

Carapace Protection Pool Investor Doc

March 19, 2023

1 Introduction

This document contains detailed description and analytics about the emerging markets Carapace pool. We qualitatively and quantitatively describe the mechanics and risk for this pool, allowing investors to make choices regarding investing in the Carapace pool as protection sellers. We also describe our methodologies and share the various shortcomings.

2 Carapace Pool 1

The first Carapace pool contains 8 pools from the Goldfinch protocol. We describe various constituents in detail.

2.1 Almavest Baskets

We include 5 lending pool run by ALMA Sustainable Finance, which is an investment management firm that creatively deploys capital for sustainable development. The pool names are Almavest Basket 3, Almavest Basket 4, Almavest Basket 5, Almavest Basket 6 and Almavest Basket 7. The first 4 lending pools invest in the same companies -

- Selfin, an Indian lender that provides small, medium-term loans to MSMEs in India through a distribution network of financial advisors.
- Upwards, a consumer lender which, through its mobile app, offers personal loans to salaried employees in India
- Impact Water which supplies over 30,000 schools across central and eastern Africa with systems that avoid burning fuel to make water safe and potable
- Greenway Appliances, a leading clean cook stove supplier and distributor, with hundreds of thousands of rural customers in India and Africa

The Almavest Basket 7 provides credit to 2 more companies focused on carbon reduction -

- JuanchoTePresta, a fintech Colombian lender that targets employees, gig workers, and students with on-demand loans, with 60% women customers.
- Trella, a leading digital transportation and logistics platform focused on the Middle East, with clients and investors including Maersk and Exxon

2.2 Cauris

We add two pools managed by the Cauris credit fund, which is a mission driven company that applies advanced technology to solve financial inclusion issues while providing high risk adjusted returns to its investors. The lending pool Cauris 1 invests in the companies -

- Branch - Branch is a personal finance app that provides access to instant loans with no physical documentation. It operates in various markets, with majority of its operations concentrated in India.
- Float - Float is a startup based in Ghana, which provides credit lines for businesses in various African countries.
- YoFio - YoFio is a technology company that develops financial solutions to help businesses grow through secure credit, based in Mexico.

The lending pool Cauris 2 invests in the companies -

- Lipa Later - Lipa Later Group is a leading fin tech platform that empowers consumers to Buy Now, Pay Later (BNPL) for essential products and services, based in Kenya.
- Asaak - Asaak is an asset financing company redefining financial inclusion and mobility for millions across Africa.
- Jetstream - Jetstream is an e-logistics company for cross-border trade that provides technology-enabled freight forwarding, trade financing, and cargo tracking tools for businesses in Africa.

2.3 Lend East

Lend East is a digital lending platform that connects global institutional capital with alternate lenders in Emerging Asia (Southeast Asia & India). Lend East is revolutionising alternate lending by offering scalable growth capital with zero dilution to technology ventures. The lending pool run by Lend East is the Lend East 1: Emerging Asia Fintech Pool. It invests in the following

- Uploan - Uploan is a fin tech company operating in South East Asia which provides a end-to-end "Salary Loan Management Platform" to employers in Philippines.
- Oriente - Oriente was established in 2017 to build a better, more equitable financial system for under served consumers in Philippines, financial and digital inclusion via its platform solutions.
- Julo - Julo is an operator of a peer-to-peer lending platform intended to connect institutional lenders to the under banked through a smartphone application, headquartered in Indonesia.
- Erudifi - ErudiFi is a mission-driven technology company focused on expanding access to financial services for students.
- Akulaku - Akulaku is a leading banking and digital finance platform in Southeast Asia, with a presence in Indonesia, the Philippines, and Malaysia.
- Atome - Atome is an omni-channel brand with a buy now, pay later feature allowing customers to split payments over time, operating in Singapore.

3 Correlation Analysis

For a protection seller, the correlation analysis of these pools is important. We try to quantitatively gauge the correlation of default for all the pools. This is done by looking at the end companies they are lending to, and assigning similarity metrics to company pairs based on factor analysis. More details for this can be found in the Appendix. The next pages contains a graphical representation of the correlations, with some observations regarding the correlations. There is one table with correlation of the end borrower companies, with one with the correlation of the lending pools derived from that. We mask the names of the companies in the correlation matrix.

