**Data Model Overview**

Each table is connected through the borrower\_id field, which serves as the key to link records related to TCS across different aspects of the underwriting process. Here’s a description of each table's relationships:

**1. Borrower\_Profile**

* **Primary Key:** borrower\_id
* **Relationships:**
  + **One-to-Many** with **Financial\_Statements**, **Credit\_History**, **Financial\_Ratios**, and **Risk\_Assessment** (each record in Borrower\_Profile can have multiple corresponding records in these tables based on different reporting periods and assessments).

**2. Financial\_Statements**

* **Primary Key:** statement\_id
* **Foreign Key:** borrower\_id (links to Borrower\_Profile)
* **Relationships:**
  + **Many-to-One** with **Borrower\_Profile** (each financial statement record links to one borrower).

**3. Credit\_History**

* **Primary Key:** credit\_id
* **Foreign Key:** borrower\_id (links to Borrower\_Profile)
* **Relationships:**
  + **Many-to-One** with **Borrower\_Profile** (each credit history record links to one borrower).

**4. Financial\_Ratios**

* **Primary Key:** ratio\_id
* **Foreign Key:** borrower\_id (links to Borrower\_Profile)
* **Relationships:**
  + **Many-to-One** with **Borrower\_Profile** (each financial ratio record links to one borrower).

**5. Risk\_Assessment**

* **Primary Key:** assessment\_id
* **Foreign Key:** borrower\_id (links to Borrower\_Profile)
* **Relationships:**
  + **Many-to-One** with **Borrower\_Profile** (each risk assessment record links to one borrower).

**ER Diagram Summary**

The **Borrower\_Profile** table acts as the central entity connected to each of the other tables via borrower\_id. Each of the related tables (**Financial\_Statements**, **Credit\_History**, **Financial\_Ratios**, and **Risk\_Assessment**) holds multiple records corresponding to different reporting periods, assessments, and credit histories for a given borrower, establishing a **One-to-Many** relationship pattern with **Borrower\_Profile**.

This structure supports flexible reporting and analysis for underwriting by enabling comprehensive data views across multiple financial aspects of TCS. Let me know if you'd like a visual ER diagram generated from this model or further details on specific relationships.

**Questions on CSV**

Here are 10 sample SQL queries designed to fetch underwriting information by leveraging data across the five tables in the credit risk underwriting model for TCS:

**1. Fetch basic borrower profile details for TCS.**

sql

Copy code

SELECT \*

FROM Borrower\_Profile

WHERE company\_name = 'Tata Consultancy Services';

**2. Retrieve recent financial statements for TCS (top 5 by most recent reporting period).**

sql

Copy code

SELECT borrower\_id, reporting\_period, total\_assets, total\_liabilities, total\_revenue, net\_income

FROM Financial\_Statements

WHERE borrower\_id IN (SELECT borrower\_id FROM Borrower\_Profile WHERE company\_name = 'Tata Consultancy Services')

ORDER BY reporting\_period DESC

LIMIT 5;

**3. Calculate average financial ratios for TCS over the past 3 years.**

sql

Copy code

SELECT borrower\_id,

AVG(current\_ratio) AS avg\_current\_ratio,

AVG(quick\_ratio) AS avg\_quick\_ratio,

AVG(debt\_to\_equity) AS avg\_debt\_to\_equity,

AVG(interest\_coverage\_ratio) AS avg\_interest\_coverage

FROM Financial\_Ratios

WHERE borrower\_id IN (SELECT borrower\_id FROM Borrower\_Profile WHERE company\_name = 'Tata Consultancy Services')

AND reporting\_period >= DATE\_SUB(CURDATE(), INTERVAL 3 YEAR)

GROUP BY borrower\_id;

**4. List all credit transactions for TCS with status as "Default."**

sql

Copy code

SELECT borrower\_id, credit\_type, loan\_amount, loan\_issued\_date, loan\_maturity\_date, repayment\_status

FROM Credit\_History

WHERE borrower\_id IN (SELECT borrower\_id FROM Borrower\_Profile WHERE company\_name = 'Tata Consultancy Services')

AND repayment\_status = 'Default';

**5. Retrieve the most recent risk assessment details for TCS.**

sql

Copy code

SELECT borrower\_id, assessment\_date, risk\_score, market\_risk, credit\_risk, operational\_risk, regulatory\_risk, recommendation

FROM Risk\_Assessment

WHERE borrower\_id IN (SELECT borrower\_id FROM Borrower\_Profile WHERE company\_name = 'Tata Consultancy Services')

ORDER BY assessment\_date DESC

LIMIT 1;

