Financial_Loan

June 12, 2025

1 Strategic Loan Insights & Risk Monitoring

[7]:
```
import pandas as pd

import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px

# Load your data
df = pd.read_csv("C:/Users/DELL'/Music/project- loan/financial_loan.csv")  # or␣
↪your source
df['issue_date'] = pd.to_datetime(df['issue_date'], format='%d-%m-%Y')

# Create Month and Year columns
df['Month'] = df['issue_date'].dt.month
df['MonthName'] = df['issue_date'].dt.strftime('%b')
df['Year'] = df['issue_date'].dt.year
```

1.0.1 1. KPI Cards (Total applications, funded, received)

[8]:
```
total_applications = df['id'].count()
total_funded = df['loan_amount'].sum()
total_received = df['total_payment'].sum()

print(f"Total Applications: {total_applications:,}")
print(f"Total Funded Amount: ${total_funded / 1e6:.2f}M")
print(f"Total Amount Received: ${total_received / 1e6:.2f}M")
```

```
Total Applications: 38,576
Total Funded Amount: $435.76M
Total Amount Received: $473.07M
```

[22]:
```
import pandas as pd
from datetime import datetime

# Set today's date (for report reference)
today = pd.to_datetime('2024-12-31')  # Adjust if needed
```

```
# Convert issue_date to datetime
df['issue_date'] = pd.to_datetime(df['issue_date'], format='%d-%m-%Y',␣
↪errors='coerce')

# Month/Year logic
current_month = today.month
previous_month = current_month - 1 if current_month > 1 else 12
current_year = today.year
previous_year = current_year if previous_month != 12 else current_year - 1

# Filters
df_mtd = df[(df['issue_date'].dt.month == current_month) & (df['issue_date'].dt.
↪year == current_year)]
df_pmtd = df[(df['issue_date'].dt.month == previous_month) & (df['issue_date'].
↪dt.year == previous_year)]
df_good = df[df['loan_status'].isin(['Fully Paid', 'Current'])]
df_bad = df[df['loan_status'] == 'Charged Off']

# --- KPI Calculations ---

total_apps = df['id'].count()
mtd_apps = df_mtd['id'].count()
pmtd_apps = df_pmtd['id'].count()

total_funded = df['loan_amount'].sum()
mtd_funded = df_mtd['loan_amount'].sum()
pmtd_funded = df_pmtd['loan_amount'].sum()

total_received = df['total_payment'].sum()
mtd_received = df_mtd['total_payment'].sum()
pmtd_received = df_pmtd['total_payment'].sum()

# --- Good/Bad Loans ---

good_apps = df_good['id'].count()
bad_apps = df_bad['id'].count()

good_funded = df_good['loan_amount'].sum()
bad_funded = df_bad['loan_amount'].sum()

good_received = df_good['total_payment'].sum()
bad_received = df_bad['total_payment'].sum()

# --- Good/Bad Loan % ---

good_pct = (good_apps * 100.0) / total_apps
```

```python
bad_pct = (bad_apps * 100.0) / total_apps

# --- Print Everything Like a Dashboard ---

print("  LOAN KPI SUMMARY")
print("                 ")
print(f"  Total Applications     : {total_apps:,}")
print(f"  MTD Applications       : {mtd_apps:,}")
print(f"  PMTD Applications      : {pmtd_apps:,}\n")

print(f"  Total Funded Amount    : ${total_funded:,.0f}")
print(f"  MTD Funded Amount      : ${mtd_funded:,.0f}")
print(f"  PMTD Funded Amount     : ${pmtd_funded:,.0f}\n")

print(f"  Total Amount Received  : ${total_received:,.0f}")
print(f"  MTD Amount Received    : ${mtd_received:,.0f}")
print(f"  PMTD Amount Received   : ${pmtd_received:,.0f}\n")

print("  GOOD LOANS")
print(f"  Applications           : {good_apps:,} ({good_pct:.2f}%)")
print(f"  Funded Amount          : ${good_funded:,.0f}")
print(f"  Amount Received        : ${good_received:,.0f}\n")

print("  BAD LOANS")
print(f"  Applications           : {bad_apps:,} ({bad_pct:.2f}%)")
print(f"  Funded Amount          : ${bad_funded:,.0f}")
print(f"  Amount Received        : ${bad_received:,.0f}")
```

```
LOAN KPI SUMMARY

Total Applications     : 38,576
MTD Applications       : 4,314
PMTD Applications      : 4,035

Total Funded Amount    : $435,757,075
MTD Funded Amount      : $53,981,425
PMTD Funded Amount     : $47,754,825

Total Amount Received  : $473,071,176
MTD Amount Received    : $58,074,440
PMTD Amount Received   : $50,132,030

GOOD LOANS
Applications           : 33,243 (86.18%)
Funded Amount          : $370,224,850
Amount Received        : $435,786,413

BAD LOANS
```