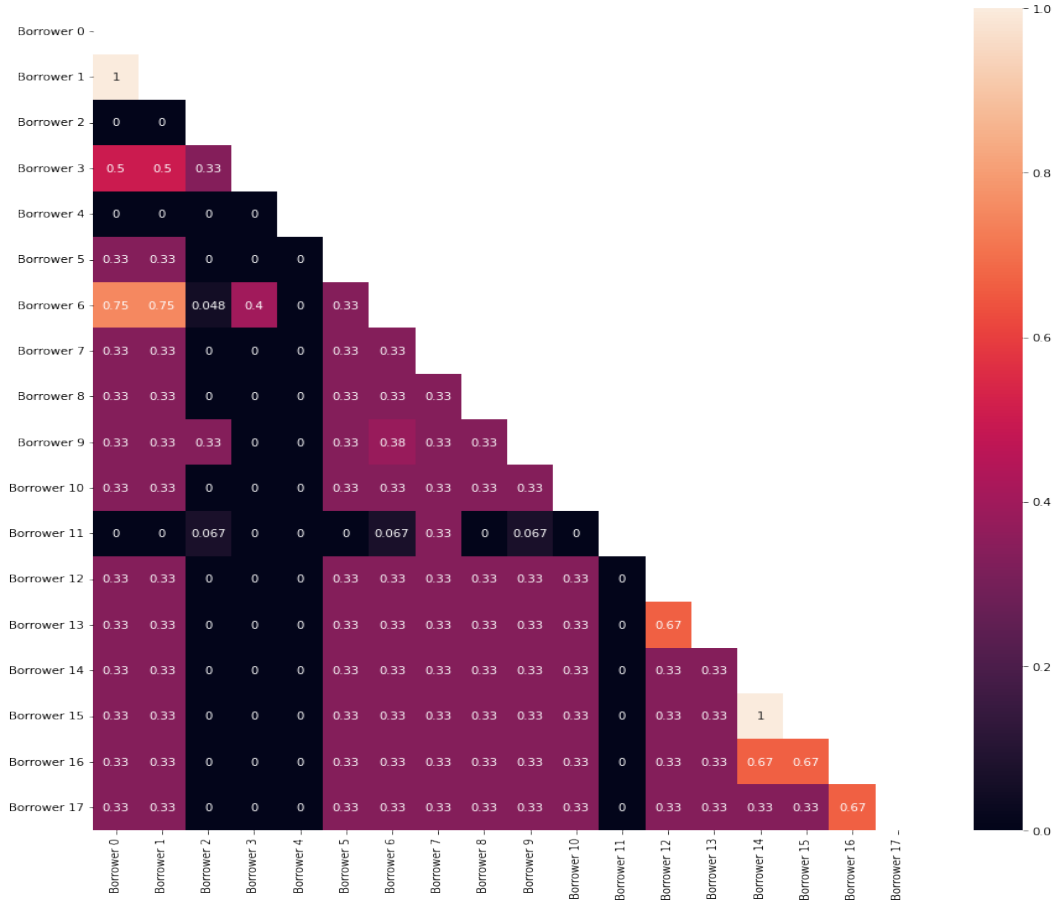


Figure 1: Company Correlation Matrix for Carapace Emerging Pool. The end borrowers name is masked due to privacy reason.

4 Portfolio Modelling

For modelling the probability of capital losses faced by a protection seller, we model the carapace pool consisting of the 10 lending pools. The methodology for modelling the capital loss probabilities is detailed in the appendix, and somebody interested can take a look.

