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RISKS MANAGEMENT. MATURITY OF THE SAMPLE AND SURVIVAL ANALYSIS

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Abstract: Risk management is relatively unexplored in Romania. Present paper follows previous research of Constangioara on issues relevant to risks management (Constangioara, 2008). Particularly I use a Hungarian dataset of consumer loan investigating the maturity of the sample and its implications on default estimates.

1. Introduction.

There are several issues that might bias the analysis of credit risk. A first issue is that the monitoring period of arrears is short, which raises the question regarding the maturity of the accounts. Immature accounts are considered those which do not have time to "go bad". In practice behavioral scorecards need to rely on at least a two years observation period. This issue is particularly relevant for transition economies, as Natasa Sarlija et all (2007) have found in a study using Croatian data. In the consequent analysis I have used an anonymous Hungarian dataset of 5060 observations of existing accounts of loans for personal needs to investigate the maturity of sample due to its implications on default estimates.

2. Maturity analysis.

The reliability of the predicted defaults depends, among other considerations, on the maturity of the accounts. The accounts were opened from May to August 2005. Arrears are registered only in three observation periods: November 2005, January 2006 and February 2006. The short observation period of the arrears raises the question about their maturity.

Most accounts in the dataset have accumulated arrears after four, five or six months - 66% of all the accounts who ever accumulate arrears are in this situation. After eight months, the number of accounts who accumulate debt drops significantly (there is only one account in this situation). However the issue of the maturity of the accounts is still unanswered because there are only 314 accounts older than 8 months in the sample (6.2% of all the accounts). Moreover, within a given tenure period, the proportion of accounts with arrears increases with tenure; for accounts with 9 months tenure the ratio is 0.10%, more than twice the overall sample's ratio (0.04%). This indicates the possibility that the sample is immature. However further investigation is needed to in this issue.

I have conducted a Cox Regression analysis of the survival of accounts, using a forward stepwise method for model specification. Hazard rate is the probability of instantaneous occurrence of an event conditional on the fact that the event has not occurred until that moment. Thus hazard rate is defined by the relations:

$$\lim_{h \to o} pr(t < T < t + h \mid T \geq t) \qquad (1)$$

$$\lambda(t \mid x) = \exp(x'b)\lambda(t) \qquad (2)$$

$\lambda(t)$ is the baseline hazard. The coefficients of the regression are statistically $\lambda(t)$ significant (p<5%). Also the change in -2 Log Likelihood for each step of the stepwise forward selection used to construct the model is also statistically significant (p=0.00). Figure 1 presents the Hazard function.

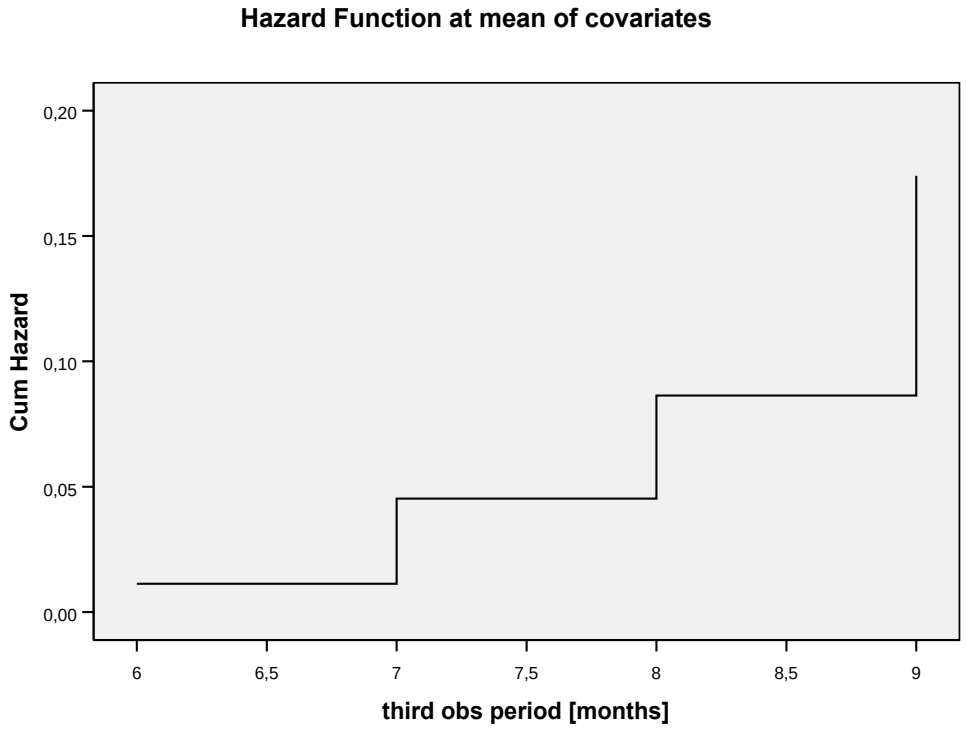

Figure 1 Cumulative Hazard function

The graphical representation of the Hazard Function is not smooth because the small horizon of time used for the analysis. The results of the estimation show that the hazard rate continues to increase after 8 months (hazard rate is 0.08 at 8 months and 0.17 at 9 months). Thus I have found evidence for the immaturity of the accounts. This of course might bias the estimated default probabilities downwards, since the accounts do not have time to mature and accumulate arrears.

Survival analysis also offers relevant information about the factors that determine the survival and hazard functions. The coefficients of the Cox Regressions are presented in Table 1.

Table 1 Coefficients of the Cox Regression

Variables	B	Sig.	Exp(B)
MARITAL	-0.53	0.0	0.58
LIFE_I	-0.34	0.0	0.71
C_ACC	-0.63	0.0	0.53
INC_BAND	0.71	0.0	2.04
TENURE_BAND	-0.54	0.0	0.58

All the coefficients are statistically significant (p=0.00). As in regression estimations, For INC_BAND the hazard increases with the income. This is once again counter-intuitive but in accordance with previous empirical findings (Jacobson and Roszbach, 1998). Same explanation is plausible – there might be personal characteristics of the borrower related with higher income that affect the probability to accumulate arrears. The B-coefficients are not directly interpretable but is possible to determine the predicted change in the hazard for one unit increase in the predictor.

3. Concluding remarks.

Using a 5060 observations sample of Hungarian consumer loans I have investigates the maturity of the sample. In this respect I have analyzed the empirical regularities in the data and I have employed a Survival Analysis. Results show evidence of data immaturity. The accounts simply did not have enough time to go bad.

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