V. Zhuk

CRISIS OCCURRENCE ANALYSIS ON FOREIGN EXCHANGE MARKET

The report is dedicated to the phenomena of heterogeneity of coutries' behavior in terms of currency crises and describes possible approaches to detecting the time span of crisis and its severity. Two groups of countries with "mild" and "hard" crisis impact have been defined. The author discusses the perspectives of further results' interpretation and implementation.

S. Ivakhnenkov, A. Heorhiadi

UKRAINIAN BUSINESSES' CHARACTERISTICS AND THE USE OF INFORMATION TECHNOLOGY: INTRODUCTION TO EXPLORATORY STUDIES

The purpose of the paper is to present the first Ukrainian academic quantitative empirical research that connects Ukrainian businesses assessment and business financial data in Ukraine and invite all interested parties to join the research. The questionnaire and some descriptive statistics are disclosed as on May, 2013. The hypothesis regarding the relationship between a size of business and the extent of the business automation (based on the financial accounting computerization level question) is tested.

Background. After the collapse of the USSR in 1991 and, consequently, the disintegration of the Soviet economy (which was based on the concept of state property and centralized governmental planning of production and sales) a free market and private entrepreneurship were introduced in Ukraine. Since that time, multiple businesses have developed in different ways. Some businesses were created 'from scratch' by domestic and foreign businessmen, others (especially large ones) were state enterprises acquired by new domestic and international owners. However, a decade ago researchers from the Department of Finance of the National University of "Kyiv-Mohyla Academy" were unable to find and identify any quantitative studies of Ukrainian business entities that would investigate connections and relationships among various business variables such as size, industry, income, ownership, the extent and the level of the information technology implementation, or any other organizational parameters.

It is interesting to note that "western-style" empirical studies using the quantitative data collection and analysis in business are extremely rare in Ukraine even now. The only systematic surveys of Ukrainian business tendencies is being quarterly conducted in Ukraine by the Institute for Economic Research and Policy Consulting [4] – the famous Ukrainian "think tank". This institute monitors perceptions and expectations of managers (separately from the manufacturing sector and from the service sector) regarding changes in overall economic conditions, production and financial performance at the firm level. The publications provide the overall picture of current economic

performance in Ukraine as well as the insights about future trends of business cycles in the country. They include the early warning indicators such as leading and coincident ones. The results of the surveys are open to participants of the surveys for free and to subscribers for a fee.

Since 2010, we have found one Ukrainian research publication that is based on the business survey data [9]. However, this publication (and the quarterly surveys mentioned above) are based just on the subjective perceptions of people without linking this information to financial data (such as income, profit etc.). This publication also lacks some other technical and organizational data, such as the type of industry, level of computerization, the geographical location etc.

The scarcity of such publications might be explained by the still-alive Soviet approaches to scientific research within Ukrainian research community (at least in the fields of accountancy and business finance). The understanding of positivistic and interpretive approaches to research, as well as the difference between the two, is not common among Ukrainian scientists. The prevailing research methods are the "dialectic materialism", coined by a Soviet founder V. Lenin and further developed by another Soviet leader J. Stalin [12]. Still, current research papers are full of verbose "philosophical" explanations of economic phenomena followed by the authors' propositions and "developments" (we discussed the issues related to the differences in Soviet and Western approaches to scientific research earlier in [11]).

The purpose of the research. The initial research objective was to establish the system of data gathering about factual information regarding the activities, structure, financial performance, information technologies and the organization of business entities in Ukraine. Achieving this objective may provide researchers with quantitative data for the subsequent empirical research.

In the very beginning, we formulated the following particular tasks: to compose the questionnaire questions for the survey of economic activity of the Ukrainian enterprises; to develop the survey methods and techniques; to create the information database suitable for the statistical analysis of data; introduce the database to graduate students, doctoral students, and other scholars.

The purpose of the current publication is twofold: 1) first it is to introduce the National University of "Kyiv-Mohyla Academy" department of Finance research database to Ukrainian and international researchers and to invite all interested parties to collaboration, and 2) second it is to test the hypothesis about the existing relationship between a business size and the extent of the business automation based on the proxy variable – the question about the financial accounting computerization level.