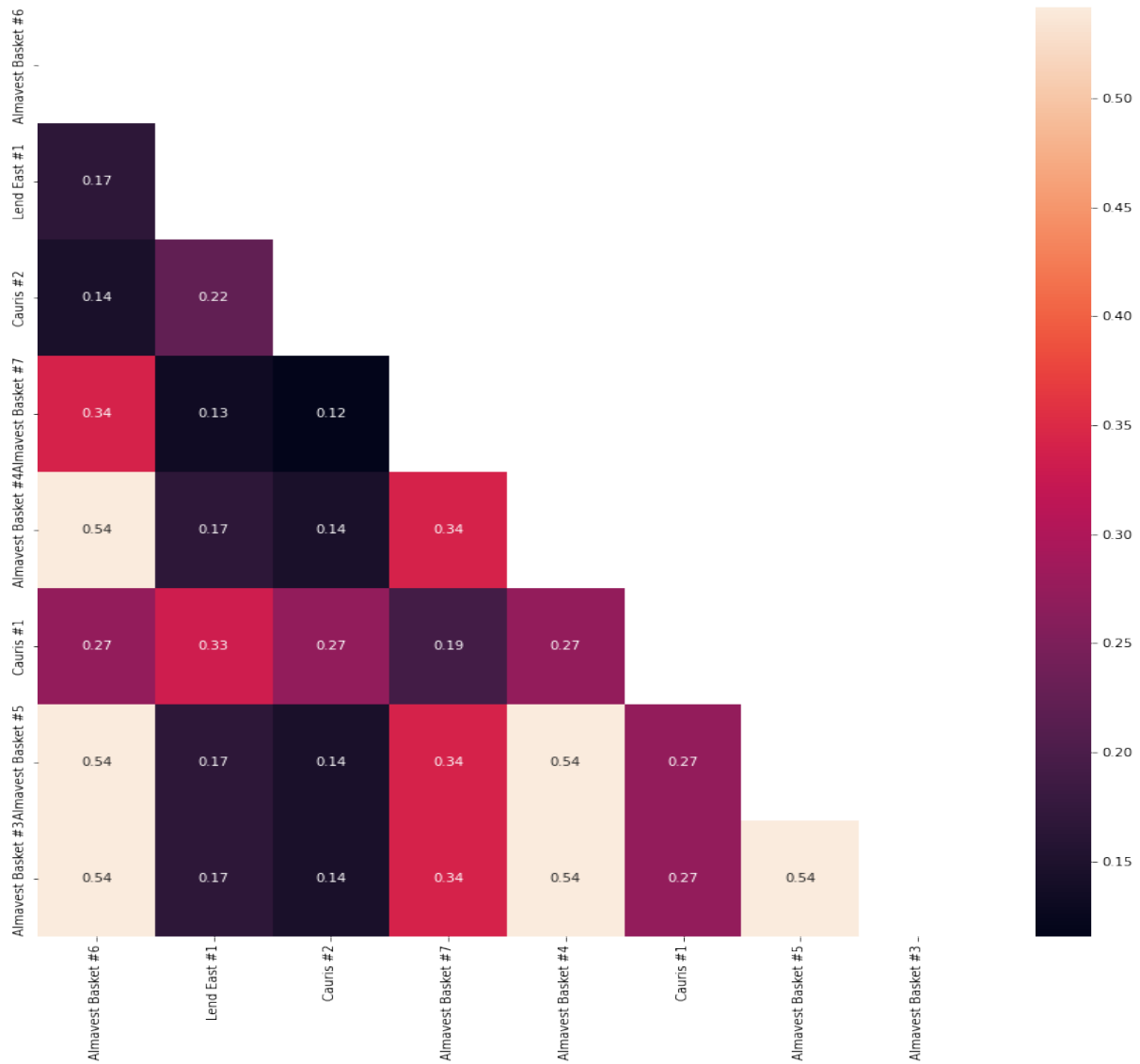


Figure 2: **Carapace Emerging Pool Correlation Matrix.** This triangular matrix contains the correlation numbers for each distinct pool pair in the first Carapace pool. These numbers are obtained by factor analysis of the borrowing companies for each pool.

One can observe that all Almavest baskets are correlated highly with each other due to money being put into similar companies. The Almavest Basket 7 is slightly less correlated with the Almavest cluster due to it investing in two more companies.

