Global Credit Data

by banks for banks

05 May 2017

Shipping Finance LGD Study 2017

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ABOUT GCD

Global Credit Data (GCD) is a non-profit association owned by 52 member banks with the simple mission to help banks better understand and model their credit risks through data pooling and benchmarking activities.

GCD started collecting historical loss data in 2005, to which member banks have exclusive access. This database now totals over 150,000 non-retail defaulted loan facilities from around the world. In 2009 GCD introduced a PD database which now covers more than 10 years of data and helps banks to calibrate and benchmark their PD.

The robustness and capacity of GCD's data collection and management infrastructure place GCD databases as the global standards for credit risk data pooling.

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SUMMARY

The shipping industry is the backbone of global trade as most exported goods are transported by ship. More than almost any other sector, it benefits from globalization and economic upturn. This also makes the industry vulnerable to economic downturns. The world of shipping banks has radically changed in recent years. After a decade of boom, the industry was hit very hard by the global economic crisis after 2008. GCD loss data confirms this general observation, showing few defaults in the early 2000's but high default levels starting in 2009.

Upcoming regulatory changes put more pressure on the financing banks, who face the possibility of much higher capital requirements currently under discussion by the Basel Committee, especially for Specialised Lending exposures.

Other requirements like IFRS9/CECL or stress testing/CCAR create the need for more detailed default and loss modelling, especially in respect of term structure and macroeconomic dependency. The long timespan of the GCD database and the detailed cash flow data allow for dedicated LGD time series analysis.

This report shows an excerpt of the work performed on the shipping finance loss data provided by members to the GCD LGD/EAD loss database. Following our motto "by banks for banks" more detailed analytics as well as the raw data set are available to GCD member banks.

In particular, this report provides insights regarding four major questions:

- **Does the data tell the story of why selling the ship is the option of last resort?** Different workout scenarios such as cures, rescheduling or sale of collateral can be analysed with the GCD data set, indicating that selling the ship leads on average to higher loss and is therefore not the preferred or indeed usual course of action taken by banks.

- **What is the impact of collaterization on LGD?** The loan to value ratio (LTV) is one of the main drivers for LGD modelling. The GCD data confirms a strong positive correlation between LTV and LGD.

- **Can you link macroeconomic developments to the LGD curve over time?** The impact of the macroeconomic downturn after the financial crisis is clearly visible in the GCD database, explaining both banks' recovery strategies as well as external economic developments.

- **Is specialised lending actually riskier than corporate finance?** No evidence can be found in the data for a significant difference between the average outcome of Large Corporate Defaults and Specialised Lending defaults, after controlling for similar collateralization.

Member banks are welcome to apply these insights and methods for their internal modelling efforts.

INTRODUCTION

Global Credit Data – established in 2004 - manages the collection of historical LGD, EAD and default observations coming from defaults of its over 50 member banks. The GCD LGD data set is one of the world's largest sources of information on all aspects of LGD modelling, providing data on 153,892 defaulted loans to 84,922 borrowers (June 2016).

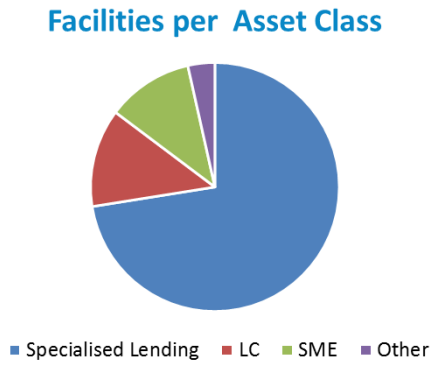
The GCD database is unique in many ways. It contains historical loss data contributed by its member banks involved in shipping finance for defaulted borrowers, loans and collaterals. Covering a history of over 15 years, the database is composed of almost 700 defaulted borrowers with roughly 1,250 loans and 1,600 vessels attached as collaterals coming from 25 different lenders all around the world. In total the exposure sums up to 12.7bn EUR. This makes it the largest loss database in the world for this sector.

