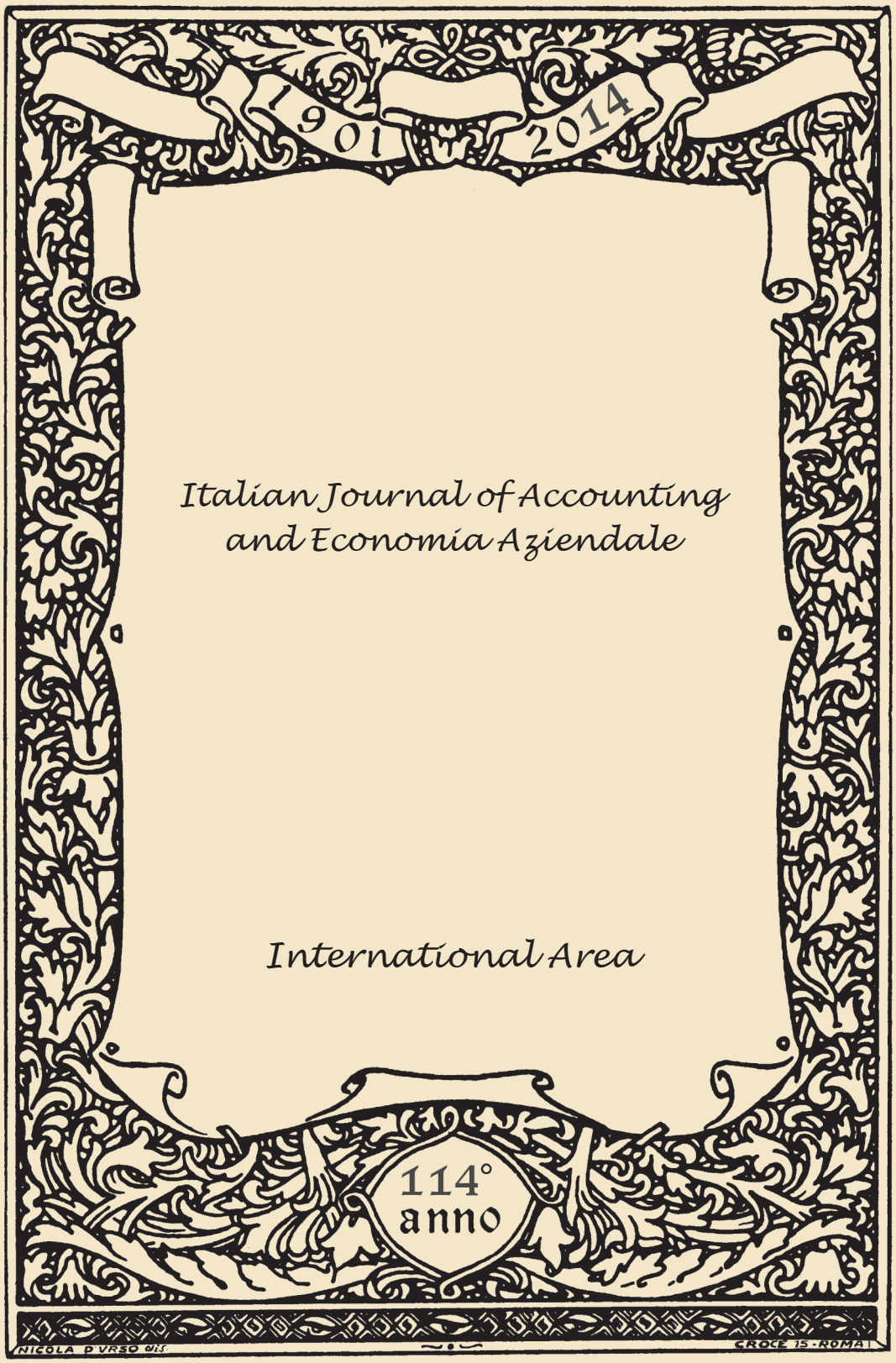

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The detection of corporate fraud in russian firms

M.A. SHTEFAN - D.A. BYKOVA*

ABSTRACT: In this paper we analyze the impact of financial and non-financial performance of Russian companies on the likelihood of corporate fraud. By constructing a regression model it was proven that the main factor indicating the presence of fraud in the company is an increase of the relationship between Sales General and Administration costs and amount of sales. The results of the study can be used as a basis for development of a methodology to identify and prevent fraud.

