Voluntary Liquidations: An Empirical Study

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Abstract: *A number of studies have analyzed the effect of voluntary corporate liquidations on shareholder wealth. Others have examined some specific aspects, such as procedural and tax differences, of voluntary liquidating firms. In this paper we perform a preliminary study of the characteristics of firms that voluntary liquidate using a logit model. The paper avoids some of the methodological flaws of commonly used binary state prediction models with different sample and population distributions.*
Key Words: *Financial distress / Liquidation / Corporate divestiture / Self-off.*

Liquidación voluntaria: un estudio empírico
Resumen: *Numerosos trabajos han analizado el efecto de la liquidación voluntaria de empresas en la riqueza de los accionistas. Otros han examinado aspectos concretos de las empresas que se liquidan voluntariamente, como por ejemplo las diferencias en los procedimientos y en la fiscalidad. En este artículo estudiamos algunas características de dichas empresas utilizando un modelo logit. El trabajo evita algunos fallos metodológicos de los modelos binarios de predicción cuando las distribuciones de la muestra y de la población difieren.*
Palabras clave: *Crisis financiera / Liquidación voluntaria / Venta de activos.*

INTRODUCTION

The shareholder wealth effects of corporate divestiture decisions (spin-offs and partial sell-offs) has been widely analyzed in the literature. Some examples are: Hite and Owers (1983), Schipper and Smith (1983), Alexander, Benson and Kampmeyer (1984), Rosenfeld (1984), and Jain (1985). Generally, a positive and significant abnormal stock response is found upon the announcement of such divestitures.

An extreme case of corporate divestiture is a complete sell-off or liquidation. In a liquidation the firm sells its assets to one or more acquirers, ceasing to exist as a corporate entity. The proceeds of these sales are used to pay outstanding obligations and any remaining funds are distributed to shareholders as liquidating dividends. The liquidation is voluntary when the firm is not under bankruptcy pressure, and managers, acting in the best interests of the shareholders, decide to liquidate the firm.

The effect of voluntary liquidation announcements on shareholder wealth has also been studied in the literature. Typically, a positive stock response has been found (see Skantz and Marchesini, 1987, and Kim and Schatzberg, 1987, among others), suggesting that if a firm decides to liquidate, it is because the firm is worth more dead than alive.

These studies have tried to explain the rationale for voluntary corporate liquidations. Skantz and Marchesini (1987) offer three hypotheses. The first one is the existence of agency problems as a consequence of poor management. They find, however, evidence against this idea since, in their sample: a) liquidating firms tend to have accounting profitability measures according with their industries standards, b) liquidations are often proposed by the firm managers and directors and are unopposed by shareholders, and c) in many cases managers own an important proportion of common shares. The second theory is the elimination of diseconomies for excessive diversification. As before, they do not find support for this idea, since their sample contained many diversified firms and only a few of them described the inability to manage their company as the reason for liquidation. The third hypothesis states that firms voluntary liquidate because there exists a favorable tax effect from Section 337 of the Internal Revenue Code (the "12-months" liquidation method): the corporation avoids taxes on accounting gains from the sale of the assets. Because of the preferential tax treatment, this theory predicts that the gain in voluntary liquidations should be greater than in mergers and sell-offs even if the underlying economic reasons driving the transactions are similar. The authors analyze 37 voluntary liquidations and find an average stock price increase in the month of the announcement of 21%, consistent with the special tax treatment hypothesis.

Kim and Schatzberg (1987) study the procedural and tax differences between voluntary liquidations, partial sell-offs, taxable mergers and non-taxable mergers. They argue that a liquidation can generate higher sales proceeds than a merger if the multiple acquirers can redeploy the assets into higher-valued uses than can a single acquirer (in case of mergers). Another difference between liquidations and mergers is that liquidations create potential wealth transfers between creditors and stockholders, since in a liquidation the selling firm must retire its debt prior to maturity at face value (or at a slight risk premium if the debt indentitures require prepayment penalties). However, in their sample they do not find evidence of this wealth transfer effect. After analyzing a sample of 73 voluntary liquidations, they find an increase in the price of the stock of the liquidating firms of 14% for the three days surrounding the announcement, plus another 3% increase when stockholders confirm the liquidation. They also find that stockholders of the acquiring firms neither gain nor lose. They conclude that liquidating firm's assets have been underutilized before liquidation, and that voluntary liquidations lead to higher-value reallocations of corporate resources.

