**Question 1:**  
How can we effectively segment our customers based on their banking behavior and preferences?

**Objective:**  
To develop a customer segmentation model that identifies unique characteristics and needs for each customer segment.

**Segment 0: Moderate Transaction Frequency, High Housing Loan Ownership**

**Characteristics:**

* **Transaction Frequency:** Moderate (~1.34)
* **Average Transaction Amount:** Moderate (~843.47)
* **Recency:** Low (~42.50) – indicating recent interactions
* **Product Ownership:** Primarily housing loans (99.78% ownership), no securities or CD accounts

**Customer Needs:**

* **Financial Planning:** Services or products to help manage or refinance housing loans.
* **Loyalty Offers:** Discounts on fees or interest rates on other loans to reward loyalty.
* **Cross-selling Opportunities:** Bundled products like insurance or credit cards that complement their loan.

**Segment 1: Low Transaction Activity, High Housing Loan Ownership, Low Product Ownership**

**Characteristics:**

* **Transaction Frequency:** Low
* **Average Transaction Amount:** Low
* **Recency:** High – suggesting recent, but infrequent, interactions
* **Product Ownership:** Primarily housing loans with minimal ownership of other products

**Customer Needs and Opportunities:**

* **Re-engagement Campaigns:** Highlight benefits of digital banking services or other products like savings accounts.
* **Educational Content:** Financial literacy materials on savings, budgeting, and product advantages to build engagement.
* **Customized Loan Products:** Refinancing options or low-interest rates to foster financial stability.

**Segment 2: Minimal Product Ownership and Transactions**

**Characteristics:**

* **Transaction Frequency and Amount:** Very low, minimal engagement across all products

**Customer Needs:**

* **Onboarding to Basic Products:** Introduce basic accounts like savings or debit accounts to build a relationship.
* **Financial Literacy Campaigns:** Provide budgeting, saving, and financial management resources to drive engagement.
* **Incentives for Engagement:** Waived fees, introductory rates, or cashback offers to encourage greater use of services.

**Segment 3: Moderate Transaction Frequency, Strong Securities Product Ownership**

**Characteristics:**

* **Transaction Frequency and Amount:** Moderate
* **Product Ownership:** High ownership of securities accounts, likely financially knowledgeable and interested in investments

**Customer Needs:**

* **Investment Products:** Offer mutual funds, retirement plans, or brokerage services to meet investment interests.
* **Wealth Management:** Provide advisory services to help grow and diversify portfolios.
* **Advanced Investment Education:** Seminars on market trends, advanced strategies, or tax-saving investments.

**Segment 4: High Transaction Frequency and Amount, Moderate Loan Engagement**

**Characteristics:**

* **Transaction Frequency and Amount:** High
* **Product Ownership:** Moderate, with some engagement in housing loans; likely high-value and financially active

**Customer Needs:**

* **Premium Banking Services:** VIP services such as a relationship manager, higher withdrawal limits, or exclusive perks.
* **Reward Programs:** Cashback, discounts on fees, or other benefits to recognize their activity level.
* **Cross-selling Loans and Credit:** Additional loan offers for liquidity, or high-limit credit cards with rewards that align with their spending.

**Segment 5: High CD Account Ownership, Balanced in Housing Loans and Transaction Frequency**

**Characteristics:**

* **Product Ownership:** High CD account ownership with a preference for stable, low-risk investments
* **Transaction Frequency:** Balanced, with moderate housing loan engagement

**Customer Needs:**

* **Low-Risk Investment Products:** Products like fixed deposits, government bonds, or stable retirement accounts.
* **Savings and Investment Advice:** Advice on diversifying low-risk investments to enhance financial security.
* **Loyalty Programs:** Benefits for CD account holders to enhance engagement with stable, bank-focused products.