Introduction

The problem of identifying, capturing and prevention of corporate fraud exists not only in Russia but in all the world. In 2011 the economic crimes affected 37% of Russian firms, while in the countries of Central and Eastern Europe this index was 30% and in the "Great Seven" – 31%. At the average in the world 34% of companies were subject to corporate fraud(1). The main consequence of corporate fraud is a significant increase in investment risks and, as a result, a sharp deterioration of the macroeconomic situation in the world. Obviously it is necessary to improve existing methods of detection and prevention of corporate fraud, to develop new effective tools. Especially this problem is important for the Russian market, which depends on foreign capital in a significant degree. Development of a model to identify and prevent corporate fraud in Russian firms will increase their investment attractiveness and will give a boost to their potential development.

1. Literature review and research hypothesis

The best known method of detection and prevention of corporate fraud is a method proposed in 1997 by Messod Beneish(2). The main hypothesis of M. Beneish was a correlation between symptoms of fraud and eight ratios formed on the basis of the financial statements, a list of which is presented in the table 1.

The Beneish model was tested on the sample of American companies forming accounting (financial) statements in accordance with the requirements of U.S. standards - Generally Accepted Accounting Principles (GAAP). It is interesting to consider the possibility of applying of above mentioned techniques to Russian companies, which form the financial statements in accordance with Russian standards, which significantly differ from GAAP that impose rather different disclosure requirements and principles of valuation of assets, of

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* Articolo ad invito.

(1) Official site of PricewaterhouseCoopers. URL: http://www.pwc.ru/.

(2) Beneish M. D. Detecting GAAP Violations: Implications for Assessing Earnings Management among Firms with Extreme Financial Performance / M. D. Beneish // Journal of Accounting and Public Policy. – 1997. – № 3. – P. 30-36.

liabilities and of capital. The answer to this question we will try to find with the help of econometric methods.

Table 1 - The set of variables of Beneish model assessing likelihood of fraud

Name	Symbol	Formula*	Notes
1	2	3	4
1.Days Sales in Receivables Index	DSRI	$$DSRI = \frac{receivables_t / sales_t}{receivables_{t-1} / sales_{t-1}}$$	A large increase in days sales in receivables could be the result of a change in credit policy to spur sales in the face of increased competition, but disproportionate increases in receivables relative to sales may also be suggestive of revenue inflation. At the average DSRI of "honest" firms is 1.031, while manipulators are characterized by 42% increase of the ratio – 1.465.
2.Gross Margin Index	GMI	$$GMI = \frac{(sales_{t-1} - COGS_{t-1})/sales_{t-1}}{(sales_t - COGS_t)/sales_t},$$ where COGS - Costs of Goods Sold.	GMI indicates whether the share of gross margin profit remains in sales o no. When GMI is greater than 1, it shows that gross margins have deteriorated. At the average GMI of "honest" firms is 1.014, while manipulators are characterized by 18% increase of the ratio – 1.193.
3.Asset Quality Index	AQI	$$AQI = \frac{1 - \frac{CurrentAssets_t + PPE_t}{TotalAssets_t}}{1 - \frac{CurrentAssets_{t-1} + PPE_{t-1}}{TotalAssets_{t-1}}},$$ where PPE - property plant and equipment.	If AQI is greater than 1 it indicates that the firm has potentially increased its involvement in cost deferral. An increase in asset realization risk indicates an increased propensity to capitalize and thus defer costs. At the average AQI of "honest" firms is 1.039, while manipulators are characterized by 21% increase of the ratio – 1.254.
4.Sales Growth Index	SGI	$$SGI = \frac{sales_t}{sales_{t-1}}$$	While sales growth is not itself a measure ofmanipulation, growth companies are likely to find-