In 2016 the member banks involved in shipping finance came together and developed a basic set of analytics to better understand the loan loss drivers that affect LGD and provide a sound foundation when facing the regulatory and internal requirements for a comprehensive risk analysis in shipping finance.

COMPOSITION OF THE DATABASE

Based on transaction data contributed by its member banks, GCD calculates observed nominal and discounted recoveries and LGD values. The data examined in this study is of defaulted shipping borrowers that have subsequently been resolved. The database requires the input of detailed information on the defaulted borrower and the characteristics of the ships serving as collaterals plus details of the timing, amount and nature of every cash flow after default, costs as well as receipts. In this way, members can calculate LGD using their own methods. The LGD levels used here are calculated on the raw data and do not reflect any bank specific portfolio alignment or addition of any statistical uncertainty add-ons.

EXHIBIT 1



Reference Data Set: LGD/EAD database, Shipping (i.e. defaulted loans with a shipping collateral)

Exhibit 1 shows the composition of the shipping data set by Facility Asset class. Specialised lending defaults is the largest segment followed by SME and Large Corporates. 'Others' contains mainly defaults in the private banking segment. SME contains mainly small river/coastal ships (70%).

NOTE ON TERMS USED

LGD refers to Loss Given Default rate which is calculated as 1 – recovery rate. The recovery rate is the net of all cash flows including external costs (using the discounted cash flows where the discount rate is equal to the risk free rate as at the default date). This calculation is made on loan level, capped between [0%,150%].

Time to resolution (TTR) is calculated as the period between the default and the resolution of a borrower.

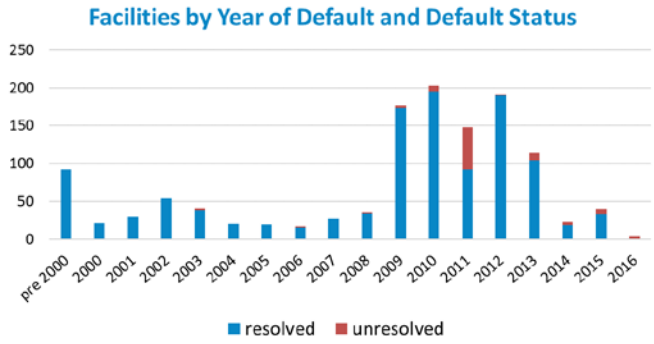
Cure is defined as having time to resolution < 1 year, no write-off and no collateral sale or guarantee call.

Rescheduling: Loans are defined as rescheduled if the borrower returns to performing and the cure definition is not met.

Loan-to-value (LTV) refers to the ratio of the outstanding amount of a loan to the value of the collateral at the default date.

Resolved / unresolved cases: Defaults are considered as 'unresolved' in case banks are still expecting further cash flows. All other cases where the lending bank has closed the recovery file are considered 'resolved'. Resolved cases include cures, reconstruction of the borrower, sale of collateral, etc. and may result in full or partial write-off or no loss at all.

EXHIBIT 2



Reference Data Set: LGD/EAD database, Shipping

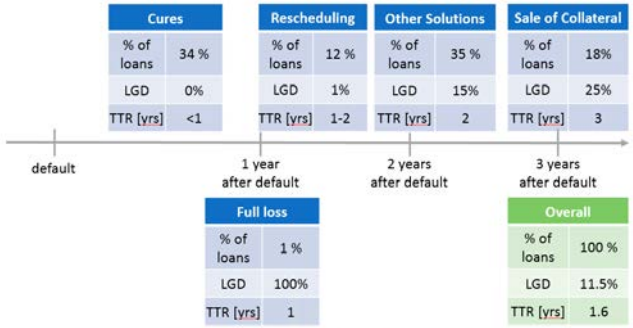
The split of the data by year of default is a good indicator of how the shipping segment flourished in the early 2000's but was heavily hit by the aftermath of the financial crisis in 2008, where default numbers increased significantly. It is also clear that the crisis was composed of two waves with a slight recovery in 2011. Low default numbers for recent years might be due to the so-called resolution bias. The resolution bias refers to the effect of yet unresolved cases which are not fully visible in the reference data set (see PECDC Downturn LGD Study for more details). As not all GCD members deliver unresolved cases, we can expect to see more defaults for 2014 to 2016 delivered in future.