The methodology for getting the correlation for each lending pool and company wise correlation is explained in Appendix

At a high level, we simulate defaults of the pools based on the risk factor we imply from real world financing

rates (this means pools with higher interest rates have more rate of default, and pools with same interest rates but lower tenor have more rate of default). For example, if a guy gets a loan at 15% and some guy gets a loan at 12%, a safe bet would be that the first guy is deemed more credit risky by the institution giving the loan. Similarly, if a guy gets a loan at 12% for 6 months and another guy gets a loan at 12% for 6 years, then again it says that the first guy is deemed more risky.

Similarly for simulating correlation of the loans, when one pool defaults we increase the riskiness of all other pools based on the correlation with the defaulted pool. The mathematics behind this can be found in the appendix, but at a high level if pool A and pool B have a correlation of 0.2 and pool A and pool C have a correlation of 0.5, then when pool A defaults pool C will be impacted more.

4.1 Low Risk Regime

The low risk regime corresponds to when we assign 5% financing rates to all the pools, and simulate the portfolio. As we assign the same rate to all of them, the difference in the risk factors come from the tenors of the loans. In general as the probability of default is low for each pool, the correlation effects do not kick in a lot. However one can still see that the 99 percentile capital loss is still not 0. This illustrates that even if an investor believes that the portfolio is low risk, he should still take into account tail risks.

4.2 Normal Risk Regime

The normal risk regime corresponds to when we assign the Goldfinch financing rates to all the pools, and simulate the portfolio. The financing costs for all pools in Goldfinch is the roughly the same (10% - 12.5%), and hence this setting is very similar to the low risk regime, except the riskiness is approximately double for each pool. One can compare this to the low risk diagram and see that the height at 0 percentile capital loss has decreased, and the heights of bars to the right has increased. One can also see that both 75 percentile, 99 percentile and mean capital loss have changed by a quite a bit. This means that the correlation effects do kick in this picture.

4.3 High Risk Regime

The high risk regime corresponds to when we assign 20% financing rates to all the pools, and simulate the portfolio. The financing costs for all pools in Goldfinch is the roughly the same (10% - 12.5%), and hence this setting is equal to the doubling the risk factor from the normal risk regime, and 4 times from the low risk regime. The pools now are quite risky, and one can also see that both 50 percentile, 75 percentile, 99 percentile and mean capital loss have changed by a quite a bit. The correlation effects dominate here, as more pools default the more the risk factor of other pools jump. We do not expect this to be the real life risk profile of the pool, but this shows the case of lending pools become more risky in the future due to some events, how does one expect the portfolio to behave.

4.4 High Risk Regime Without Correlation

This regime is the same as the high risk regime, expect all pools are uncorrelated, and hence no pools' riskiness jumps if some other pool defaults. If one compares this risk regime with the high risk regime, then one can see the effects of the correlation clearly, and judge the diversification, as correlation effects come greatly into picture in the high risk regime. We see a decrease in the 75 percentile, 99 percentile and mean capital loss compared to the high risk regime. The more value is in tail, the more the extent of decrease, illustrating how correlation effects tail values a lot. The extent of the decrease here can be compared with other Carapace pools to see which Carapace pool is more diversified.