Hite, Owers, and Rogers (1987) also investigate the valuation consequences of voluntary proposals to sell part or all of a corporation's assets, and they find a positive stock performance of 12.24% for the day of the announcement.

Similar findings are obtained by Kudla (1988) and Petty, Martin, and Kensinger (1999). They argue that the favorable tax treatment for gains on sale of corporate assets, having a buyer willing to pay a premium for the assets, and a high degree of insider ownership facilitate voluntary corporate liquidations.

More recently, Mehran, Nogler and Schwartz (1998) study CEO's incentives to liquidate their firms. The authors find that liquidation decisions increase shareholder value and are indeed influenced by CEO incentive plans.

Hence, these studies suggest that the value of the firm as a liquidating concern is greater than the value of the firm as a going concern. However, we know little about the characteristics of firms that voluntary liquidate. This paper uses a logit procedure (corrected for biases) to know what is special about firms that decide voluntary to liquidate.

The rest of the article is organized as follows. Next section presents some methodological aspects of the binary state prediction models. Section 3 describes the data and methods used. The empirical results are presented in Section 4. Finally, Section 5 summarizes and concludes the paper.

METHODOLOGICAL ISSUES

In this section we discuss some methodological flaws in binary state prediction models and we study how to avoid these problems.

Palepu (1986) analyzes empirical binary state prediction models of corporate takeovers. He argues that existing estimation methods presuppose an exogenous sampling process, that is, one in which a sequence of decision makers are drawn and their choice behaviors are observed.

However, the typical procedure used in binary state prediction models is to draw a sample with approximately equal number of previously selected firms and randomly selected ones. This sampling procedure is not purely random. It can be described as a choice based sampling process (see Manski and Lerman, 1977, and Manski and McFadden, 1981). Here, a sequence of chosen alternatives is drawn and the characteristics of the decision makers selecting those alternatives are observed. Unlike in pure random sampling, a firm's probability of being selected into the choice based sample is a function of its liquidation status, i.e., whether a firm voluntary liquidates or not. Thus, common estimation procedures lead to biased and incorrect inferences.

To see the nature of the bias, consider a firm i in the population with a probability p of voluntary liquidation. Let p' be the probability that the firm i in the sample voluntary liquidates. Using the Bayes' formula, we have that

$$p' = \Pr\big(i \text{ voluntary liquidates (VL)} \,\big|\, i \text{ is sampled}\big)$$

$$= \frac{\Pr(i\,\text{VL}) \times \Pr(i \text{ is sampled} \,|\, i\,\text{VL})}{\Pr(i\,\text{VL}) \times \Pr(i \text{ is sampled} \,|\, i\,\text{VL}) + \Pr(i \text{ no VL}) \times \Pr(i \text{ is sampled} \,|\, i \text{ no VL})}$$

In the case of random sampling, the probability of firm i being sampled is the same whether it voluntary liquidates or not. Hence the above expression simplifies to p. However, under choice based sampling, this is not so. If N_1 and N_2 are the number of voluntary liquidations and non-voluntary-liquidations in the population, and n_1 and n_2 are the corresponding numbers in the sample, then

$$p' = \frac{p\left(\dfrac{n_1}{N_1}\right)}{p\left(\dfrac{n_1}{N_1}\right) + (1-p)\left(\dfrac{n_2}{N_2}\right)} \qquad (1)$$

