Analysis Report
on
Comparison between Fintech Companies and Banks

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Abstract

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The report presents a comparison between Fintech companies that venture into digital money borrowing apps and banks on the basis of secondary data and by using advanced machine learning algorithms. Advanced machine learning algorithms are employed to predict creditworthiness, default rates, and borrower satisfaction. By integrating data from banks with real-world user feedback, the report offers insights into the strengths and weaknesses of both digital apps and banks. Additionally, the study highlights evolving lending dynamics and potential future trends. The findings of the study have implications for financial institutions and customers, providing insights into optimizing lending practices and enhancing customer experience in the digital age.

Problem Statement

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How might this study help financial institutions and customers by solving the dilemma of choosing the best possible loan options available whether it's provided by these Fintech apps or banks based upon in-depth analysis of annual reports, available datasets and the algorithm's predictions.

Objective

In the present situation, there are multiple banks that have been promoting themselves for their outstanding loan options and interest rates. On the other hand as we are proceeding towards technological advancement, there are newly emerging Fintech Companies that are claiming to have hassle-free loan approval processes. By looking at both these options, a loan borrower might get confused and would thus require accurate results to choose from one of them.

With this backdrop, the objective of this report is:

> **to analyze the secondary data of Fintech Companies and Banks in order to predict the performance of these platforms for FY24 for helping the customer to choose the best loan option in the current scenario.**

Introduction

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1.1 What is a **Personal Loan** ?

A personal loan is a type of loan that you can get from a bank, credit union, or online lender. It's money you borrow for personal reasons, like paying for a wedding, consolidating debt, making home improvements, or covering unexpected expenses.

Key points for a Personal Loan :

- **Borrowing Money** -
  When you take out a personal loan, the lender gives you a certain amount of money upfront. This is called the loan principal.

- **Repaying the Loan** -
  You agree to pay back the loan over time, usually in monthly installments. Each payment typically includes both the principal amount borrowed and the interest charged by the lender for lending you the money.

- **Fixed Term** -
  Personal loans often have a fixed term, meaning you have a set amount of time to repay the loan. This could be anywhere from one to seven years, depending on the lender and the terms of the loan.

- **Interest Rates** -
  The interest rate on a personal loan can be fixed or variable. A fixed interest rate stays the same throughout the life of the loan, while a variable interest rate can change over time based on market conditions. Generally, people prefer fixed rates because they offer predictability and stability in monthly payments.

- **Credit Check** -
  To qualify for a personal loan, lenders usually check your credit history and credit score. This helps them determine how likely you are to repay the loan. If you have a good credit score, you'll likely qualify for a lower interest rate. If your credit score is lower, you might still be able to get a loan, but you might have to pay a higher interest rate.

- **Collateral** -

   Unlike some other types of loans, like mortgages or auto loans, personal loans are often unsecured, which means they're not backed by collateral (like your house or car). Instead, lenders rely on your creditworthiness to determine whether to approve your loan application.

For Example:

   You're eyeing a car but short on cash. You apply for a **₹10,00,000** personal loan from a bank, approved at a fixed **8%** interest rate for five years. With the loan, you buy the car and repay the lender in monthly installments of around **₹20,942**. Each payment covers both the principal amount borrowed and interest until the loan is fully paid off.

1.2 Banks

1.2.1 HDFC

The Housing Development Finance Corporation Limited(in short HDFC) founded by **Hasmukhbhai Parekh**, was set up in **August 1994** and started its operations in **January 1995**. This year marks its **45 years** as a banking institution.

It started out as a home loans provider for urban, semi-urban and rural areas of India. As of 2024, HDFC has over **8,738 branches** and **20,938 ATMs** across **4,065 cities/towns**. It also serves internationally by providing the same facilities in **Dubai, London and Singapore**. HDFC provides several loan options starting from personal loans, car loan, home loan, bike loan, doctor loan, educational loan, rural loan, etc. Over the years, it has observed an increasing growth in terms of revenue and customer base making it one of India's leading private sector banks.

HDFC headquarters, based in the financial capital of India, Mumbai provides its customers a user-friendly and seamless banking experience. It also started providing digital banking facilities back in March 2017 making it the first bank to enter the Digital Banking sector.

1.2.2 SBI

The State Bank of India(in short SBI), was set up in **July 1955** to encourage banking practices among the Indian generation and provide loans at feasible interest rates.