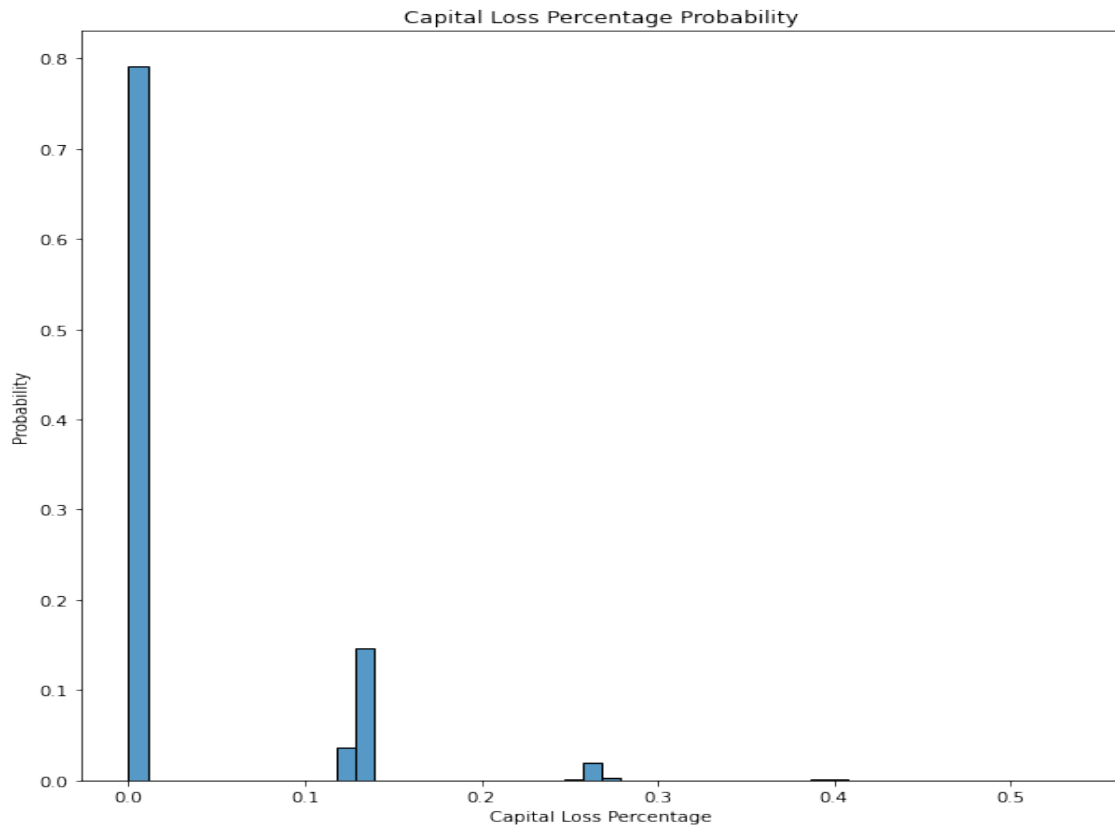


Figure 3: Low Risk Capital Loss Percentage Probability The above graph represents the loss of capital for an investor who lends equal money to all the 10 lending pools of the first Carapace Pool. So if an investor invests 1 dollar equally divided into all the 10 lending pools, the probability of losing no money (i.e the probability that none of the pool defaults) is given by the height of the bar at 0 (which is more than 0.7 that is 70% here).

The percentile values for capital loss for an investor giving 1000 dollars equally distributed in the low risk regime are

