COSTS AND BENEFITS OF BEING AFFILIATED WITH UKRAINIAN FINANCIAL-INDUSTRIAL GROUPS: CASE OF SUGAR INDUSTRY

by

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Abstract

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The present work is aimed to analyse the influence of Ukrainian financial-industrial groups (FIGs) on the change in performance of the enterprises under their control. In the paper, three main questions were studied: what are the determinants for to acquire plants, whether there exists investment advantages for the FIG-affiliated companies, and whether FIG-affiliation can increase performance of the enterprises. The regression analysis, based the data for sugar industry of Ukraine, showed that FIGs are tend to acquire plants which are more successful and are located more close to the cities, and they help the affiliated plants to deal with problem of limit of funds, so that the affiliated plants are investing more. However, FIG-affiliated enterprises did not show larger increase in performance than the others. This suggests either the improper use of investment funds for the plants controlled by FIGs, or tax avoidance behaviour of FIG-affiliated units, or their money laundering. The main conclusion of study is that Ukrainian FIGs seem not to increase added value of the affiliated plants, while can prevent them from bankruptcy and cash constraints.

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GLOSSARY

Business group is group of the production enterprises and/or financial institutions controlled by a common body, mostly on basis of direct or indirect ownership. Business group is called keiretsu (zaibatsu) in Japan, chaebol in South Korea, and financial-industrial group (FIG) in Russia and Ukraine. Very similar to the business groups are German konzerns and North American conglomerates.

Chapter 1

INTRODUCTION

Ukraine on its way of transition into a market economy faces many economic and institutional problems, which make the newly liberalized economic activity rather difficult. In a highly uncertain economic environment, lack of contract enforcement, capital shortage, changed structure of demand and broken production relations, most of the firms were forced to restructure and re-orient their production to survive. Due to these problems, that were especially severe in early 90-s, and because of legal imperfections, firms, being highly undervalued, had become easy objects of acquisition for the bodies that managed to take advantage of the uncertainties. This led to the emerging and development of oligarchic groups that concentrated much ex-state assets. In the mid 90-s, some of those groups failed because of low quality of acquired enterprises and poor management, others became more consistent in their expansion policies, and formed the financial and industrial groups (hereafter FIGs or Groups) that play an important role in the economy of contemporary Ukraine.

The question of importance of business groups in the developing economy of Ukraine have been raised all the time of the transition. In Ukraine, attitude to the FIGs is rather negative, due to their predatory means of activity. Nevertheless, the existence of business groups can be beneficial for the affiliated firms, and, through the increase of added value of those firms, it can stimulate all the transition economy.

The main advantage of business groups in the emerging markets is that they substitute the intermediaries and institutions that exist in developed markets, creating better environment for the affiliated companies' activities and restructuring possibilities.

Business groups, acting as market intermediaries, can eliminate many market failures. Among them are the problems of incomplete or asymmetric information, and caused by this adverse selection and moral hazard problems which are solved in business group due to close relationship between Group's members and their mutual dependence. Even more, inside the business group, firm's insider information can be available to other Group members, so allocation of funds inside the FIGs can be even better than in the developed capital market (i.e. more close to the perfect capital market, without any asymmetric information).

Another problem of transition economies is poor contract enforcement system, and thus low payment discipline. Of course, this is eliminated inside the business group due to firms' interdependence and (often) due to the Group's effective interior control system.

The mentioned properties of FIGs eliminate the transaction costs for the member firms that have business contacts (i.e. in case of vertically integrated Groups), or make capital lending less costly (for bank-centered Groups). And, more, in transition countries, with high level of inflation, and, therefore, low level of savings and available capital, independent firms can have no access to the external capital at all, while successful FIGs can have their own capital sources. Also, Groups, with their positive reputation, can have better access to the foreign capital sources than small independent firms have.

Large business groups might create inside themselves the perfect market of capital and other intermediation institutions that are still absent in the underdeveloped economies (this, however, can be costly for small Groups because of a scale effect, i.e. when the costs of creating the interior market institutions is relatively high with comparison to the size of the Group[1].).

[1] See Khanna and Palepu (1993)

Also the role of business group in the transition economy, with the liberalized economic activities and prices, but low state support of firms in time of changes, can be rather important. Business group can assist their members, supporting them in this period, i.e. taking the role of the state or of the "central planner" before the restructuring process finishes.

The above mentioned properties of business groups are the main advantages that follow from existence of business groups in the environment of uncertainty and lack of funds. But Group affiliation can be beneficial not only in reducing market imperfections, but also in taking the advantage of close inter-firm relationships, as the theory of industrial organization says. The first such benefit is economy of scale for horizontally merged firms-members of FIGs. The second is better possibilities of taxation optimization – due to possible redistribution of costs and, therefore, reduction of taxation base, especially in case of vertically integrated firms and in bank-led groups.

Another possible benefit that business groups' affiliates can gain is the influential position of the Groups in the policy-making inside the country, i.e. strong lobbying power of FIGs.

But the latter, being beneficial for the FIG-members, hardly could be favourable for the non-affiliated firms, which do not have such possibilities. More, this can be harmful for the industries and for the economy, because it endows the firms with different conditions, which could distort markets significantly.

Another drawback which can be caused by lobbying, and also by increasing the possibility of horizontal collusion of firms in business groups (BGs) is strengthened market monopolization of FIG members, which could lead to monopolization on the specific market, i.e. deepen imperfections there.

Therefore, existence of business group can be costly for the economy at whole, and this is one of the main concerns about FIGs in the Ukrainian society.

Besides the negative macro-effects of business groups' existence there are reasons, why Groups can be inefficient by themselves. These are intra-group imperfections, such as ineffectiveness in governance (i.e. possibility of suboptimal decisions due to long management chain which cause informational lags, especially in highly diversified BGs), agency problems, problem of resource misallocation (due to specific preferences of group leaders), and soft budget constraint which can lead to suboptimal behavior of firms. Also, group owners can have the objectives other than profit maximization, for instance: profit stability, income diversification, or equality in earnings, which is similar to the objectives of central planner. Some empirical evidence for activities of business groups throughout the world is described in the next chapter of my work.

The question of my study is, which pattern show Ukrainian FIGs, i.e. whether the Groups are beneficial for their members, or their negative peculiarities outweigh positive effects for insiders. This question is important for the policy makers, in order to regulate activities of business groups in way to enhance positive effects and reduce the failures followed from FIGs' activities.

In my study I will try to study the influence of Ukrainian FIGs on improving the performance of the affiliated companies. In order to do it, I will compare the affiliated with FIGs plants from one industry with the groups of not affiliated plants: state-controlled and privatized. The first question of my study is checking the hypothesis that FIGs can create the "inside" capital market for their affiliates, i.e. that external cash is more available for the companies belonging to the FIGs, while the other companies could suffer from harder cash constraints. The other question is whether performance of the plants affiliated with FIGs differ from that of the other groups of plants. If the FIG-controlled companies

are less constrained in funds, they can have more possibilities to develop more successfully than the other companies, so their performance should be improved after joining the FIG. The study of those hypotheses and additional supplementary studies are presented in chapter 4 of my work.

Chapter 3 is dedicated to more detailed presenting of the field of my study and to description of objects of my interest – the sugar industry and financial-industrial groups of Ukraine.

Conclusions and possible implications are presented in the last chapter of my study.

Chapter 2

LITERATURE REVIEW

2.1 WORLD EVIDENCE OF BUSINESS GROUP ACTIVITIES

Since business groups (BGs) are widespread throughout the world, importance of their existence has been studied in many aspects. The papers were dedicated to the studies of the influence of BGs on the added value of their members and on the whole economy, the advantages in investment possibilities of BG affiliates, and the role of BGs in reduction of market imperfections, if the latter are severe in the country.

For the economies with developed market institutions, rather contradictory evidences for role of BGs in increasing added value of its members were found. Recent works on Japanese BGs (called *keiretsu*), held by Morck and Nakamura (1999), Kang and Stulz (2000), using the data for 90-s years, revealed higher costs than benefits of group membership, while Hoshi et al (1991) argued that keiretsu affiliation is rather beneficial.

The difference in their conclusions is not so surprising. As it was explained by Khanna and Palepu (1999), BGs have the advantage in developing economies, reducing market imperfections for its members, but in the developed market systems, costs of BGs activities are higher than benefits. Also, Kali (2000) developed the model to show that activity of diversified business groups is beneficial only in imperfect but (necessarily) developing capital market. While Hoshi et al used the data on 1977-1982, when Japan's capital market was on the stage of development, BGs' affiliation was preferable for the companies, but in recent decades the situation is different.