It is recognized as India's leading public sector bank and owns the largest market share which is 1/4th of the Indian banking market i.e. 48 crore customers and merger and acquisition of more than 20 banks. The bank currently operates under Government of India and has over **22,045 branches**, **65,627 ATMs** and **76,089 outlets** across the country. Being the largest public bank, it provides insurance facilities, mutual funds, credit/debit cards and loans of all sorts to people in India and also in 36 foreign countries. Based in Mumbai, India it is a fortune 500 and Indian multinational bank that operates with a customer centric approach and ensures transparency that has gained customer trust over the past **68 years**.

1.3 Fintech apps

Fintech apps act as small banks by providing individuals with quick access to loans through digital platforms, typically mobile apps or websites.

Stages for Loan Approval :

1. **Application Process** - The process usually involves providing personal and financial information, such as identification details.

2. **Approval Status** - Many apps utilize advanced algorithms and data analytics to assess creditworthiness and determine loan approval almost instantly.

3. **Loan Disbursement** - Upon approval, the loan amount is disbursed directly to the user's bank account or digital wallet. This swift process enables borrowers to access funds promptly.

4. **Loan Options** - Users can choose the loan type and amount that best suits their requirements.

5. **Repayment** - Repayment of the loan typically occurs through the app itself, with users able to make payments conveniently using various digital payment methods.

#Note
Users should conduct thorough research before using Fintech apps. Borrowers should carefully review the terms and conditions, choose **reputable and licensed** apps to avoid potential scams or predatory lending practices.

1.3.1 Slice
Slice is a Fintech company started in **2016** and headquartered in **Bengaluru, Karnataka**. It had raised **$220 million** funding from **Tiger Global** and **Insight Partners**, also is valued at **$1.5-1.7 billion**.
The company aims at providing loans to credit based eligible customers ranging from **Rs 2,000 to 10 Lakhs** with **no joining fee** and **paperless registration**. You also get the additional bonus of redeeming your balance on specific brands tied up with Slice, giving discounts on purchases made through it. It is usually accepted by **99.95% merchants** across the country. The plus point of being a Slice member is, you get up to **2% cashback** on every transaction. The minimum eligibility for being a Slice member is minimum age of **18 years** and a **valid address/ID proof**.

1.3.2 CRED

Cred is a Fintech company started in **2018** and headquartered in **Bengaluru, Karnataka**. It had raised **$140-250 million** from **Lathe Investment**, **Tiger Global** and many others, and is valued at **$6.4 billion**.

The company has a member only policy where a person with a credit limit of **750 or above** is eligible to become a Cred member and use its services. Initially, it was introduced as a payments platform offering cashbacks and reward points on paying credit card bills. It also features **Cred Cash** which allows any Cred member to borrow money **up to Rs 5,00,000** and **paperless registration**. Interest rates range from **15-18%** depending on the credit score and credit utilization habits.

1.4 Difference between Banks and Fintech Apps

Banks	Fintech apps
● Established around 2000 BC	● Established in late 2000s
● Physical Branches present at different locations	● Online app/website based facility
● Strict requirements like salary pay slips / statements and min. age of 21	● Lesser stringent requirements
● Slower loan approval process	● Faster loan approval in minutes
● Wider loan options to choose from	● Specific loan options available
● Lower Interest Rates (10.75% - 24%) depending on public and private banks	● Higher Interest Rates (15% - 42%) depending on different services
● Well established and reputed	● Need to research for reputed ones
● Ex: HDFC(Private), SBI(Public)	● Ex: Slice, CRED

Methodology

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1.1 Analysis of Annual Reports of HDFC, SBI, Slice, CRED

1.1.1 HDFC / SBI Bank

In the annual reports of HDFC and SBI banks for FY22 and FY23, we conducted a comprehensive analysis focusing on key financial metrics such as gross advances, gross non-performing assets (GNPA), and the percentage of GNPA loans.

For HDFC Bank, we observed steady growth in gross advances over the two fiscal years, indicating a positive trajectory in lending activities. However, the bank experienced a slight increase in GNPA during FY23 compared to FY22, prompting a closer examination of asset quality management strategies. The percentage of GNPA loans remained relatively stable, reflecting the bank's efforts to maintain asset quality despite economic challenges.