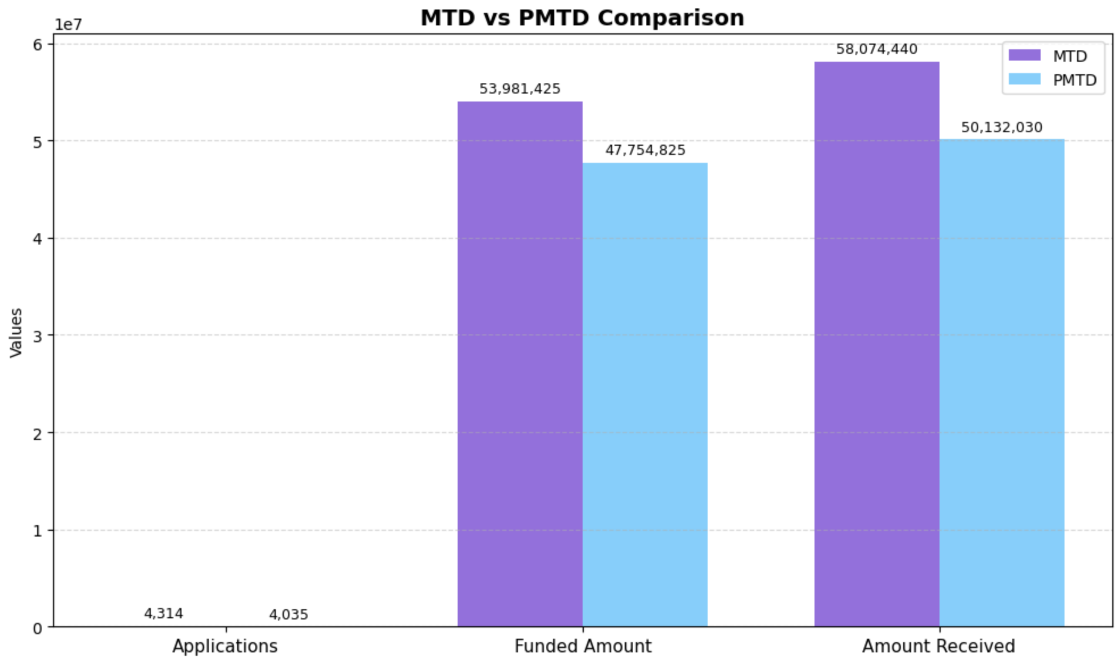
```
 Applications           : 5,333 (13.82%)
 Funded Amount          : $65,532,225
 Amount Received        : $37,284,763
```

[35]:
```
# Clean loan_status values

df['loan_status'] = df['loan_status'].str.strip().str.title()

# Count applications per loan status
loan_status_counts = df['loan_status'].value_counts().reset_index()
loan_status_counts.columns = ['Loan Status', 'Application Count']

# Display the result
print(loan_status_counts)
```

```
   Loan Status  Application Count
0   Fully Paid              32145
1  Charged Off               5333
2      Current               1098
```