WORKOUT SCENARIOS: DOES THE DATA EXPLAIN WHY SELLING THE SHIP IS THE OPTION OF LAST RESORT?

One of the most interesting questions is what happens to a borrower after the default occurs. Publicly available information on defaults in the shipping industry is restricted to forced sale cases. The actual outcome is a mixture of restructuring efforts by the bank and the capacity of the company to overcome its problem as well as general market conditions. For shipping finance, the quality of the financed collateral plays a crucial role when it comes to the loss severity

a bank is willing to accept. It does not surprise experienced lenders to learn that 34% of the defaults result in a cure, with 0% LGD and time to resolution shorter than one year (see note on terms used for definition of cure and time to resolution). Only 1% of the defaults result in a complete loss. This worst case occurs on average one year after the default, probably reflecting legal or fraud problems with the collaterals, leaving nothing to restructure.

EXHIBIT 3



Reference Dataset: LGD/EAD Database, Shipping, resolved, EAD > 100,000 EUR and year of default ≤2014

12% of the defaults can be successfully rescheduled within the first one to two years resulting in a very small loss. Offering longer payback schemes or temporary suspension of interest payments are instruments used by banks to give companies more time to find new charterers or deal with lower income and so overcome temporary illiquidity.

On average banks seek to sell the collaterals three years after the default, which indicates that this is often the option of last resort for the banks. One reason for that might be the on average relatively high loss rate of 25% which is well above the overall average LGD of 11.5%. To a certain degree this indicates a hen-egg-problem. Do the banks decide to sell the ship because it is a bad loan or is a high loss realized because the bank decides to sell? Banks generally have the power to choose when to start the liquidation process for collaterals. Especially in times of crisis banks might prefer to wait for improved economic conditions before starting liquidation. The long time to resolution for the sale of collateral scenario is a good indicator for time lag assumption in macroeconomic time series analysis.

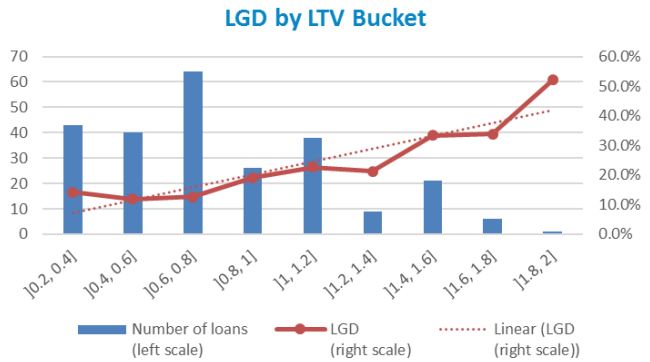
35% of the defaults result in "other solutions" with an LGD of 15%. Examples involve voluntary collateral sale, new equity and debt for equity conversions.

LOAN-TO-VALUE: THE IMPORTANCE OF THE COLLATERAL VALUE FOR THE LGD

LTV is an important metric for lenders and modellers. Typically, the LTV is selected either directly or indirectly as one main driver for LGD modelling of shipping related transactions. Generally, there is a strong correlation between LTV and LGD as shown in Exhibit 4, which illustrates the expected behaviour that the LGD increases with increasing LTV.

The relatively high number of defaults in the range between 0.6 and 0.8 reflects the normal lending behaviour in the banks while higher LTV might already be an indicator of deteriorating collateral values leading to the default event.

EXHIBIT 4



Reference Data Set: LGD/EAD database, Shipping, resolved, EAD > 100,000EUR, 1 Collateral per Loan, homogeneous deal structure, LTV between 0.2 and 2.0

ANALYZING COLLATERALS: WHAT OTHER FACTORS DRIVE LGD?

