilization of bancassurance at the market (Wierzbicka, 2011). Due to the cost efficiency issue related to the risk management maintenance, the small non-banking markets such as brokers-dealer, are left with the simplified or standard method which does not attract significant research attention.

Our former research in area of the operational risk focused on the isolated issues such as limitation of the double entry book-keeping accounting (Staszkiwicz, 2014) or capital impact (Staszkiwicz, 2013) and knowledge management (Chomiak-Orsa, 2011). The issue seems to be untouched by others while the discussion on Polish brokers-dealer market is conducted mainly on technical accounting and organization issues (Aleksandrowska, 1998; Drewniński, 2007; Dziuba, 2002; Werwińska, 1996), implementation of the electronic channels (Chmielarz, 2002, 2004) or capital requirements from the bank perspective (Cicirko, 2009). This paper aims to fill in the existing gap in research by investigating the grounds for market players' behavior. Thus the working hypothesis of this research is:

$H_0$  There is a significant difference in Basel Committee prescribed business lines for standard approach in terms of the mean and variance used by brokers-dealers.

## *Methodology*

The matrix of the licensed activates (L) was weighted with the return on equity matrix (R) and the transposition matrix (T) to obtain the weighted activities with return on activities (W) matrix. Thus:

$$\mathbf{W} = \mathbf{L} \times \mathbf{T} \times \mathbf{R}$$

Where:

$\mathbf{W}_{n,m}$ ;  $\mathbf{L}_{n,m}$   $\mathbf{T}_{k,m}$ ;  $\mathbf{R}_{m,n}$

n – number of observation (financial statements), m – number of activities licensed;

k – number of return ratios.

The correlation analysis upon  $\mathbf{W}$  was applied to identify the uncorrelated variables and the set of highly correlated variables.

The activity line of the specific brokers-dealer was reconciled to the brokers-dealers' activity register held by the Polish FSA as of 22 October 2012. It was assumed that the changes to the register's scope for the period of two reporting periods (2010 and 2009) were immaterial. The categories disclosed in the register were treated as the variables representing the brokers' activities lines. A list of these is presented in Appendix 1.

The return on equity was calculated on specific accounting disclosure section of the financial statements. The following formulas were used:

(RoE) Return on Equity = Net result/Equity

(RoE<sub>MA</sub>) Return on Main Dealers Activity to equity = Result on Dealers Activity / Equity

(RoE<sub>IN</sub>) Return on Instruments to equity = Sum of results on instruments at fair value through the profit or loss, available for sell and held to maturity investments/ Equity

(RoE<sub>OR</sub>) Return on other operational result to equity = Other operational result / Equity

(RoE<sub>FI</sub>) Return on financing to equity = Result on financing / Equity

The ratios were calculated both for the Polish and IFRS GAAPs assuming no significant differences in valuation between the standards. In some cases the specific information for the separate instrument lines results were not disclosed by the entities. It was applied, accordingly to materiality assumption, imputation of zeros for the unknown values. The following conversion was used for the linkage between the scope of activities and ratios:

Table 2: Transformation key (variable number as per Appendix 1).

	1 Transfer, 2 Execution, 4 Management, 5 Advice, 6
RoE <sub>MA</sub>	Offering, 7 Underwriting, 9 Storage, 11 Structure, 12
	M&A, 14 Analysis
RoE <sub>IN</sub>	3 Own account, 10, *
RoE <sub>OR</sub>	15 Standby
RoE <sub>FI</sub>	13 FX, 16 Derivatives

Source: own presentation.

The **T** matrix became a zero-one matrix for a specific ratio to a specific scope of activity line. The value one denotes the application of the ratio to the activity, while value zero denies such a relation.

The identification of the IT tools applied, was done on the basis of the notes disclosure. The companies with licenses granted after 2010 were excluded from the Polish brokers-dealer market (54 companies as of 22 October 2012). After that restriction a random sample of the entities was selected. The sample consists of 34 entities and represents 62% of the market in terms of number of entities. Both consolidated and unconsolidated financial statements for periods ended 2010 and 2009 were taken into consideration. The total financial statements included in the sample were 84 yearly observations.

## Results and discussion

The calculations were performed using the application of Statistica and Gretl software (StatSoft, 2011).

There were no identified a significant dedicated risk management IT solution as described in the notes to financial statements both in term of the business intelligence, big data systems or self-developed dedicated ICT (Information-Communication Technology), which indicate rather application of simplified tools for risk management. Table 3: presents the result of the correlation analysis.