If maximum likelihood procedure (MLE) is used to estimate the model parameters and choice probabilities, the *sample* likelihood function is maximized. When a choice based sample is used, the sample likelihood is obtained using p'. The maximization of the sample likelihood, thus, yields an unbiased estimator of p'. Since p' is not equal to p, the procedure does not yield an unbiased estimator of p, the population voluntary liquidation probability. The resulting bias can be calculated as follows

$$p' - p = \frac{\left(\dfrac{n_1}{N_1} - \dfrac{n_2}{N_2}\right)p(1-p)}{p\left(\dfrac{n_1}{N_1}\right) + (1-p)\left(\dfrac{n_2}{N_2}\right)}$$

Since usually N_1 is much smaller than N_2 and n_1 is close to n_2, then $p' - p > 0$, thus, the estimated probability overstates the true ones.

The bias is directly proportional to the difference in the sampling ratios of liquidating firms and non-liquidating ones. This bias in the estimated probabilities does not alter the relative ranking of firms in terms of their liquidation probabilities. However, when the biased estima-

tes of the liquidation probabilities are used to predict voluntary liquidating firms and non-voluntary-liquidating firms, the observed prediction accuracies do not reflect the true predictive ability of the model.

Obviously, the bias can be eliminated if the entire population is used to estimate the model. The problem is that the computational cost can increase substantially and that we cannot use a "hold-out" sample to test the predictive power of the model. Alternative ways to reduce the bias are the conditional maximum likelihood estimation (CMLE) and the weighted maximum likelihood estimation (WMLE) procedures (see Manski and McFadden, 1981).

THE EMPIRICAL STUDY

We employ a logit model in this study to specify the relationship between the characteristics of the firm and the probability of voluntary liquidation in a given period. The model is estimated by the maximum likelihood estimation procedure.

Let $p(i,t)$ be the probability that firm i will voluntary liquidate in period t, $x(i,t)$ a vector of firm characteristics, and β a vector of unknown parameters to be estimated. Then, the logit model states that

$$p(i,t) = \frac{1}{1 + \exp(-\beta x(i,t))} \qquad (2)$$

To select the variables that could explain voluntary liquidations, we look at the factors commonly used in the financial literature as predictors of business failure. For example, Altman (1968), using discriminant analysis, concludes that the significant financial ratios as predictors of corporate bankruptcy are: working capital over total assets, retained earnings over total assets, earnings before interest and taxes over total assets, market value of equity over total debt, and sales over total assets. Similar results can be

found in Ohlson (1980) and Barniv and Raveh (1989). Moreover, Skogsvik (1990), using factor analysis, finds the following factors to be helpful in predicting the performance of a firm: profitability, cost structure, capital turnover, liquidity, asset structure, financial structure and growth.

Thus, we consider the following firm characteristics in this study:

– Profitability: measured by the ratios of net income over total assets, *NI/TA*, and retained earnings over total assets, *RE/TA*.
– Change in profitability: given by the annual growth rate of the *NI/TA* ratio,

$$PCHAN = \frac{\Delta(NI/TA)}{NI/TA}$$

– Sales growth: annual growth rate of net sales,

$$GROWTH = \frac{\Delta SALES}{SALES}$$

– Leverage ratio: ratio of long-term debt to long-term debt plus equity,

$$LEV = \frac{DEBT}{DEBT + EQUITY}$$

– Liquidity: measured by the ratios of working capital to total assets, *WC/TA*, and current assets to current liabilities, *CA/CL*.
– Size: given by the natural logarithmic of total assets, *L-SIZE* = ln(*TA*).
– Efficiency: measured by the ratio of net sales to total assets, *SALES/TA*.
– Secured debt proportion: percentage of total long-term debt that has been secured to creditors, that is

$$SDEBT = \frac{SEC.DEBT}{DEBT}$$

– Intangible assets proportion: ratio of intangible assets to total assets, *INTA = INTA/TA*.

Following Palepu (1986), we averaged those variables over three years in order to obtain more stable estimates[2].

THE SAMPLE

The population from which we extract the sample consists of all U.S. firms listed in the Standard and Poor's COMPUSTAT Industrial file during the period 1980 through 1989[3]. Up to 2,370 firms were identified.

