Regulating Robo Advisors
Across the Financial Services Industry

Tom Baker & Benedict Delleart
Penn Optimizing Government Project
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What is a robo advisor?

• An automated service that ranks, or matches consumers to, financial products on a personalized basis, embedded in:
  • **Consumer financial product intermediaries:**
    • Insurance exchanges, brokers & companies:
    • Financial advisors & broker dealers
    • Mortgage brokers
  • **Lead generation services:**
    • Domain specific media companies: Zillow
    • Web based financial advice/mgt services: Mint.com, NerdWallet
    • Web-based advertising aggregators
We build and manage your personalized, globally diversified investment portfolio.

Different investment accounts to suit your needs.

When you open an account you’ll get a personalized asset allocation based on your risk score and the account’s tax status.

Invest Now
Experts are behind every choice we make.

Our technology is what makes Betterment better – we believe it’s simply the best that’s available today. But we also have industry experts with decades of experience who guide everything we do, from the tax tools we build to the funds we choose for our portfolio.

Meet our team of experts »

Dan Egan
Director of Investing
## Compare Mortgage Rates and Home Loans

Enter your home loan details to get personalized quotes with today's current mortgage rates.

### Loan purpose
- **Purchase**
- **Refinance**

### ZIP code
- **97229**

### Purchase price
- **$ 300,000**

### Down payment
- **$ 60,000**
  - **20 %**

### Credit score
- **720-739**

**GET PERSONALIZED RATES HERE**

It's fast and easy!

To get rates for your own situation:
- Fill out these fields
- See results in seconds

<table>
<thead>
<tr>
<th>Loan Type</th>
<th>Rate</th>
<th>APR</th>
<th>Payment Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 year fixed</td>
<td>4.071%</td>
<td>4.071% APR</td>
<td>4.000% Rate · $1,146/mo · $3,281 in fees</td>
</tr>
<tr>
<td>30 year fixed</td>
<td>4.186%</td>
<td>4.186% APR</td>
<td>4.125% Rate · $1,163/mo · $1,740 in fees</td>
</tr>
<tr>
<td>30 year fixed</td>
<td>3.778%</td>
<td>3.778% APR</td>
<td>4.56% Rate · $1,140/mo · $1,740 in fees</td>
</tr>
</tbody>
</table>

**CITI**
- **1,004 Reviews**
- **4.79/5**
- Citibank, NA
- NMLS #412915

**BNY**
- **1,040 Reviews**
- **4.56/5**

**Lender website**
Find the best credit cards for you.

Whether you’re looking for side-by-side comparisons, info around rewards versus points or you’re ready to apply, we’ve gathered everything you need in one easy place.

Compare over 1700 credit cards, fast.
We can help you choose the right health plan.

Answer a few questions and we will identify plans that fit your needs. It’s quick & easy!

Help Me Choose

No Thanks. Browse On My Own

How It Works

Quick & Easy Process

Three short steps to collect the medications, doctors and other information used to determine plan "fit".

Your Score

Your Plan Score (100 being the highest), determined on a number of dimensions, identifies how well each plan fits your needs.

Utilize our detailed cost estimations and benefit descriptions to make the right, educated decision for you.
Basic Information
To ensure the most relevant plans are shown to you, please provide some basic information.

Find the Right Plans
Please answer the following questions in each section to help us find plans you qualify for and estimate the monthly premium for each plan.

What coverage are you looking for? Medical & Prescription
What is your ZIP code? 14482
What is your County? Genesee
When should coverage begin? 1/1/2017
What is your date of birth? October 12, 1932
What is your gender? Male
Do you use tobacco products? No
Are you disabled? No
Do you have end stage renal disease? No
Medications
Let’s make sure you are covered for the medications you take

Do you take any prescription medications?  ✔ Yes  ☐ No

Enter Medications
Please enter medications to see whether or not they are covered under each available plan. Results will be displayed under 'View Plan Details' for each available plan on the results page.

➕ Add Medication

Next »
Medicare Advantage Plans with Prescription Drug Coverage

UnitedHealthcare Medicare Complete Choice
Plan 3 (Regional PPO)

Network Type: PPO
CMS Star Rating: ★★★★★

Premium: $36.00/mo
Estimated Out of Pocket Costs: $505 - $1,807/yr

Your Score Explained  View Plan Details  Out of Pocket Costs Explained  Mail Order Savings

How Your Plan Score Was Calculated
Your Plan Score (100 being the highest score) informs you how well each plan fits your needs. Its calculation is based on prescription costs, predicted medical usage of “people like you”, and other factors. Some high-level scoring dimensions are provided here. Learn More

UnitedHealthcare Medicare Complete Choice
Plan 4 (Regional PPO)

Network Type: PPO
CMS Star Rating: ★★★★★

Premium: $66.00/mo
Estimated Out of Pocket Costs: $858 - $2,035/yr

Your Score Explained  View Plan Details  Out of Pocket Costs Explained  Mail Order Savings

Mail Order Savings

Add to Cart

UnitedHealthcare Medicare Complete Choice

Premium: $0.00/mo
In theory, robo advisors are:

• Always on
• 100% competent at the (really difficult) math
• Immune to the paradox of choice
• Unbiased
• Transparent
• Scalable: marginal cost rapidly approaches $0
Core components (regulatory focal points)

- Algorithms
- Data:
  - Financial products & attributes
  - Consumer attributes
- Choice architecture (user interface)
- IT infrastructure
Regulatory focal points

Core component
1. Algorithms:
2. Data:
   1. Financial products & attributes
   2. Consumer attributes
3. Choice architecture (user interface)
4. IT infrastructure

Regulatory concern
1. Bias, competence, fairness
2. Access, quality,
   1. Producers won’t provide
   2. Consumer data incomplete, biased
3. Bias, competence
4. Security, privacy, reliability
Questions about algorithms

• What is the objective?
• What are the product and consumer attributes taken into account?
• Are there any other factors taken into account?
• What are factors you’d like to take into account but cannot?
• What factors did you consider and reject? Why?
• How were the weights assigned to attributes?
  • Data and methodology follow ups
• How do you identify edge cases? What do you do about them?
• How is success measured & improved over time?
Questions about data

• Where do you get your product (customer) data?
• What other sources of data are there?
• What data about product attributes do the manufacturers have that you do not?
• What data about customer attributes would you like to get but cannot?
• How do you check quality of the data?
  • What problems have you found and how have you overcome them?
  • What do you do about missing data?
Questions about choice architecture

- Did you follow recognized best practices?
- What do you track about progress through the choice environment?
- What patterns do you see in variance between recommendations and choices? What do you learn from them?
Beyond basic competence

• Challenge:
  • Promoting diversity and quality among robo advisors
    • Contests (and contests of contests)

• Opportunities:
  • Greater intermediary accountability
  • Greater product diversity without the paradox of choice
Who are the regulators?

- Financial services authorities:
  - CFPB
  - State insurance departments
- Other agencies:
  - FTC – UDTPA
  - State level consumer protection agencies
- Self regulatory organizations: FINRA
- Accounting firms: will there be SOC 4 & SOC 5?
- Other certification entreprenuers
- Large contracting partners
- Insurance companies (cyber insurance)