Besides the pure value of the collateral other factors influence the outcome of a default. In this study, we analyse the underlying collateral structure in more detail to answer the question of whether vessel type, size, age or the rank of the security influence the LGD. The GCD database consists largely of container vessels, dry cargo vessels and tankers although cruise vessels and offshore vessels are also present. Member banks have access to a more detailed insight into the underlying collaterals. Please not that Exhibit 5 to 8 are based on the number of vessels in the data set.

EXHIBIT 5

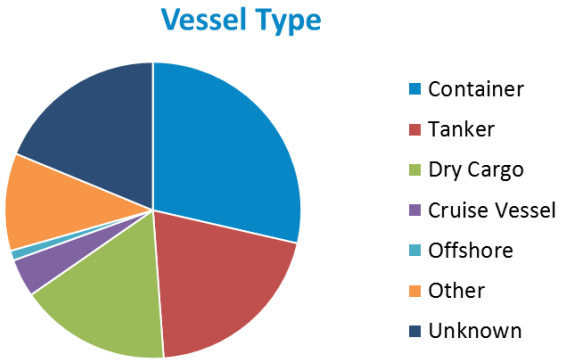
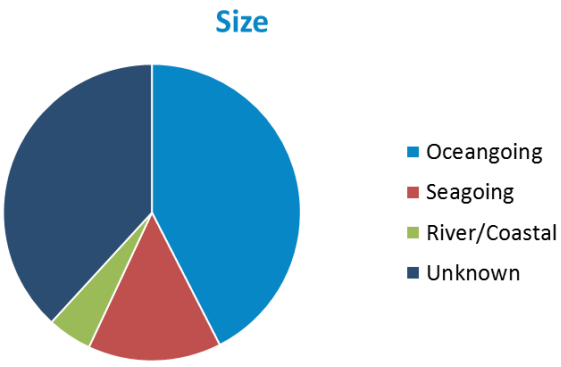


EXHIBIT 6



Most of the vessels are large oceangoing or seagoing ships. River/Coastal ships play a minor role. In terms of age a wide

range from new built until up to over 15 years of vessels are present in the database.

Most of the ships are either first lien or first and pari passu liens which holds especially true for syndicated loans, while second lien collaterals are rare.

EXHIBIT 7

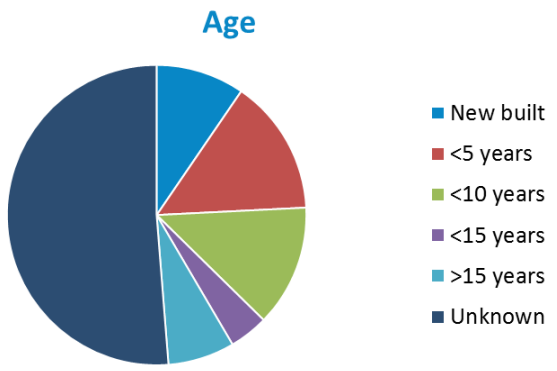
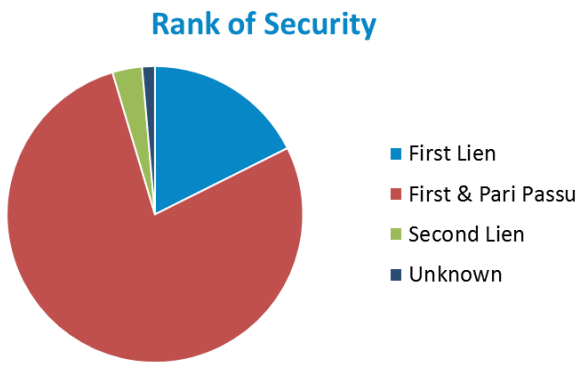


EXHIBIT 8



LGDs are displayed in Table 1 for a selected combination of characteristics. The data set is filtered for comparable asset classes Large Corporates and Specialised Lending. Vessels with an age of over 15 years are excluded from the data set as well as second lien securities. This filtering results in a more homogeneous data set with meaningful LGDs. The LGD is calculated with a risk-free rate. As different regulators have established different discount rate requirements, the LGDs for the defaults in the GCD database can also be calculated based on the cash flows and individual discount rates.