			themselves under pressure to manipulate in orderto keep up appearances. At the average SGI of "honest" firms is 1.134, while manipulators are characterized by 42% increase of the ratio –1.607.
5.Depreciation Index	DEPI	$DEPI = \frac{\frac{Depreciation_{t-1}}{Depreciation_{t-1}+PPE_{t-1}}}{\frac{Depreciation_t}{Depreciation_t+PPE_t}}$	A slower rate of depreciation (a DEPI > 1) maymean that a firm is revising useful lives. The purpose of these changes may be associated with an increase in earnings for the period.
6.Sales General and Administrative Expenses Index	SGAI	$SGAI = \frac{SGAExpenses_t/sales_t}{SGAExpenses_{t-1}/sales_{t-1}}$, SGA Expenses where - Sales General and Administrative Expenses.	Suggests that analysts would interpret adisproportionate increase in sales as a negative signal about the firm's future prospects.
1	**2**	**3**	**4**
7. Leverage Index	LVGI	$LVGI = \frac{\frac{LTD_t+CurrentLiabilities_t}{TotalAssets_t}}{\frac{LTD_{t-1}+CurrentLiabilities_{t-1}}{TotalAssets_{t-1}}}$, where LTD – Long-term Debt.	A LVGI greater than 1 indicates an increase in leverage. The variable is included to capture debt covenants incentives for earnings manipulation. Changes in leverage in the firms' capital structure could be associated with the stock market effect of default. In order to raise the market value of the shares, the management company may artificially reduce the value of financial instruments.
8. Accruals to Total Assets	TATA	$TATA = \frac{TotalAccruals_t}{TotalAssets_t}$, where Total Accruals isdefined as Current Assets – Cash – Current Liabilities – Current Maturities ofLong-term Debt – Income Taxes – Depreciation and Amortization	This ratio helps to identify the manipulation of incomes or expenses under accruals concept.

* Year t refers the first year in which earnings manipulation occurs

We applied a regression analysis in order to establish a relationship between a dependent variable and independent ones. As the quantity characterizing the likelihood of corporate fraud, i.e. the dependent variable in the model, we use a dichotomous variable coded 1 for companies found guilty of economic crimes and 0 otherwise. The latent variable underlying a binary variable, we designate fraud*. It seems problematic to use non-dichotomous variable, which could allow to make a full and qualitative forecast of fraud in a company, due to the lack of necessary information.

As financial indicators that signal the presence of corporate fraud, we will use the following ratios proposed in the model of M. Beneish:

- DSRI - Days Sales in Receivables Index,
- GMI - Gross Margin Index,
- AQI - Asset Quality Index,
- SGI - Sales Growth Index,
- SGAI - Sales General and Administrative Expenses Index,
- LVGI - Leverage Index.

Indicators TATA (Total Accruals to Total Assets) and DEPI (dynamic Depreciation Index) were excluded from the model due to the lack of information in financial statements of Russian firms considered necessary for their calculation.

Moreover, we added to the regression model non-financial indicators. From our point of view, not only quantitative but also qualitative indicators, such as a legal form, conditions of the environment and others, could signal the presence of corporate fraud in acompany. Therefore, we consider it advisable to use in the regression model a binary variable that characterizes an organizational form of a company - orgform. This variable takes the value 1 if a company is characterized asa joint-stock one and 0 otherwise. We consider joint-stock companyas of lower risk of fraud because of the separation between the owners and managers, who tend to be different people. An increase of control functions in such a way reduces the possibility of fraud by managers and employees of firms.

We also propose to use the second additional variable, a parameter region, calculated as the ratio of the number of economic crimes in the region, in which the analyzed company operates, to the total number of organizations registered in this region by the Federal Tax Service (Russia). This index, reflecting the criminal statistics in the region, characterizes the environment in which an organization functions, the general atmosphere and the frequency of fraud commitments by other firms that may influence the decisions of potential transgressors, members of a firm. It is likely that in regions with a higher incidence of economic crimes potential fraudsters can choose to stick to the law-abiding behavior line. We can assume that in the above mentioned circumstances supervisors must show greater vigilance and, as a result, the probability to be detected for transgressors increases.