Table 3: Variables correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Transfer	1																
2	Execution	<b>0,92</b>	1															
3	Own account	-0,15	-0,14	1														
4	Management	<b>0,51</b>	<b>0,43</b>	-0,04	1													
5	Advice	<b>0,58</b>	<b>0,48</b>	0,02	<b>0,72</b>	1												
6	Offering	<b>0,8</b>	<b>0,87</b>	-0,01	<b>0,44</b>	<b>0,41</b>	1											
7	Underwriting	<b>0,77</b>	<b>0,79</b>	-0,01	<b>0,44</b>	<b>0,54</b>	<b>0,74</b>	1										
8	MTF								1									
9	Storage	<b>0,83</b>	<b>0,92</b>	<b>-0,24</b>	<b>0,25</b>	<b>0,29</b>	<b>0,79</b>	<b>0,65</b>		1								
10	Loans	0,03	0,03	<b>0,47</b>	-0,05	0,06	-0,03	-0,04		0,03	1							
11	Structure	0,18	0,12	<b>-0,23</b>	<b>0,55</b>	<b>0,39</b>	0,04	-0,01		0,11	0,06	1						
12	M&A	<b>0,79</b>	<b>0,81</b>	0	<b>0,4</b>	<b>0,36</b>	<b>0,95</b>	<b>0,71</b>		<b>0,73</b>	-0,03	-0,09	1					
13	FX													1				
14	Analysis	<b>0,97</b>	<b>0,91</b>	0,01	<b>0,52</b>	<b>0,59</b>	<b>0,82</b>	<b>0,79</b>		<b>0,81</b>	0,03	0,12	<b>0,8</b>		1			
15	Standby	0,02	0,01	0,02	0,1	0	0,07	0		0,02	0,01	0,04	0		0,08	1		
16	Derivatives																1	
17	*	0,17	0,17	<b>0,5</b>	0,11	<b>0,23</b>	0,09	0,12		0,05	<b>0,95</b>	0,07	0,1		0,17	0,01		1

*Bold represents significance at  $p < .05$ .*

*Source: own calculation.*

The following activities were not presented in the tested sample: MTF, FX and Derivatives. The following variable were not significantly correlated with the others: (3) Own account, (10) Loans, (11), (15) Standby, Structure (17) \*. Loans are significantly correlated with Own account (0.47). Structure is negatively correlated with Own account (-0,23), while Own account is highly positively and significantly correlated with \*.

Table 4 presents the legal requirement for allocation of the scope of activities to the business line for the standard approach calculation.

Table 4: Scope of activity allocation to business lines

Business line	Coefficient	Variable No
Investment activity	18%	6 Offering 15 Standby 14 Analysis 5 Advice 11 Structure 12 M&A
Financial instruments turnover	18%	3 Own account 1 Transfer 2 Execution 7 Underwriting 8 MTF
Retail broker activity	12%	1 Transfer 2 Execution 7 Underwriting
Business to business activity	15%	10 Loans
Retail activity	12%	10 Loans
Payments and settlements	18%	NON
Agent services	15%	9 Storage
Asset management	12%	4 Management

Source: own presentation based on resolution of Ministry of Finance dated 18 November 2009 in regards of scope and detailed principled of setting up the capital requirement for brokers-dealer house and establishing the maximum values of credits, loans or bonds (2009).

By accepting the assumption that the business activities are properly extracted and within each business line, any business activities correlation is equal or close to zero (A1). Thus the variance of independent variables will be the sum of variances. An another assumption is that within each business line the business activities have common distribution (A2) thus average variance and average standard deviation of the mean will be:

$$V(\bar{X}) = V\left(\frac{X_1 + X_2 + \dots + X_n}{n}\right) = \frac{1}{n^2} [V(X_1) + V(X_2) + \dots + V(X_n)] = \frac{1}{n^2} nV(X) = \frac{V(X)}{n}$$

and standard deviation:

$$\sigma(\bar{X}) = \sqrt{\frac{V(X)}{n}} = \frac{\sigma(X)}{\sqrt{n}} \text{ (Hellwig, 1980:114).}$$

Than the expected mean of return and standard deviations as per line are shown on the following table.