10 percentile capital loss is 0.0

25 percentile capital loss is 0.0

50 percentile capital loss is 0.0

75 percentile capital loss is 0.0

99 percentile capital loss is 265.24

Mean capital loss is 31.29

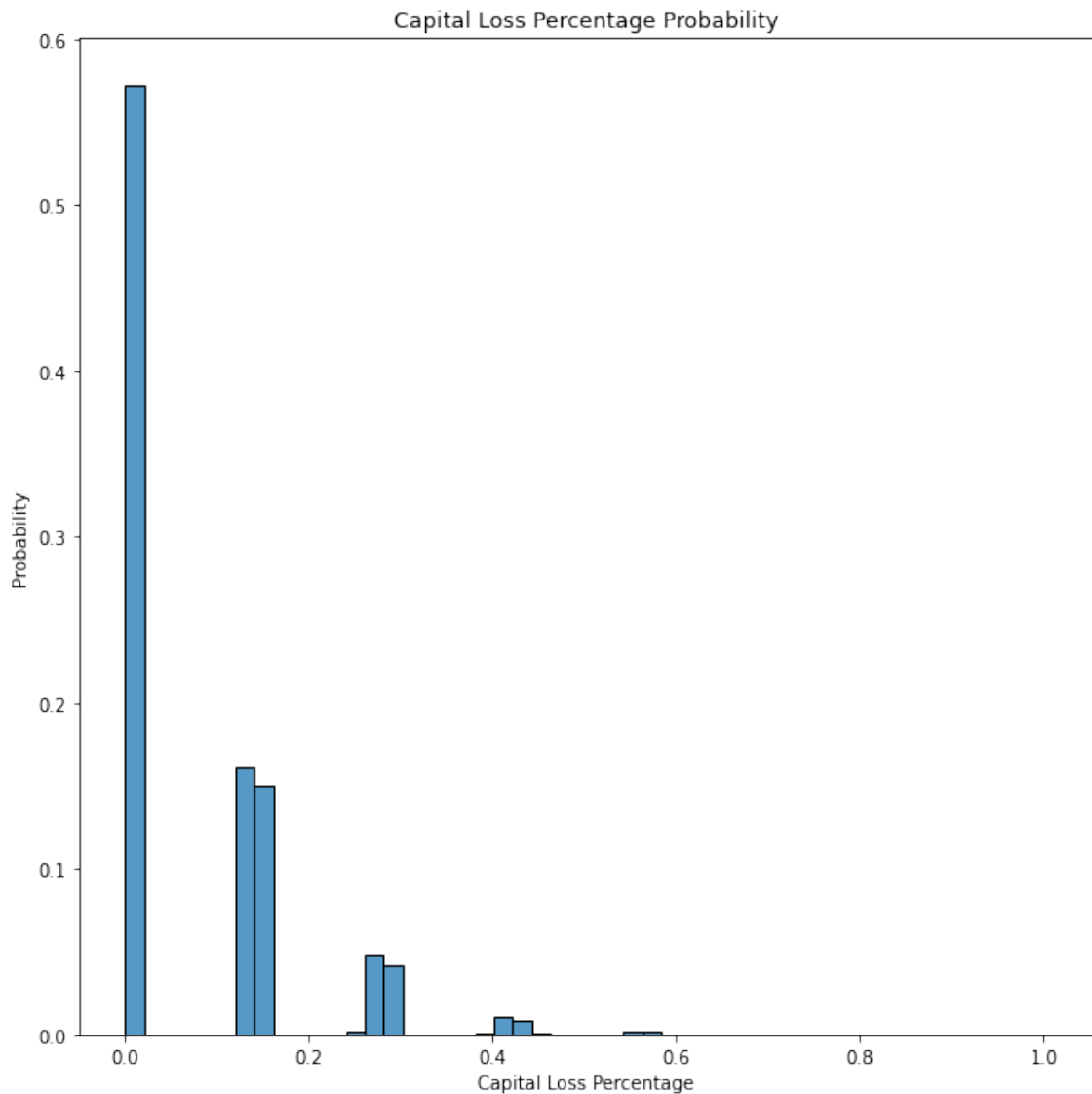


Figure 4: Normal Risk Capital Loss Percentage Probability The above graph represents the loss of capital for an investor who lends equal money to all the 10 lending pools of the first Carapace Pool. So if an investor invests 1 dollar equally divided into all the 10 lending pools, the probability of losing no money (i.e the probability that none of the pool defaults) is given by the height of the bar at 0 (which is more than 0.5 that is 50% here).

The percentile values for capital loss for an investor giving 1000 dollars equally distributed in the normal risk regime are -

- 10 percentile capital loss is 0.0
- 25 percentile capital loss is 0.0
- 50 percentile capital loss is 0.0
- 75 percentile capital loss is 141.438
- 99 percentile capital loss is 426.899
- Mean capital loss is 80.68