TABLE 1

Vessel Type	Size	Nr of Loans	LGD
Container	oceangoing	179	3.6%
	seagoing	28	18.4%
Container Total		**207**	5.6%
Dry Cargo	oceangoing	66	16.3%
	seagoing	31	7.5%
Dry Cargo Total		**97**	13.5%
Tanker	oceangoing	76	14.1%
	seagoing	18	12.1%
Tanker Total		**94**	13.7%

Reference Data Set: LGD/EAD database, Shipping, resolved, EAD > 100KEUR, Facility Asset Class Large Corporate or Specialised Lending, Rank of Security First or First and Pari Passu Lien, Age of Vessel < 15 years

A higher discount rate has a more pronounced effect on LGD for longer workout cases with high recovery rates, where the quantum being discounted is higher (see GCD Discount Rate Study for more details).

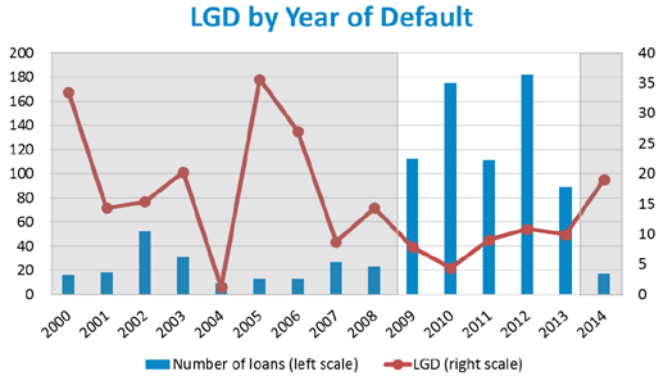
Except for container vessels, the size class does not play a major role in the loss severity. On average Container vessels appear to have lower LGDs (5.6%) than Dry Cargo and Tanker vessels, which have relatively comparable values (13.5% and 13.7%).

DOES HISTORICAL DATA SHOW MACROECONOMIC EFFECTS ON THE LGD AND DEFAULT RATES?

To analyse macroeconomic effects on the LGD we plot LGD by year of default. Cruise vessels are excluded from the data set as they operate in a completely different market (people entertainment, not goods transport) and are likely to be affected by different macroeconomic drivers. The homogeneous data set contains data for default years 2000 until 2014, thereby avoiding the resolution bias.

For years before 2009 few data points per year are available resulting in a volatile LGD curve. Interestingly, the LGD curve even drops below the long-term average for the early crisis years 2009 and 2010. This is likely due to two factors. Firstly, shipping lenders opted for a cooperative strategy with their distressed borrowers, amending and extending existing contracts giving their clients more time to repay their loans. This strategy was accompanied by a slight recovery of market conditions in 2010 and early 2011 for containers. In the course of 2011, despite the global economy steadying, new ships continued to be delivered. This led to an increasing supply/demand imbalance and falling freight rates. Having already used up cash reserves and with income barely covering operating costs many shipping companies defaulted in 2012, with banks no longer willing or able to extend repayment schedules. This becomes evident when analysing the different workout scenarios, with rescheduling for the default years 2009 to 2011 at 19% dropping to 3% for the years 2012 to 2013. The relatively high cure rate for the years 2012 to 2013 reaching almost 50% is quite remarkable (see Exhibit 10).