We select the sample of liquidating firms from the COMPUSTAT Research file, which lists firms removed from the COMPUSTAT Industrial file for merger or acquisition, going private, bankruptcy, or liquidation. To finally identify firms that voluntary liquidated, as well as the month in which the board of directors recommended liquidation, the Wall Street Journal Index was used. Out of the 84 firms that were selected from the COMPUSTAT Research file, 22 voluntary corporate liquidations were identified (after eliminating observations with insufficient data for our purposes).

In Table 1 we list the names, SIC codes and liquidation months for our sample and in Table 2 we provide the frequency distribution of voluntary liquidations during the 1980's in the United States. We see that almost all the liquidations took place in the first half of the decade.

Table 1.- List of voluntary liquidating firms

Name of the firm	SIC code	Liquidation month
American Mfg. Co.	2200	May 1980
Amerifin Corp.	6799	Oct 1984
Anta Corp.	3350	Apr 1985
Barber Oil Corp.	1220	Jun 1981
Bayuk Cigars Inc.	2100	Jul 1982
City Investing Co.	6799	Sep 1985
Conroy Inc.	2510	Nov 1984
Consolidated Refining	3350	Dec 1982
Cowless Communications	4833	Dec 1982
Dyneer Corp.	3714	Aug 1986
General Growth Prop.	6798	Sep 1985
Great Basins Petroleum	1311	Aug 1982
Gulf United Corp.	6311	Jan 1984
Heizer Corp.	6799	Mar 1985
House of Ronnie	2300	Aug 1981
Kaiser Industries Corp.	3312	Jan 1980
Mansfield Tire & Rubber Co.	2400	Jan 1981
R.H. Medical Services	3851	May 1981
Raymond Industries Inc.	3572	Feb 1985
U.V. Industries Inc. Liq. Trust	6799	Mar 1980
U.S. Realty Investments	6798	Jan 1983
United Buying Service	5961	Apr 1985
The sample consists of 22 firms that voluntary liquidated in the U.S. from 1980 through 1989.		

Table 2.- Frequency distributions of corporate voluntary liquidations

Year	Number of liquidations
1980	3
1981	4
1982	4
1983	1
1984	3
1985	6
1986	1
1987	0
1988	0
1989	0
The sample consists of 22 firms that voluntary liquidated in the U.S. from 1980 through 1989.	

We draw a randomly selected sample of non-liquidating firms from the 2,370 firms listed in the COMPUSTAT Industrial tape. These firms were located sequentially on a file. Then, 60 random numbers between 1 and 2,370 were generated. Firms whose register in the file was given by these random numbers were selected. Of these firms, 56 had enough data to be included in the sample of non-liquidating firms.

Thus, a sample of 22 firms that voluntary liquidated during the period 1980 through 1989, and a random sample of 56 firms that did not voluntary liquidated as of 1989, form the total sample of 78 firms used for the estimation of the model.

MODEL ESTIMATION

Since we use choice based sampling, we will estimate the sample probability of liquidation, p', and not the population probability of voluntary liquidation, p.

Given that all available voluntary liquidating firms are selected, we have that $n_1 = N_1 = 22$. However, out of the 2,370 non-voluntary-liquidating firms, only 56 firms (2.4%) are included in the sample, so, $n_2 = 56$ and $N_2 = 2,370$. Thus, the relationship between p' and p as given by (1) is

$$p' = \frac{p}{p + 0.024(1 - p)}$$

Because we are assuming a logit model for p in equation (2), we can write that

$$
p' = \frac{1}{1 + 0.024 \exp(-\beta x(i,t))}
$$
$$
= \frac{1}{1 + \exp(\ln(0.024) - \beta x(i,t))}
\tag{3}
$$

Note that the functional form of p' is also logistic. We can now estimate model (3) by the maximum likelihood procedure. The estimators of the parameters that determine the population probability p can easily be recovered since all the parameters other than the constant term in the model are unaffected, and the constant terms in the two models differ by a known value.