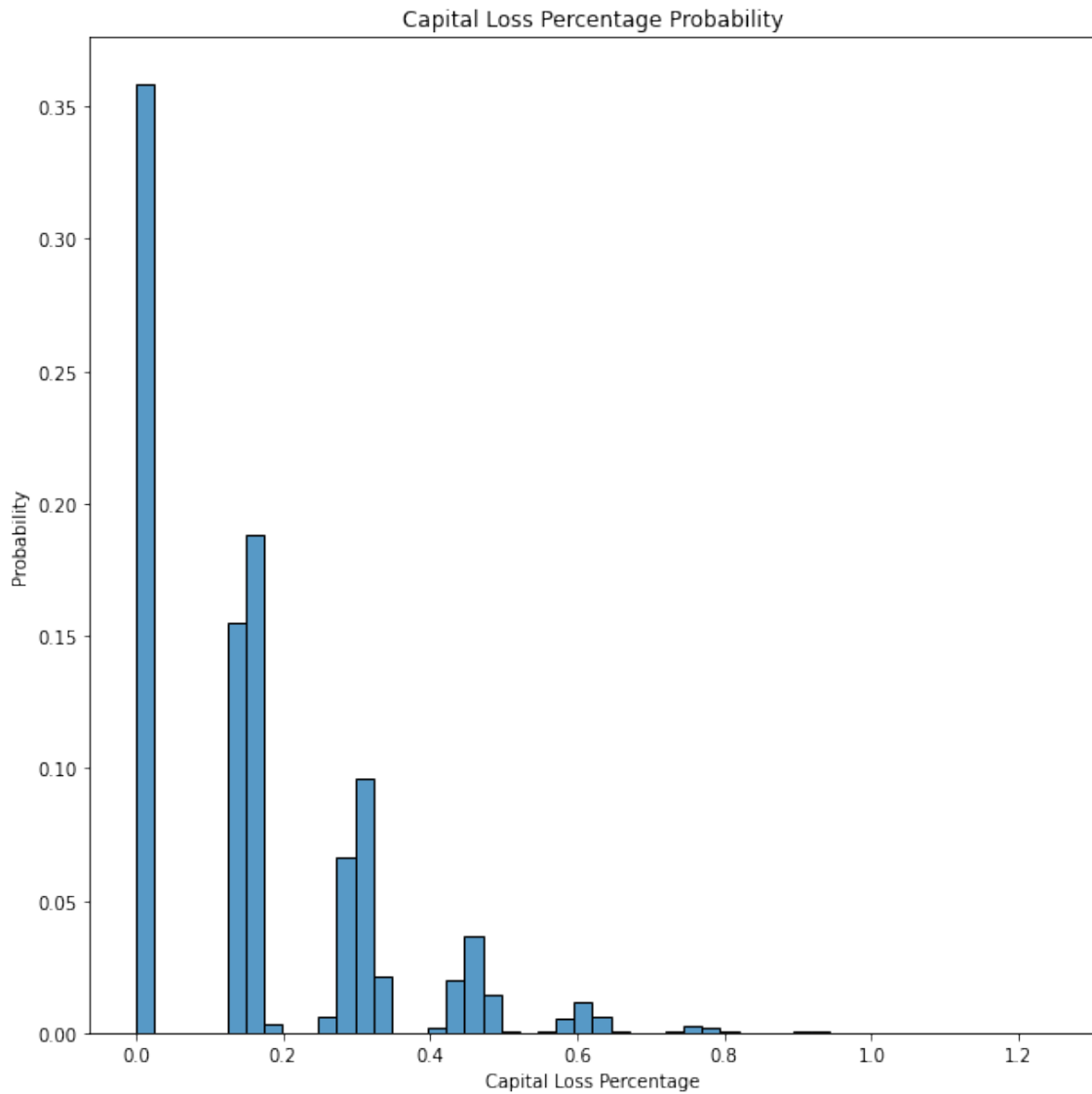


Figure 5: **High Risk Capital Loss Percentage Probability**. The above graph represents the loss of capital for an investor who lends equal money to all the 10 lending pools of the first Carapace Pool. So if an investor invests 1 dollar equally divided into all the 10 lending pools, the probability of losing no money (i.e the probability that none of the pool defaults) is given by the height of the bar at 0 (which is more than 0.25 that is 25% here). The percentile values for capital loss for an investor giving 1000 dollars equally distributed in the low risk regime are - 10 percentile capital loss is 0.0
25 percentile capital loss is 0.0
50 percentile capital loss is 148.39
75 percentile capital loss is 291.36
99 percentile capital loss is 632.23
Mean capital loss is 164.17

