**95-828:**​ Machine Learning for Problem Solving  
**Case Study Phase 2:**​ Data Cleaning, Preparation, & Exploration  
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Responses to Questions 1-6 are in the attached .ipynb file.

7.

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Average Return** | | | |
| **Grade** | **% of loans** | **% Default** | **Average Interest** | **M1** | **M2** | **M3 (i=0.002)** | **M3**  **(i=0.005)** |
| **A** | 15.95 | 7.54 | 7.22 | 0.0363 | 0.0144 | 0.0192 | 0.0662 |
| **B** | 28.60 | 15.87 | 10.85 | 0.0450 | 0.0116 | 0.0174 | 0.0642 |
| **C** | 28.33 | 26.15 | 14.08 | 0.0455 | -0.000006 | 0.0093 | 0.0547 |
| **D** | 15.77 | 34.30 | 17.57 | 0.0478 | -0.0057 | 0.0045 | 0.0488 |
| **E** | 7.79 | 42.92 | 20.81 | 0.0495 | -0.0147 | -0.0035 | 0.0390 |
| **F** | 2.80 | 49.01 | 24.59 | 0.0541 | -0.0194 | -0.0088 | 0.0325 |
| **G** | 0.76 | 54.28 | 27.31 | 0.0481 | -0.0354 | -0.0226 | 0.0168 |

1. See chart above.
2. See chart above. As expected, the average default rate increases as grades lower.
3. See chart above. Overall, it seems that the average interest increases as grades lower. This is expected since investments of lower grade and higher risk have higher interest rates.
4. See chart above.
5. These numbers do not surprise me. As expected, average percentage return per grade for M2 and M3 (both rates) generally decreases as grade lowers. However, average percentage return per grade for M1 tends to increase as the grade lowers. This is because M1 is an optimistic calculation since is assumes that the investor can immediately invest in another load with exactly the same return. In reality, this will likely not happen. If I had to invest in one grade only, I would likely invest in grade B because it has similar returns to those of grade A, but higher interest rates.