Thus, the hypothesis of our study is a systematic relation between the probability of corporate fraud and a number of qualitative characteristics and financial statement variables calculated for Russian firms.

2. Dataset, variables and method

The regression model of the dependence of the probability of corporate fraud in Russian companies on qualitative and quantitative (financial) indicators of their activity is as follows:

$$fraud^* = \alpha 0 + \beta 0 * DSRI + \beta 1 * GMI + \beta 2 * AQI + \beta 4 * SGI + \beta 5 * SGAI + \beta 6 * LVGI + \beta 7 * orgform + \beta 8 * region + \epsilon i \quad (1)$$

To test the hypothesis it was necessary to form an array of data, the main stages of this process were:

1. Sampling of companies whose employees committed fraud, and guilt was determined by court during the period from 2009 to 2011. As a source of information we used the site of unified decisions database of general jurisdiction courts of the Russian Federation[3].

In total in the analyzed data set we included 124 companies, regarding 62 of which there were instituted legal proceedings related to fraudulent activities of representatives of these firms. Most of fraud cases were carried out in the form of false reporting (Table 2). Asset misappropriation was relatively less reported in the companies of the sample. The most rarely observed fraud category in the chosen Russian firms was corruption.

Table 2 - Sample structure according to fraud categories

№	Fraud category	Percent
1	Fraudolent statements	54,84%
2	Asset misappropriation	28,55%
3	Corruption	16,61%

2. Collection and compilation of information on financial and non-financial performance of the companies from the sample.

The main sources of information were:

- accounting (financial) statements of companies, are formed on the basis of which the formed the ratios proposed in the model of M. Beneish:DSRI, GMI, AQI, SGI, SGAI, LVGI,
- information on the legal form of the analyzed companies (from the independent rating agency Fira Pro),
- information on the statistics of economic crimes in regions of the Russian Federation from the site of the Federal Service of State Statistics and Information about state registration of legal entities by the Federal Tax Service.

3. Preparation of the data array, i.e. formation of financial and non-financial variables included in the model. The results of this step are shown in Table 3.

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[3]Official site of unified decisions database of general jurisdiction courts of the Russian Federation