Ferris, Kim and Kitsabunnarat (2001) revealed the "diversification discount" (based on work of Berger and Ofek 1995, who studied this effect for the US corporations) of Korean business groups called *chaebols*, when the total value of BG-affiliated firms is less than sum of values of similar standing out firms. They tested three hypotheses that can explain such a phenomenon. *Profit stability* behavior rather than profit maximizing – they revealed that mean annual return on assets of chaebol firms is significantly less than that of independent firms, though the variation of return is much lover. *Over-investment* – higher (than for independent firms) level of investments into unprofitable enterprises revealed. *Cross-subsidization* – no strong support of this hypothesis was revealed. Also, the authors described two facts that increase values of BGs. The first is *co-insurance effect*, when different chaebol firms, due to imperfect correlation of their cash flows, co-insure their debt risks, making higher level of debt possible. The second is *better tax management* – chaebol firms pay on average twice the less taxes than the corresponding independent companies. This is explained by wider possibilities of debt management for the firm, which has tight contacts with other firms.

Much of the literature for BGs activity is dedicated to the difference in sources of funds in the BGs' affiliated and independent companies. Hoshi et al. (1991) were the first who separated firms by the criterion of group affiliation. Using data on Japan, they applied Tobin's accelerator cash flow model, regressing investments of firm on cash flow, Tobin's Q [2], and lagged production of firm. They concluded that investments of keiretsu-affiliated firms are less sensitive to internal funds, than the stand-alone companies are, which make keiretsu firms less constrained in their investment decisions. They explained this fact by the relationships of keiretsu firms with the main keiretsu banks, which mitigate problem of imperfect information and, therefore, make risks and transaction costs lower, so funds are easier attainable for keiretsu members. Also the authors

[2] Tobin's Q is the ratio of market value of company to the replacement value of its capital – the proxy for expected return on investments

emphasized on the reduction of conflict of interests (i.e. agency problem), while keiretsu banks are both shareholders and debt-holders of firms.

The same accelerator cash-flow model was applied for the Korean chaebols by Shin and Park (1999), and Indian business groups, by Gangopandhyay et al. (2001), and the results were the same: group members appeared insensitive to the internal cash flow in their investments decision while separate firms didn't. However, a study on India by Khanna and Palepu (1999) revealed no such difference in dependence of investment sources on group affiliation. The authors, instead, found that group-affiliated firms have "disproportionally good access to international sources of capital". The most interesting results of Khanna and Palepu is that performance (either Tobin's Q or return on assets) of BGs depends on their degree of diversification (quantity of industries encompassed). Firm's performance was regressed on logarithm of sales, age of firm and group dummies, which controlled for degree of diversification of groups. The authors revealed that the members of the least and intermediate diversified groups have significantly worse results of performance than separate firms have, but members of the most diversified groups have statistically significantly higher estimates of performance. According to the authors, the explanation of such a behavior of large diversified BGs is that they have enough resources to create internal institutions that replicate the functions of (internal) financial intermediaries, reducing negative effects of informational imperfections, imperfections of contract enforcement, property rights problems, etc. Also they argued that Indian BGs mitigate the possible costs of diversification (like soft budget constraints or agency problem), because affiliated companies are performing relatively independently on the Groups' owners in India, and there is small role of internal capital market there (which, however is inconsistent with findings of Gangopandhyay et al, (1999)). Another explanation of better performance of large BGs in India, according to the authors, is higher possibility "to derive economic benefits because of their political connections in an economy where government plays important role."

While all the mentioned above works revealed positive effect of BGs on firms' access to investment funds, they did not say anything about the efficiency of investments in these companies. So, even though group members benefit from using funds in higher amount, this does not mean that companies invest more efficiently than independent firms. As the effect of inefficient usage of available funds could offset the better access to capital (soft budget constraint problem), the advantages of BGs affiliation over stand-alone companies are not so straightforward. In my study I will try to control the investment influence for Ukrainian FIGs.

2.2 STUDIES ON RUSSIA AND UKRAINE

Since the collapse of the USSR, newly independent states have been facing various problems, such as: broken economic contacts (production chains), collapse of planning system and absence of market (intermediary) institutions, underdeveloped financial system, also lack of legal enforcement and poor role of the state in solving all these problems. All this strengthened by the historical reliance on implicit contracting and oligopolistic structures of industries, gave the area for development of business groups. FIGs became very important in setting the new contacts and especially in raising funds. Russian Groups that emerged in the period 1993-1995, have been studied even more deeply than keiretsu and chaebols, even though in case of Russia, much problems with the data can occur.

Russian FIGs appeared in early 1990-s by the two ways (Piankov, 1998). First, bank-centred groups, - by large banks' attempt "to purchase anything while it's cheap", using the idea that companies were underestimated in the first years of transition (due to low access to capital and high uncertainty). By this way, most diversified FIGs appeared. Another way of forming FIGs was based on the economic relationships between enterprises (i.e. production associations): vertically integrated, production oriented FIGs emerged to reduce contractual problems of the firms that constituted one production chain.

The detailed studies on Russian groups were made by Perotti and Gelfer (1998, 1999), and Brown and Earle (1999).

The core of studies of Perotti and Gelfer (1998) is the above mentioned Tobin's cash flow model. Though usage of estimates of Tobin's Q was criticized by Volchkova (2001), and Brown and Earle (1999), because market value of the companies in the underdeveloped and illiquid secondary asset market do not reflect the true expectations of the companies' performance, empirical findings of Perotti and Gelfer (using data on 1995-1996) showed that Russian capital

market "is able to identify firms who can successfully fund their best investments". Regressing investments on Tobin's Q, cash flow, cash stock, and on profit (the latter also criticized by Brown and Earle), they received the same results as Hoshi (1991), and Shin and Park (1999): group affiliated firms are less constrained in their investments by their internal funds. The sample of their study was small - 76 firms only, but Brown et al 1999, widening the sample, supported this result. Perotti and Gelfer also revealed a negative relationship between cash flow of group-affiliated firms and their level of investments for the business groups where banks play major role. They suggested redistribution of funds inside the FIGs, which can be either more efficient, or just using the cash-rich firms as "cash cows for the Groups", (which is consistent with belief that FIGs do not use their capital properly or use it for their own needs). Here, an important finding is that the level of investments for FIGs' firms positively correlates with their market value, while for independent firm it doesn't. So their main conclusion was that FIGs invest into more "prospective" (with higher Tobin's Q) companies, i.e. redistribute capital efficiently. Similar conclusions were made by Davydenko (1999).

Volchkova (2001), employing the cash flow model, asserts that Tobin's Q-value does not represent the true revenue expectation of the firm because of low liquidity in the secondary stock market and, therefore, informational problems. Referring to Anderson and Kegels (1997), she chose the change in level of sales as a reliable estimator of expected profitability of investments. While Anderson and Kegels used profit as the proxy for Tobin's Q (for Czech firms), Volchkova's approach is more consistent with the accounting system of Russia, where profit does not reflect successful activity. Separating into unofficial FIG members and independent firms, and controlling for firm's size, she revealed equal sensitivity for small companies of both groups to the internal funds, and higher internal funds sensitivity of medium-sized FIG members. In contrast, large FIG-affiliated companies reveal significantly less constrained in investments than their independent analogues. The author interpreted this result

as possible redistribution of funds inside FIGs into larger, "more important" companies.

Brown and Earle (1999), did not use the capital flow model for Russia's groups because of lack of reliable measures of firm's market value, of actual level of investments and of profit as measure of productivity in Russia, due to peculiarities of accounting system and undeveloped capital market. Main question of their work was to reveal difference in performance of FIG-affiliated firms and other companies. So they used output growth and labor productivity as effective measures of firms' performance. Employing the data on 19,509 enterprises for 1992-1997 (here problem is that they used only data on officially registered FIGs, while most successful Russian FIGs are unregistered), they revealed positive effect of FIG membership on productivity and output growth, but no effect on labor growth, which suggest that FIG members demonstrate relatively better labor performance due to better management rather than to higher level of labor curtailment. Also they separated FIGs into horizontal, vertical and diversified, by the type of relationship between FIG-members, and found a statistically significant positive effect of Group-affiliation on output growth of the companies, for all the types of Groups. In addition, there was detected positive effect of membership tenure on labor productivity and output growth for the horizontal FIGs, suggesting the advantage of being horizontally merged. This is in the contrast with studies on BGs of India, Korea and Japan, where most positive effect was revealed due to diversified nature of BGs. However, this study took into account only official FIGs, while the most interesting are unofficial ones.

Brown, Volchkova, and Guriev (1999), used more detailed data on FIG membership, taking into account also unofficial FIGs. Studying the impact of the phenomenon of BGs in the Russian economic environment, they stressed possible positive role of the groups on accumulating and distributing the capital

in the absence of capital market. Using the same sample as Brown and Earle (but better classification), they made the same conclusions, though they revealed better performance inside unofficial FIGs. This is especially seen in the real interest rates on credits that companies received in the year 1996: on average, 6% for unofficial FIGs, 17% for official, and 22% for stand-alone companies. Johnson (1997) explained such a weak performance of official groups. She argued that official status of FIG helps its owners to maintain better the control inside the Group, and to diversify the risk of activities in the uncertain economic environment, thus official Groups tend more to the stability rather than to profit-maximizing. Another explanation made by Johnson is that the unofficial FIGs are more integrated than official ones (this fact also was supported by the evidence that in Tobin's Q model, unofficial FIGs' members appeared less cash constrained). Some of the official Groups were created "on paper" – to gain from the status of FIG, which implied some privileges from the state (according to the law on FIGs, 1993).