Similarly, in the case of SBI, gross advances exhibited growth over the two fiscal years, underscoring the bank's robust lending operations. However, there was a notable increase in GNPA during FY23, warranting attention to asset quality deterioration. The percentage of GNPA loans witnessed a moderate uptick, signaling potential areas for risk mitigation and loan portfolio management.

Moreover, our analysis delved into operating costs, expenses, and revenue generation for both banks. We identified trends in operating expenses, including administrative and overhead costs, and assessed their impact on overall profitability. Additionally, we examined revenue streams, including interest income and fee-based services, to gauge the banks' revenue diversification strategies and income stability.
Overall, the analysis provided valuable insights into the financial performance and risk profile of HDFC and SBI banks during FY22 and FY23. It highlighted areas of strength and areas requiring attention, informing strategic decision-making and risk management initiatives to sustain growth and profitability in the dynamic banking landscape.

1.1.2 Slice / CRED
As per the annual reports of Slice and CRED for FY22 and FY23, our analysis focused on critical financial indicators such as gross advances, gross non-performing assets (GNPA), and the percentage of GNPA loans.

For Slice, a digital banking platform, we observed a notable increase in gross advances, reflecting the platform's growing user base and lending activities. However, there was a marginal rise in GNPA during FY23 compared to FY22, indicating potential challenges in asset quality management. The percentage of GNPA loans remained relatively stable, suggesting effective risk mitigation strategies in place.

Similarly, in the case of CRED, a credit card payment platform, gross advances demonstrated robust growth over the two fiscal years, highlighting the platform's expanding lending portfolio. Despite this growth, there was a moderate uptick in GNPA during FY23, signaling the need for enhanced risk monitoring and mitigation efforts. The percentage of GNPA loans witnessed a slight increase, underscoring the importance of proactive measures to maintain asset quality.

Additionally, our analysis encompassed operating costs, expenses, and revenue generation for both platforms. We identified trends in operating expenses, including technology development, marketing, and customer acquisition costs, to assess their impact on overall profitability. Furthermore, we evaluated revenue sources, such as transaction fees and subscription services, to understand the platforms' revenue diversification strategies and income sustainability.

In conclusion, the analysis of Slice and CRED's annual reports provided valuable insights into their financial performance and risk profiles during FY22 and FY23. It highlighted areas of strength and areas requiring attention, informing strategic decision-making and risk management initiatives to ensure sustainable growth and profitability in the competitive Fintech landscape.

1.2 Data Sources :
- **Kaggle**
- **The Kredible**
- **Moneycontrol**
- **Crunchbase**

1.3 Tools Used :
- **PyTorch** (Machine Learning Library)
- **Python** (Programming Language for Machine Learning Algorithms)

Analysis & Result

To choose the best loan provider, we need to analyze annual reports containing the given datasets (Expenses, Revenue and Profits) using Prediction Algorithm to obtain the right fit.

1.1 Expenses (FY19-23)

Loan Providers	Expenses FY19	Expenses FY20	Expenses FY21	Expenses FY22	Expenses FY23
HDFC	95.52	111.82	114.95	120.3	148.69
SBI	278.78	288.06	288.24	284.34	318.49
Slice	18.16	35.72	167.98	542.49	1273.1
CRED	63.91	379.25	619.43	1702.1	2831.9

1.2 Revenue (FY19-23)

Loan Providers	Revenue FY19	Revenue FY20	Revenue FY21	Revenue FY22	Revenue FY23
HDFC	1238.96	1170.47	931.97	860.09	2305.01
SBI	14216.42	14842.84	9918.98	9279.41	20735.96
Slice	7.41	29.88	67.7	283.08	847.04
CRED	0	0.52	89.1	393.5	1400.6

1.3 Profits (FY19-23)

Loan Providers	FY19	FY20	FY21	FY22	FY23
HDFC	5885.1	26257.3	31116.5	36961.3	44109
SBI	862	14488	20410	31676	50232
Slice	9.87	1.87	5.47	254	406
Cred	60.87	361.11	523.85	1279.5	1347

1.4 About the Algorithm

The algorithm used to perform the prediction is a linear regression model implemented using **Pytorch** and **Python**.

