

## Pre-Class Discovery Handout: P2P Lending &amp; Robo-Advisors

**Activity 1: The Lemon Problem**

*Scenario:* You run a P2P lending platform. Of your applicants, 70% are low-risk (default rate 2%) and 30% are high-risk (default rate 15%). Unfortunately, you cannot distinguish between the two types.

**Q1:** What interest rate must you charge to break even if you cannot distinguish borrower types? Calculate the expected default rate using:

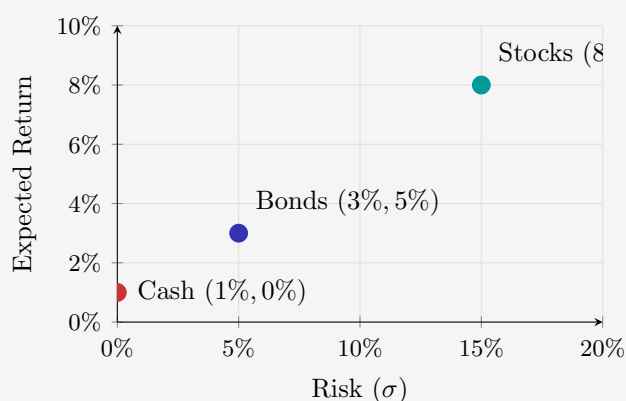
$$\mathbb{E}[\text{default}] = 0.70 \times 2\% + 0.30 \times 15\%$$

**Q2:** At this break-even rate, what happens to low-risk borrowers? Will they stay on the platform or leave?

**Q3:** How does this dynamic illustrate Akerlof's "market for lemons" problem? What mechanism could the platform use to mitigate it?

**Activity 2: Portfolio Construction**

*Scenario:* You have CHF 10,000 to invest. A robo-advisor offers three asset classes:



**Q1:** Construct a **conservative** portfolio (weights summing to 100%). Calculate its expected return:  $r_p = w_S \cdot 8\% + w_B \cdot 3\% + w_C \cdot 1\%$ .

**Q2:** Construct an **aggressive** portfolio. Calculate its expected return.

**Q3:** Why can't an investor simply maximize return? What constraint does risk impose?

**Activity 3: Robo vs Human**

*Scenario:* Compare a robo-advisor and a traditional human financial advisor across five key dimensions. Fill in the blank cells based on your research.

Dimension	Robo-Advisor	Human Advisor
Annual cost		
Personalization		
Emotional coaching		
Rebalancing speed		
Minimum investment		

**Q1:** Fill in the comparison for each dimension.

**Q2:** When is a robo-advisor the better choice? When is a human advisor better?

## Solutions

### Activity 1: The Lemon Problem

- A1:**  $\mathbb{E}[\text{default}] = 0.70 \times 2\% + 0.30 \times 15\% = 1.4\% + 4.5\% = 5.9\%$ . The platform must charge at least 5.9% interest just to cover expected losses, before adding any operating margin or profit.
- A2:** Low-risk borrowers (who would only need a rate around 2–3% on a platform that could identify them) face an inflated 5.9%+ rate. Many will leave for cheaper alternatives (e.g., traditional bank loans), while high-risk borrowers—who benefit from the pooled rate—stay. This adverse selection worsens the pool quality over time.
- A3:** This is Akerlof’s lemons problem: when quality is unobservable, the market price reflects average quality, driving out good “products” (low-risk borrowers). The platform can mitigate this through credit scoring, identity verification, or tiered pricing that separates risk pools—effectively making quality observable again.

### Activity 2: Portfolio Construction

- A1:** Conservative example: 20% Stocks, 60% Bonds, 20% Cash. Expected return:  $r_p = 0.20 \times 8\% + 0.60 \times 3\% + 0.20 \times 1\% = 1.6\% + 1.8\% + 0.2\% = 3.6\%$ . On CHF 10,000 this yields CHF 360 in expected annual return.
- A2:** Aggressive example: 70% Stocks, 20% Bonds, 10% Cash. Expected return:  $r_p = 0.70 \times 8\% + 0.20 \times 3\% + 0.10 \times 1\% = 5.6\% + 0.6\% + 0.1\% = 6.3\%$ . On CHF 10,000 this yields CHF 630 per year—but with substantially higher volatility.
- A3:** Higher returns require accepting higher risk (volatility). An investor who maximises return would hold 100% stocks, but a 15% standard deviation means potential losses of 20–30% in a bad year. Risk tolerance, time horizon, and liquidity needs constrain the feasible allocation, which is the core insight of Modern Portfolio Theory.

### Activity 3: Robo vs Human

- A1: Annual cost:** Robo 0.25–0.50% of AUM vs. Human 1.0–1.5%. **Personalization:** Robo uses algorithm-driven questionnaires (limited nuance) vs. Human provides holistic life-stage planning. **Emotional coaching:** Robo offers none (automated nudges at best) vs. Human prevents panic selling during downturns. **Rebalancing speed:** Robo rebalances automatically within minutes vs. Human may take days or require a meeting. **Minimum investment:** Robo often CHF 0–1,000 vs. Human typically CHF 100,000+.
- A2:** A robo-advisor is better for young, cost-sensitive investors with straightforward goals and small portfolios. A human advisor is better for high-net-worth individuals with complex needs (estate planning, tax optimization, business succession) or investors who need behavioural coaching to avoid emotionally driven mistakes during market turbulence.