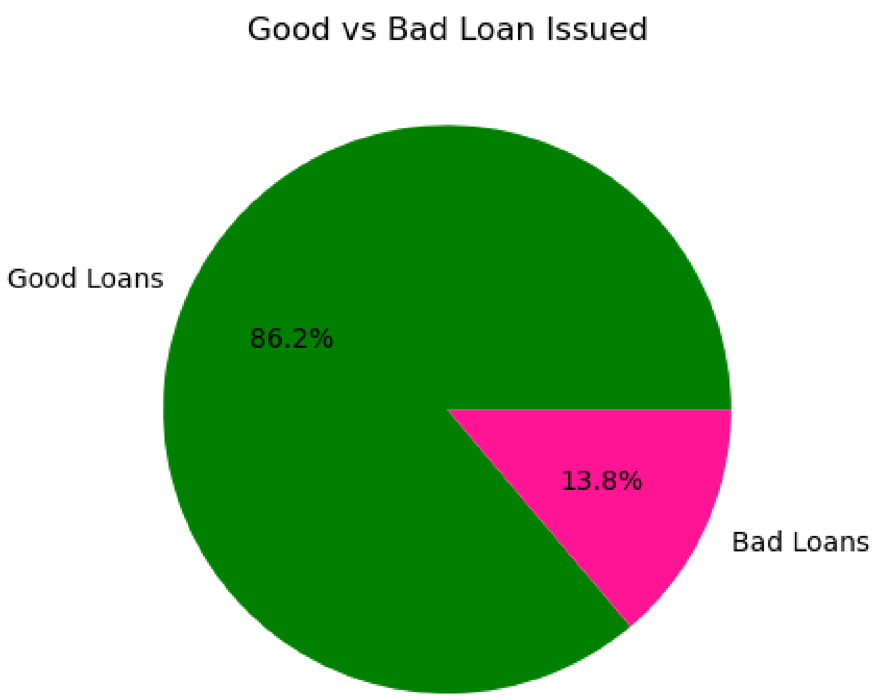
[ ]:

[29]:
```
import matplotlib.pyplot as plt

# Data for the bar chart
categories = ['Applications', 'Funded Amount', 'Amount Received']
mtd_values = [mtd_apps, mtd_funded, mtd_received]
pmtd_values = [pmtd_apps, pmtd_funded, pmtd_received]

x = range(len(categories))  # X-axis positions

# Plotting
plt.figure(figsize=(10, 6))
bar_width = 0.35

# MTD bars
plt.bar([i - bar_width/2 for i in x], mtd_values, width=bar_width,␣
 ↪color='mediumpurple', label='MTD')
# PMTD bars
plt.bar([i + bar_width/2 for i in x], pmtd_values, width=bar_width,␣
 ↪color='lightskyblue', label='PMTD')

# To Add value labels on top
for i, val in enumerate(mtd_values):
    plt.text(i - bar_width/2, val + max(mtd_values)*0.01, f"{int(val):,}",␣
 ↪ha='center', va='bottom', fontsize=9)
for i, val in enumerate(pmtd_values):
    plt.text(i + bar_width/2, val + max(pmtd_values)*0.01, f"{int(val):,}",␣
↪ha='center', va='bottom', fontsize=9)

# For Styling
plt.xticks(x, categories, fontsize=11)
plt.title('MTD vs PMTD Comparison', fontsize=14, fontweight='bold')
plt.ylabel('Values')
plt.legend()
plt.grid(axis='y', linestyle='--', alpha=0.5)
plt.tight_layout()
plt.show()
```