Tendency to monopolization of markets and export activities due to existence of FIGs was also described in the report of Brown et al (1999). Thus, FIGs have a positive effect on their members but negative on the outsiders, so the total impact of FIGs on the economy is under the question. Kozlov (1999) also stressed the positive effect of FIG membership on access to export, but the reason for that can be not only better resource allocation, as he noted, but also FIGs' activities to restrict competition for export.

The FIGs' creation in Russia and Ukraine differ in the way that the latter are not created to gain some official advantages from being the registered FIGs, so they are more close to the unregistered Russian FIGs.

Grygorenko (2001) made an attempt to study the effect of presence of "third

party" (influence of oligarchs) in the metal industry of Ukraine, and revealed the positive effect of such phenomenon: he found positive significant effect of "oligarchs intrusion" on the book values of plants' capital. While the regression in his paper suffers from the endogeneity problem (presence of third party can be determined by higher value of plants' assets), and the effect of "third party" is not robust to changes of regression specification, the conclusions can support the idea that Ukrainian FIGs can create additional value for affiliated firms.

Except this study, no other empirical researches on the behavior and productivity of Ukrainian business groups were done. The possible reason for that is comparatively small development of Ukrainian Groups, absence of legislation that regulate activity of such groups in Ukraine, and, what is more important, rather unclear and not transparent ownership structure of Ukrainian FIGs. But despite of that, FIGs play important role in Ukrainian economy, controlling large share of internal production. So, the question of performance of financial-industrial groups in Ukraine can be rather important for the policy makers and for bodies that are responsible for control of the markets competition.

Chapter 3

DEFINING THE FIELD OF STUDY

In my empirical analysis of Ukrainian FIGs' activities I am going to compare the performance of companies belonging to Ukrainian FIGs with the other groups of homogenous firms. The only industry in Ukraine that can be studied according to that purpose is the sugar industry. The reason is that sugar industry is the only one where there is comparatively large sample of relatively equal firms (near 120 in 2002), and among them there are plants (about 1/4 of total quantity) affiliated with financial and industrial groups, owned by small owners (also about 1/4), and firms that are owned either by the state, or by the minority shareholders (employees)[3]. All three groups are in the interest of my study, because, comparison of the FIG-affiliated companies to the state-owned could not be fair, because the state-owned firms are considered to be less productive than the private-owned, i.e. comparison of FIG-owned firms with state-owned (as it will be in metallurgy of machinery industries) will look like the comparison of state and private firms, which is not the topic of my study.

So, before I present my assumptions about the activities of Ukrainian oligarchs, short description of the sugar industry and business groups in Ukraine is needed.

[3] FIGs are also present in milk, bread, beer, and banking industries, but the number of affiliated firms there is quite low in comparison to the general number of companies. Companies that are acting in the energy, machinery, metal ore, metal industry, and mass-media, are the most powerful assets of the FIGs. But there I can compare the behavior of FIG-affiliated firms only with the state-owned companies, because almost all of them are either state-owned, or are belonging to the "oligarchs".

3.1 INDUSTRY DESCRIPTION

Ukrainian sugar industry has been faced with extremely high troubles after the collapse of USSR[4]. The first problem of Ukrainian sugar plants was the lost of their share in international market due to breakdown of trade relationships between former parts of one state. The biggest market for Ukrainian sugar plants was Russia, but after collapse of USSR, some traders from Latin America and Europe filled the Russian market with the sugar that was cheaper than the product from Ukraine. Another problem was the breakdown of state collective farms and emerging of small farms which were not able to provide the sugar beet of needed quantity and quality due to their financial constraints. Another problem that affected the industry was inefficient privatization strategy, according to which shares of the plants were distributed among the plant workers without any remuneration for the state. Market specialists emphasize that such a policy led to the situation, when the plants, formally private, remained *de facto* owned by the "red directors", who were controlling the plants before the privatization. However, the shares of some plants were later bought by some persons, who tried to change the policy inside the plants. Among those persons the representatives of Ukrainian "large business", i.e. business groups were present.

Ukrainian sugar industry, which was the world biggest producer of beet sugar in early 90-s (producing 6.3 Mio. tons of sugar annually) and uniting 192 sugar plants, in the year 1999 had only 135 plans that produced only 2.1 Mio. tons of sugar. At that time, the state made the attempt to reanimate the industry, making the interventions to support the prices, or making some regulating restrictions, which, however, deepened the crisis. For instance, in the year 1997-1998, the maximum price for the sugar beet was set on such a low level, that supply of beet fell dramatically. This, and the financial crisis of 1998 forced many plants to go bankrupt.

[4] See Parashchiy (2004), Fedorenko (2003)

Later, the state authorities adapted the program of sugar industry regulation. In the year 1999, the reform took place, according to which the plants should produce the sugar according to quotas[5], and the price floor of sugar was fixed at the level of 2.37 UAH per kilogram. The quota was set for each plant by the state authorities, with respect to the past level of production of the certain plant. There is, however, no evidence that such a regulation helped, because in the year 2002 only 128 working plants remained in Ukraine (and 121 in 2003), and the total sugar production was cut to 1.8 Mio. tons. The main reason for low performance of the quota system is that the state is not consistent with implementing this system, i.e. it does not guarantee that if the plant meet quota, it will be able to sell the produced sugar, as it is the case in Europe.

Another evidence of activity of sugar plants in Ukraine is their highly depreciated equipment. According to the estimations of Ukrainian Sugar Association, 70% of equipment need to be updated. This also makes the problem of extremely high energy intensity of sugar production, which also affects the costs.

In Ukraine the average annual per plant production has been shorten from 33 thousand tones in 1990 to 11 in 2003. This is in the contrast with sugar plants that are acting in the Europe. The average per year capacity of German plants is 170 thousand tons and is growing each year due to launching of new factories with annual capacity of 0.8-1 Mio. tones. The latter is the evidence that larger sugar plants are more efficient. However, there are many reasons why this can not be the case in Ukraine. Among them there are problems of investment in new equipment, and beet supply constraints. Large plants had been most affected by the problems of beet supply, because the problem of underutilized capacities touched them more dramatically[6].

[5] Similar quotas was set in the European sugar industry in 1980: A- for internal market, B – for neighbour countries (EU), quota C – for import in the world sugar market

[6] i.e., it is easier to fill the capacity of small plant than of the large plant, see Parashchiy, 2004 for more details

So, the main problems that are in the sugar industry now are low level of investment and capital renovation, and problems of beet supply. In my work I will try to examine, whether powerful business groups can make contribution into the solving those problems, and into the revival of the industry.

3.2 UKRAINIAN FIGs

Ukrainian FIG, can be defined as a group of enterprises, institutions and organizations, as well as financial institutions, which are operating under the control of one, common body which can be called a core of the group. Relationship between enterprise and core of the group is often based on the share ownership: direct or trough other affiliated structures, or just on executing control over the enterprise, e.g. obtaining the "right" to control the company, even when it can be formally owned by state or the other companies[7].

In my study, only the groups that own sugar plants are present. Some of them are diversified, bank- or industry-led BGs, and some are agricultural/food conglomerates.

Below, in the table 1, I present the FIGs that own sugar plants in the year 2002. The reason why I split FIGs into 2 groups, is possible different attitude of representatives of those Groups to the sugar plants, and therefore, possible different performance of the plants affiliated with different types of FIGs[8]. For the second group if FIGs, sugar industry is more important than for the first, so there may be the fact that in the latter FIGs more attention can be paid to the sugar plants as to the important assets.

The information about ownership I took from the mass-media, and checked it with the official information provided by the State Commission of Securities. The problem with such a comparison is that it is not easy to check whether the company, registered in offshore zone (for example in the Virginia Islands) is affiliated with the Ukrainian FIG. In such a case I should believe the mass media that it is.

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[7] The example for this is the control of Pryvatbank the assets of formally state-owned metal ore corporation "UkrRudProm", or control of Uksibbank over the formally Russian assets in the Ukrainian major automobile tyre producer "Rosava".

[8] There is the evidence that regional authorities are more likely to let agriculture-oriented groups control the plants.

Table 1. Control of Ukrainian FIGs over the sugar plants.

FIG	# of affiliated plants (2002)	main industries
Diversified		
Aval	2	Banking
Interpipe	6	Pipe, Agricultural Mashinery
Prykarpattya	3	Banking, Construction
Pryvat	5	Banking, Metallurgy
Slavutych (Dynamo)	3	Energy distribution
Ukrinterproduct	3	Food
Ukrsib	5	Banking, Chemistry, Metallurgy
Agro-Oriented		
Dubnotsukoragro	3	Agriculture &Food
Shelton, Gilea	2	Agriculture & Food
Ukrprominvest[9]	3	Car Industry, Confectionary
Ukrros	2	Agriculture & Food

Sources: State Commission of Securities(www.istock.com.ua), Инвест Газета, К. Боднаренко *Хто й чим володіє в Україні*

[9] UkrPromInvest is the diversified FIG, but I placed it to the agriculture-oriented FIGs because sugar plants are one of the components of confectionary production chain, so they are highly important to this FIG.

