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Effects of debt collection practices on loss given default

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ABSTRACT

In this article, we propose an LGD model that is solely based on legal and internal debt collection actions. Our model is supported by empirical tests in which it performs better than a usual firm specific model. This result is noteworthy when we recall that the model has only binary variables that indicate whether an action was taken. Our model can be applied to update the LGD of distressed firms in a timely manner reflecting the actions taken during the debt collection period. It also can be used to assess the effect of a recovery action and to determine whether to apply an action to certain types of debt.

1. Introduction

Historically, loss given default (LGD) did not receive as much attention as probability of default (PD), although they are both key risk components of credit risk. However, recent regulatory reforms have attracted more interest from both academics and industry practitioners toward LGD; for example, the Basel II agreement allows banks to measure LGD using their internal data via advanced internal rating based approach (AIRB). In consequence, more effort has been put into estimation of LGD breeding many empirical results in the area. But the proprietary nature of loan data kept these results mostly limited to bonds and only recently, led by practitioners and followed by academics, researches on loan LGD has become richer.

Since Altman et al. (1977), there have been two streams of research regarding LGD. One focuses on the relationship between PD and LGD: Frye (2000) suggests a model in which the correlation between PD and LGD is derived from a common economic factor; Jokivuolle and Peura (2003) assume a positive correlation between firm's asset value and collateral value and invent an LGD model based on an option pricing theory where LGD is determined by the stochastic collateral value; Bruche and González-Aguado (2010) show that the correlation between PD and LGD results in a significant increase of credit loss of loan portfolios.

The second stream deals with estimation of LGD focusing on the determinants and/or estimation methods. Factors that are found significant include size of loan, collateral, seniority of debts, product type, firm size, creditworthiness, financial ratios, firm age, industry classification, and macroeconomic condition among others. However, different studies suggest different factors and there is no consensus on these factors except collateral. See Asarnow and Edwards (1995), Hurt and Felsovalyi (1998), Thorburn (2000), Araten et al. (2004), Varma and Cantor (2005), Dermine and Neto de Carvalho (2006), Acharya et al. (2007), Chalupka and Kopecsni (2009), and Grunert and Weber (2009) for more details. The reason for this inconsistency can be attributed to the differences in loan portfolios among banks, lending and debt collection procedures among countries, LGD measurement methods and/or sample periods. Apart from the determinants, there are commonly observed features in the LGD distribution, i.e., left-skewness and bimodality. Bimodality makes OLS estimator inappropriate and has yielded parametric and non-parametric models that attempt to capture the distributional characteristics of LGD. Refer to Renault and Scaillet (2004), Gourieroux and Monfort (2006), Calabrese and Zenga (2010), Bastos (2010), Qi and Zhao (2011), and Loterman et al. (2011) for various estimation approaches. It is generally agreed that generalized linear model (GLM) is better suited for LGD estimation than OLS and nonparametric methods are superior to parametric methods.

Previous studies, however, ignore one important factor that relates to LGD, the legal and institutional devices that can be utilized

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Table 1
Summary statistics of LGD by years. Firms are divided by the year of default and LGD is calculated for each year. 2009 includes only the firms that defaulted before May 31.

Year	*N*	Mean	Median	Std.dev.
1990	10	0.833	0.887	0.226
1991	176	0.926	0.996	0.167
1992	752	0.906	0.995	0.183
1993	1057	0.890	0.995	0.208
1994	1229	0.888	0.995	0.203
1995	1900	0.867	0.995	0.232
1996	1843	0.880	0.995	0.218
1997	2325	0.882	0.995	0.228
1998	4952	0.889	0.996	0.226
1999	3222	0.854	0.996	0.281
2000	2978	0.702	0.992	0.412
2001	4071	0.729	0.990	0.390
2002	3728	0.699	0.982	0.409
2003	6250	0.738	0.993	0.393
2004	7456	0.719	0.990	0.402
2005	7705	0.671	0.953	0.419
2006	6221	0.634	0.902	0.426
2007	4972	0.652	0.922	0.419
2008	5178	0.691	0.953	0.405
2009	2846	0.628	0.892	0.428
Overall	68,871	0.736	0.985	0.384