2. Good vs Bad Loan

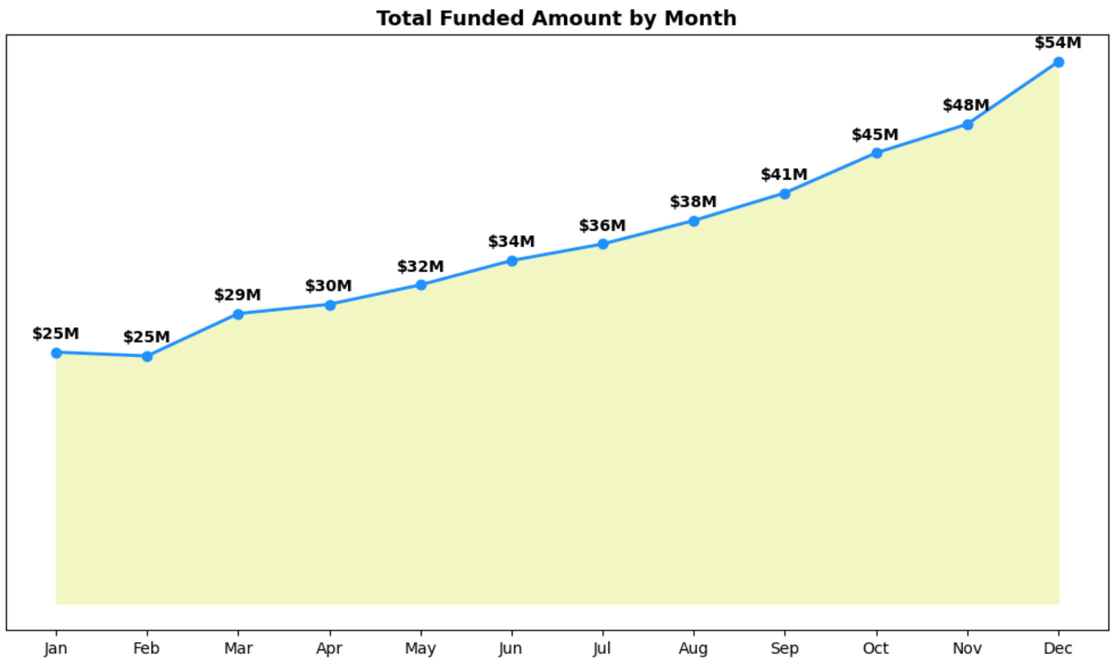
[9]:
```
good = df[df['loan_status'].isin(['Fully Paid', 'Current'])].shape[0]
bad = df[df['loan_status'] == 'Charged Off'].shape[0]

plt.pie([good, bad], labels=['Good Loans', 'Bad Loans'], autopct='%1.1f%%',␣
↪colors=['green', 'deeppink'])
plt.title("Good vs Bad Loan Issued")
plt.show()
```



3. Total Funded Amount by Month

```
[13]: import matplotlib.pyplot as plt


      monthly_funds = df.groupby('MonthName')['loan_amount'].sum().reindex([
          'Jan', 'Feb', 'Mar', 'Apr', 'May', 'Jun',
          'Jul', 'Aug', 'Sep', 'Oct', 'Nov', 'Dec'
      ])

      monthly_millions = monthly_funds / 1e6

      # To Plot with fill
      plt.figure(figsize=(10, 6))
      plt.fill_between(monthly_millions.index, monthly_millions.values,␣
       ↪color='#F3F6C3')  # soft yellow like Power BI
      plt.plot(monthly_millions.index, monthly_millions.values, marker='o',␣
       ↪color='dodgerblue', linewidth=2)

      # To Annotate values above points
      for i, value in enumerate(monthly_millions.values):
          plt.text(i, value + 1, f"${value:.0f}M", ha='center', va='bottom',␣
       ↪fontsize=10, fontweight='bold')
```

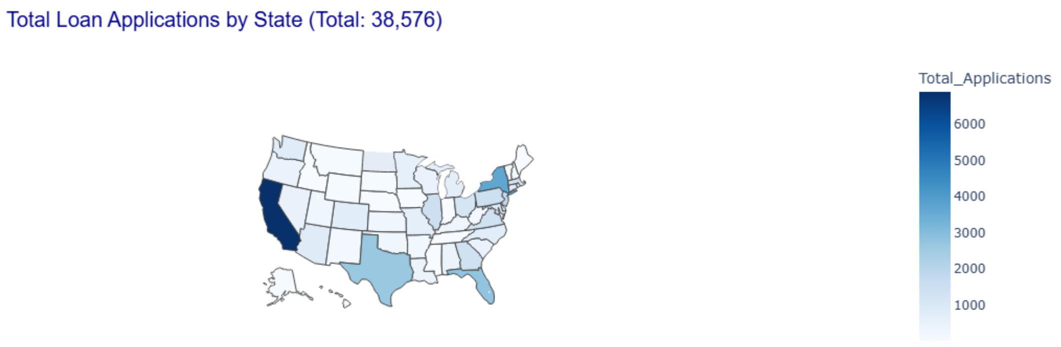
```python
# Title
plt.title('Total Funded Amount by Month', fontsize=13, fontweight='bold')


plt.yticks([])  # remove y-axis values
plt.ylabel('')  # remove y-axis label

# To Clean X-axis
plt.xticks(fontsize=10)
plt.grid(False)

plt.tight_layout()
plt.show()
```