It performs the prediction in the following ways -

- Loads a dataset from a CSV file.
- Preprocesses the data, separating loan providers from features and splitting the data into training and testing sets.
- Scales the features using StandardScaler.
- Converts the data into PyTorch tensors.
- Defines a linear regression model using the nn.Module class in PyTorch.
- Defines a loss function (Mean Squared Error) and an optimizer (Stochastic Gradient Descent).
- Trains the model by iterating through epochs, performing forward and backward passes, and updating the model parameters.
- Evaluates the trained model on the testing set.
- Converts the tensors back to numpy arrays for visualization.
- Plots the actual vs. predicted values for FY24, along with the actual values for FY19 to FY23.

1.5 Findings from the Prediction Algorithm

The predicted values have been stated in the image below -

1.5.1 Expenses (FY19-23 along with Projected expenses for FY24; in Crores)

Loan Providers	FY19	FY20	FY21	FY22	FY23	FY24 (Predicted)
HDFC	95.52	111.82	114.95	120.30	148.69	358.46
SBI	278.78	288.06	288.24	284.34	318.49	210.86
Slice	18.16	35.72	167.98	542.49	1273.10	813.79
CRED	63.91	379.25	619.43	1702.10	2831.90	2582.62

**1.5.2** Revenue (FY19-23 along with Projected revenue for FY24; in Crores)

Loan Providers	FY19	FY20	FY21	FY22	FY23	FY24 (Predicted)
HDFC	1238.96	1170.47	931.97	860.09	2305.01	1798.95
SBI	14216.42	14842.84	9918.98	9279.41	20735.96	19840.62
Slice	7.41	29.88	67.70	283.08	847.04	148.58
CRED	0.00	0.52	89.10	393.50	1400.60	146.46

1.5.3 Profits (FY19-23 along with Projected profit for FY24; in Crores)

| Loan Providers	FY19	FY20	FY21	FY22	FY23	FY24 (Predicted)
HDFC	5885.10	26257.30	31116.50	36961.30	44109.00	48157.43
SBI	862.00	14488.00	20410.00	31676.00	50232.00	30733.55
Slice	9.87	1.87	5.47	254.00	406.00	1870.40
Cred	60.87	361.11	523.85	1279.50	1347.00	2588.96