Table 3 - Financial and non-financial indicators of performance of Russian firms

№	fraud	orgform	DSRI	GMI	AQI	SGI	SGAI	LVGI	region
1	2	3	4	5	6	7	8	9	10
1	1	0	0	-0,12642	0	0,693545	0	1,737602	0,079233
2	1	0	0	1,266599	0	1,21609	0,698385	0,493784	0,075981
3	0	0	0,519526	1,099515	1,003414	1,332173	1,396548	1,21085	0,075981
4	1	0	1,965497	0,921024	2,255613	1,309001	0,852893	1,045853	0,075981
5	0	1	1,063427	1,674587	0,626478	1,241018	0	0,89213	0,042437
6	1	1	0,999409	0,168247	1,167306	1,0867	0	0,564753	0,053348
7	0	1	0,89049	0,816269	0,696558	1,315967	1,321298	1,710065	0,053348
8	1	0	1,154989	0,800816	0,747785	0,996516	1,168643	1,0021	0,053348
9	0	0	1,138027	0,572111	0	0,7066	1,699029	0,993167	0,053348
10	1	1	1,066817	-1,92765	1,099353	0,922042	0	0,992073	0,076663
11	0	0	0,600677	0,96899	0,929388	0,99375	0	0,266343	0,044267
12	1	0	0,54974	1,708567	1,306346	0,757621	0	1,732134	0,137964
13	1	0	2,022011	1,000565	0	0,46342	1,672114	1,048719	0,049149
14	0	0	0,774429	0,870665	0	1,159512	0	0,185526	0,003766
15	0	0	0,195146	0,508684	0	0,512438	0	0,431793	0,045681
16	1	0	1,084788	1	0,15394	0,954839	0	0,871086	0,057143
17	0	0	1,168682	1	0	1,942185	0	0,893465	0,061072
18	0	0	1,002053	1,065291	0	0,643325	0,573091	1,100731	0,065641
19	1	0	0	0,989368	0,950321	1,021057	1,08574	1,318443	0,039955
20	1	1	1,388858	0,88354	0,655688	0,809528	0,957549	0,686912	0,05013
21	1	0	0,446481	0,657283	0	2,054665	0	1,167861	0,044724
22	0	0	0,972697	0,654723	1,868843	0,746971	1,50294	0,947516	0,045681
23	0	1	0,571914	1,507552	0	1,718292	3,685831	0,206726	0,013415
24	1	0	0,233921	1,153919	0	0,812239	0,33344	0,06456	0,013415
25	0	0	0,738146	1,083604	0	1,413257	0,937144	3,512839	0,069672
26	1	0	1,481549	0,561489	0	1,252741	0	0,958864	0,013415
27	0	0	0,271739	0,332437	0	0,92	0	0,950781	0,03188
28	1	0	2,248399	0,867844	1,111027	0,470675	0	0,931997	0,03188
29	1	0	0,749209	1	0	1,101366	0,232811	0,891628	0,042437
30	0	0	0	0,816623	0	1,360237	0,628844	0,156307	0,078435
31	0	0	0,148858	1,245848	0,005821	1,168317	0	0,939259	0,053348
32	1	0	0,781324	-1,32167	1,187839	0,896045	0	0,996813	0,03188

33	1	0	0	1,062147	0,977923	0,94847	1,171324	0,722654	0,078435
34	0	0	0,589189	0,553256	0,01044	1,363144	1,532567	0,919801	0,003766
35	1	0	0	0,578694	0	0,88182	1,676375	1,100682	0,03188
36	0	0	1,169872	0,979156	0	0,440721	2,449529	1,025327	0,044267
37	1	1	1,268168	0,86213	1,054779	1,108883	0,951823	1,018349	0,03188
38	0	0	0,683418	0,351882	3,257529	1,640639	2,566849	0,590825	0,042437
39	1	1	1,624977	3,060821	0,433636	1,354624	0	1,116851	0,043966
40	0	0	0,994846	2,769646	2,876453	1,487649	0	1,038703	0,119522
41	1	1	3,326478	0,727581	2,872125	1,579162	0	1,073402	0,082107
42	0	1	0,877421	2,519594	0,045915	0,899805	0,952588	0,725026	0,044724
43	1	0	1,192266	-0,04854	6,408855	0,76997	0	1,238849	0,137964
44	1	1	1,268168	0,86213	1,054779	1,108883	0,951823	1,018349	0,03188
45	0	0	0,683418	0,351882	3,257529	1,640639	2,566849	0,590825	0,042437
46	1	1	1,624977	3,060821	0,433636	1,354624	0	1,116851	0,043966
47	0	0	0,994846	2,769646	2,876453	1,487649	0	1,038703	0,119522
48	1	1	3,326478	0,727581	2,872125	1,579162	0	1,073402	0,082107
49	0	1	0,877421	2,519594	0,045915	0,899805	0,952588	0,725026	0,044724
50	1	0	0,679073	1,389449	1,762943	1,065224	0	1,134335	0,020482
51	0	0	1,163327	1,106578	1,655529	1,646177	0	1,407066	0,078321
52	1	0	1,668602	1,12262	0,994625	0,882612	0	1,047215	0,013415
53	0	0	0,875703	1	1,504274	0,848525	1,006865	0,769102	0,013415
54	1	0	3,556059	1,102943	0,008097	0,951615	1,157371	0,852328	0,013415
55	0	0	0,912686	1,419177	0,010924	4,86369	0,874582	1,075269	0,020482
56	1	0	1,573149	0,289097	0,001646	2,144109	0,054684	0,499807	0,020482
57	0	0	0,691603	0,775899	0,515416	2,030125	1,016878	0,565352	0,082107
58	1	1	2,859241	0,860826	0,660021	1,137852	0,054413	1,206338	0,03188
59	1	1	0	0	0,94994	0	0	0,731681	0,042437
60	1	0	2,048455	3,694051	0	0,553786	0	0,998256	0,051769
61	1	0	0	0	0	0	0	1,048282	0,013415
62	1	1	0	0	0	0	0	1,401557	0,051769
63	1	0	0	0	0	0	0	1,038259	0,051769
64	1	0	0	0	0	0	0	1,232949	0,042437
65	1	0	0	0	0	0	0	1,343443	0,042437
66	1	0	0	0	0	0	0	0	0,013415
67	1	0	0	0	0	0	0	0	0,013415
68	1	0	0	0	0	0	0	1,308755	0,042437