EXHIBIT 9

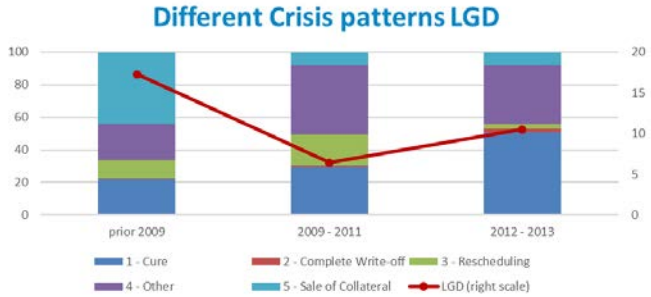


Reference Data Set: LGD/EAD database, Shipping, resolved, EAD > 100,000EUR, year of default [2000, 2014], no cruise vessels
Grey area: few data points

Given the long time period for collateral sales it is expected that a few more defaults in this scenario will be coming into

the data set once they are resolved. LGD for the second wave of the crisis is higher than for the first, despite the high cure rate.

EXHIBIT 10



Reference Data Set: LGD/EAD database, Shipping, resolved, EAD > 100,000EUR, year of default [2000, 2013], no cruise vessels

This indicates that the distribution of losses is dominated by either loans with no loss or a relatively high portion of defaults with high realized losses which reflects the deteriorating economic situation from 2012 onwards.

IS SPECIALISED LENDING RISKIER THAN CORPORATE FINANCE?

Table 2 shows almost no difference between the average LGDs for specialised lending and large corporate defaults. The LGD for SME is significantly higher due to a different collateral structure with mainly smaller vessels.

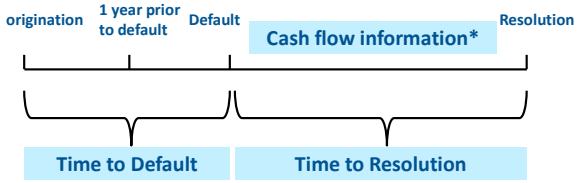
TABLE 2

Facility Asset Class secured by ship collateral	Nr of Loans	LGD
Specialised Lending	652	7.6%
Large Corporates	115	8.9%
SME	110	28.0%
Other	36	20.0%
Large Corporate secured (all collaterals)	9181	21.8%

Reference Data Set: LGD/EAD database, Shipping, resolved, EAD > 100KEUR, year of default ≤ 2014
LGD/EAD database, Large Corporates, Collateral Indicator=yes, resolved, EAD > 100KEUR, year of default ≤ 2014

GCD DATA STRUCTURE

Five event dates allow analysis of LGD term structure from origination to resolution. Time to default influence on LGD can be analyzed as a potential driver and included in lifetime LGD modelling.



* Cash flow information includes amount, date, currency, cash flow type, source of cash flow, liquidated collateral ID

Large Corporate secured is defined as all Large Corporate defaults in the database that have any type collateral attached (including general collaterals and 2nd ranking collaterals). The comparison shows a significantly higher LGD of 21.8% vs 8.9% for first mortgage ship collateralized Corporate defaults.

OUTLOOK

Further analysis could include separation of different vessel types, age or rank in order to isolate even further the risk drivers which can only be presented on a high-level basis here. Banks are encouraged to create their own reference data set with filter criteria that extract a representative data set for their own portfolio.

Another interesting exercise would be to analyse haircuts on the collateral values and influencing factors. Nevertheless, the drivers for LGD are diverse and dependency structures are complex. Controlling other influences is the challenging task in order to isolate term structure effects on LGD.

In summary, the GCD data provides a highly valuable source for quantitative measurements for banks seeking a data-driven method to account for the upcoming challenges in modelling shipping finance loss.

CONCLUSIONS

In summary, the following conclusions can be drawn from the analyses presented here:

- Selling the ship leads to a higher loss outcome on average and is therefore not the normal solution for banks.
- The impact of the macroeconomic downturn after the financial crisis is clearly visible in the GCD database explaining both banks' recovery strategies as well as external economic developments. During crisis years ships do not get sold if the banks can avoid it, as vessel values are then at their lowest.
- The GCD data confirms a strong positive correlation between LTV and LGD.
- No evidence can be found in the data for a significant difference between Large Corporate Defaults and Specialised Lending defaults controlling for a similar collateralization

The results created in this report can be applied by GCD member banks for improving, benchmarking and further sharpening their modelling efforts.