Loan Default Risk Analysis & Portfolio Insights

A Comprehensive Data-Driven Approach to Identifying Risk Segments, Improving Credit Decisions, and Enhancing Loan Performance

**Business Problem**

Effective credit risk and loan portfolio management are crucial for profitability in financial services. This report provides insights into high-risk borrower segments, default behavior, loan purpose performance, and trends over time to guide better credit approval processes and reduce non-performing assets.

**1. Identify High-Risk Borrower Segments**

**Key Indicators Used:**

* **Credit Score**
* **Debt-to-Income (DTI) Ratio**
* **Income**
* **Loan Amount**

**Findings:**

* Borrowers with low credit scores and high loan amounts are more likely to default.
* A higher DTI ratio is associated with increased default risk.
* Borrowers with lower income fall into the higher-risk category when combined with large loans.
* The correlation between loan amount and default is clearly positive — larger loans show a higher chance of non-repayment.

**Visuals Used:**

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| --- |
| **[Defaults by Age & EmploymentType](https://app.powerbi.com/MobileRedirect.html?action=OpenReport&reportObjectId=a7d48278-746f-4d85-b235-8b01fe720513&ctid=19e0bd4d-fca8-4ec7-8e50-04218d65eae9&reportPage=aee1fba9d9920872779e&pbi_source=copyvisualimage)** |
|  |
| **[Defaults by Age & Credit Score](https://app.powerbi.com/MobileRedirect.html?action=OpenReport&reportObjectId=a7d48278-746f-4d85-b235-8b01fe720513&ctid=19e0bd4d-fca8-4ec7-8e50-04218d65eae9&reportPage=aee1fba9d9920872779e&pbi_source=copyvisualimage)** |
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**2. Determine Key Factors Contributing to Loan Defaults**

**Findings:**

* Credit Score emerged as the strongest indicator. Borrowers with scores below 600 and low income had disproportionately higher default rates.
* Loan amount and DTIRatio(Debt-to-Income) also play critical roles — as both increase, so does the likelihood of default.
* Missing values and outliers in fields like interest rate and loan term were cleaned using a 5-number summary, improving data quality for analysis.

**Impact:**

* **Enhancing credit scoring thresholds** and introducing stricter evaluation of DTI and loan amount can reduce defaults.

**3. Analyze the Impact of Co-signers, Dependents, and Existing Mortgages**

**Findings:**

* Borrowers without co-signers exhibited higher default rates, suggesting co-signers improve repayment behavior.
* Higher number of dependents increases financial burden, slightly raising the default probability.
* Borrowers with existing mortgages are at greater risk of defaulting on additional loans.

**Visuals Used:**

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| --- |
| **[Default Rate (%) & HasDependents by HasCoSigner & HasMortgage](https://app.powerbi.com/MobileRedirect.html?action=OpenReport&reportObjectId=a7d48278-746f-4d85-b235-8b01fe720513&ctid=19e0bd4d-fca8-4ec7-8e50-04218d65eae9&reportPage=2b01659711751a198201&pbi_source=copyvisualimage)** |

**4. Assess Performance of Loan Purposes & Employment Types**

**Findings from Your Table:**

* **Loan Purposes**:
  + Home loans had the lowest default rates (~10.23%) and highest repayment success (~89.77%).
  + Business and Education loans had the highest default rates, especially among unemployed borrowers.
* **Employment Types**:
  + Full-time employees had the lowest default rate (~9.46%) and highest repayment rate (~90.54%).
  + Unemployed borrowers showed the highest risk with a ~13.55% default rate.

**Insights:**

* Prioritize **Home loan applicants with full-time employment** for lower risk.
* Consider **revising approval criteria** for unemployed or self-employed applicants, especially in business loan categories.

**Visualization Used:**

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| --- |
| **[A Power BI visual](https://app.powerbi.com/MobileRedirect.html?action=OpenReport&reportObjectId=a7d48278-746f-4d85-b235-8b01fe720513&ctid=19e0bd4d-fca8-4ec7-8e50-04218d65eae9&reportPage=2b01659711751a198201&pbi_source=copyvisualimage)** |
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**5. Investigate Trends in Loan Defaults Over Time**

**Visualization Used:**

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| --- |
| **[Loan Default Rate by Year](https://app.powerbi.com/MobileRedirect.html?action=OpenReport&reportObjectId=a7d48278-746f-4d85-b235-8b01fe720513&ctid=19e0bd4d-fca8-4ec7-8e50-04218d65eae9&reportPage=2b01659711751a198201&pbi_source=copyvisualimage)** |
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**Findings:**

* **2016** had the highest default rate (~11.75%) — possibly due to relaxed lending policies or macroeconomic factors.
* **2017** showed a significant improvement with the lowest default rate (~11.50%).
* **2018** marked a slight uptick in defaults (~11.59%), suggesting early warning signs that need monitoring.

**Recommendations:**

* Investigate 2015–2016 lending criteria for risky patterns.
* Reinforce policies implemented after 2016 that led to lower defaults.
* Monitor post-2018 uptick to avoid another peak.