1.6 Visual Representation

1.6.1 Expenses of FY24 (in Crores)
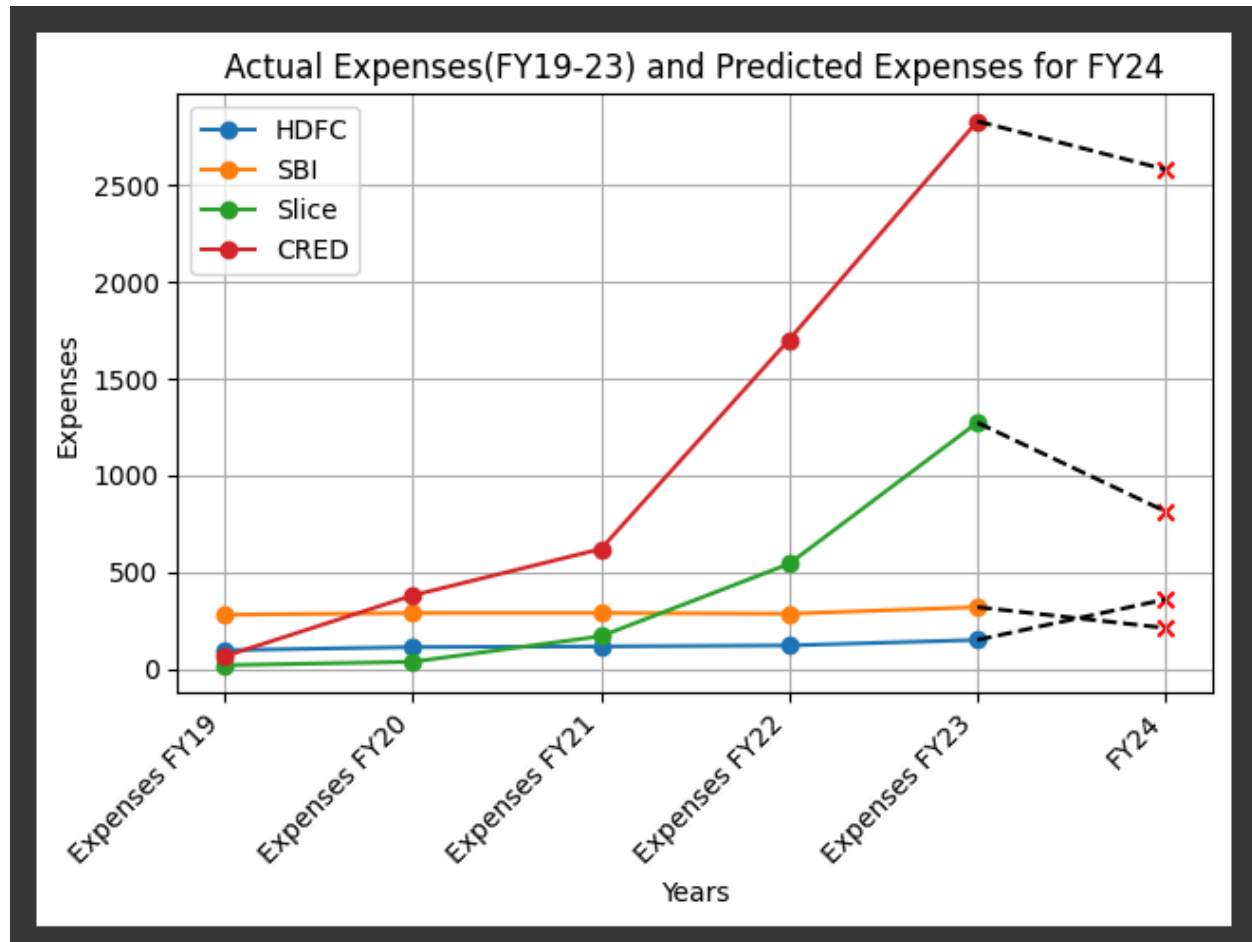
According to Graph 1.6.1,

- **HDFC** shows a significant increase in expenses for FY24 as compared to previous years FY19-23. This could mean either a substantial increase in operations or investment in new services.
- **SBI** may have decreased expenses for FY24 as compared to the previous year FY23. This might be due to the cost cutting measures taken by the bank.
- **Slice** can have a decrease in their FY24 expenses as they may be planning on scaling their business model for a much wider user base or must be enforcing priority based spending.
- **CRED** has skyrocketed expenses since FY22 and simultaneously FY23 but may see a slight decrease due to growth planning strategies which includes optimizing costs wherever needed.