When estimating the model, the dependent variable is assigned a value of one for firms that voluntary liquidated and zero otherwise. In this paper, we estimate model (3) using a weighted logit model (Manski and Lerman, 1977). The estimation procedure is the same as that of the logit model, but the observations are weighted (scaled) taking into account the difference proportions of 1's and 0's in the population and in the sample.

To compute the weights, note that the proportion of 1's and 0's in the sample are 22/78 = 0.2820 and 56/78 = 0.7180 respectively. On the other hand, the corresponding true proportions of 1's and 0's in the population are 22/(22+2,370) = 0.009197 and 2,370/(22+2,370) = 0.990803 respectively. Thus the 1's are over represented in the sample by while the 0's are under represented. To obtain the right mix in the sample, we have to scale down the 1's by 0.009197/0.2820 = 0.0326, and to scale up the 0's by 0.990803 / 0.7180 = 1.3800.

RESULTS

WITHOUT CONSIDERING CHOICE BASED SAMPLING

Two different models are estimated in Table 3. The only difference between these models is that, as a result of its insignificance, the variable *INTA/TA* has been left out in the second model[4]. In both cases, the parameters of the models have been estimated by ordinary least squares (OLS) and by the logit procedure. OLS estimates are

used as initial values of the maximization of the likelihood function procedure in the logit analysis. Because of its high correlation with the variable *RE/TA*, and to avoid multicollinearity problems, the variable *NI/TA* is finally not included in the models.

Table 3.- Logistic regressions models of voluntary liquidations

Variable	Model 1 LOGIT	Model 2 LOGIT	Model 2 CHOICE-LOGIT
GROWTH	-5.1381 (0.0133)	-5.1801 (0.0099)	-5.1801 (0.0981)
PCHAN	0.5016 (0.0996)	0.4595 (0.0899)	0.4595 (0.8331)
L-SIZE	-0.5985 (0.0219)	-0.6057 (0.0181)	-0.6057 (0.1767)
CA/CL	0.2264 (0.1149)	0.2521 (0.0722)	0.2521 (0.4214)
WC/TA	-4.5944 (0.0405)	-4.2880 (0.0396)	-4.2880 (0.3268)
INTA/TA	-13.2559 (0.2285)		
SDEBT	-1.6294 (0.1638)	-1.4277 (0.2044)	-1.4277 (0.8331)
LEV	1.0235 (0.1511)	1.0073 (0.1485)	1.0073 (0.6714)
RE/TA	4.8310 (0.0134)	4.2005 (0.0130)	4.2005 (0.3669)
INTERCEPT	1.5941 (0.3693)	1.4019 (0.4209)	-2.3278 (0.7058)

The sample consists of 22 firms that voluntary liquidated in the U.S. from 1980 through 1989 and a random sample of 56 firms that did not voluntary liquidated as of 1989, and that were listed in the Standard and Poor's COMPUSTAT Industrial file. CHOICE-LOGIT and LOGIT refers to the logistic model adjusted and not-adjusted for choice based sampling, respectively. P-values are given in parenthesis.

From the results of the logit analysis applied to the first model, we see that five variables are significant at the 10% significance level. The variable *GROWTH* has negative and significant coefficient, indicating that firms that voluntary liquidate are likely to have negative sales growth rates at least in the three years preceding the liquidation. This could be consistent with the hypothesis of incompetent management.

Surprisingly, the coefficient of the variable *PCHAN* is positive and significant. This suggests that the liquidating firms show increasing net income to total assets ratios in the years preceding liquidation. It seems contradictory with the fact, mentioned above, that the growth of sales of the liquidating firms is negative. A possible explanation for this result is that the liquidating firms offer decreasing dividend payout ratios, and the li-

quidation process is thought to be one way to get returns from the investment in the stocks of the firms (consistent with the hypothesis of market undervaluation of the firm). The positive and significant coefficient of the ratio of retained earnings to total assets seems to reinforce this idea.