Analysis of the contemporary sources and publications. The basic approaches to modern quantitative research in business, management, accounting in finance can be found in some sources [1; 5; 6]. The most useful theory that we believe could provide many interesting hypotheses and research benefits is contingency theory, represented, for instance in Woodward (1965) [7]. This theory argues that technologies (and other contingencies) directly determine differences in such organizational attributes as span of control, centralization of authority, and the formalization of rules and procedures. Morgan (2006) presented the main ideas underlying contingency as following: organizations are open systems that need careful management to satisfy and balance internal needs and to adapt to environmental circumstances; there is no one best way of organizing and the appropriate form depends on the kind of task or environment one is dealing with [3]. This approach proved true not just in the business organization field research, but in the modern managerial accounting, information systems, and auditing studies.

Explanation of the basic material. We started with general considerations suggesting that there have to be relationships and inter-dependencies among different business entities' variables. Two types of a questionnaire were developed: for banks and for all other business entities. This necessity was caused by the fact that the banking industry has its specific regulations, business peculiarities, and, particularly, different types of assets and liabilities. We did not survey non-profit entities (including state-funded organizations) and private entrepreneurs due to the similar considerations.

The questionnaire for business consists of the following parts:

1. *General Information*, which includes information about company's name, state identification code and the registration date, region, number of employees, type of the ownership, industry/industries.

2. *Business model and competitiveness.* These are the questions about the company's business and marketing strategy, competitors, pricing, production type, centralization vs. decentralization, tax privileges.

3. *Organization of managerial and financial accounting.* This includes questions about the number of managerial and financial accountants, cost methods, accounting staff responsi-

bilities, budgeting, accounting policy, internal reporting, accounting document flow, reporting dimensions.

4. *Auditing.* Type of audit opinions for 2 last financial years, presence/absence of the internal auditing department and its number of employees, usage of consulting services connected to auditing etc.

5. *Information technologies in business and accounting.* The questions about the number of employees in IT departments, information systems used for different tasks (financial and managerial accounting, marketing, sales, production), IT systems' control responsibilities, the use of smart-cards, POS-terminals, on-line banking etc.

6. *Investments,* which includes types of investment activities and methods used for the evaluation of investment projects.

7. *Financial reporting.* Financial reporting standards, stock market activities, financial statement consolidation questions.

8. *Performance indicators.* Sales, income, net profit, average assets, profitability and liquidity ratios, assets' and debts' turnover etc.

The total number of parameters that are being entered during the survey is up to a hundred (full Ukrainian and English versions of the questionnaire can be found on-line here: http://www.ivakhnenkovaudit.info/Survey/).

The questionnaire has being filled out by university students doing their internship at Ukrainian companies (4-week obligatory summer internship included into the curriculum). Filling the questionnaire is a part of the student's internship task. It is based both on the interviews and financial data analysis. The respondents in business are mostly accountants, economists, and financial managers.

In order to follow the conduct of research ethics, the following steps are undertaken. First, students who do not want to participate may ask for another task instead of surveying the entity. Secondly, all the study participants are warned that only the aggregate the data will be used for the research purposes and the companies' names will not be publicly disclosed. If a company requests, an official letter of confidentiality signed by the dean of the Faculty of Economic Sciences department can be provided. Finally, if a company management has strict confidentiality rules, the company name and other identity information is not entered into the database (while this is a regular routine yet).

As on the May 2013, we have 233 unique, fully identified (which renders strong authenticity) records on Ukrainian companies accumulated in the 2005–2013 time period. They are distributed by regions as following (table 1).

As one can see from the table, most of the companies are from Kyiv and Kyiv oblast. For future research, it would make sense to distinguish companies from Kyiv region (including Kyiv and Kyiv oblast) and the rest of Ukraine. The industries are shown in the table 2 in descending order by frequencies (companies may be involved in several ones).

There are very different entities by the business size. In the table below we present some descriptive statistics on the number of employees, annual average assets and total sales (table 3). We used norms based on the number of employees from the Ukrainian Law [10] to group entities.