4. Total Loan Applications by State

[15]:
```python
import plotly.express as px

# To Group data by state
state_counts = df.groupby('address_state')['id'].count().reset_index()
state_counts.columns = ['address_state', 'Total_Applications']

# To Calculate total applications
```

```
total_apps = state_counts['Total_Applications'].sum()

# To Create map
fig = px.choropleth(
    state_counts,
    locations='address_state',
    locationmode='USA-states',
    color='Total_Applications',
    scope='usa',
    title=f'Total Loan Applications by State (Total: {total_apps:,})',
    color_continuous_scale='Blues'
)

fig.update_layout(
    title_font=dict(size=20, family='Arial', color='darkblue'),
    geo=dict(bgcolor='rgba(0,0,0,0)'),
    margin=dict(l=20, r=20, t=60, b=20)
)

fig.show()
```



[2]:
```
pip install pypandoc
```

```
Defaulting to user installation because normal site-packages is not
writeableNote: you may need to restart the kernel to use updated packages.

Requirement already satisfied: pypandoc in
c:\users\dell'\appdata\roaming\python\python312\site-packages (1.15)
```

[21]:
```
import pandas as pd
from datetime import datetime

# Assume issue_date is already in datetime format
```

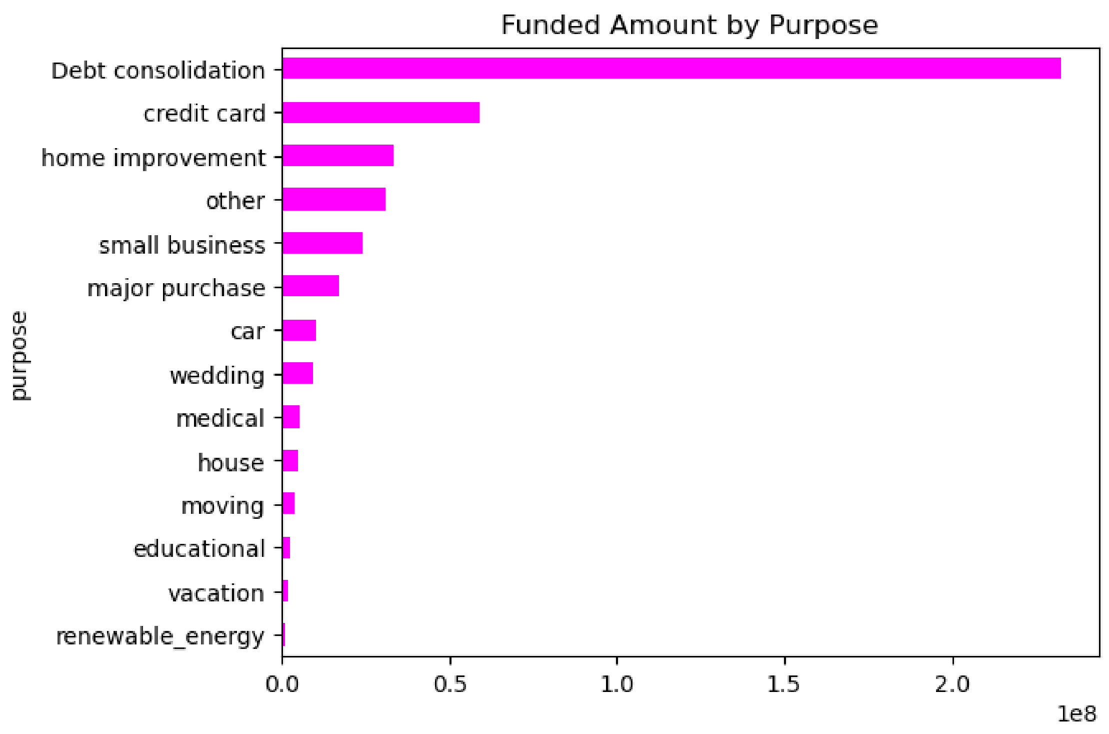
```
df['issue_date'] = pd.to_datetime(df['issue_date'], format='%d-%m-%Y',␣
↪errors='coerce')

# Set reference date to today (or override with your report date)
today = pd.to_datetime('2024-12-31')  # Example: Dec 2024

# Extract current and previous month
current_month = today.month
previous_month = current_month - 1 if current_month > 1 else 12
current_year = today.year
previous_year = current_year if previous_month != 12 else current_year - 1

# --- Total Loan Applications ---
total_apps = df['id'].count()

# --- MTD Applications ---
mtd_apps = df[(df['issue_date'].dt.month == current_month) &