Chapter 4

EMPIRICAL PART

Before I impose the hypotheses on FIG-affiliated firms' activity in Ukraine, the important question of my study will be to reveal the determinants of FIGs' decision to acquire the plant. This can help me avoid the possible endogeneity problem in studying the performance of FIG-affiliated enterprises (i.e. the selection bias problem, when the better performing companies could be more likely to become FIG-affiliated, so they are better not because they have become governed by the FIG).

The first hypothesis (H1) is that FIG plays the role of pure financial market for the affiliated companies, in the environment of under-developed market of capital. Studying the problem is possible by using the Tobin's cash flow model of investment. Support of my hypothesis will be in case when the level of investment of the FIG-affiliated firm will not depend on the cash flow of the firm, while other firms will have the dependence in their investments on their internal cash. My prediction is that the result will be similar to the behavior of the Russian FIG-affiliated companies, studied by Perotti and Gelfer (1999), Volchkova (2001), and Davydenko (1999), that the FIG-affiliated companies are less constrained in their internal funds than the other groups of firms.

Except the sensitivity of investment decision, it is also useful to compare the levels of investments of different groups of enterprises, and the efficiency of investment. The latter question will be studied while testing the second hypothesis.

The second hypothesis (H2) here is that enterprises belonging to FIGs are performing more efficient than the state-owned enterprises, and can be more

efficient than the enterprises owned by the non-FIG private owners. The positive support of such hypothesis can be in line with the studies of Brown and Earle (1999), and Brown, Guriev and Volchkova (1999) on Russia, while the negative support of the hypothesis may be in line with the common negative attitude to the FIGs of Ukrainian society.

To test this hypothesis, I am going to set the model that will reveal the performance change determinants for the sugar plants, similar to the model of Brown and Earle (1999).

Depending on fulfilling or failing the hypotheses, we will be able to make some conclusions on the behavior of Ukrainian FIGs.

4.1 DATA USED

Data that is used for the research consists of 2 datasets. The first is the panel data on physical inputs, outputs and capacities of the sugar plants: 1994-2002, provided by UkrZukorProm Ltd. and UkrZukor, the other is a dataset for financial data for the year 2001-2002[10]. All the datasets are rather hard to combine together, due to mismatching of the plants in different databases, so that the combination of all parameters of the observations for the year 2002 consists only of 53 observations. So, to avoid the problem of constructing such a small sample, I will try to use the data sets separately, when it is possible. Also, the financial data on Ukrainian enterprises can be reliable with some restrictions. That is why I prefer to use more reliable physical data, where it is possible to avoid monetary values.

The sample of the plants is divided by 3 groups that are assumed to be homogenous, and that reflect three ownership structures of plants. The first is group of plants that are FIG-affiliated[11] (if FIG owns more than 20% of the shares). The second is group of firms that is privatized by the non-FIG owners (with at least 20% of shares). The third is group of the minority holding enterprises (owned by the state or by the employees/managers of the plants), which are assumed to behave like the state-owned enterprises, because despite the "privatization", the managers remained the same since state-owned times there.

Table2. Privatization process of sugar plants before 2003

	1998	1999	2000	2001	2002
FIG-privatised	3	3	15	9	3
Privatised, non FIG	1	8	24	9	3

Source: State Commission of Securities

[10] The database *Registry*, available at the EERC library

[11] FIGs can be also split into 2 groups, as was mentioned above

I use the observations for the years 1998 (before the privatization starts) and 2002 (the last period with available data) to compare the change of technical performance of FIG-affiliated and stand-alone enterprises, and the data for years 2001 and 2002 when I study the performance change difference in monetary units (the only years with all available for me monetary data).

All the plants are split into 3 groups, depending on the ownership in the year 2002. Below some statistics for the groups of plants is provided.

Table 3. Average output for 3 groups (thousand tones of sugar).

	Sugar production, tones		Extraction coefficient[12]		Number of plants	
	1998	2002	1998	2002	2002	bankrupted
FIG	15469	14828	75,78	70,46	30	9%
small private	12855	13747	75,50	71,48	33	25%
not privatized	8039	8169	72,39	67,95	61	38%
Average	10664	11355	73,82	69,55	total 124	30%

Source: UkrZukorProm Ltd.

Table 3a. P-values of Z-statistics of differences between average group extraction coefficients[13]

Ho	1998	2002
FIG=Not private	0,00***	0,34
FIG=Private	0,41	0,56
Private=Not private	0,00***	0,30

*** shows that we can reject the Ho at level of significance 1%

The presented tables show evidence that on average, firms that are acquired by FIGs are bigger than the others. Also, all the privatized (by FIG or not) firms were more productive before the privatization, (and FIG-owned firms were more productive than non-FIG privatized firms, but this difference is statistically insignificant). Also, the plants owned by the non-FIG individuals, became more

[12] Extraction coefficient is a percentage of sugar that is extracted from the beet, which shows the quality of technology and of the supplied beet. It is used as a proxy for productivity odf plant

[13] Here, the assumption of normal distribution of productivities is used, which, however is not the case, as the tests showed.

productive in the end of period of consideration. The difference in productivity of three groups disappears in 2002, i.e. after privatization.

More, the density functions of the productivity distributions (see appendix 2) show that in 1998, most of plants that became later FIG-affiliated, were more productive, while many firms that were of low productivity, were not privatized at all. But, the densities for the year 2002 show that the FIG-affiliated plants, lowering their productivity since becoming affiliated, have become similar in productivity to the non-privatized firms, and many of them became less productive than the plants of other groups of study[14]. If we combine this with the information that among FIG-privatized firms, only 9% were closed (Table 3), while among the non-FIG privately-owned - 25% and among the others[15] – 38%, we can conclude that relative decrease in efficiency does not lead to bankruptcy for the FIG-affiliated plants, while for the other firms does. This can be supposed as existence of soft budget constraint for the FIG-affiliated plants.

Also, the existing evidence of performance of sugar plants in other regions of Europe suggests that the number of sugar plants is too big in Ukraine (for the comparison, in Germany and France their number is between 50 and 70, with twice a larger total production). So, the possible tendency can be expected that more plants will be closed in the nearest future in Ukraine. In this case, purchase of the plant by the FIG can be either a guarantee that it will remain working, or the opposite - FIG can acquire a plant to close it, decreasing the competition for survival with the other plants affiliated with this Group. The existing statistics partially supports both those ideas. The fact that FIG-affiliated plants are on average less likely to go bankrupt supports the first, while the fact that all the closed plants are belonging to the agriculture-oriented FIGs supports the second

[14] Here I should note that the written above is just the trial to derive some conclusions from visual inspection of tables and graphs, while to test the significance of difference between parameters of groups we should use more reliable methods. The next section starts this process.

[15] This comparison, however, suffers from the selection bias problem, when less efficient plants are less likely to be privatized, but more likely to go bankrupt.

idea: sugar industry is important for this group of FIGs, so they are more interested in some reforms in this industry, and do such reforms.

4.2 DETERMINANTS OF PRIVATIZATION OF SUGAR PLANTS

Below I use the considerations for influencing different factors on the probability of the FIGs and other private bodies, to obtain the control over the sugar plant, and set the *logit* models to test the significance of those determinants.

Before considering the determinants, we should divide the investors into FIGs (here we can also divide the FIGs into diversified and agricultural, to separate possible differences in motives for those two groups of FIGs to purchase plant), and non-FIG investors, hereafter called small private.

The privatization in Ukrainian sugar industry started in 1997-1998, when the corporatization of all plants was finished. The "privatization" was conducted by the "sharing"[16] methods, when all the shares were distributed between the employees of the plant, so that the control over the enterprises was kept in arms of the managers (who managed them from soviet times). But after that, the outsiders were allowed to purchase the plants' shares.

The object of primal interests for investors is the quality of the acquired enterprises. So, this measure could be significant in the decision for investors of all types to purchase the plants. To proxy this parameter for the factories, I propose to use the percentage of usage of the planned capacity of the plant (***utilization***). The more intensively capacities are used, the more attractive the plant should be for the investors, because it shows that quality of the equipment is satisfactory to produce the sugar, and that the beet and fuel supply is also set on the good level in the plant.

In the decision to purchase the plant, the potential (big) investors can analyze the possibilities of further development of the acquired assets. The ***planned capacity*** can be good approximation to the prospective of the plant's development (future rate of sales). It is also consistent with the fact that in the

[16] Ukrainian „паювання", see Parashchiy (2004)

Europe all plants are of high production capacity, so it could be true that in the future so will be in Ukraine, so that plants of higher capacities are of higher demand for investors. This measure should be important for the large investors, i.e. FIGs, while small investors are hardly able to purchase the objects of high capacity.