Table 1. **The Distribution of Entities Surveyed by the Regions of Ukraine**

Num.	Region	Frequency	Percent, %	Cumulative, %
1.	Kyiv city	104	44.64	45.02
2.	Kyiv Oblast	28	12.02	57.14
3.	Lviv Oblast	11	4.72	61.90
4.	Zaporizhia Oblast	10	4.29	66.23
5.	Dnipropetrovsk Oblast	8	3.43	69.70
6.	Donetsk Oblast	8	3.43	73.16
7.	Ternopil Oblast	8	3.43	76.62
8.	Odessa Oblast	5	2.15	78.79
9.	Poltava Oblast	5	2.15	80.95
10.	Sumy Oblast	5	2.15	83.12
11.	Kharkiv Oblast	5	2.15	85.28
12.	Chernihiv Oblast	5	2.15	87.45
13.	Autonomous Republic of Crimea	4	1.72	89.18
14.	Vinnytsia Oblast	4	1.72	90.91
15.	Ivano-Frankivsk Oblast	4	1.72	92.64
16.	Other regions	17	7.31	100.00
	Missing	2	0.86	
	Total	233	100	

Table 2. **The Distribution of Entities Surveyed by Industries**

Num.	KVED Code (Ukrainian state classification code)	Type of industry	Count	Table Total %
1.	G	Wholesale and retail trade; repair of motor vehicles and motorcycles	88	37.77
2.	C	Processing industries	75	32.19
3.	M	Professional, scientific and technical activities	42	18.03
4.	J	Information and telecommunications	23	9.87
5.	F	Construction	21	9.01
6.	H	Transportation, warehousing, postal and courier activities	20	8.58
7.	A	Agriculture, forestry and fishery	11	4.72
8.	L	Operations with real estate	9	3.86
9.	I	Accommodation in hotels and catering	7	3.00
10.	N	Activities in the field of administrative and support services	6	2.58
11.	S	Other types of services	4	1.72
12.	K	Financial and insurance activities	3	1.29
13.	P	Education	3	1.29
14.	B	Mining industry and quarrying	2	0.86
15.	E	Water supply; sewerage, waste management	2	0.86
16.	R	Art, sports, entertainment and recreation	2	0.86
17.	D	Supply of electricity, gas, steam and air conditioning	1	0.43
		Total	233	136.91

Table 3. **Basic Descriptive Statistics**

Num. of entities	Parameter	Min.	Max.	Range	Mean	Std. Dev.
Group 1	***Micro-businesses (10 and less employees)***					
31	Number of employees	2.0	10.0	8.0	6.8	2.7
18	Average Assets (EUR, thousands)	0.04	30.50	30.46	2.63	7.03
18	Sales (EUR, thousands)	0.06	48.90	48.83	5.49	12.27
Group 2	***Small businesses (from 11 to 50 employees)***					
58	Number of employees	11.0	50.0	39.0	26.3	10.6
43	Average Assets (EUR, thousands)	0.04	897.71	897.68	35.32	138.70
41	Sales (EUR, thousands)	0.03	71.14	71.11	13.29	18.19
Group 3	***Medium-size businesses (from 51 to 251 employees)***					
69	Number of employees	51.0	246.0	195.0	116.83	56.1
48	Average Assets (EUR, thousands)	0.28	2,850.64	2,850.36	288.43	669.34
46	Sales (EUR, thousands)	0.28	3,737.84	3,737.56	257.90	666.27
Group 4	***Large (more than 250 employees)***					
70	Number of employees	252.0	74578.0	74,326.0	3,205.8	9698.6
50	Average Assets (EUR, thousands)	0.13	19,234.24	19,234.11	1,542.31	4,058.84
51	Sales (EUR, thousands)	0.19	19,303.16	19,302.97	1433.35	3,769.14
Total	***All entities***					
228	Number of employees	2.0	74,578.0	74,576.0	1,027.2	5,541.3
161	Average Assets (EUR, thousands)	0.04	19,234.24	19,234.20	574.71	2,370.27
158	Sales (EUR, thousands)	0.03	19,303.16	19,303.13	541.83	2,245.69

The empirical hypothesis that larger companies tend to use more comprehensive (and expensive) information systems is common in literature [2] and it is supported by anecdotal evidence. So, we tested the hypothesis that there is a relation between business size and the level of the financial accounting automation.

The table 4 is a cross-tabulation of the binned *Business Size* nominal variable created from the *Number of Employees* variable by the *Financial Accounting Automation* nominal variable, with counts and row proportions shown as the summary statistics. Row proportions are computed so that they sum to 100 % down each row. If these two variables are unrelated, then in each column the proportions should be similar across rows, which represent entities of different size. There appear to be differences in the proportions, and the chi-square test supports this.