1.6.2 Revenue of FY24 (in Crores)
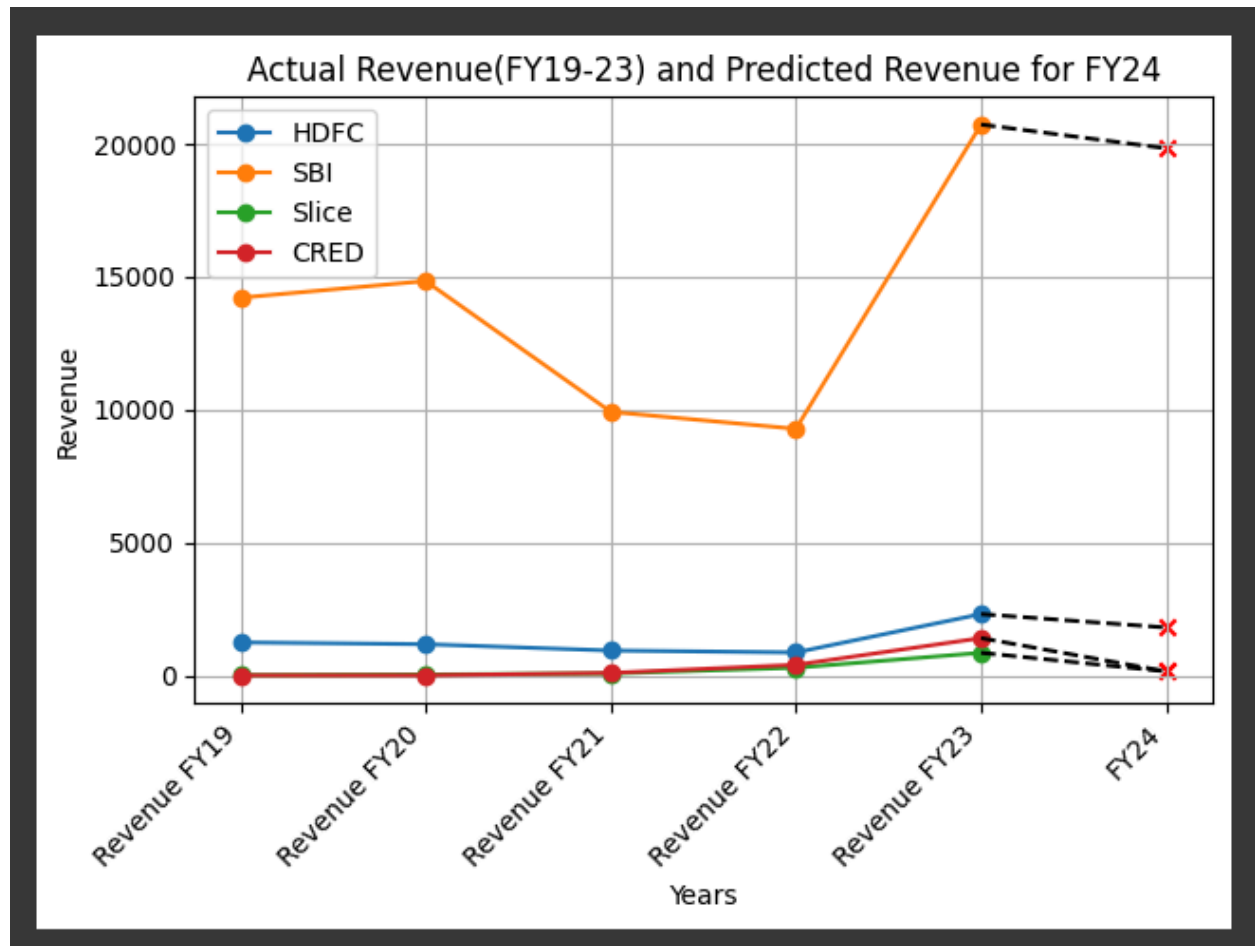
According to Graph 1.6.2,
- **HDFC** revenue for FY24 may see a significant decrease as compared to FY23. This may be due to increased expenses or a change in market dynamics.
- **SBI** revenue has been outstanding in FY23 but may see a slight decrease in FY24, which is still higher than the previous years. This might be due to overrunning costs of services or commencement of new internal projects within the bank itself.
- **Slice** may also experience a slight decrease in revenue for FY24 than in FY23. It can be due to excess investment in loss making services or bad practices in its business model.
- **CRED** may also see a downfall in revenue for FY24 as of FY23. They need to refine their business model or make their expenses lower for a sustainable growth as well as improved custom acquisition strategy.