The variable *L-SIZE* has a negative and significant coefficient estimate, indicating that, in our sample, voluntary liquidating firms are smaller than firms non-liquidating firms. This seems to be inconsistent with the diseconomy for excessive diversification hypothesis. However the amount of total assets is not a very good proxy for the degree of diversification of a firm.

We expect the variables *INTA/TA* and *SDEBT* to exhibit negative coefficients, consistent with the idea that the higher the proportion of intangible assets and the higher the proportion of secured debt, the lower the probability of voluntary liquidation. The reason is that the presence of greater amounts of intangible assets and secured debt make it more difficult for shareholders to get the proceeds from the sales of the assets of the firm. Unfortunately, we find that neither of the two coefficients are significantly different from zero at 10% level.

The liquidity measure in terms of working capital over total assets, *WC/TA*, shows, as expected, that liquidating firms have lower liquidity than non-liquidating ones. This result is significant at 5% confidence level.

It was also found that the leverage ratio and the current assets to current liability ratio are positively related with the probability of voluntary liquidation. However these results are not significant.

CONSIDERING CHOICE BASED SAMPLING

The last column of Table 3 shows the parameter estimates corrected for choice based sampling as explained before. Note that the estimators of the coefficient of the variables are the same as those of the "uncorrected" logit model (except for the intercept term). However, the standard deviation of the parameter estimators is much higher and the resulting p-values are much higher. As a consequence, out of the five significant variables in the original logit model,

GROWTH is the only one that remains significant. As before, *GROWTH* is negatively related with the probability of voluntary liquidation.

Thus, when we correct for the fact that the true proportion of voluntary liquidating firms in the population is much lower than in our sample, the explanatory power of the model decreases significantly. This is consistent with our discussion in Section 2, where it was shown that the probability that a firm voluntary liquidates given that the firm had been sampled, p', is in general greater than the true probability, p. With the uncorrected logit model, what we really estimate is p', while with the choice-logit model what we estimate is p. Since, in general, $p' > p$, with the uncorrected logit model we overstates the true probability of liquidation and obtain more explanatory power.

SUMMARY AND CONCLUSIONS

Several empirical studies have analyzed the wealth effect of corporate divestiture decisions on the shareholders of the divesting firms. It is generally found a positive and significant abnormal stock response to the announcement of such divestitures.

An extreme case of corporate divestitures occurs when the firm voluntarily decides to liquidate. The effect of voluntary liquidation announcements has also been studied in the literature. Similar to other cases of divestitures, a positive stock response to the announcement of voluntary liquidations has been found. However these studies have not constructed any statistical model to analyze the characteristics of the liquidating firms or predict when a firm would voluntary liquidate. This has been the goal of the present paper.

A binary state logit model has been used to study which variables are significant in predicting when a firm may voluntary liquidate. Because the proportion of "target" firms in the sample is greater than in the population, common binary state prediction models using conventional estimation models overstate the true probabilities. This flaw has been avoided here by using a choice sample based logit model.

The results seem to indicate that if we do not take into account the mentioned correction, firms that voluntary liquidate have lower sales growth, are smaller in terms of total assets, have lower liquidity, and show higher retained earnings over total assets and increases in retained earnings over total assets ratios. The last two results appear to be inconsistent with our findings of negative correlation between sales growth and the probability of voluntary liquidation. However, one possible explanation is that liquidating firms have low dividend payout ratios while the stock is underpriced in the market. Thus, the only way shareholders can get returns from their investment in the firm is by selling its assets.

When the choice based sample effect is considered, the results, are, as expected, much weaker. The only significant variable is sales growth. As before, we find that liquidating firms exhibit lower sales growth than non-liquidating firms.

NOTES

1. I would like to thank two anonymous referees for their helpful comments. All errors are my own.
2. We repeated the analysis without averaging the variables and we achieved similar results.
3. The sample period ends in 1989 for no special reason other than data availability problems.
4. Zmijewski (1984) and Pindado and Rodrigues (2004), among others, show that a binary discriminant model does not need too many explanatory variables to be efficient.