The test of independence hypothesizes that *Business Size* and *Financial accounting automation* are unrelated – that is, that the row proportions are the same across the rows, and any observed discrepancies are due to the chance variation. The χ^2 (chi-square) statistic measures the overall discrepancy between the observed cell counts and the counts one would expect if the rows proportions were the same across rows. A larger χ^2 statistic indicates a greater discrepancy between the observed and expected cell counts – greater evidence that the row proportions are not equal, that the hypothesis of independence is incorrect, and, therefore, that *Business Size* and *Financial accounting automation* are related.

The computed χ^2 statistic has a value of 20.793. In order to determine whether this is enough evidence to reject the hypothesis of independence, the significance value of the statistic is computed. The significance value is the probability that a random variate drawn from a χ^2 distribution with 9 degrees of freedom is greater than 20.793. Since this value is less (0.014 and the Likelihood ratio 0.023) than the alpha level (0.05) we can reject the hypothesis of independence at the 0.05 level (based on the statistical methodology from [8, p. 191]).

If we consider Standardized Residuals, in the particular cells we see that this dependence is caused mostly by the amount of micro-size companies where financial accounting is not automated at all (value of 2.5) and large businesses where financial

Table 4. **Business size / Financial accounting automation – Crosstabulation**

Business size	Parameters	Financial accounting is not automated	Some tasks are computerized	All tasks are computerized and integrated	Financial accounting is fully computerized within an ERP-system	Total
Micro	Count	6	6	14	4	30
	Expected Count	2.3	6.8	11.7	9.3	30.0
	% within Business size	20.0 %	20.0 %	46.7 %	13.3 %	100.0 %
	Std. Residual	**2.5**	-0.3	0.7	-1.7	
Small	Count	3	14	25	15	57
	Expected Count	4.3	12.9	22.2	17.7	57.0
	% within Business size	5.3 %	24.6 %	43.9 %	26.3 %	100.0 %
	Std. Residual	-0.6	0.3	0.6	-0.6	
Medium	Count	5	18	28	18	69
	Expected Count	5.2	15.6	26.9	21.4	69.0
	% within Business size	7.2 %	26.1 %	40.6 %	26.1 %	100.0 %
	Std. Residual	-0.1	0.6	0.2	-0.7	
Large	Count	3	13	21	33	70
	Expected Count	5.3	15.8	27.3	21.7	70.0
	% within Business size	4.3 %	18.6 %	30.0 %	47.1 %	100.0 %
	Std. Residual	-1.0	-0.7	-1.2	**2.4**	
Total	N of Valid Cases	17	51	88	70	226
	% within Business size	7.5 %	22.6 %	38.9 %	31.0 %	100.0 %

$\chi2$ Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson $\chi2$	20.793(a)	9	0.014
Likelihood Ratio	19.211	9	0.023

(a) 2 cells (12.5 %) have expected count less than 5.
The minimum expected count is 2.26

accounting is fully automated as part of an ERP system (value of 2.4).

Conclusion and suggestions for the future research. The database we created is a living continuous project. The number of entities surveyed depends from year to year but varies from 40 up to a hundred annually. The entities of different industries and sizes are presented. The research project has great potential for both the scientific and business communities it is open for all who are interested in studying Ukrainian business and organizations.

The hypothesis about relationship between business size and the level of the financial accounting automation has been tested and proved.

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ХАРАКТЕРИСТИКИ УКРАЇНСЬКИХ ПІДПРИЄМСТВ ТА ВИКОРИСТАННЯ ІНФОРМАЦІЙНИХ ТЕХНОЛОГІЙ: ВСТУП ДО ДОСЛІДЖЕНЬ

Метою статті є представлення першого українського наукового кількісного емпіричного дослідження, яке поєднує як результати обстеження підприємств, так і дані з фінансової звітності. Усі зацікавлені сторони запрошені приєднатися до дослідження. Структура анкети, а також деякі дані описової статистики розкриті станом на травень 2013 р. Перевірено гіпотезу про взаємозв'язок між розміром бізнесу і ступенем його автоматизації на прикладі питання про рівень комп'ютеризації бухгалтерського (фінансового) обліку.

Ключові слова: обстеження, анкетування, емпіричне дослідження, українські бізнес-дані, дослідницька база даних, інформаційні технології, автоматизація фінансового обліку, розмір бізнесу.