1.6.3 Profits of FY24 (in Crores)

Actual Profits(FY19-23) and Predicted Profit for FY24
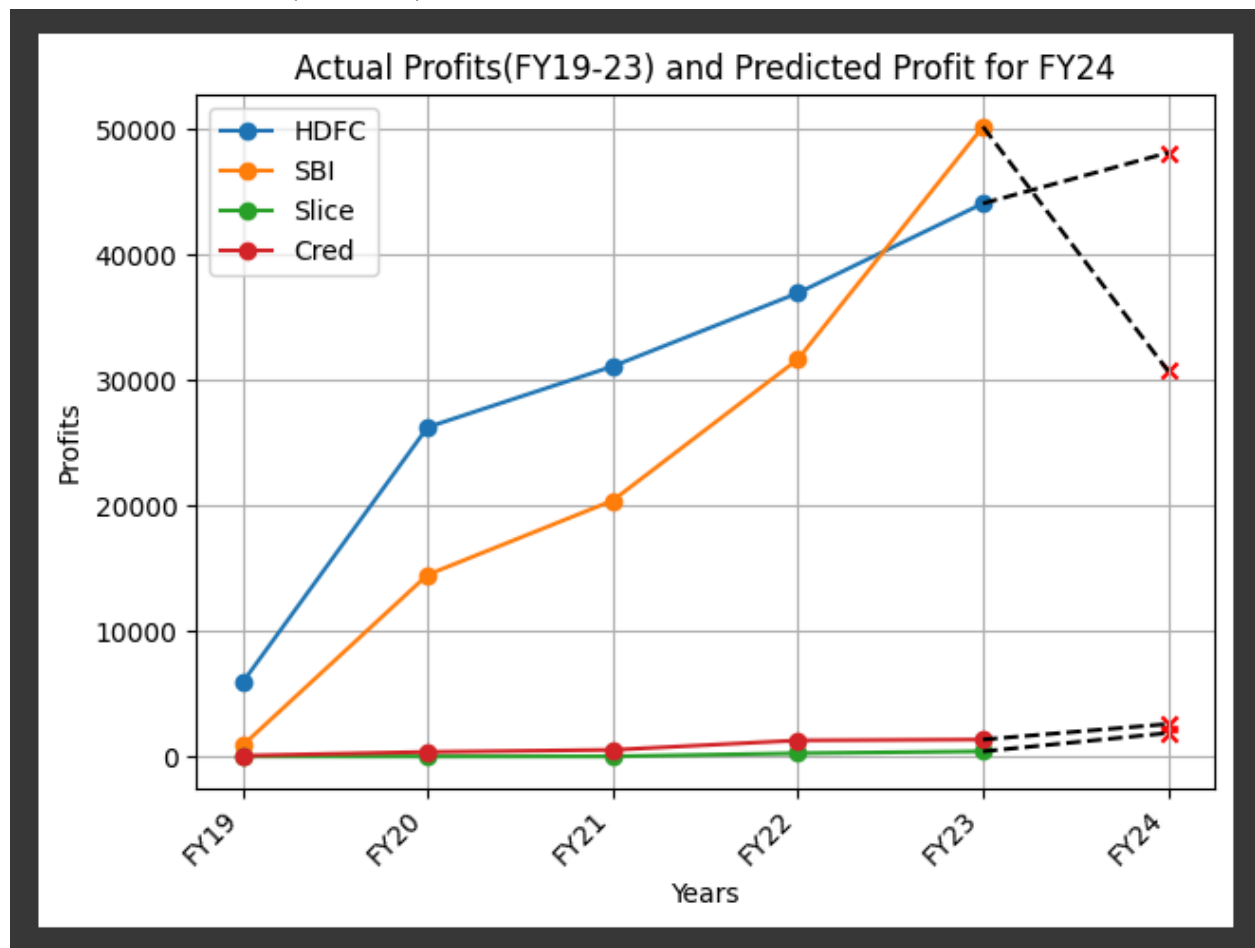
According to Graph 1.6.3,
- **HDFC** has been increasing steadily for its profits since FY19-23 and will still see the same for FY24. This creates a sense of reliability for new/old customers towards the bank.
- **SBI** may see an all time low profit since FY19 for FY24. This can be due to lack of improvement in the bank's performance in terms of lack of sustainable practices.
- **Slice** can see a slight increase in profits for FY24 as compared to the previous years. This shows little bit improvement over the years marking steady growth which might increase over the upcoming years if planned appropriately.
- **CRED** will also see an increase in profits for FY24 than in the previous years. We can see it competing with other banks in the future if they put sustainable practices into account.

Conclusion & Discussion

- HDFC: Demonstrates robust profitability and revenue despite a significant increase in expenses, suggesting effective cost management and revenue generation strategies.

- SBI: Maintains relatively stable profitability while grappling with declining revenue, emphasizing the importance of strategic adjustments to bolster revenue streams.

- Slice: Shows promising growth potential with a substantial increase in profits, but must address declining revenue to ensure sustained profitability and long-term viability.

- CRED: Faces challenges with high expenses and fluctuating profitability, indicating potential risks in its operational model that require careful evaluation and strategic refinement.

The analysis of FY24 financial data for loan providers reveals varying impacts on expenses, revenue, and profits compared to previous years. HDFC witnessed a significant increase in expenses, potentially signaling expansion or investment strategies that need careful scrutiny. SBI managed to reduce expenses but experienced declining revenue, indicating the need for strategic adjustments to sustain growth. Slice saw a significant decrease in expenses and revenue, suggesting a need for reassessment of its business model and revenue streams. Conversely, CRED maintained high expenses and experienced a sharp decline in revenue, highlighting challenges in its revenue model and market positioning. Despite these variations, providers need to prioritize strategic alignment, operational efficiency, and revenue diversification to ensure long-term sustainability and growth in a dynamic financial landscape.