              (df['issue_date'].dt.year == current_year)]['id'].count()

# --- PMTD Applications ---
pmtd_apps = df[(df['issue_date'].dt.month == previous_month) &
               (df['issue_date'].dt.year == previous_year)]['id'].count()

# --- Good Loan Applications ---
good_apps = df[df['loan_status'].isin(['Fully Paid', 'Current'])]['id'].count()

# --- Bad Loan Applications ---
bad_apps = df[df['loan_status'] == 'Charged Off']['id'].count()

# --- MTD Good Loans ---
mtd_good_apps = df[(df['issue_date'].dt.month == current_month) &
                   (df['loan_status'].isin(['Fully Paid', 'Current']))]['id'].
↪count()

# --- PMTD Good Loans ---
pmtd_good_apps = df[(df['issue_date'].dt.month == previous_month) &
                    (df['loan_status'].isin(['Fully Paid', 'Current']))]['id'].
↪count()

# --- MTD Bad Loans ---
mtd_bad_apps = df[(df['issue_date'].dt.month == current_month) &
                  (df['loan_status'] == 'Charged Off')]['id'].count()

# --- PMTD Bad Loans ---
pmtd_bad_apps = df[(df['issue_date'].dt.month == previous_month) &
                   (df['loan_status'] == 'Charged Off')]['id'].count()
```

```
# Print all results like dashboard
print(f"  Total Applications: {total_apps:,}")
print(f"  MTD Applications (Dec): {mtd_apps:,}")
print(f"  PMTD Applications (Nov): {pmtd_apps:,}")

print(f"  Good Loan Applications: {good_apps:,}")
print(f"  Bad Loan Applications: {bad_apps:,}")

print(f"  MTD Good Loans: {mtd_good_apps:,}")
print(f"  PMTD Good Loans: {pmtd_good_apps:,}")

print(f"  MTD Bad Loans: {mtd_bad_apps:,}")
print(f"  PMTD Bad Loans: {pmtd_bad_apps:,}")
```

```
 Total Applications: 38,576
 MTD Applications (Dec): 4,314
 PMTD Applications (Nov): 4,035
 Good Loan Applications: 33,243
 Bad Loan Applications: 5,333
 MTD Good Loans: 3,665
 PMTD Good Loans: 3,474
 MTD Bad Loans: 649
 PMTD Bad Loans: 561
```