Another possible parameter which can influence the purchasing decision for the FIGs is the ability to control the plants after privatization. For FIGs, the latter could be negatively correlated with the ***distance from the regional center*** to the plants, as their headquarters and regional representatives are located in the regional centers. For the small private investors this measure hardly can be the criterion, while small private owners can be located more close to the plants.[17]

Also, important factor for the FIGs' purchasing decision of the plant is relationship between regional authorities and leaders of FIGs. There is strong evidence that Groups tend to purchase the plants in certain regions[18]. This can be explained by the fact that FIGs should receive the permission for purchase from regional authorities, and marginal costs for obtaining the permission for the second plant's acquisition is much lower than for the first. But, unfortunately, the relationships between FIGs and regional authorities are rather high to model (they only can be observed after they have established), so we cannot account for such possible relationships in the purchasing decision model.

In the model I used data for the year 1998 – the year of start of the privatization. The dependent variables are FIG affiliation and small private ownership dummies for 2002. The method of estimation *is multinomial logit*, which accounts the probabilities of being privatized by different investors for the plants with certain characteristics.

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[17] In most cases, small private owners are the collective farmers

[18] For instance, Interpipe owns most of plants in Sumy region (2002), Ukrsib – in Kharkiv region (2002), Ukrros – in Ternopil region (2003), Dubnozukoragro - in Rivne and Lviv regions (2003).

Table 4. Output of *Multinomial Logit* equation for decisions of sugar plants privatization by different investors

	FIGs	Non-FIGs
planned capacity	0.531***	0.411**
utilization	3.951***	3.646***
dist to regional center	-0.016***	-0.001
constant	-2.756***	-3.084***

Pseudo R-sq=0.11 *** -significant at level of significance 1%, ** - 5%, * - 10%.
Number of plants: 141; number of FIG-affiliated: 28; of small private-owned: 33.
Data sources: UkrZukorProm Ltd, State Commission of Securities

From the results above, we can conclude that, all, the utilization of capacity, the potential of the plant, and the location of the plant are important for the decision of the FIGs to acquire the plant, and all except distance to the plant from regional center is important for the non-FIG private owners. But, we see that FIGs are more likely to privatize large and effective plants than the small private investors are.

We also can be interested in dividing the FIGs into large diversified and agriculture-oriented, which can show clearer picture of purchasing decision for two groups of FIGs which could have different attitude to the sugar industry. In this case, the agricultural groups can pay more attention to the quality of the capital, as this is important for the production process, but the diversified FIGs could pay less attention to this, while more attention to the possibility of development of plant, i.e. planned capacity can be paid by the latter. And the distance to regional canter seem to be not so important to agricultural FIGs, because their representatives can be located more close to the plants, especially if those sugar plants are important assets of those FIGs.

The regression supports the hypothesis about different location dependence of probability for being affiliated with FIGs, while our suggestions about planned capacity and utilization level difference for FIGs failed (see table 5 below).

Table 5. Output of *Multinomial Logit* equation for decisions of sugar plants privatization for different investors

	FIGs		Non-FIGs
	Diversified	Agricultural	
planned capacity	0.336	0.760***	0.425**
utilization	4.811***	1.766	3.643***
dist to regional center	-0.023***	-0.006	-0.001
constant	-2.473**	-4.695***	-3.143***

Pseudo R-sq=0.12 *** -significant at level of significance 1%, ** - 5%, * - 10%.
Number of plants: 141; number of FIG-affiliated: 18 (diversified), 10 (agro); number of small private-owned: 33.
Data sources: UkrZukorProm Ltd, State Commission of Securities

It is seen from table above that agricultural FIGs are more likely to acquire large plants than small privates, but the latter are more likely to purchase large plants than diversified FIGs. Insignificant coefficient at the planned capacity variable for diversified FIGs can be explained by the fact that especially large plants are the main enterprises in the towns/villages of their location, so that they are rather "strategically important" for the region of their location, and, therefore, the Groups for which sugar industry is not an important one can be not allowed to acquire such assets (i.e. regional authorities can impose such restrictions). For the agro-oriented FIGs, sugar plants are important, so they, knowing the world tendency try to acquire larger plants, and regional authorities are more friendly to the representatives of such agro-oriented Groups. However, the insignificance of the quality of plants' equipment in the purchasing decision of the agriculture-oriented FIGs is a surprise[19], which only can be explained by the fact that the planned capacity if the object of extremely interest for the agro FIGs, so that no other things are interesting to them.

The main conclusion of this section is that there are determinants of the purchasing decision of the plants for different groups of investors, so that we cannot treat those parameters as exogenous in the further performance analysis of plants with different ownership structure, as a selection bias could exist there.

[19] The division of FIGs into 2 groups should be regarded with the limits because of small number of observations in each group.

4.3 EMPIRICAL MODEL FOR ESTIMATING THE FIRST HYPOTHESIS

(**H1**): FIG can play the role of pure financial market for the affiliated companies.

Table 6. Level of investment for different groups of plants, 2002, UAH

	N	Mean	st dev
FIGs	25	3570	308820
Small private	30	-146140	515000
Non-privatized	38	-355460	1335210

Data source: Registry database.

Table 6a. Difference in investment: p-values

Ho	z-stat	p-value	decision
Inv.(FIG)=Inv.(Small. private)	1,331	0,095	regect
Inv.(FIG)=Inv.(Non privatized)	1,594	0,059	regect

Table 7. Average profit for each group of enterprises, 2002, UAH

	FIG	Divers	Agricult	Private	Non-Privatized
mean	-10248	-22848	21508	-13116	-12295
st.dev	84916	53781	137823	33559	50311

Data source: Registry database.

From the tables presented above, we see that on average the FIG-affiliated plants invest more than the non-affiliated, and the differences are statistically significant at 10% (two-sided) confidence interval. And, more, we see that the FIGs are only the owners who invest in the sugar plants, while all other "owners" divest. So, we can conclude that FIG-affiliation positively influencing the level of investment of the companies. This can suggest that there exist the internal capital market inside the groups, or that groups help their affiliates to raise the capital level.

But, higher level of investments does not help to make the FIG enterprises more profitable than the others, as is seen form table 7.

To reveal the influence of intra-group capital market on the FIG-controlled companies, I will use the Tobin's investment-cash flow model first implemented to business groups by Hoshy et al (1991), as it was introduced by Volchkova (2001) in her study of Russian FIGs. Referring to Volchkova:

$$I = a + b1*\Delta Y + b2*\Delta Y_{-1} + d1*CF + d2*CF_{-1} + f1*D*CF + f2*D*CF_{-1}$$

Where ***I*** is the investment level at time ***t***, ***ΔY*** is change in sales for the company at period ***t***, ***CF*** is company's cash flow at period ***t***, ***D*** is FIG dummy, subscript $|_{-1}$ reflects the period ***t-1***. All the variables are weighted by the capital stock at the period ***t-1***.

This model reflects the environment and peculiarities of Russian as well as Ukrainian accounting, where it is rather hard to use the Tobin's Q estimate[20] as the expected rate of return on investment. And although Perotti and Gelfer (1999) assert that Tobin's Q measure fits the Russian situation well, we can hardly rely on that in Ukraine, because of extremely low liquidity of shares of Ukrainian enterprises. So, better proxy for expected return is the change of sales. Here, the subject of interest is the coefficients at ***CF*** variables, which can reflect the dependence of investments on the cash flow.

In my model, ***CF*** is proxied by the net profit of the plant. In this case, there could be the endogeneity problem, when the level of investment determines plant's profit, but this is not the case for the Ukrainian sugar industry. Here the sugar extraction process starts in September or October, and finishes in December, so that plants are selling the produced sugar mostly in the next year. So, profit is obtained in the beginning of the year, while the production season starts later.

[20] Tobin's Q is the relationship between market value of firm to the replacement value of the capital. It can be used as the approximation of expected return on the assets, but only in the case when the capital market is liquid

It should be useful also to add in the model some control variables, other than ***Y***. For instance, level of debt also can negatively influence the investment decision of the company, as it was shown by Anderson and Kegels (1997). Therefore, I insert in the model the level of company's credit debt (lagged, because not lagged can be endogenous to investments), expecting that high level of debt reduces the investments level due to imposing more restrictions of funds usage, and the first difference of credit debt (lagged), which shows the dynamics of debt re-payment, and could also negatively influence the investment decision, if it is large.

Also, to avoid the possible bias by comparing the FIG-affiliated enterprises with the other companies, that are still not homogenous, I also should divide the sample of the non-FIG enterprises into the state- or minority-owned companies, and enterprises that have the small private non-FIG owners.

So, the final version of the model will be the following:

$$I = a + b1*\Delta Y + b2*\Delta Y_{-1} + c1*FIG + c2*PRIV + d1*CF + d2*CF_{-1} + e1*DBT_{-1} + e2*\Delta DBT_{-1} + f*FIG*CF + g*PRIV*CF$$

Where ***FIG*** is a dummy for FIG-owned companies, ***PRIV*** is a dummy for small private owners, and ***DBT*** is the level of company's debt, ***I*** is investments, i.e. level of change of primal value of plant's capital for the year.