**Question 2:**

**What are the key factors influencing customer engagement with our marketing campaigns?**

**Analysis of Historical Campaign Data: Key Engagement Drivers**

1. **Previous Contact Days (pdays):**
   * **Insight:** The timing of prior contacts is a top factor affecting engagement. Customers with recent or consistent past contacts tend to have higher engagement levels.
   * **Implication:** Campaigns that maintain a shorter interval between contacts are more effective, emphasizing the value of timely follow-ups.
2. **Customer Balance:**
   * **Insight:** Higher average balances correlate with increased engagement, likely because these customers have greater financial stability or a higher interest in investment products.
   * **Implication:** Campaigns targeting high-balance customers may yield better results with minimal adjustments, while campaigns aimed at lower-balance customers may require a more personalized approach.

**Proposed Metrics for Tracking Campaign Effectiveness**

1. **Conversion Rate:**
   * **Definition:** The percentage of customers who took the desired action (e.g., subscribed to a term deposit) after being targeted.
   * **Purpose:** This metric gauge the overall persuasiveness and effectiveness of a campaign. High conversion rates reveal successful elements that can be replicated.
2. **Engagement Rate by Segment:**
   * **Definition:** Response rate segmented by attributes like age, balance, or customer clusters.
   * **Purpose:** This metric assesses which segments respond best, allowing adjustments to targeting and messaging.
3. **Follow-Up Success Rate:**
   * **Definition:** Tracks engagement among customers who have been previously contacted versus new contacts.
   * **Purpose:** This metric highlights the impact of past interactions, showing if repeated contacts boost engagement.
4. **Return on Investment (ROI):**
   * **Definition:** Measures the financial return on a campaign relative to its cost.
   * **Purpose:** Helps prioritize high-ROI campaigns, ensuring resources are allocated effectively.
5. **Churn Rate Reduction:**
   * **Definition:** Measures the change in churn rate among engaged customers versus those who didn’t engage.
   * **Purpose:** Provides insights into retention value, indicating how effectively campaigns prevent customer attrition.

**Question 3:**

**How do customer behaviors and preferences vary across different segments?**

**Analysis of Patterns Across Segments**

Based on the available data, here are some key patterns and behaviors in customer segments:

1. **Segment Analysis: Product Usage and Transaction Behavior**
   * **Segment with Housing Loans (e.g., Segments 0 and 1):** These segments have high housing loan ownership. Segment 0 shows moderate transaction activity, while Segment 1 has low activity but recent engagement.
   * **Opportunities:** Offer financial planning and loyalty rewards for Segment 0. Segment 1 could benefit from re-engagement efforts with educational content on savings and budgeting.
2. **Investment-Oriented Segment (e.g., Segment 3):**
   * **Behavior:** Customers in this segment show moderate transaction frequency with strong securities product ownership, suggesting a focus on investment.
   * **Opportunities:** Provide advanced investment products and educational seminars to deepen engagement with sophisticated offerings.
3. **High-Transaction, Low Loan Engagement (e.g., Segment 4):**
   * **Behavior:** High transaction frequency and volume, with moderate loan engagement, indicating high financial activity.
   * **Opportunities:** Promote premium banking services, rewards programs, and high-limit credit cards tailored to their active financial lifestyle.
4. **Low Engagement and Minimal Product Ownership (e.g., Segment 2):**
   * **Behavior:** Very low transaction frequency and limited product ownership, possibly newer or minimally engaged customers.
   * **Opportunities:** Initiate onboarding to basic products like savings accounts and incentivize engagement through introductory offers and financial literacy resources.

**Targeted Marketing Opportunities**

1. **Personalized Campaigns by Segment:**
   * Use insights from product usage and transaction history to develop personalized campaigns (e.g., premium offers for high-transaction customers, financial literacy for low-engagement customers).
2. **Timing and Frequency of Contact:**
   * Adjust contact timing based on prior engagement (pdays) patterns, particularly for segments that benefit from frequent follow-ups.
3. **Tailored Offers by Financial Status:**
   * For segments with higher balances, focus on investment products. For lower-balance segments, offer savings plans or lower-cost credit options to address financial stability.