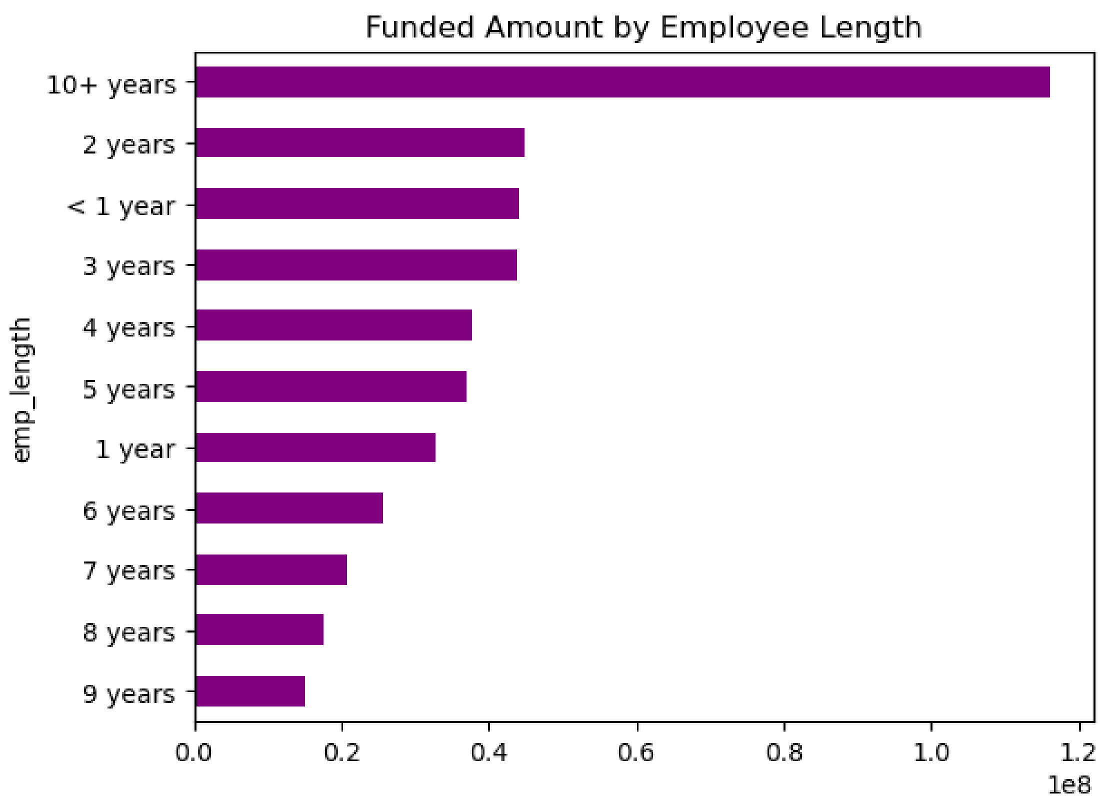
Purpose

[16]:
```
purpose = df.groupby('purpose')['loan_amount'].sum().sort_values()
purpose.plot(kind='barh', color='magenta', title='Funded Amount by Purpose')
plt.show()
```