69	1	0	0	0	0	0	0	1,753263	0,042437
70	1	0	1,908808	-0,18742	0	0,54104	0	1,00969	0,025055
71	1	0	2,381479	0,073934	0	1,082508	0	1,156707	0,025055
72	1	0	1,048891	-1,2471	0	1,132027	0	0,979729	0,025055
73	1	1	2,542742	-1,79975	0	0,372549	0	1,069199	0,025055
74	1	0	0	0	0	0	0	0,865102	0,025055
75	1	0	0	0	0	0	0	1,633477	0,025055
76	1	0	0	0	0	0	0	1,122988	0,013415
77	1	0	0	0	0	0	0	1,349219	0,013415
78	1	0	3,965856	1	0	1,92692	0	1,020361	0,013415
79	1	1	1,771196	-0,01681	2,805624	0,790888	0	0,878596	0,025055
80	0	1	0,946085	-0,05077	0,770759	2,612933	0	1,027127	0,051769
81	0	1	1,074956	0,491467	0,951712	1,302174	2,242853	2,94886	0,075981
82	0	0	0,918641	1,584184	1,046594	0,690786	4,538909	1,16463	0,02512
83	0	1	0,678813	1,100724	1,214229	1,070697	0,560438	1,108063	0,03188
84	0	1	2,164018	1,177036	1,043933	1,217757	1,06385	1,048372	0,078321
85	0	1	1,412382	0,459332	0,399759	1,107825	2,549573	0,489688	0,037159
86	0	1	1,649985	1,221175	0,521584	0,761429	0	0,299878	0,044724
87	0	1	0,388388	1,426204	0,106862	3,707567	0,20263	0,742529	0,020482
88	0	0	2,200952	0,596825	0,949065	1,219885	0	1,224248	0,071961
89	0	1	0,529621	1,821125	0,634056	1,156116	3,684112	1,184148	0,030837
90	0	0	3,01675	0,703608	0,766473	1,018422	1,014964	0,84644	0,049149
91	0	1	1,591666	0,875604	0,602828	1,347566	1,220316	0,99075	0,013415
92	0	1	1,784227	0,910891	1,365739	0,579088	1,29911	1,038878	0,03983
93	0	1	1,649985	1,221175	0,521584	0,761429	0	0,299878	0,044724
94	0	1	0,388388	1,426204	0,106862	3,707567	0,20263	0,742529	0,020482
95	0	0	2,200952	0,596825	0,949065	1,219885	0	1,224248	0,071961
96	0	1	0,529621	1,821125	0,634056	1,156116	3,684112	1,184148	0,030837
97	0	0	0,524805	1,865227	0,324994	5,246194	0,287724	1,097536	0,025055
98	0	0	3,01675	0,703608	0,766473	1,018422	1,014964	0,84644	0,049149
99	0	1	1,591666	0,875604	0,602828	1,347566	1,220316	0,99075	0,013415
100	0	1	1,784227	0,910891	1,365739	0,579088	1,29911	1,038878	0,03983
101	1	0	0,938261	0,576548	0	0,842963	0	0,743284	0,03188
102	1	0	0,692949	0,760892	0	1,844516	0	0,993801	0,078435
103	1	0	3,163271	1,396422	0	1,097557	0	0,880431	0,013415
104	1	0	1,120081	0,528462	0	2,597593	0	0,956584	0,013415