REFERENCES

ALEXANDER, G.P.; BENSONM P.G.; KAMPMEYER, J.K. (1984): "Investigating the Valuation Effects of Announcements of Voluntary Corporate Sell-Offs", *Journal of Finance*, vol. 39, pp. 503-517.

ALTMAN, E.I. (1968): "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy", *Journal of Finance*, vol. 23, núm. 4, pp. 589-609.

BARNIV, R.; RAVEH, A. (1989): "Identifying Financial Distress: A New Nonparametric Approach", *Journal of Business Finance & Accounting*, vol. 16, núm. 3, pp. 361-383.

HITE, G.L.; OWERS, J.E. (1983): "Security Price Reactions Around Corporate Spin-Off Announcements", *Journal of Financial Economics*, vol. 12, pp. 409-436.

HITE, G.L.; OWERS, J.E.; ROGERS, R.C. (1987): "The Market for Interfirm Assets Sales: Partial Sell-Offs and Total Liquidations", *Journal of Financial Economics*, vol. 18, pp. 229-252.

JAIN, P.C. (1985): "The Effect of Voluntary Sell-Off Announcements on Shareholder Wealth", *Journal of Finance*, vol. 40, pp. 209-224.

KIM, E.H.; SCHATZBERG, J.D. (1987): "Voluntary Corporate Liquidations", *Journal of Financial Economics*, vol. 19, pp. 311-328.

KUDLA, R.J. (1988): *Voluntary Corporate Liquidations*. Westport, CT: Quorum Books.

MANSKI, C.F.; LERMAN, S.R. (1977): "The Estimation of Choice Probabilities from Choice Based Samples", *Econometrica*, vol. 45, núm. 8, pp. 1977-1988.

MANSKI, C.F.; MCFADDEN, D. (1981): "Alternative Estimators and Sample Designs for Discrete Choice Analysis", in C.F. Manski and D. McFadden [ed.]: *Structural Analysis of Discrete Data with Econometric Applications*. Cambridge, MA: MIT Press.

MEHRAN, H.; NOGLER, G.E.; SCHWARTZ, K.B. (1998): "CEO Incentive Plans and Corporate Liquidation Policy", *Journal of Financial Economics*, vol. 50, pp. 319-349.

OHLSON, J. (1980): "Financial Ratios and the Probabilistic Prediction of Bankruptcy", *Journal of Accounting Research*, vol. 18, pp. 109-131.

PALEPU, K.G. (1986): "Predicting Takeover Targets, A Methodological and Empirical Analysis", *Journal of Accounting and Economics*, vol. 8, pp. 3-35.

PETTY, J.W.; MARTIN, J.D.; KENSINGER, J.W. (1999): *Harvesting Investments in Private Companies*. Morristown, NJ: Financial Executives Research Foundation.

PINDADO, J.; RODRIGUES, L. (2004): "Parsimonious Models of Financial Distress in Small Companies", *Small Business Economics*, vol. 22, pp. 51-56.

ROSENFELD, J.D. (1984): "Additional Evidence on the Relation between Divestiture Announcements and Shareholder Wealth", *Journal of Finance*, vol. 9, pp. 1437-1448.

SCHIPPER, K.; SMITH, A. (1983): "Effects of Recontracting on Shareholder Wealth: The Case of Voluntary Spin-Offs", *Journal of Financial Economics*, vol. 12, pp. 437-467.

SKOGSVIK, K. (1990): "Current Cost Accounting Ratios as Predictors of Business Failure: The Swedish Case", *Journal of Business Finance & Accounting*, vol. 17, núm. 1, pp. 137-160.

SKANTZ, T.R.; MARCHESINI, R. (1987): "The Effect of Voluntary Corporate Liquidation on Shareholder Wealth", *The Journal of Financial Research*, vol. X-1, pp. 65-75.

ZMIJEWSKI, M. (1984): "Methodological Issues Related to the Estimation of Financial Distress Prediction Models", *Journal of Accounting Research*, Suplement 22, pp. 59-86.