

dr. Janez Beš ter

Institute for Economic Research

Kardeljeva pl. 17

1000 LJUBLJANA

SLOVENIA

e-mail: BESTERJ@IER.SI

ph: + 386 1 4 328 151

fax: + 386 1 5 342 760

**TAKEOVER THEORIES AND PREDICTION MODELS
- THE CASE OF SLOVENIAN PRIVATISED COMPANIES**

ABSTRACT

There are numerous motives that stimulate investors (bidders) in the market for corporate control to compete for the right to manage the assets of other companies (targets). These motives are not only numerous and different in nature, they can also be conflicting and dynamically changing during the process of each takeover – statistical models that predict takeover probabilities for individual companies in general will be crippled by this complexity of the real life.

If different bidders have different preferences about characteristics of potential targets and these characteristics are at least partially reflected in publicly available information, then a model predicting probability of becoming a takeover target for individual companies is by definition sub-optimal. Obviously, the continual race of researchers to prove whose or which theory is the ‘right one’ is doomed to be fruitless.

I test this hypothesis by constructing and comparing a set of ordered probit models for 38 takeover motives and for the probability of takeover, as well. The analysis is based on a sample of 275 privatised companies in Slovenia (24.1% of the population). Set of explanatory variables consists of financial ratios derived from individual financial statements of the companies, other selected publicly available information and additional data gathered with questionnaires. The empirical investigation shows that the hypothesis stated above cannot be rejected.

1. INTRODUCTION

The intensity of takeovers measured by their frequency and size has been growing significantly during the last decade. This is the case not only for the USA or UK but also for the rest of the world, including continental Europe (Sudarsanam, 1995; Wagstyl, 1997; Reed, 1999). Takeovers are also the inseparable companion of the process called globalisation. Besides growth in their number, what is even more striking, is the size of individual international takeovers that has by far surpassed everything that corporate world has seen ever in the past. This is especially true for the automobile producers, banking and telecommunications industries, but also for other sectors of economic activity (Daimler - Chrysler, Deutsche Bank AG - Bankers Trust Corporation, Mannesmann - Vodafone).

On the other hand, privatisation in most of the so called 'transition economies' is practically finished. This is the case also for Slovenia, which has started this process back in 1993, and is now facing a whole new set of problems and opportunities - previously unknown to this economy. Highly dispersed ownership structure, which is the outcome of Slovenian privatisation model, lack of financial tradition, masses of unsophisticated shareholders are only some of the characteristics of the present Slovenian capital market and the market for corporate control, as well.¹

Intensity, techniques and overall importance of takeovers vary from country to country substantially, depending on corporate governance mechanisms, size and structure of the capital markets, importance of banks and other sources of capital, legislature, tradition, etc. Therefore significant differences can be expected between countries in the relevance of individual takeover motives, number of takeovers and also in their economic consequences.

Nevertheless, the hypothesis that was in this research tested on a sample of Slovenian companies is expected to be universal. While the relevance of individual takeover motives will change in time and will be different in different environments, the main issue is, that there is no single motive or theory that can explain the whole set of takeovers. Different motives can (not necessarily or always) be related to different preferences of bidders about desired characteristics of potential target companies. Obvious consequence of this simple fact are the problems with constructing prediction models for future takeovers.² In this paper I investigate this hypothesis by constructing a set of models for takeover probability and 38 takeover motives.

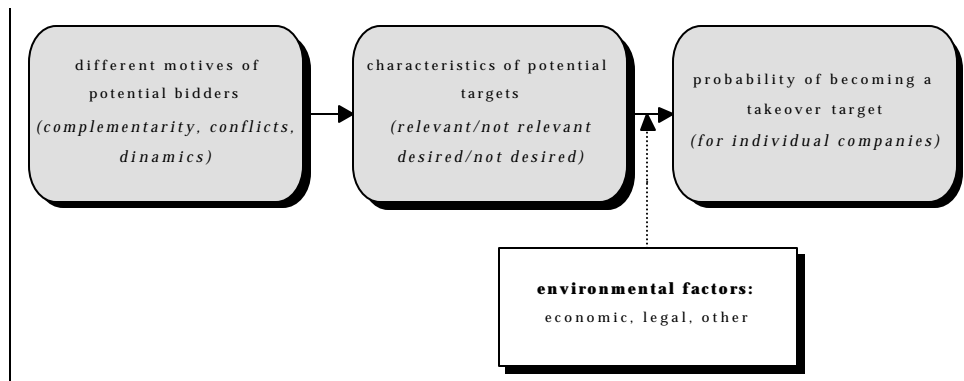
¹ More about privatisation in Slovenia and its consequences see Mramor 1996, 2000 and Ribnikar 1996, 1999.