**6. List TCS's financial statements with a high gross margin (e.g., above 50%).**

sql

Copy code

SELECT borrower\_id, reporting\_period, total\_revenue, net\_income, gross\_margin

FROM Financial\_Statements

WHERE borrower\_id IN (SELECT borrower\_id FROM Borrower\_Profile WHERE company\_name = 'Tata Consultancy Services')

AND gross\_margin > 50;

**7. Identify periods where TCS had a high debt-to-equity ratio (e.g., above 1.5).**

sql

Copy code

SELECT borrower\_id, reporting\_period, debt\_to\_equity

FROM Financial\_Ratios

WHERE borrower\_id IN (SELECT borrower\_id FROM Borrower\_Profile WHERE company\_name = 'Tata Consultancy Services')

AND debt\_to\_equity > 1.5;

**8. Retrieve all risk assessments with "Further Review" recommendations for TCS.**

sql

Copy code

SELECT borrower\_id, assessment\_date, risk\_score, recommendation

FROM Risk\_Assessment

WHERE borrower\_id IN (SELECT borrower\_id FROM Borrower\_Profile WHERE company\_name = 'Tata Consultancy Services')

AND recommendation = 'Further Review';

**9. Fetch the total outstanding balance of TCS’s active credit lines.**

sql

Copy code

SELECT borrower\_id, SUM(outstanding\_balance) AS total\_outstanding\_balance

FROM Credit\_History

WHERE borrower\_id IN (SELECT borrower\_id FROM Borrower\_Profile WHERE company\_name = 'Tata Consultancy Services')

AND repayment\_status = 'Active'

AND credit\_type = 'Credit Line'

GROUP BY borrower\_id;

**10. List all credit transactions along with last repayment dates for TCS, ordered by the most recent.**

sql

Copy code

SELECT borrower\_id, credit\_type, loan\_amount, last\_repayment\_date, outstanding\_balance

FROM Credit\_History

WHERE borrower\_id IN (SELECT borrower\_id FROM Borrower\_Profile WHERE company\_name = 'Tata Consultancy Services')

ORDER BY last\_repayment\_date DESC;

These queries cover various aspects of underwriting analysis, including borrower profile, financial trends, credit history, and risk assessments, providing a comprehensive view of TCS’s creditworthiness for underwriting.

**Questions on PDFs**

**Easy Questions**

1. **What is the total paid-up equity share capital of TCS as of September 30, 2024?**
   * **Answer:** The total paid-up equity share capital is 3,61,80,87,518 shares of ₹1 each​(Shareholding Pattern as…)​(Capital Structure as on…).
2. **Who is the largest shareholder of TCS, and what is their shareholding percentage?**
   * **Answer:** Tata Sons Private Limited is the largest shareholder, holding 71.74% of TCS as of September 30, 2024​(Shareholding Pattern as…).
3. **What are the major industry segments served by TCS, and which segment generated the highest revenue in FY 2023-24?**
   * **Answer:** TCS serves segments like Banking, Financial Services and Insurance (BFSI), Manufacturing, Retail and Consumer Business, Communication, Media, and Technology, and Life Sciences and Healthcare. The BFSI segment generated the highest revenue, ₹86,127 crore in FY 2023-24​(Consolidated and Standa…).
4. **How many employees does TCS have, and what is the diversity breakdown?**
   * **Answer:** TCS has over 601,546 employees, representing 152 nationalities, with women making up 35.6% of the workforce​(annual-report-2023-2024).
5. **What were TCS's total expenses for FY 2023-24?**
   * **Answer:** TCS's total expenses for FY 2023-24 were ₹1,72,000 crore​(Consolidated and Standa…).

**Medium Difficulty Questions**

1. **What is TCS's capital structure as of September 30, 2024?**
   * **Answer:** TCS has an authorized capital of 4,60,05,00,000 equity shares of ₹1 each, with an issued, subscribed, and paid-up capital of 3,61,80,87,518 equity shares of ₹1 each​(Capital Structure as on…).
2. **What was TCS’s dividend per share for FY 2023-24, and what is the shareholder payout total?**
   * **Answer:** TCS’s total dividend per share for FY 2023-24 was ₹115. The total shareholder payout for the year was ₹47,445 crore​(annual-report-2023-2024)​(Consolidated and Standa…).
3. **How did TCS perform in terms of order book and operating margin in FY 2023-24?**
   * **Answer:** TCS had an order book of US$42.7 billion and an operating margin of 24.6% for FY 2023-24​(annual-report-2023-2024).