Table 5: Business line's actual profitability and standard deviation according to the legal allocation of activities to lines

Business line	Coef.	Variable No	Mean	Std.Dev.	Var	Mean	Avg Var	Avg St Dev	3 $\times$ $\sigma$
A	B	C	D	E	F	G	H	I	J
Investment activity	18%	6 Offering	0,10	0,36	0,13	0,08	0,01	0,12	0,35
		15 Standby	0,00	0,05	0,00				
		14 Analysis	0,13	0,33	0,11				
		5 Advice	0,11	0,25	0,06				
		11 Structure	0,10	0,24	0,06				
		12 M&A	0,08	0,35	0,12				
Financial instruments turnover	18%	3 Own account	0,03	0,13	0,02	0,08	0,01	0,11	0,34
		1 Transfer	0,14	0,34	0,11				
		2 Execution	0,13	0,33	0,11				
		7 Underwriting	0,08	0,28	0,08				
		8 MTF	0,00	0,00	0,00				
Retail broker activity	12%	1 Transfer	0,14	0,34	0,11	0,12	0,03	0,18	0,55
		2 Execution	0,13	0,33	0,11				
		7 Underwriting	0,08	0,28	0,08				
B2B activity	15%	10 Loans	0,01	0,06	0,00	0,01	0,00	0,06	0,19
Retail activity	12%	10 Loans	0,01	0,06	0,00	0,01	0,00	0,06	0,19
Payments and settlements	18%								
Agent services	15%	9 Storage	0,15	0,30	0,09	1,42	0,09	0,30	0,89
Asset management	12%	4 Management	0,13	0,29	0,09	0,13	0,09	0,29	0,87

Source: own calculation.

As the consequence of the above results the hypothesis:

H<sub>0</sub> There is a significant difference in Basel Committee prescribed business lines for standard approach in terms of the mean and variance used by brokers-dealers –

should be partially rejected as the two major lines - investment activity and financial instruments turnover - seems to be equal in terms of mean and variance. Another two lines B2B activity's and retail activity's yield is insignificant and close to zero.

## Conclusion

While measuring the operational risk with standard approach the diversification in lines in terms of mean and standard deviation is not significant. The BIA application imposes inadequate requirement on the profitability from the point of view of the company's majority stakeholder which is not supported with the real risk profile on the market. The analytical review of the application of the Business Intelligence, Big

Data and ICT tools confirms the limited usage of advanced IT management tools. When judging upon the results it should be underlined that the available population is short in terms of the time span due to late implementation of the Basel II in Poland. There is some subjectivity at arriving to the transposition matrix and application types of the return, which might constitute a field for further study.

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## Annex

### Annex 1. Definition of variables and references to the legislation.

No	Acronym	Reference	Variable description
1	Transfer	69/2/1	the acceptance and transfer of orders to acquire or dispose of financial instruments;
2	Execution	69/2/2	the execution of the orders referred to in Art 69.2.1 for the account of the customer;
3	Own account	69/2/3	the acquisition or disposal of financial instruments for the broker's account;
4	Management	69/2/4	the management of portfolios including one or more financial instruments;
5	Advise	69/2/5	investment advice;
6	Offering	69/2/6	offering financial instruments;
7	Underwriting	69/2/7	the provision of services under standby underwriting agreements and firm commitment underwriting agreements or the execution and performance of other similar agreements on financial instruments;
8	MTF	69/2/8	organising a multilateral trading facility;
9	Storage	69/4/1	the storage or registration of financial instruments, including the keeping of securities accounts and cash accounts;
10	Loans	69/4/2	giving loans to finance transactions in one or more financial instruments, if the transaction is effected through the intermediation of the investment firm giving the loan;
11	Structure	69/4/3	advising companies on capital structure, corporate strategy and other matters related to such structure or strategy;
12	M&A	69/4/4	advisory and other services relating to mergers, demergers and acquisitions of companies;
13	FX	69/4/5	providing foreign-exchange services where these are connected with investment services, as provided for in Art 69.2;
14	Analysis	69/4/6	the preparation of investment analysis, financial analysis and other recommendations of a general nature relating to transactions in financial instruments;
15	Standby	69/4/7	additional services related to standby underwriting and firm commitment underwriting;
16	Derivatives	69/4/8	conducting the activities specified in Art 69.4.1-7 and Art 69.2, related to the underlying instruments of derivatives specified in Art 2.1.2.d-f and Art 2.1.2.i, if
17	*	69/4/9	Base instruments of derivatives' specified in art 2.1.2.d-f and art 2.1.2.i.; The articles are based on the Act on Trading in Financial Instruments of 29 July 2005, No 183, Item 1538, status as of 2010 (No. 211, item 1384).

Source: own presentation based on the Act on Trading in Financial Instruments of 29 July 2005, No 183, Item 1538, status as of 2010 (No. 211, item 1384).