² Prediction models never stopped to attract attention of researchers and investors in the capital market. The reason is in the takeover premiums, that average around 30% but can reach even more than 100%

2. TAKEOVER THEORIES AND PREDICTION MODELS

Study of extensive literature (books, manuals, articles, research papers, etc.) dealing with takeovers, their motives and economic effects, has revealed that scientific area of takeovers is extremely broad, heterogeneous in its nature – even eclectic – and even more it is dynamically changing all the time (for a systematic overview see Weston, Chung and Hoag, 1990). There is no dominant explanation (theory or hypothesis) with ambition and realistic potential to scientifically rationalise a wide set of different takeovers, which are direct or indirect outcomes of numerous, complementary or conflicting, and sometimes even offsetting motives.

Figure 1: Fuzzy logic of takeovers



But in spite of a vast number of empirical research papers dealing with takeovers, there is still a *gap in understanding the causal logic between different motives of different potential bidders, characteristics of potential targets (companies), and probability that a certain company will actually become a takeover target*. Especially the empirical research, which is directed towards construction of more efficient *prediction models*, seems to be seriously crippled by the fact that *the complexity and dynamics of motives* has not been given satisfactory attention, yet. Another important conclusion that can be drawn from comparing different studies and prediction models (for a comparative overview see Rees, 1990) is the simple fact, that different researchers use different samples (size, time, location, selection criteria) and find different sets of financial ratios and other information as statistically significant – sometimes this are (even) partially the same, but directions of

in individual takeovers. Investors, that would be able to predict future targets of takeovers better than other investors in the market, could make extra profits. Obviously the best performing prediction models are not to be published in academic literature – at least not while they are still functioning – they should be (and probably are, if they exist) exploited in the real life.

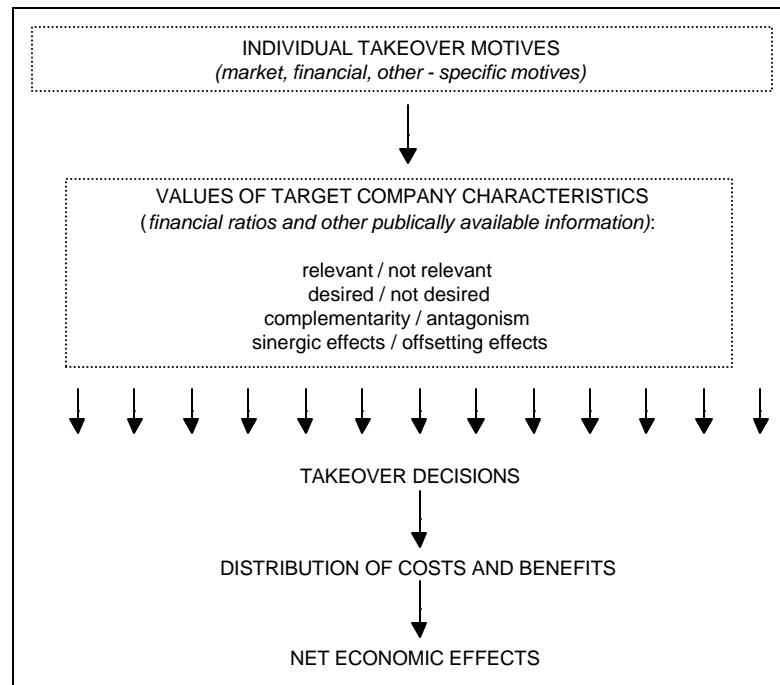
relations are different. Testing the prediction power of models on the same data (or parts of the same sample), that was used to construct them, will usually result in overly optimistic evaluation of their quality. Since, there are not two different studies (at least not known to the author of this article) that revealed the same set of explanatory variables as statistically significant, it seems necessary to further investigate the background of this phenomena.