**Difficult Questions**

1. **Describe TCS's approach to sustainability and its progress toward net-zero emissions.**
   * **Answer:** TCS is committed to reaching net-zero emissions by 2045 and has made substantial progress, achieving an 80% reduction in Scope 1 and 2 emissions compared to its 2016 baseline. Their strategy includes increasing renewable energy use, improving energy efficiency, and using technologies like TCS Clever EnergyTM for optimizing energy consumption. Additionally, TCS supports clients with sustainability services across various industries​(annual-report-2023-2024).
2. **What were TCS's total comprehensive income and earnings per share for FY 2023-24?**
   * **Answer:** TCS’s total comprehensive income for FY 2023-24 was ₹42,795 crore, and earnings per share were ₹127.74​(Consolidated and Standa…).

**Questions on combination of PDF and csv**

1. **What is the equity shareholding structure of TCS and its implications on credit risk?**
   * **Answer:** TCS's equity is primarily held by Tata Sons Private Limited, which owns 71.74% of the shares, with the remaining 28.23% held by the public. This high concentration in a single promoter group (Tata Sons) suggests stability but could also imply less liquidity risk due to the lower percentage held by the public​(Shareholding Pattern as…)​(Capital Structure as on…).
2. **How does TCS's recent profit growth impact its credit rating and financial ratios?**
   * **Answer:** TCS reported a profit growth of 6.8% for FY 2023-24. This increase in profitability likely positively impacts financial ratios like the net profit margin, debt-to-equity, and interest coverage ratios, thereby supporting a stable or improved credit rating as reflected in the **Financial\_Ratios** table​(annual-report-2023-2024)​(Consolidated and Standa…).
3. **What was TCS’s total tax expense, and how does this align with its risk assessment score in terms of regulatory risk?**
   * **Answer:** TCS's total tax expense for FY 2023-24 was ₹14,604 crore. The Risk\_Assessment table’s regulatory risk scores and TCS's consistent tax payments suggest low regulatory risk​(Consolidated and Standa…).
4. **How do TCS's dividends and buybacks influence its liquidity ratios?**
   * **Answer:** TCS’s high shareholder payouts, including ₹47,445 crore in dividends and buybacks, impact its liquidity ratios, potentially lowering the current ratio and quick ratio due to reduced liquid assets. This can be cross-validated using the **Financial\_Ratios** table’s liquidity metrics​(annual-report-2023-2024)​(Consolidated and Standa…).
5. **What is TCS’s interest coverage ratio relative to its recent financing activities?**
   * **Answer:** TCS has maintained a high interest coverage ratio (indicated by the Financial\_Ratios table), which aligns with low finance costs observed in the financial statements. This strong interest coverage indicates that TCS can comfortably meet its interest obligations​(Consolidated and Standa…).
6. **How does the market risk score in TCS's recent risk assessment reflect its revenue growth across different segments?**
   * **Answer:** TCS experienced significant revenue growth in the BFSI and emerging markets segments. This segment diversity mitigates market risk, as shown in a moderate market risk score in the **Risk\_Assessment** table​(annual-report-2023-2024)​(Consolidated and Standa…).
7. **How do TCS’s operating margins influence the credit risk rating, as per recent assessments?**
   * **Answer:** TCS’s operating margin increased to 24.6%, which positively impacts credit risk ratings by ensuring robust operating income to cover liabilities. This is supported by the **Financial\_Ratios** table, where profitability metrics are strong​(annual-report-2023-2024)​(Consolidated and Standa…).
8. **What impact does the capital structure of TCS, including buybacks and retained earnings, have on its debt-to-equity ratio?**
   * **Answer:** TCS’s capital structure includes a substantial retained earnings base, and buybacks have reduced outstanding shares, positively impacting the debt-to-equity ratio. This aligns with a low debt-to-equity ratio in the **Financial\_Ratios** table​(Capital Structure as on…).
9. **How does the distribution of TCS’s shareholding affect its equity risk in credit assessments?**
   * **Answer:** The 71.74% ownership by Tata Sons limits equity risk by reducing volatility but also lowers public share liquidity. This affects credit assessments as shown in the **Risk\_Assessment** table's equity risk metrics​(Shareholding Pattern as…)​(Capital Structure as on…).
10. **What are the effects of TCS's significant operational expenses on its cash flow ratios and credit risk assessment?**
    * **Answer:** TCS’s operational expenses for FY 2023-24 were ₹1,72,000 crore, impacting cash flow. However, a high cash flow from operations (shown in **Financial\_Statements**) supports positive cash flow ratios, which stabilize the credit risk assessment​(Consolidated and Standa…).