105	1	0	0,765531	1,004768	0	1,385701	0,675405	0,987726	0,013415
106	1	1	0,768344	1,135658	0,11681	1,221078	0	0,46269	0,013415
107	1	1	0	0	0	0	0	2,170833	0,013415
108	0	1	0,540889	1,078084	0,554731	0,993147	1,130462	1,000183	0,103977
109	0	1	1,101514	1,023725	1,11092	1,07901	1,400824	0,964944	0,043879
110	0	1	1,043358	1,213033	1,288593	1,457632	1,041081	0,870848	0,03188
111	1	0	2,897136	0,734017	4,942655	1,302552	1,026871	1,012585	0,03188
112	1	0	0,753275	0,362596	0,947325	1,082609	0	0,925191	0,079233
113	1	0	0,844494	0,978735	0	1,214014	0,990511	1,014796	0,013415
114	0	1	2,517075	2,199002	0,704981	0,728189	0	0,977292	0,013415
115	0	1	1,006278	1,200511	0,819247	1,332821	0,037333	0,958523	0,040419
116	0	1	0,513932	0,866768	0,885252	1,184458	1,134744	0,974321	0,013415
117	0	1	5,697642	0,851786	0,176026	0,451882	1,900663	0,898938	0,03983
118	0	1	1,433529	1,057516	0,647674	1,051653	0,81321	1,14947	0,03188
119	0	1	0,938908	0,884151	0,851263	0,922467	1,136749	1,032152	0,045681
120	0	1	2,096898	1,145717	0,743361	1,112997	0,917553	1,334897	0,013415
121	0	1	0,718728	0,908459	1,146272	1,327674	0,062388	0,705774	0,013415
122	0	1	1,127628	0,916951	0,472666	0,985526	0,937859	0,939474	0,020482
123	0	0	1,42211	0,872523	0,804469	1,813658	0,962216	1,05311	0,013415
124	0	1	0,842186	0,946411	0,908169	1,458051	1,111146	0,8016	0,013415

Assessment of the relationship between the probability of corporate fraud and financial and non-financial performance of Russian firms was carried out on the basis of econometric methods for testing binary models, namely using probit-and logit-models. The results obtained for probit- and logit-models are shown in Tables 4 and 5 respectively.

Table 4 - Probit Estimation Results (not ordered)

Probit regression — Number of obs = 124; LR chi2(8) = 58.76; Prob > chi2 = 0.0000; Log likelihood = -56.570627; Pseudo R2 = 0.3418

fraud	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
orgform	-.7245306	.295194	-2.45	0.014	-1.3031	-.1459611
dsri	.1111976	.1477849	0.75	0.452	-.1784554	.4008507
gmi	-.3285419	.185254	-1.77	0.076	-.6916331	.0345492
aqi	.1004243	.1644771	0.61	0.541	-.2219449	.4227934
sgi	-.6932096	.265269	-2.61	0.009	-1.213127	-.1732919
sgai	-.9859067	.2264269	-4.35	0.000	-1.429695	-.5421181
lvgi	.3498436	.3220207	1.09	0.277	-.2813053	.9809925
region	-7.904608	5.957472	-1.33	0.185	-19.58104	3.771823
_cons	1.691065	.5110217	3.31	0.001	.6894808	2.692649

fraud * = - 0.72453*orgform + 0.111198*DSRI - 0.32854*GMI + 0.10042*AQI - 0.69321*SGI - 0.98591*SGAI + 0.34984*LVGI - 7.90461*region (4)