That is why the main emphasis in my research has been given to a set of possible motives, that make different investors become bidders for other companies - called targets. I hypothesise, that different motives of bidders are reflected in their different preferences about characteristics of target companies. These characteristics are at least partially visible to the capital market by evaluating publicly available information. Among others, financial statements reported by individual companies offer a source to produce a set of financial ratios that can be used - in combination with other publicly available information - to predict the importance of individual motives for individual target companies.

Since there can be more than one potential bidder interested for the same target company, while motives of these bidders can be the same or different (complementary, conflicting, offsetting), I hypothesise, that general models predicting takeover probability for individual companies are at least in some cases crippled in their efficiency due to statistically significant offsetting relations.³ These are studied thoroughly in the empirical investigation.

³ More about methodology in financial analysis and prediction models for takeovers see Rees, 1990.

Figure 2: Motives - complementarities and offsetting effects



3. METHODOLOGY AND SAMPLE

The population of companies, that was addressed by a questionnaire, was defined on the basis of an objective criteria: Slovenian companies that were privatised by 01.04.1998 (1139 companies) - more accurately - they acquired the 'second approval' from the Agency of Republic of Slovenia for Restructuring and Privatisation as a necessary condition for Court Registry entry. The questionnaire was prepared, tested and sent to all 1139 companies.⁴ In the first round 155 questionnaires were collected from these companies and in the second round (to the rest of the companies - 984 - questionnaires were sent again) additional 125. Alltogether the size of the sample was 275 privatised Slovenian companies and the overall response rate was 24.1%.

To obtain further information necessary to complete the project, interviews with governmental officials and with managers of some privatised companies were organised and executed. These meetings proved to be very informative and helpful in assessing the progress of privatisation and its consequences in Slovenia, including intensifying takeover activity. Additional information was gathered using Internet and home pages of several other governmental and non-governmental

⁴ Questionnaire was tested on a sample of 15 companies and some minor modifications to original content were made before addressing the whole target population.

institutions like: Agency of the Republic of Slovenia for Securities Market, Agency of the Republic of Slovenia for Restructuring and Privatisation, Slovenian Development Company - all these institutions were also visited personally to either obtain or to verify certain information relevant to the project.

Official financial data about privatised Slovenian companies was obtained from the Agency for Payments (Clearing) and was used to produce a set of financial ratios, which were tested in the empirical analysis.

The empirical analysis was done using standard statistical packages like SPSS and LIMDEP (LIMited DEpendent variables – Greene, 1989). Ordered probit model was used to investigate statistical relations between publicly available information about companies (especially financial ratios) and the estimated probability of takeovers in comparison to estimated importance of individual 38 potential motives for takeovers. Takeover probability and the importance of individual motives to individual companies were gathered using the questionnaire. So the *publicly available information was actually used to predict the answers of the companies' representatives* (highest ranking managers).⁵

Another important question was, why not using actual takeover data instead of gathering management opinions about motives and probability of takeovers. While one good explanation lies in the fact, that number of actually executed takeovers in Slovenia is still relatively small (which was even more true for the years till 1999), this cannot be an argument while analysing data from other capital markets. Nevertheless, there is an even more important reason to use data gathered with questionnaires before takeovers of these companies are actually executed. While predictions of takeover probabilities for individual companies can always be compared to the actual events in the next years, the identification of takeover motives is not an easy task to do at all.

The main question is, when are the answers of the managers about motives for potential takeovers of their companies more and when less biased. If the company was already taken over, than we can expect – both when the new management was appointed or the old one was kept – that the answers

⁵ Top level managers of the companies, that represent a sample of the study, were asked (among others) to evaluate every single motive (38) on a scale from 0 to 4 (*irrelevant* - ... - *very relevant* for the company he/she was representing) and the probability of takeover for their companies on a scale from 0 to 5 (*very unlikely* - ... - *inevitable*). Since the dependent variables in the models were ordered and the independents represented a mix of scale, ordered, nominal and dummy variables (many with problematic distributions), an ordered probit model was selected as the most appropriate statistical tool (see formal explanations in Greene, 1997; Pindyck and Rubinfeld, 1991 and Stanovnik, 1992).

will reflect the opinions of their bidders, i.e. new owners. This is because managers could be afraid to lose their jobs, if they are not loyal to their new owners.