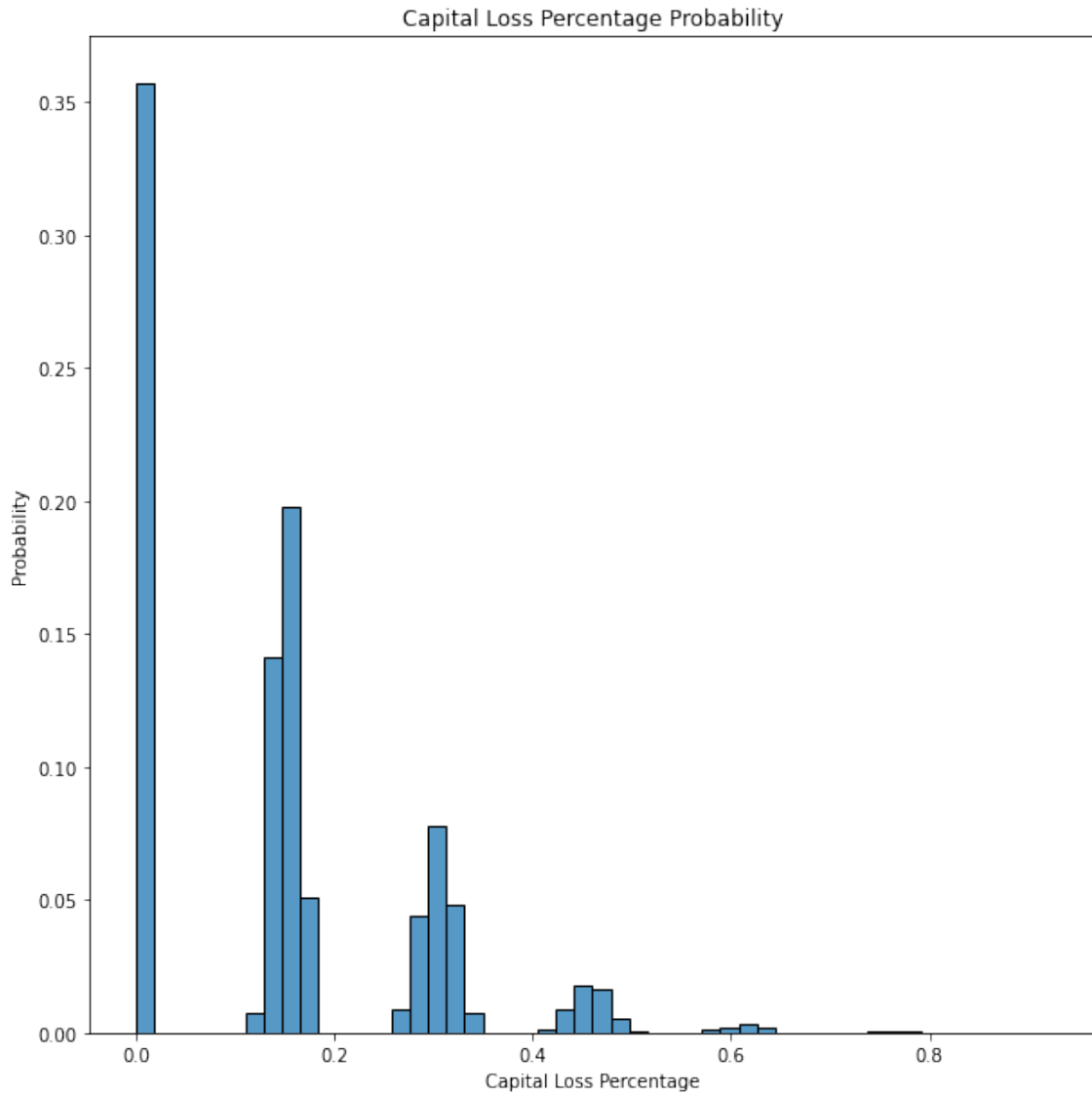


Figure 6: **High Risk Uncorrelated Capital Loss Percentage Probability.** The above graph represents the loss of capital for an investor who lends equal money to all the 10 lending pools of the first Carapace Pool. So if an investor invests 1 dollar equally divided into all the 10 lending pools, the probability of losing no money (i.e the probability that none of the pool defaults) is given by the height of the bar at 0 (which is more than 0.25 that is 25% here).

The percentile values for capital loss for an investor giving 1000 dollars equally distributed in the low risk regime are -

- 10 percentile capital loss is 0.0
- 25 percentile capital loss is 0.0
- 50 percentile capital loss is 146.79
- 75 percentile capital loss is 173.49
- 99 percentile capital loss is 496.71
- Mean capital loss is 145.71