All the variables (except dummies) are weighted by the average capital stock for 2001 and 2002[21]. The model is estimated for the year 2002. Method – simple OLS. The result of the model estimation can be seen on the next page.

[21] I used average capital stock there , because the level of capital stock differs significantly from year to year, i.e. in some cases it can be so small that the investments divided by that level are unjustified big.

Table 8. Investment sensitivity model output (OLS model).

Dependent Variable:	Investment	
	Coeff	**p-value**
Revenue change	0.059	0.481
Revenue change lagged	0.052	0.461
Credit debt lagged	-0.367*	0.056
Change in debt lagged	0.283	0.278
Cash flow	1.809***	0.000
Cash flow lagged	-0.218	0.401
Small private dummy	-0.037	0.651
FIG dummy	0.043	0.620
Cash flow*Small private dummy	-1.450***	0.003
Cash flow*FIG dummy	-1.835***	0.002
Constant	0.017	0.854

Adj Rsq= 0.499 *** -significant at level of significance 1%, ** 5%, * 10%
Number of observations: 117; number of Fig-affiliated plants: 19; of small private: 22.
Data source: Registry database.

Table 8a. Wald test for coefficients restrictions:

Ho	**F-stat**	**p-value**	**decision**
FIG_dummy*CF + CF = 0	0.00	0.960	not reject
Small private_dummy*CF + CF = 0	0.74	0.393	not reject
Small private_dummy*CF=FIG_dummy*CF	0.35	0.555	not reject

We cannot reject neither of the presented hypotheses at level of significance 10%.

As we see from the output for the investment cash-flow model, the investment decision positively depends on the cash flow of the firm which did not change the owner since soviet times, while for the case of small private and FIG-owned firms, this coefficient looks insignificant. The *Wald test* supports that fact. This result is robust to any specification of the model, for instance, inserting the levels of revenues instead of first differences. Also, we can conclude from the regression output that increase in profitability expectation of the plant is not the main criteria for investing. This result can be explained by high market regulation, which could make the decision to invest dependent on some other factors which are not included in the regression.

The results for the insensitivity hypothesis of investment decision on the internal cash flow of the FIG-affiliated firms are the same as was for the case of Russia, displayed by Perotti and Gelfer (1999) and others, i.e. that FIGs create the internal capital market, so that the affiliated companies are less constrained in their investment decision on their internal cash flow. However, this market does not look perfect, because the decisions of investments for FIGs are not determined by expectations of future rate of sales (i.e. lagged sales rates).

Also, we see that the small private owners of the sugar plants look like unconstrained in their investment decision on their cash flows. But this phenomenon can be easily explained if we recall that the average level of investments for those companies (as for the non-privatized) is negative. So, we can conclude that in case of stand-alone companies, the level of divestment does not depend on the available cash flow for the small privately-owned plants, while it directly depends on the cash flow for the non-privatized plants. This can be supported by the idea that owners (directors) of not privatized plants divest only when they need funds (e.g. for salary payments etc., when they have negative cash flow), while the private owners divest whether they have negative or positive cash flow.

Also, summarizing the findings of this section, I would like to note that average profitability of the sugar plants (except affiliated with agro FIGs) is negative, as it is seen from table 7. This suggests either that the industry is unprofitable (which is not the case, according to the arguments of the industry's insiders), or that we have the situation of tax avoidance. The latter is common for all Ukrainian industries, so we should look for another parameters than profitability to compare the performance of sugar plants.

4.4 EMPIRICAL MODEL FOR ESTIMATING THE SECOND HYPOTHESIS

(**H2**): enterprises belonging to FIGs are performing more efficient than the state-owned enterprises, and can be more efficient than the enterprises which are owned by small private owners, because FIG-privatized plants can develop their equipment by lower costs.

Before implementing the regression model for the hypothesis check, I would like to present summary statistics for one of the performance measures – the percentage of (optimal) usage of plant's capacity.

Table 9. Summary statistics for utilization level of planned capacity (in %) for different groups of plants

	average		Min		max		p-values for Ho[22]: Avg(2002)= Avg(1998)
Ownership in 2002:	1998	2002	1998	2002	1998	2002	
Not privatized	36.9	39.8	14.8	3.9	81.5	100.3	0.204
Small private	45.1	52.9	22.4	13.6	88.3	105.7	0.026**
FIGs (agro)	39.5	41.8	9.7	21.3	67.1	78.2	0.288
FIGs (divers)	41.8	42.4	21.3	10.4	73.2	83.5	0.451

Source: UkrZukorProm Ltd.

From the presented above statistics, we cannot conclude that FIGs raise the utilization level of capacities of their plants. The owners which, on average, did it are only the small private. FIGs did not show significance increase in performance of their plants. So, the performance change hardly can be explained by FIG-ownership of sugar plants.

To check this aspect more precise, I will set the empirical model introduced by Brown and Earle (1999):

$$Ln(P/P_{-1}) = a + b*C + d*P_{-1} + e*D + f*\lambda$$

Where ***P*** is firm's performance, ***C*** is matrix with control variables, ***D*** is FIG-dummy, and λ is Mill's ratio of Heckman estimation process to avoid selection bias, which is emerging due to the selection process performed by the FIG before acquiring the enterprise. For the measure of performance I choose the *extraction* coefficient of the plants, i.e., the percentage of sugar that has been extracted from the beet, and the percentage of usage of plant's capacity (*utilization*). The functional form of the regressand is chosen to avoid the problem of limited variable regression, i.e. if the dependent variable is limited: in my case both performance variables are strictly positive, (see descriptive statistics in table 9 and table A1 of the appendix 1) and change is also positive, on average, for the *utilization*.

As the control variable I used the lagged measure of performance, as it could determine need to changes in performance and their value. In addition to the FIG dummy, I introduce the majority ownership dummy there, and split the FIG group into two different groups: the agriculture-oriented (which can be more interested in better performance of sugar plants), and diversified.

While the performance could be one of the possible determinants of FIG's purchasing decision, as it was shown in the section 4.2, I cannot use simple OLS to study the effect of FIG-affiliation. To avoid the selection bias, I should use either the Heckman's 2-step procedure, introducing the selection equations for FIGs privatization (agricultural and diversified) and non-FIG privatization, or use the instrumental variable regression, when the ownership dummies are instrumented.

In my study I used both methodologies. Using the Heckman's 2-step procedure. In the first stage, I implemented the multinomial *logit* regression for the

[22] The alternative hypothesis is that average utilization in 2002 is larger than in 1998. Note, that the hypothesis check is based on the assumption of normal distribution of utilization scores, which wasn't supported statistically.

combined ownership dummies, choosing the variables that are influencing selection process for FIGs and small private owners, but do not influence change in performance. Here, two main explanatory variables are chosen, basing on the selection model presented in section 4.2. The first is planned capacity of the plant (it hardly influence the performance change of the plants: it can raise performance for the large plants because they seem to be more rich and prospective, but the evidence is that it is too hard to utilize large plant's capacities fully, so that high planned capacity does not influence change in performance directly). The second is the distance to the plants from the regional centers (this influence the decision for purchasing plants for FIGs, but does not influence performance change of plants, because performance of agricultural (sugar) enterprises does not depend on the distance from cities). Also, in the regression on the first stage, the regressors from second stage, i.e. lagged capacity utilization and lagged extraction coefficient were included. The output for this regression can be seen in table A2 of appendix 3. Then the predictions for those models were taken and inverted Mill's ratios for those predictions were inserted as regressors into the main (second-stage) equation to eliminate possible selection bias.

In the instrumental variable regressions I used similar (2-step) approach. But here, the fist stage model was simple linear model on dummies, and the predicted values from the first stage were inserted in the main regression as explanatory variables[23].

The regression on extraction change from 1998 to 2002 showed no influence of any of new owners on the change in efficiency (see table 10), while in regression on the utilization change, small private dummy appeared significant and positive. This suggests that small owners raised more (or reduced less) the usage of capacities of their plants than the FIGs or managers of non-private plants did.

[23] The output for instrumental variable regression can be seen in appendix 3, table A3, while in the text I present the results for Heckman's regression only.

Table 10. Regression (second stage) output: determinants of performance change from 1998 to 2002.

	Dep. variable: log of performance change:			
	extraction		utilization	
	coeff	lambda	Coeff	lambda
Performance lagged	-0.000	-	-1.415**	-
Small private dummy	0.005	0.125**	0.360**	1.345
FIG(agro)dummy	-0.002	-0.059	0.212	0.670
FIG(divers.)dummy	0.002	-0.008	0.134	0.473
Constant	0.054	-	-1.244	-
Adj. Rsq	*0.00*		*0.16*	

*** -significant at level of significance 1%, ** 5%, * 10%
Number of plants 117, number of FIG-affiliated 18 (diversified) and 12 (agro); number of small private-owned 31.
Data source: UkrZukorProm Ltd.

