1. Job Profile Analysis

- **High-Risk Job Categories:**
  - **Sales** and **Self-employed** individuals show the **highest default rates**.
  - **Office** and **Prof Exe** roles have the **lowest default risk**.
- **Default Volume:**
  - The **"Other"** category contributes the most to total defaults, indicating potential risk ambiguity in undefined job categories.
- **Loan Amounts:**
  - **Self-employed** individuals receive the **highest average loan amounts**, despite high default rates — a red flag for risk exposure.
- **Tenure Insight:**
  - Defaults are concentrated among those with **less than 8 years** on the job, indicating lower employment stability increases risk.
- **Key Insight:**
  High-risk profiles often combine **low job tenure**, **undefined job roles**, and **high loan volume** — suggesting the need for **job-based segmentation in risk scoring.**

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2. Debt Burden Analysis

- **Mortgage & Property Value:**
  - Defaults are more **dense among lower-value properties**, especially below **$200K**, suggesting economic vulnerability in that segment.
- **Loan vs Property Value:**
  - Many defaults happen when **loan amounts are high** relative to **property value**, indicating over-leverage.
- **Debt-to-Income Ratio (DTI):**
  - DTI > **50** correlates with **~100% default probability**, clearly marking this as a **critical threshold**.
- **Delinquency & Derogatory Behavior:**
  - Both delinquent and derogatory incidents rise with DTI — reinforcing that **DTI is a key predictive feature**.
- **Key Insight:**
  Strong **non-linear threshold effects** around DTI and **value-risk mismatches** suggest the need for tighter **debt caps**and **underwriting criteria**.

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3. Credit Maturity Analysis

- **Open Credit Lines:**
  - Default risk rises **non-linearly after ~30 open credit lines**, signaling **overextension**.
- **Credit Inquiries:**

    - Default rate increases with **more recent inquiries**, especially **beyond 10 inquiries**, indicating **credit-seeking behavior as a red flag**.
- **Credit History Age:**
    - Shorter credit histories (under 100 months) are associated with **higher defaults**.
- **Interaction Heatmaps:**
    - High default clusters occur where **recent inquiries are high** and **credit history is short**, pointing to **immature and risky borrowers**.
- **Key Insight:**
  To introduce early-stage screening and **reduce exposure to default**, adding scoring penalties for applicants with **10 inquiries in the past year** and **more than 30 active credit lines** would be beneficial.