One good example of this logic are officially announced takeover motives of bidders that typically differ from those that are communicated to the shareholders and the public by target companies' managers (definitely true in hostile takeovers). Therefore it is less likely, that answers of the managers will be biased before takeovers are actually executed or even announced, than later, when they are expected to support the opinions of the new 'bosses'.

Using questionnaire to assess opinions of highest ranking managers about takeover perspectives of their companies in relation to the characteristics of these companies (that are publicly available) brings a fresh new look at the 'old problems'. It is also important that this methodology is applicable in any other capital market. Actually the fact, that there are huge databases for thousands of takeovers available for countries like USA and UK, could have diverted the attention of researchers from more primary questions that can further clarify the logics of takeovers in general.

4. RESULTS AND COMMENTS

In the empirical analysis, I test the hypothesis that different motives of bidders can best be explained using different sets of publicly available information and even more, that some of the motives will have different directions of relations with the same explanatory variables – signs of coefficient estimates in the model will be different. The test is done by constructing and comparing a set of ordered probit models for 38 motives as well as for the probability of takeover in general.

4.1. PREDICTING PROBABILITY OF TAKEOVER FOR INDIVIDUAL COMPANIES

Overall, there are more than 60% of companies in the sample, that have rated the probability of becoming a takeover target in the next few years as moderate, high or very high.⁶ 28% of the companies have also stated, that they know exactly, who their potential bidders are.

Explanatory variables that represent publicly available information and were tested in the models are made of three different sets:

⁶ Their answers were transformed from verbal to numerical: moderate – 3, high – 4 and very high – 5.

- financial and other ratios calculated from financial statements of the companies,
- dummies for branches,
- dummies for other publicly available information:
 1. is the company listed in the stock market,
 2. have the shares of the company been accepted to the Central Securities Clearing Corporation Registry - CSCC (shares issued in a book entry form),
 3. is the Law on Takeovers applicable for the company.

Following, I present the results of the model predicting answers of the company representatives about their perceptions of the probability that their companies will be taken over during the next few years.

Table 1: Estimation of the ordered probit model – probability of takeover

Variable	Coefficient estimate	Asymptotic standard error
<i>Financial ratios:</i>		
BDVZ – gross value added per employee	-0.0001 ^c	0.0000
CW – cost of labour per employee	0.0001 ^b	0.0001
<i>Dummies for branches:</i>		
SKD_24 - chemicals	0.6117 ^c	0.3288
SKD_30 - electronics	0.9260 ^a	0.3596
SKD_34 - transport equipment	-0.7202 ^c	0.3807
SKD_36 - furniture	-1.8202 ^a	0.5740
SKD_50 - wholesale/retail	0.3783 ^b	0.1680
<i>Other dummies:</i>		
KA12 - company is delaying registration of its shares with the CSCC	0.3212 ^b	0.1610
KA63 - does not know whether the Law on Takeovers is applicable for the company	-0.2996 ^b	0.1497

Summary statistics

Number of observations = 271

$L(c) = -432.18$

$L(\alpha) = -410.07$

$\chi^2(9) = 44.210$

Note:

- $L(c)$ denotes the value of the likelihood function assuming all the coefficients (except the constant) are zero.
- $L(\alpha)$ denotes the value of the likelihood function on sample.
- ^a $p < 0.01$; ^b $p < 0.05$; ^c $p < 0.10$

The main conclusions are the following:

1. The probability, that the predicted probability of takeover will be higher, decreases with the increase in gross value added per employee (all other things being equal).

2. The probability, that the predicted probability of takeover will be higher, increases with the increase in labour cost per employee (all other things being equal).

To put it simply, representatives of companies with higher labour cost and/or lower gross value per employee were most likely to predict the probability of takeover of their companies higher than other representatives of the companies in the sample. In other words, the probability of takeover was higher for companies with lower labour productivity and/or higher wages.

While there were no market ratios tested in the analysis – market values like share prices were available only for 13 out of 275 companies in the sample – it is very interesting, that in this model there is not a single standard financial ratio (representing profitability, liquidity, short and long term paying ability, leverage etc.) – 33 were tested – statistically significant at an acceptable level ($p \leq 0.10$). I investigated this finding further with ordered probit models for individual motives. The results are summarised in Table 3.

Also, companies in some of the branches were more likely to have higher perceptions of takeover probabilities than others – chemicals, electronics and wholesale/retail. On the other side, producers of transport equipment and furniture were more likely than companies from all other branches to evaluate the probability of takeover as very low.