during the course of lending and debt collection to accelerate recovery. Credit enhancement by collateral, compulsory execution of distressed debt, and application for workout by the debtor all significantly affect recovery of debt and therefore LGD. There are a few papers studying post-default period. These papers mainly focus on what happens during the post-default period and how and why it differs among firms. For example, Bonfim et al. (2012) investigate what happens to firms after default by establishing a set of stylized facts concerning the evolution of corporate default and its resolution, focusing on access to credit after default. However, to our best knowledge, no papers examine the effect of recovery actions on LGD. In this regard, our paper aims to assess how legal and internal recovery enhancing devices and legal means for debtor's credit recovery can affect LGD. These actions are practiced after default occurs and the results of this paper are not directly applicable to an LGD forecast model of normal debts. This is not the purpose of the paper. Rather, the contribution of our work is better described by the following points: (1) Precisely estimating LGD of an insolvent debt is very important for cash flow management and risk management. Our model allows to continuously update the LGD estimate taking the actions practiced during the debt collection period into consideration. (2) Empirical test reveals which action is more effective for LGD mitigation and the same methodology can be deployed to determine whether an action should be taken on a certain type of debt by analyzing the cost and benefit of the action. (3) Lastly, our model establishes a framework to evaluate and possibly invent an internal recovery enhancing device.

Table 2
Summary statistics of LGD by industry. Firms are divided by Korea standard industry classification and LGD is calculated for each industry.

Industry	*N*	Mean	Median	Std.dev.
Agriculture and fishing	202	0.734	0.983	0.385
Food and beverage	1383	0.811	0.991	0.336
Textile and apparel	4744	0.819	0.995	0.331
Wood and furniture	1412	0.755	0.990	0.374
Paper and printing	1822	0.749	0.987	0.372
Oil and chemicals	796	0.753	0.972	0.365
Metals and mining	4584	0.771	0.986	0.351
Computer and electronics	1950	0.791	0.990	0.341
Machinery and equipment	6210	0.772	0.988	0.350
Automotive	1330	0.759	0.985	0.363
Other manufacturing	5516	0.788	0.991	0.345
Utilities	192	0.668	0.938	0.412
Construction	7750	0.682	0.941	0.403
Wholesale and retail	25368	0.715	0.985	0.401
Accommodation	148	0.641	0.960	0.443
Telecommunication	1146	0.680	0.976	0.413
Transportation	1173	0.663	0.939	0.417
Other services	3145	0.668	0.960	0.422

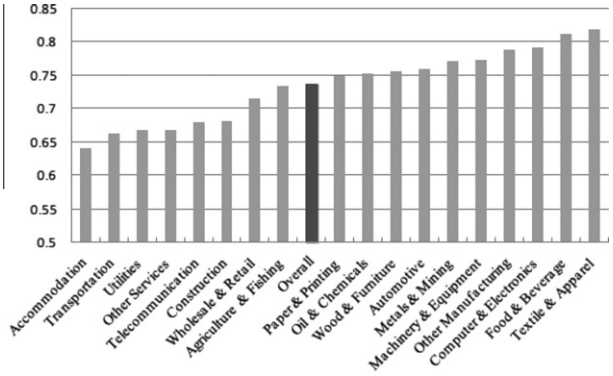

Fig. 1. Mean LGD by industry.

We first propose an LGD model that has only the "recovery related action" variables (henceforth, we call this model *recovery action model*) and compare it with a firm specific factor model. We also combine these two models and examine which model performs best in terms of explanatory power and estimation error. There are three types of recovery related actions we consider in our analysis. The first type is legal debt collection practices that are utilized by the lender in order to compulsorily collect debts: foreclosure, provisional seizure, and injunction are included in this category. The second type is internal devices designed by the lender to enhance debt collection. For example, KODIT, from which we use recovery data for empirical analysis, allows a debtor to amortize its debt when it cannot repay the debt at once. The last type is legal actions taken by the debtor as a means of credit recovery. Though these actions cannot be used at the lender's discretion, they are closely related to LGD and we include these variables. Individual workout, individual rehabilitation, and individual bankruptcy are in this category.

This paper is organized as follows: In Section 2, the data used for empirical analysis are described and the LGD measurement method as well as summary statistics of the data are also presented. In Section 3, two LGD estimation models, *i.e.*, a firm specific model and the recovery action model are described and Section 4 is dedicated to the analysis of estimation results. Finally, concluding remarks are given in Section 5.

2. The data

For empirical analysis, we acquire recovery data from KODIT, Korea Credit Guarantee Fund. KODIT is a public financial institution established in 1976 with the objective of leading balanced development of the national economy by extending credit guarantees for the liabilities of promising SMEs which lack tangible collateral. If a firm with a loan guaranteed by KODIT fails to honor its obligation, KODIT pays the lending bank the principal and interest on behalf of the firm and obtains the right to indemnity against the firm. This mechanism transfers the recovery risk from the bank to KODIT. The recovery risk is typically high as most loans are credit loans without collateral.