The above results show that the FIG-affiliated plants did not become more efficient neither in sugar extraction, nor in increase of utilization of the resources of the plants (i.e expanding the usage of plant's potential). So, the natural question appears: for what reasons the FIG-affiliated plants invest, if investments do not go for increase of plants' performance?

The conclusion for this part may be that FIGs do not invest to raise their productivity. However, the productivity can be not the aim of investments, while the target could be the reduction of variable costs of production here. To check this idea, we should use the cost and revenue data, and compare the average costs of the plants, which are determined as variable costs for each kilogram of sugar produced.

From the table 11, we can see that for the period 2001-2002, average cost in production of sugar was decreased, on average, only for the plants affiliated with the agriculture-oriented FIGs (however, this reduction is not statistically significant), while for the other groups of plants it was increased. The increase is even statistically significant – for the affiliated with diversified FIGs, and for small privately owned plants. So, only the agro-FIGs seem to be interested in

reduction of production costs, while the diversified FIGs seem to invest in sugar industry for other reasons.

Table 11. Descriptive statistics of average costs changes [24]

Average costs	average		Min		Max		p-value of change hypothesis	
Groups of plants	2001	2002	2001	2002	2001	2002		Hypot. Alternative
Not privatized	17.4	22.9	5.8	1.3	40.6	139.7	0.185	2002> 2001
Small private	14.3	19.5	0.6	0.1	37.4	55.5	0.052*	2002> 2001
FIGs (agro)	24.3	21.9	15.1	14.1	41.2	39.2	0.375	2002< 2001
FIGs (divers)	12.5	15.3	5.4	4.6	23.9	37.1	0.052*	2002> 2001

Number of observations: 53; FIG-affiliated plants: 13 (diversified) and 6 (agro); small private-owned plants: 19.
Source: registry Database.

To reveal the relationship between the investment and performance, I propose the following regression model:

$$Ln(AC/AC_{-1}) = a + b*AC_{-1} + c0*I + c1*PRIV + c2*FIG\_agro + c3*FIG\_div + d1*I*FIG\_div + d2*I*FIG\_agro + d3*I*PRIV + f*\lambda$$

Where AC is cost of kilogram of sugar produced in the year 2002, and AC_{-1} is the same for 2001, I is investment level for 2002, (here estimated as increase in primary value of capital from beginning to end of year, i.e $I = Ln(K/K_{-1})$, FIG_div, FIG_agro, and $PRIV$ are ownership dummies, and λ is vector of inverted Mill's ratios from the selection equation (from Heckman's 2-step procedure: on the firs step of this estimation, the same exogenous variables were used is in the Heckman's for technical changes, see output for it in the appendix 3, table A4).

[24] Note that in this case, decrease of performance change means increase in efficiency

Table 12 Determinants of cost efficiency change, from 2001 to 2002

Dep. Var.: LOG (Average costs change)			
	coeff	p-value	lambda
Average cost 2001	0.004	0.31	-
Investment	0.137	0.281	-
Small private dummy	0.236	0.338	0.481
FIG (agro) dummy	-1.131	0.802	0.772
FIG (divers) dummy	0.041	0.802	-1.702
Investment*Small private dummy	1.290***	0.002	-
Investment*FIG(agro) dummy	9.271	0.972	-
Investment*FIG(divers) dummy	-2.639	0.508	-
Constant	0.770	0.667	-

Adj. R_sq = 0.17 *** -significant at level of significance 1%, ** 5%, * 10%
Number of observations: 53; FIG-affiliated plants: 13 (diversified) and 6 (agro); small private-owned plants: 19.
Data source: Registry database

Table 12a Wald test for coefficients restrictions.

Ho	F-stat	p-value	decision
Inv.+Inv*Small_pr._dummy = 0	10.59	0.002	regect
Inv.+Inv*FIG(agro) dummy = 0	0.16	0.692	not reject
Inv.+Inv*FIG(diver) dummy = 0	0.46	0.503	not reject

The presented above regression output shows that for the small private owners, investments lead to (statistically significant) increase of costs of production. Maybe, this is the reason why they do not invest, on average. Also we see that reduction of the costs hardly is the motive for the investments of FIGs in their affiliated sugar plants, even if the sugar industry is important for activity of other enterprises of FIGs (i.e. in case of agriculture-oriented Groups).

So, there is no evidence that investments of FIG-affiliated plants (even agriculture-oriented) lead to the production costs reduction.

Another variant is possible, that FIGs are investing in their sugar capacities they invest to reduce the costs of production of sugar at a higher level of production than it is allowed to them now, as it is showed in the figure 1 below. So, in this case, the average cost should decrease with rise in sugar production.

To study this hypothesis, I extend the above presented model, inserting log of increase in sugar output from 2001 to 2002 there (and interacting it with the dummies). The result of this regression could be seen in the appendix 4 (table A5). The model showed that there is no influence of sales change on decrease of average costs for FIG-affiliated plants.

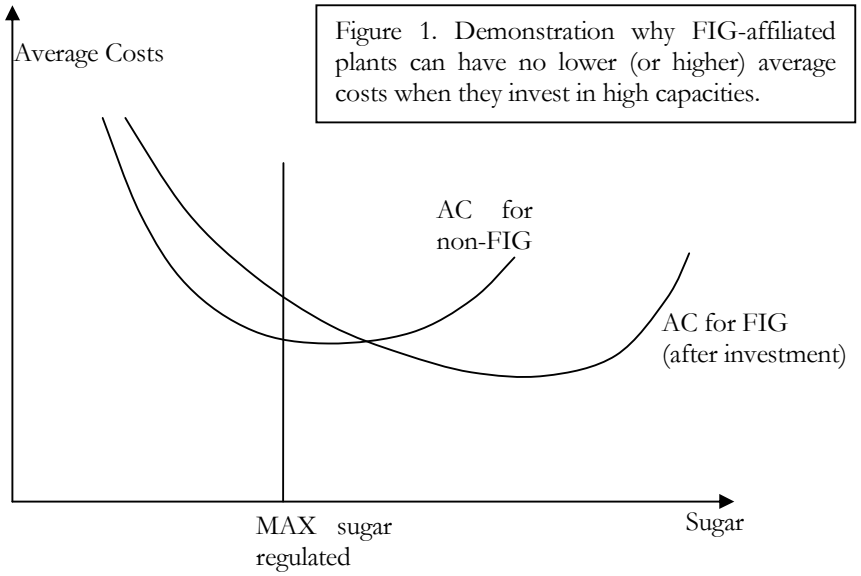

Figure 1. Demonstration why FIG-affiliated plants can have no lower (or higher) average costs when they invest in high capacities.

All the presented above supports the idea that the reason for investments in FIGs might be the attempt to reduce costs of taxation, or that there exists a money laundering process inside the FIGs. Another explanation of such a phenomena could be that sugar plants under the FIGs' ownership experience soft budget constraint, so that they "invest" improperly. Unfortunately, we cannot distinct between those suggestions. But, the only thing we can say, is that FIGs do not make their affiliated enterprises more procuctive, or more cost efficient, or more efficient in usage of the capacity of the plants.

Chapter 5

CONCLUSIONS

From the study of the activity of FIGs in Ukrainian sugar industry, we can conclude that FIGs tend to purchase larger and more efficient plants, while afterwards they do not do anything to raise the efficiency of the acquired enterprises. In the contrast, plants privatised by the small owners tend to increase their performance, in order to survive. The danger to go bankrupt is not sufficient for the FIG-affiliated plants, especially if the FIGs are diversified (however, too small period of time is considered here to support this evidence with high level of statistical significance), while for the other plants it exists. Those statements lead to the conclusion that FIG-affiliated plants are working under the conditions of soft budget constraint, and can be supported financially by the main company in any time, while the budget constraint is much harder for the other enterprises, which force them to close or try to increase their performance.

FIG-affiliated sugar plants are investing (using not only internal funds) while the other plants are divesting, on average. The investments of enterprises affiliated with FIGs do not raise their productivity or production volume, and do not reduce the average costs of production. This can suggest that investments are not determined by the purpose of development of the plants. So, the FIGs can use investments as means of taxation avoidance for the other enterprises[25], or they can use investment as means of money laundering. Another possible explanation for such low effect of investments can be the mentioned above soft budget constraint, which allows improper usage of funds.

[25] If the sugar plant is registered as the agricultural enterprises (as in most cases is), then investments into it imply considerable tax remissions in Ukraine, according to legislation.

The general conclusion of my study (from the period of consideration) is that FIG affiliation can be beneficial for the plants in two aspects: it allows decrease of budget constraint for the plants, and can guarantee from bankruptcy even if the plants is of low efficiency. On the other side, (may be due to soft budget constraint), FIG –ownership of the plant does not raise its performance, which suggests that purchase of the (sugar) plant by the FIG will not imply further increase in performance of it, and does not guarantee solving of all the problems that exist on that plant.