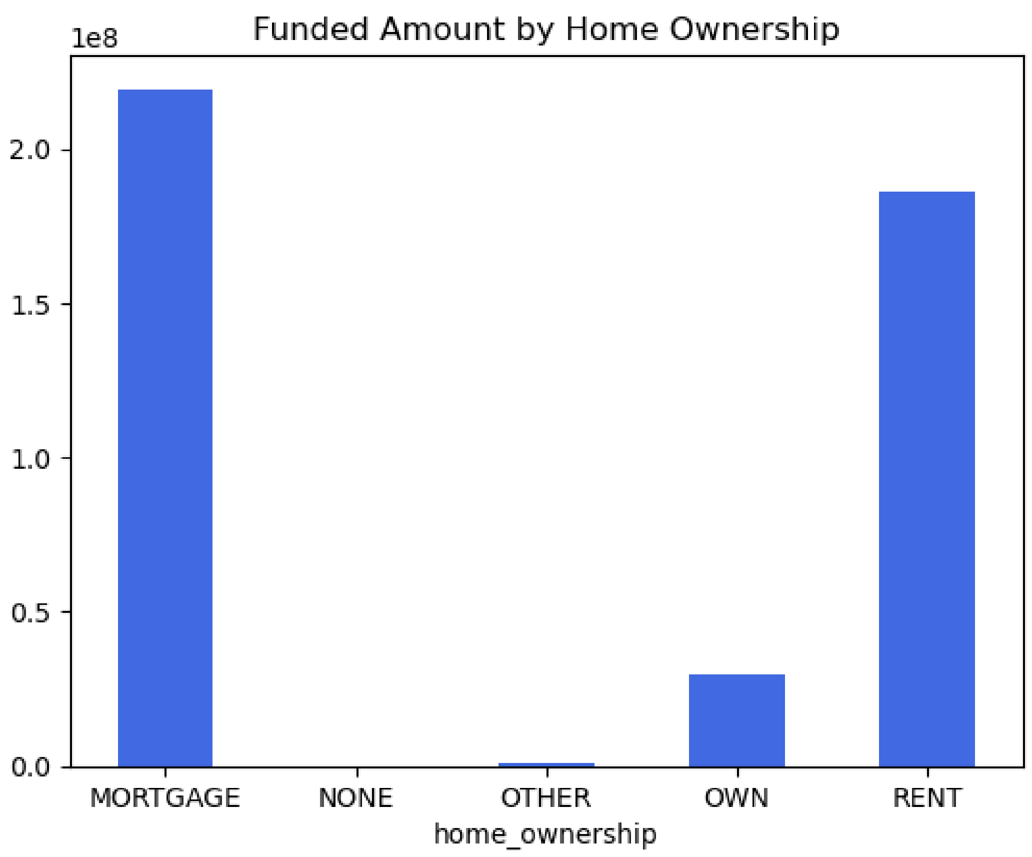
Employee Length

[17]:
```
emp_len = df.groupby('emp_length')['loan_amount'].sum().sort_values()
emp_len.plot(kind='barh', color='purple', title='Funded Amount by Employee␣
↪Length')
plt.show()
```



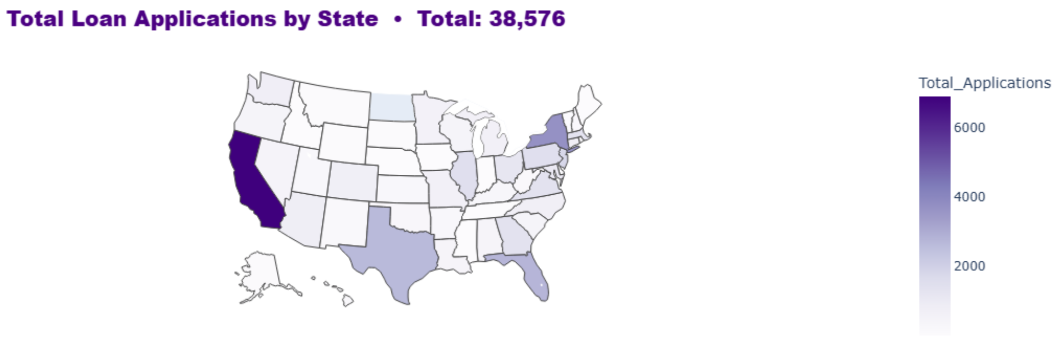
Home Ownership

[18]:
```
home = df.groupby('home_ownership')['loan_amount'].sum()
home.plot(kind='bar', color='royalblue', title='Funded Amount by Home␣
  ↪Ownership')
plt.xticks(rotation=0)
plt.show()
```



[20]:
```python
import plotly.express as px

# Group data by state
state_counts = df.groupby('address_state')['id'].count().reset_index()
state_counts.columns = ['address_state', 'Total_Applications']

# Calculate total loan applications
total_apps = state_counts['Total_Applications'].sum()

# Build choropleth map
fig = px.choropleth(
    state_counts,
    locations='address_state',
    locationmode='USA-states',
    color='Total_Applications',
    scope='usa',
    title=f'Total Loan Applications by State  •  Total: {total_apps:,}',
    color_continuous_scale='Purples'  # Power BI-style purple
)
```

```
# Style adjustments
fig.update_layout(
    title_font=dict(size=20, family='Arial Black', color='indigo'),
    geo=dict(bgcolor='rgba(0,0,0,0)'),
    margin=dict(l=20, r=20, t=70, b=20)
)

fig.show()
```



```
[ ]:
```