The probability, that the predicted probability of takeover will be higher, is also true for companies that have been delaying registration of their shares with the CSCC (they could have seen a defence mechanism against takeovers in this behaviour) and/or companies, whose representatives were not sure whether the Law on Takeovers is applicable in case of their companies or not.

4.2. INDIVIDUAL MOTIVES AND EXPLANATORY VARIABLES

In the following table there is a list of 38 motives, which were thoroughly analysed in the ordered probit models. Listing includes frequencies and averages for individual motives. In this table we can see, that market motives are expected to prevail over financial and other – more specific motives. Market motives are also expected to be the major driving force for foreign investors seeking takeover opportunities in Slovenia.

Table 2: Takeover motives – frequencies and averages (in decreasing order)

Rank	Motives	Answers	1	2	3	4	5	n	Average
1	B – acquiring market share (in Slovenia) of the target company		53	30	43	58	74	258	3.27
2	C – quick entry into Slovenian market (foreign bidder)		96	29	38	58	37	258	2.66
3	V – high quality of human resources in the target company		75	34	81	52	16	258	2.61
4	F – interesting products/services of target company		90	32	63	50	23	258	2.55
5	Y – economies of scope		86	39	69	50	14	258	2.48
6	Z – financial synergies		93	37	71	42	12	255	2.38
7	E – acquiring distribution channels of the target company		105	49	41	38	25	258	2.34
8	X – economies of scale		92	47	67	44	6	256	2.32
9	W – lower labour cost		91	52	65	43	7	258	2.31
10	Q – stable and relatively large cash flows		95	55	59	34	15	258	2.30
11	M – undervaluation of the target company		95	52	66	37	8	258	2.27
12	S – technologically advanced production		102	44	67	35	10	258	2.25
13	T – unutilised production capacity		95	59	64	33	7	258	2.22
14	J – eliminating a competitor in Slovenia (probable closedown of the target)		118	45	41	30	24	258	2.21
15	H – strategic realignment		105	45	77	20	11	258	2.17
16	R – unutilised credit potential		110	57	42	37	9	255	2.13
17	P – free (excess) cash flows of the bidder		110	47	63	27	8	255	2.12
18	A – fast growth		117	44	63	22	12	258	2.10
19	HH – ‘split up’ – takeover and sale of parts of the company		120	49	37	29	15	250	2.08
20	G – diversification		110	54	66	22	6	258	2.07
21	DD – management replacement		109	59	67	16	7	258	2.04
22	K – securing supplies (target company as a critical supplier of inputs)		131	47	39	25	14	256	2.00
23	U – high quality of R&D department		122	57	44	28	7	258	2.00
24	GG – speculation		125	45	38	23	13	244	1.99
25	EE – replacement of the members of the supervisory board		125	57	49	19	8	258	1.95
26	L – securing sales (target company as a critical buyer of bidders outputs)		135	47	46	22	8	258	1.92
27	BB – concessions		139	48	24	23	15	249	1.90
28	AA – tax minimisation		124	67	37	19	8	255	1.90
29	II – hubris		132	62	32	17	8	251	1.83
30	N – high price/earnings ratio		135	60	48	10	5	258	1.80
31	I – eliminating a competitor in the foreign markets (probable closedown)		169	33	23	18	13	256	1.72
32	O – low price/earnings ratio		144	66	41	6	1	258	1.66
33	D – access to market shares of the target in foreign markets		168	36	17	15	12	248	1.66
34	JJ – political motives		159	43	26	14	6	248	1.65
35	LL – defence motives		150	47	34	12	2	245	1.65
36	CC – patents, licences		164	51	23	14	4	256	1.61
37	KK – money laundering		167	45	30	6	2	250	1.52
38	FF – stock market quotation		174	43	14	2	1	234	1.35

Note: above data is derived from the ordered probit models for individual motives – due to singularity problems some companies were removed from the sample for individual motives.

Results of the ordered probit models for individual motives compared to the model for probability of takeovers are summarised in Table 3. Statistically significant predictive variables, that represent publicly available information and have demonstrated different (offsetting) directions of relations, are listed (*+ and - signs are used to denote the direction of relation*) and marked by asterisk (*). There are also other variables listed, that were statistically significant in 6 or more models (motives).