The latter statement is supported by the recent anecdotal evidences, however only a more deep research with including the most recent periods can support those conclusions statistically. As it is known to me, the recent sugar market is shared between the Groups (the mass privatization occurred in early and late 2003 and is occurring now), so only after the finishing of privatization process we would be able to see the real relationships between affiliation with large Groups and efficiency.

As a result of my study, I can conclude that affiliation with FIGs can be beneficial for the managers of the plants (soft budget constraint etc.), but not for the workers, because obtaining the "big" owners does not lead to the improvement of situations on the plants. So, the policy of regional administrations that limits the access of the large diversified FIGs is justifiable. And, more, similar cautions should be used while allowing the agriculture conglomerates' access to the plants. The latter is especially important if we remind that agricultural FIGs can acquire plants to close them in order to reduce competition in the sugar market. Thus, the acquisition of sugar plants by "big" owners should be restricted by the authorities if no justified investment plan is proposed by such a "potential investor".

Also the conclusions of my study can be useful in defining the role of FIGs in the Ukrainian economy. As we see, except softening budget constraints, no other benefits from existence of the FIGs for the affiliated plants experience.

But the softened budget constraint is negatively influencing the wish to improve for the plants, so that without existence of FIGs the industry could develop more (or at least not less) dynamically. The conclusion, however, can be treated carefully, as the study of separate industry does not show the full picture of FIGs' activities n the whole economy.

In general, we can conclude that, on average[26], FIGs do not create added value for their affiliates, whether the affiliates are important assets of FIGs, or not, while they do soften the budget constraints for those plants.

[26] Here, I would like to note, that in my analysis only the average tendency can be revealed, while for more precise results, the analysis of individual activities of each FIG should be held.

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APPENDIX 1

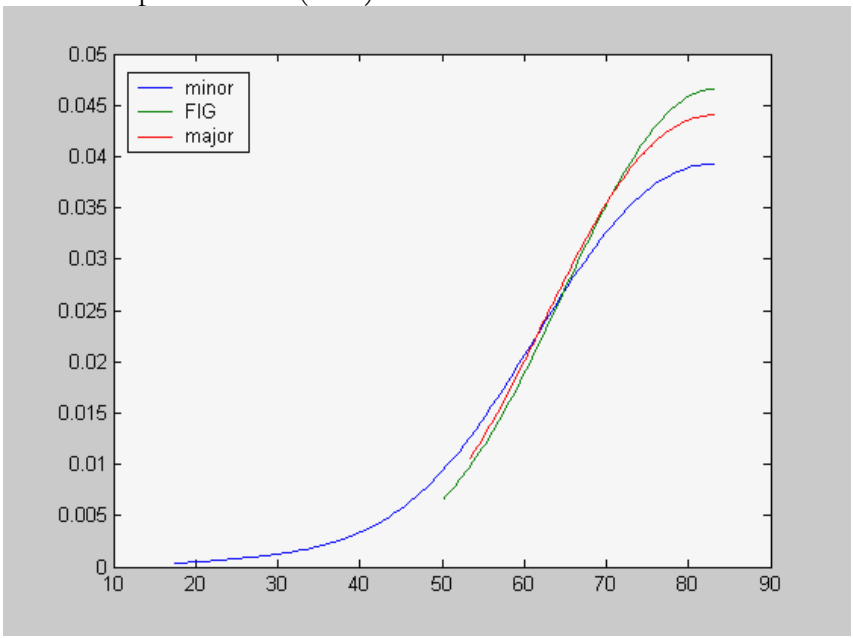
Table A1. Descriptive statistics for the parameters for sugar plants, 1998

	mean	st. dev	min	max
Planned capacity, tones of beet per day	2.69	1.34	0.75	9.48
Utilization of planned capacity, %	36	16.57	8	88
Road distane from regional center to plant, km	94	51.64	1	278
Sugar extraction coefficient, %	74.2	5.49	53.1	82.6

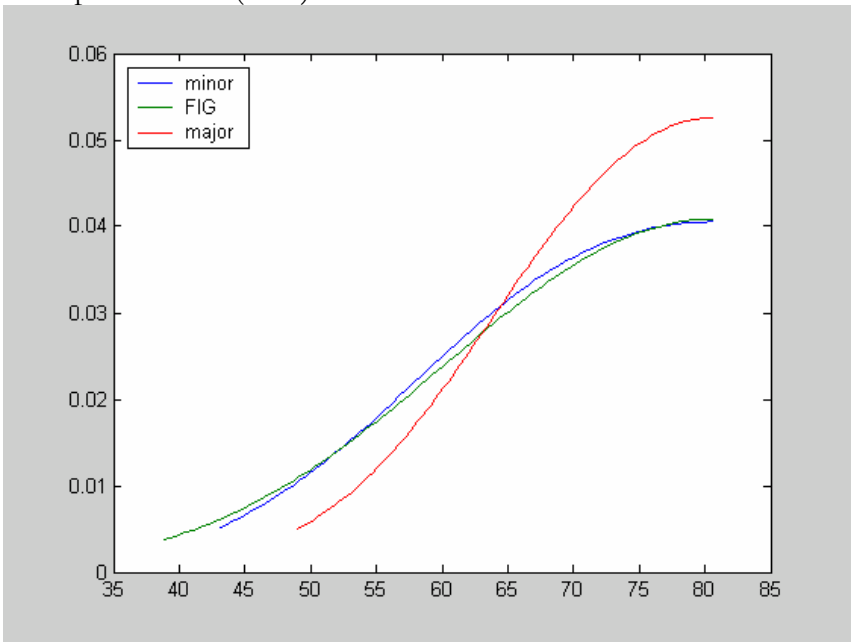
APPENDIX 2

Extraction coefficients (in %) distribution functions for 3 groups of companies

Before the privatization (1998)



After privatization (2002)



APPENDIX 3

Table A2.
Multinomial logit equation output for the first step of Heckman's estimation procedure, to avoid possible selection bias in estimating dependence of technical efficiencies parameters change on the ownership structure.

	Small private	FIGs (agro)	FIGs (divers)
Planned capacity	0.649***	1.266***	0.593**
Utilization 98	3.995***	0.722	2.953
Extraction 98	-0.011	0.009	-0.009
Distance to reg. center	-0.001	-0.008	-0.253***
Constant	-2.888	-5.792	-1.293

Pseudo R-sq = 0.168 N=117

Table A3.
Instrumental Variable regression and simple OLS regression outputs for the technical efficiencies change models:

	Dep. variable: log of performance change:			
	extraction		utilization	
	coeff (IV)	coeff (OLS)	coeff (IV)	coeff (OLS)
Performance lagged	-0.000	-0.000	2.366	-1.805***
Small privat dummy	-0.096	0.002	-6.548	0.313**
FIG(agro)dummy	0.037	0.004	0.998	0.070
FIG(divers.)dummy	0.026	0.002	-1.366	0.085
Const	-0.011	-0.015	0.919	0.636***
Adj. Rsq	*0*	*0*	*0*	*0.17*

Instruments used: planned capacity of plant, distance from regional center to the plant, lagged extraction coefficients and utilization of the plants.

Table A4.
Multinomial logit regression output for selection equation (first step of Heckman's procedure), to avoid possible selection bias in bias in estimating dependence of average cost change on the ownership structure.

	Small private	FIGs (agro)	FIGs (divers)
Average cost 2001	-0.084*	0.024	-0.121**
Investment 2002	0.017	0.078	0.048*
Distacne to reg. center	-0.007	-0.032**	-0.029**
Planned capacity	0.457*	1.069***	0.595*
Constant	0.824	-2.485	2.496*

N=53, Pseudo R_sq = 0.229

APPENDIX 4

Table A5. Output of the study of influence of increase in size on decrease of unit costs for different groups of enterprises. Second step regression output.

Dep. Var.: LOG (Average costs change)			
	coeff	p-value	Lambda
Average cost 2001	-0.037*	0.099	-
Investment	0.259	0.132	-
Production change	-1.877***	0.001	
Small private dummy	0.091	0.706	2.798
FIG (agro) dummy	-0.069	0.852	-0.074
FIG (divers) dummy	-0.069	0.800	0.582
Investment*Small private dummy	1.243***	0.002	-
Prod_change*Small private dummy	0.387	0.565	-
Prod_change*FIG(agro) dummy	0.545	0.551	-
Prod_change*FIG(divers) dummy	1.176**	0.046	-
Constant	-1.371	0.536	-

Wald test showed insignificance of increase in output for decrease of costs for both groups of FIG-affiliated plants.

Table A6. Multinomial logit regression output for selection equation (first step of Heckman's procedure for model presented in table A5)

	Small private	FIGs (agro)	FIGs (divers)
Average cost 2001	-0.092*	0.022	-0.130**
Investment 2002	0.755	6.77	3.040
Distacne to reg. center	-0.007	-0.032**	-0.029**
Planned capacity	0.425	1.048***	0.560*
Sugar production shange	-0.913	-0.738	-0.790
Constant	0.987	-2.334	2.812*