Table 5 - Logit Estimation Results

Logistic regression — Number of obs = 124; LR chi2(8) = 57.75; Prob > chi2 = 0.0000; Log likelihood = -57.073267; Pseudo R2 = 0.3360

fraud	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
orgform	-1.20953	.4968859	-2.43	0.015	-2.183409	-.2356518
dsri	.1858899	.2465569	0.75	0.451	-.2973527	.6691326
gmi	-.5569224	.3185354	-1.75	0.080	-1.18124	.0673955
aqi	.1552069	.2699739	0.57	0.565	-.3739323	.6843461
sgi	-1.135652	.4426743	-2.57	0.010	-2.003278	-.2680263
sgai	-1.614721	.3891511	-4.15	0.000	-2.377443	-.8519991
lvgi	.5576163	.5506358	1.01	0.311	-.5216101	1.636843
region	-12.7099	9.948742	-1.28	0.201	-32.20907	6.789277
_cons	2.812122	.9033622	3.11	0.002	1.041564	4.582679

fraud * = - 1.20953*orgform + 0.18589*DSRI - 0.55692*GMI + 0.155207*AQI - 1.13565*SGI - 1.61472*SGAI + 0.557616*LVGI - 12.7099*region (5)

3. Results

Marginal effects from independent variable variations on the regress and were determined through the application of commands of the statistical program STATA. Analysis of the results presented in Table 6 shows that in this study: the results are rather similar across

estimation methods of both probit- and logit-models; there is no significant difference in the value and quality in any model.

Table 6 - The marginal effects of financial and non-financial indicators on the presence / absence of corporate fraudin Russian firms

Factor	Impact of factors on the likelihood of corporate fraud	
	probit-model	**logit-model**
DSRI	Non significant	Non significant
GMI	-0,13	-0,14
AQI	Non significant	Non significant
SGI	-0,28	-0,28
SGAI	-0,39	-0,40
LVGI	Non significant	Non significant
region	Non significant	Non significant
orgform	-0,29	-0,29

As a result of analysis of factors that are significant at 10%, we identified a number of dependencies. With a 10% increase of share of profit margin in sales compared to the previous year, the probability of fraud in such a company is reduced by 1.3 - 1.4%. With a 10% increase of the amount of revenue the probability of fraud is reduced by 2.8%. With a passage to joint-stock organizational the likelihood of fraud is reduced by 0.28%.

According to the results of the study the Sales General and Administrative Expenses Index has the greatest marginal effect on the likelihood of corporate fraud. Thus, with reduction of the share of sales costs by 10% the probability of fraud increases by 3.9 - 4%. On the one hand, it is possible to explain this relationship assuming that the decrease in the share of sales cost was caused by changes in the marketing policy of a company, i.e.by diminution of the previously mentioned expenses. Such dynamics also can indicate deterioration of the economic situation of the company, which, accordingly, may lead to an increased fraud risk. On the other hand, the reason for the reduction of SGAI could be the growth of the company's sales. Generally, in such firms a probability to commit fraud, especially in a form of fraudolent statements, is estimated higher since it is exert more pressure on managers to achieve obtained financial results in the future.

In the study we determined that the variable region is not significant at the 10% level, but we consider its effect on the probability of fraud as essential. The use of this variable in the regression model showed that in the Russian regions with a higher incidence of economic crime employees prefer to stick to the law-abiding behavior line. This tendency could be explained by the strengthened control measures by the government supervisors of companies' financial performance and, as a result, more vigilance from managers and employees.

5. Conclusion

Thus, the regression model allowed us to identify the dependence of the probability of corporate fraud in Russian firms from a number of financial and non-financial indicators. The study showed that the methodology developed by M. Beneish maybe applied to companies that form the financial statements on the basis of Russian accounting standards. As a consequence, we concluded that accounting principles have no significant effect on the parameters change of which may indicate the presence of signs of corporate fraud. The results of the study can be used as a basis for development of a methodology to identify and prevent fraud.

M.A. SHTEFAN

Associate professor
Head of the Department
of accounting, analysis and auditing

National Research University Higher School
of Economics in Nizhni Novgorod
E- mail -: shtefanmaria@yandex.ru

D.A. BYKOVA
Master

National Research University Higher School
of Economics in Nizhni Novgorod
E-mail: serface@bk.ru

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