40.317 FSD Case Study Analysis
18th June Thursday 6pm. Yeo Peng Heng, Chong Yu Kai

The primary purpose of the questions below is to deepen your understanding of the issues and the relevant issues and the relevant history underlying this case study. The secondary purpose of these questions is to help ensure you participate effectively in the in-class discussion, which will take place on Thursday 18th June.

You must submit at least one paragraph in response to each of the following questions.

You will need to conduct online research in order to answer most of these questions. You will receive credit for citing external sources, so to be sure to do so in your responses.

1) Summarise the history of modern credit scoring, beginning with:

a. the Mercentile Agency, later renamed R. G. Dun & Company, in the U.S.A. in the 1840s

The history of modern credit scoring started in the early 18th-century of America whereby borrowers asked their neighbours to vouch for their character to lenders. At the start of 1820s, credit reporting started to change due to the density of business transactions of the old system being too troublesome. There were many experiments in trying to standardize credit evaluation. Most of them were for commercial credit. (loaning to business people) (Trainor, 2015)

In the early 1830s, entrepreneurs had borrowed huge amount money, expanded their operations and taken on a lot of debt. This is especially important for the cotton sectors. Cotton sector in the south doubled their outputs between 1830 to 1837 which resulted in cotton price decreasing. People who lent money to those factories began to get nervous. As the amount of cloth and clothes produced by those factories start to slow down, those factories start to lay off workers. Lenders start to cut off credit to the cotton sectors and to those who buy their cotton. When they lose their credit, local banks have a hard time to get back their money from those who are involved. The entire financial sector got involved and the economy had gotten into a liquidity crisis. (Cornell, 2014)

Tappan, the founder of Mercantile Agency, understood the need for a centralized credit reporting system. He built a company and created the DUNS alphanumeric system, a network of people would provide the reliable, objective credit information to their subscribers such that subscribers could find out if their debtors were trustworthy. However, these reports about debtors' characters were often subjective and biased. (Dun & Bradstreet, 2020)

b. Retail Credit Company, founded in 1899 in Atlanta, Georgia, U.S.A.

Retail Credit Company, founded in 1899, had created a system whereby information regarding millions of Americans were stored as data. The information consists of data on credit, capital, character, individuals' social, political and sexual lives. (Trainor, 2015)

2) Describe the operational model of the three main credit scoring companies in the U.S. today – Experian, TransUnion, and Equifax – for the benefit of individuals. To assess the creditworthiness of an individual, what inputs do they typically receive, from what sources, and what output(s) do they produce?

Experian, TransUnion and Equifax developed the VantageScore 4.0. VantageScore 4.0 uses machine learning techniques in the field of scorecards for consumers with dormant credit histories and have a Gini score as an output. This Gini score will be further used to assess if the consumers are likely to default or not. (VantageScore 4.0 Overview, 2017)

To assess the creditworthiness of an individual, the inputs they receive from the consumers are the trended credit data of changing credit behaviours of the user over time. (VantageScore 4.0 Overview, 2017)

The sources they receive the inputs from are from all three national credit reporting companies namely Experian, TransUnion and Equifax. (VantageScore 4.0 Overview, 2017)

The output they produce will be the predictive performance called Gini. Gini is statistical measure of a model's capacity to identify consumers who are likely to default. Individuals with a low Gini score is likely to default while individuals with high Gini score is likely to pay. (VantageScore 4.0 Overview, 2017)

3) Summarise the origins of microfinance, beginning with the 1983 founding of Grameen Bank in Bangladesh by Nobel Prize winner Muhammad Yunus.

In 1976, Yunus visited the poorest households in the village of Jobra and found out that very small loans could have a positive impact to a poor person rather than having large loans. Village women who made bamboo furniture had to take loans with high interest rates to obtain the materials they need. They had to repay their revenues made from selling the furniture to the lenders and might not earn much profit in the end. Traditional banks do not want to make loans to the poor as well due to their high risk of defaulting. However, Yunus had faith that the poor would pay their loans given the right opportunity to empower themselves. Providing upfront capital for them to start businesses was one way of empowerment and thus he started the microcredit business model with Grameen Bank. (Muhammad Yunus, 2020)

He started out with loaning US$27 to 42 women in the village and made some profit on the loan. Subsequently, Yunus managed to secure a loan from the government Janata Bank to lend to the poor. In 1983, this project operated like a full-fledged bank and was renamed Grameen Bank. Since July 2007, Grameen Bank had issued US$6.38 billion to 7.4 borrowers as well. To ensure that all the borrowers can return their loans, they form small informal group such that they would apply loans together and have each one of them acting their co-guarantors of repayment. (Muhammad Yunus, 2020)

4) List at least three reasons why microcredit/ microlending has become much more feasible since 1983.

One of the reasons why microcredit/microlending has become much more feasible since 1983 is the management of the borrowers in repaying the debt. Borrowers are grouped where they act as co-guarantor for each other and monitor each other. The advantage of having this culture is that it satisfies the self-fulfilling expectations of like-minded groups of people and makes borrowers' activities transparent to bank workers. This management creates a culture whereby peer pressure is being used to ensure that the borrowers stay consistent with their contracts. (Shahidar Khandher, 1994)

The second reason is that there is a social development services offered at the same time which creates a healthy ecology to empower borrowers to repay their debt. With this new ideology being ingrained into the borrowers, it improves their decision making as well as their health and productivity. For example, Grameen Bank had suggested its members to practice the sixteen decisions daily and trains them on the modus operandi of Grameen Bank. This is one of the design solutions that is important for the success of microlending. (Shahidar Khandher, 1994)

The third reason is the sources of fund for microlending have been made available at concessionary rates by external and internal sources. This enabled Grameen's financial and economic sustainability as well. (Shahidar Khandher, 1994)

5) Suggest three possible ways in which you might use Machine Learning techniques to assess the creditworthiness of a person who has no collateral and no credit history.

a) Instead of credit history, one way would be to collate personal information about people, and its relationship with default rates. These features could include information such as education, occupation, social media activity, bills payment and creditworthiness of community. With this data, machine learning models can be trained to estimate the probability of a person defaulting, and the creditworthiness can be inferred from this.

b) In the process of applying for loans, there will inevitably be those who attempt to exploit or be dishonest. Machine learning can be used to identify such scenarios, detecting attempts to make multiple loans, usage of bots or fraudulent applications. This can be done through tracking the digital footprint on the platform, checking whether the users' clicks are human-like or whether the IP is suspicious.

c) Another method is to continuously assess the creditworthiness of a person based on risk factors over time instead of an upfront snapshot. Changes in certain factors could be used to signal a corresponding change in creditworthiness and actions can then be taken to mitigate such risks. We could monitor current economic and industry factors and model their relationship with default rates, or a person without credit history could agree to have his spending actions tracked and the lender can step in when spending becomes too risky.
A step further would be to include recommender systems to assist in at-risk cases to help these people prevent a default scenario.

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