HDFC demonstrates strong profitability and revenue, despite a significant increase in expenses. SBI maintains relatively stable profitability but faces declining revenue. Slice shows potential for growth with a significant increase in profits but needs to address declining revenue. CRED exhibits high expenses and fluctuating profitability, indicating potential risks.

Considering these factors, HDFC emerges as a favorable option due to its consistent profitability and revenue generation, despite the increase in expenses. This suggests robust financial health and operational efficiency, which may translate to better loan terms and stability for borrowers.

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Appendices

```python
import torch
import torch.nn as nn
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler

# Load the dataset from CSV file
data = pd.read_csv('filename.csv')

# Separate loan providers from features
loan_providers = data['Loan Providers'].tolist()
X = data.drop(columns=['Loan Providers'])

# Use Expenses FY19, FY20, FY21, FY22, FY23 as features
X_train, X_test = X.iloc[:, :-2], X.iloc[:, :-2]

# Use Expenses FY24 as the target variable
y_train, y_test = X.iloc[:, -1], X.iloc[:, -1]

# Scale the features
scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)

# Convert data to PyTorch tensors
X_train_tensor = torch.tensor(X_train, dtype=torch.float32)
X_test_tensor = torch.tensor(X_test, dtype=torch.float32)
y_train_tensor = torch.tensor(y_train.values,
 dtype=torch.float32).reshape(-1, 1)
y_test_tensor = torch.tensor(y_test.values,
 dtype=torch.float32).reshape(-1, 1)

# Define the linear regression model
class LinearRegressionModel(nn.Module):
```

```python
    def __init__(self, input_size):
        super(LinearRegressionModel, self).__init__()
        self.linear = nn.Linear(input_size, 1)

    def forward(self, x):
        return self.linear(x)

# Instantiate the model
input_size = X_train_tensor.shape[1]
model = LinearRegressionModel(input_size)

# Define the loss function and optimizer
criterion = nn.MSELoss()
optimizer = torch.optim.SGD(model.parameters(), lr=0.01)

# Train the model
num_epochs = 100
for epoch in range(num_epochs):
    # Forward pass
    outputs = model(X_train_tensor)
    loss = criterion(outputs, y_train_tensor)

    # Backward pass and optimization
    optimizer.zero_grad()
    loss.backward()
    optimizer.step()

    # Print the loss value during training
    print(f'Epoch [{epoch+1}/{num_epochs}], Loss: {loss.item():.4f}')


# Evaluate the model
with torch.no_grad():
    y_pred = model(X_test_tensor)

# Convert tensors to numpy arrays
y_test_array = y_test_tensor.numpy().flatten()
y_pred_array = y_pred.numpy().flatten()

print()
```

```python
# Plot actual values for FY19 to FY23
for i, provider in enumerate(loan_providers):
    expenses = X.iloc[i, :].values  # Get expenses for the current loan
provider, including FY23
    x_values = range(len(expenses))  # Adjust range to include FY23
    plt.plot(x_values, expenses, marker='o', label=provider)  # Use
original unscaled values from the dataset

# Plot predicted values for FY24
for i, provider in enumerate(loan_providers):
    plt.scatter(len(X.columns), y_pred_array[i], marker='x', color='red')
# Plot predicted value for FY24
    # Join FY23 and FY24 with a dotted line
    plt.plot([len(X.columns)-1, len(X.columns)], [X.iloc[i, -1],
y_pred_array[i]], linestyle='--', color='black')

# Set x-axis ticks and labels
plt.xticks(range(len(X.columns) + 1), list(X.columns) + ['FY24'],
rotation=45, ha='right')
plt.xlabel('Years')
plt.ylabel('Profits')
plt.title('Actual Profits(FY19-23) and Predicted Profit for FY24')
plt.legend()
plt.grid(True)
plt.tight_layout()
plt.show()

print()

# Print loan providers, actual, and predicted values
print("Loan Providers   FY19    FY20    FY21    FY22    FY23    FY24
(Predicted)")
for i, loan_provider in enumerate(loan_providers):
    actual_values = X.iloc[i, :].values
    predicted_value = y_pred_array[i]
    print(f"{loan_provider:<15} {' '.join([f'{value:<8.2f}' for value in
actual_values])} {predicted_value:<8.2f}")
```