Different sets of statistically significant explanatory variables in the models for individual motives already support the hypothesis, that bidders with different takeover motives differ in their attitude towards selected characteristics of target companies. What is even more convincing is that there are also several explanatory variables that are statistically significant in more than one model, but the directions of their relations to the values of individual motives are not the same. In Table 3 these are marked by asterisk: 8 financial ratios, 10 branches (dummies) and 3 dummies for other publicly available information about companies. This means, that bidders with certain motives prefer higher values of certain variables (representing characteristics of target companies), other bidders with different motives prefer lower values of the same variables and in the third group there are potential bidders that are indifferent towards values of these same variables. This finding shows us that prediction models, that do not take into account this fact of possible counter-effects, will be at least sub optimal if not useless.

5. CONCLUSIONS – DISCUSSION

The empirical research has proved that different motives, which were tested in statistical models, differ in their importance for individual companies in the sample. Some of them are considered very relevant for most of the companies and others only for specific groups of companies (for instance in some of the branches). Also the impact of perceived importance of individual motives on general probability of becoming a takeover target is not homogeneous.

I have also found out, that market motives are expected to dominate (in opinion of managers from Slovenian sample of privatised companies) the takeover process in Slovenia. Especially foreign bidders are expected to take over Slovenian companies to gain access to their market shares - mainly in Slovenia. On the average, financial and other more specific motives seem to be less important than market motives.

Testing a number of financial ratios and other publicly available information in ordered probit models also proved, that different motives of bidders are reflected in different preferences about characteristics of target companies. In other words, *bidders select targets by setting up the criteria that is dependent on their motives. Different motives mean different criteria and therefore different 'desired' characteristics of potential targets.* This means, that the same quality (reflected in publicly available information) of the target company may be desirable by one

bidder and not desirable by another. Actually, the same target company may be interesting to the second bidder for another of its qualities, that is irrelevant or even unacceptable by the first one. The model predicting probability of a takeover for such a company is crippled by the fact that the predictive power of the variable representing such a quality of the target company will be nullified due to counter-effects of different expectations - desired target characteristics - of the two or more (groups of) bidders.

The statistical verification of the hypothesis explained above has not only important theoretical, but also interesting practical implications. Different bidders can have different motives, even when trying to gain control of the same target company, which also means, that the economic outcome of such takeovers can be different - depending on which bidder/motive wins the 'takeover battle'.

REFERENCES

1. *Greene H. William: LIMDEP – Version 5.1. New York : Econometric Software, 1989.*
2. *Greene H. William: Econometric Analysis. Upper Saddle River (New Jersey) : Prentice-Hall, 1997.*
3. *Mramor Dušan: Financial Behaviour of Slovenian Companies. Portorož : Zveza ekonomistov Slovenije, Zveza računovodij, finančnikov in revizorjev Slovenije, 2000.*
4. *Mramor Dušan: Primary Privatization Goal in Economies in Transition. The International Review of Financial Analysis, Birmingham (Alabama), 5(1996), 2.*
5. *Pindyck S. Robert, Rubinfeld L. Daniel: Econometric Models and Economic Forecasts. New York : McGraw-Hill, 1991.*
6. *Reed Stanley: Buyout Fever! LBOs changed dealmaking in America. Will they change Europe, too?, Business Week, New York, (1999), June 14.*
7. *Rees Bill: Financial Analysis. New York : Prentice Hall, 1990.*
8. *Ribnikar Ivan: Who Would be the Best Owners of Slovenian Companies? Slovenska ekonomska revija, Ljubljana, 47(1996), 4.*
9. *Ribnikar Ivan: Kdo bo vladal podjetjem. Gospodarski vestnik, Ljubljana, 48(1999), 51.*
10. *Stanovnik Tine: Perception of poverty and income satisfaction. Journal of Economic Psychology, Amsterdam, 13(1992), 1.*
11. *Sudarsanam P. S.: The Essence of Mergers and Acquisitions. London : Prentice Hall, 1995.*
12. *Wagstyl Stefan: Arranged marriages: Pan-European mergers are all the rage. Financial Times, London, (1997), October 14.*
13. *Weston J. Fred, Chung S. Kwang, Hoag E. Susan: Mergers, Restructuring, and Corporate Control. Englewood Cliffs (N.J.) : Prentice Hall, 1990.*