The Ostrich in Us: Selective Attention to Financial Accounts, Income, Spending, and Liquidity

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Motivation

Most of the time people seek useful information to make better decisions but sometimes people seek useless or avoid useful information because information may have a direct hedonic impact on utility.

Evidence for Ostrich effects and information avoidance: summarized in Golman et al. (2016)
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Literature review


Literature review


- Direct empirical evidence on attention remains scarce: Sicherman et al. (2015), Karlsson et al. (2009), and Gherzi et al. (2014)
In light of this evidence, a literature on information-dependent and belief-dependent utility emerged: Caplin and Leahy (2001, 2004), Kőszegi and Rabin (2009), Dillenberger (2010), Golman and Loewenstein (2015), and Ely et al. (2015)


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First-order determinants of paying attention to financial accounts: rational inattention or selective attention?
Empirical findings

First large-scale empirical study of individual attention of spending, savings, and credit-card accounts using data from a personal finance management app/software provider

- Empirical findings about attention to financial accounts:

  - Income causes people to pay attention
  - Credit-card payments cause people to pay attention but the response is negatively correlated with liquidity
  - Spending and overdrafts are negatively correlated with attention
  - Logins jump discretely when balances turn from negative to positive
  - Savings and cash holdings are positively correlated with attention
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  - Paying attention is less painful when income or cash holdings are high.
  - Reduced fee payments (or consumption smoothing) are a benefit of paying attention.
The financial aggregation app: overview

- We use a transaction-level panel dataset of discretionary spending, income, balances, limits, and logins by device recorded by a financial aggregation and service app in Iceland from 2011 to 2016.
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  - The digitization of budgeting processes and attendance tracking of online behavior allow direct measurement of individual attention
The financial aggregation app: screenshots

Edit Profile
- Gender
- Year of birth: 1984
- Adults: 1
- Children: 0
- House: 100
- Bedrooms: 0
- Cars: 0

Transactions
- **WEDNESDAY, SEPTEMBER 16**
  - **TAXI DAMIAN**
    - Taxis & Public Transportation
    - £4,454
- **Metrostation Islands B**
  - Planes, Trains and Automobiles...
  - £713

- **TUESDAY, SEPTEMBER 15**
  - **Millifær: Tollstjóri**
    - Taxes (+ and -)
    - £33,341

- **MONDAY, SEPTEMBER 14**
  - **FOETEX FISKETORVET**
    - Groceries
    - £732

- **SUNDAY, SEPTEMBER 13**
  - **NETTO AXEL HEIDESG**
    - Groceries
    - £78

- **SATURDAY, SEPTEMBER 12**
  - **NETTO AXEL HEIDESG**
    - Groceries
    - £263

Feed
- **Current**
  - £1,134,157
- **Credit cards**
  - £183,924
- **Savings**
  - £9

- **Show Only Transactions**
- **HOTEL TIROL S.A.**
  - Hotels & Accommodation
  - £54,809
- **TAXI EDUARDO GAI**
  - Taxis & Public Transportation
  - £4,441
- **SCHWEIZ. BUNDES...**
  - Planes, Trains and Automobiles...
  - £1,162
- **Restaurant**
  - £22,412
The financial aggregation app: screenshots
## Summary statistics by terciles of logins and income

<table>
<thead>
<tr>
<th></th>
<th>Log in terciles</th>
<th>Income terciles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propensity to log in</td>
<td>0.1% 0.4% 6.1%</td>
<td>1.2% 2.3% 3.1%</td>
</tr>
<tr>
<td>Monthly income</td>
<td>3,217 3,543 3,939</td>
<td>448 2,995 7,240</td>
</tr>
<tr>
<td>Monthly regular income</td>
<td>3,099 3,426 3,822</td>
<td>428 2,933 6,969</td>
</tr>
<tr>
<td>Monthly irregular income</td>
<td>92 90 92</td>
<td>20 60 193</td>
</tr>
<tr>
<td>Monthly financial fees</td>
<td>-24 -23 -19</td>
<td>-14 -22 -30</td>
</tr>
<tr>
<td>Current account balance</td>
<td>1,991 2,060 1,877</td>
<td>1,590 1,378 2,837</td>
</tr>
<tr>
<td>Savings account balance</td>
<td>2,527 3,220 4,979</td>
<td>2,428 2,924 4,939</td>
</tr>
<tr>
<td>Overdraft</td>
<td>-1,740 -1,712 -1,557</td>
<td>-1,453 -1,453 -2,046</td>
</tr>
<tr>
<td>Credit card balance</td>
<td>-1,204 -1,313 -1,748</td>
<td>-1,041 -1,099 -1,989</td>
</tr>
<tr>
<td>Overdraft limit</td>
<td>2,446 2,534 2,546</td>
<td>1,993 2,067 3,311</td>
</tr>
<tr>
<td>Credit card limit</td>
<td>3,501 4,080 5,891</td>
<td>3,178 3,304 6,492</td>
</tr>
<tr>
<td>Liquidity</td>
<td>9,261 10,582 13,545</td>
<td>8,146 8,575 15,591</td>
</tr>
<tr>
<td>Monthly discretionary spending</td>
<td>1,384 1,478 1,578</td>
<td>923 1,432 2,080</td>
</tr>
<tr>
<td>Age</td>
<td>42 42 41</td>
<td>37 42 45</td>
</tr>
<tr>
<td>Female</td>
<td>52% 48% 43%</td>
<td>51% 54% 38%</td>
</tr>
<tr>
<td>Spouse</td>
<td>19% 24% 40%</td>
<td>25% 28% 30%</td>
</tr>
</tbody>
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Looking at payday effects on attention

We run the following regression:

\[ x_{it} = \sum_{k=-7}^{7} \beta_k I_i(Paid_{t-k}) + \text{fixed effects} + \epsilon_{it} \]
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- \( \text{fixed effects} \): individual, day-of-week, day-of-month, year-month, and holidays
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- We utilize exogenous variation in payment arrival via Saturdays, Sundays, and holidays
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Looking at payday effects on attention

- We utilize exogenous variation in payment arrival via Saturdays, Sundays, and holidays
- This log in response to income payments is not driven by other payments or a spending response to income payments
- Logins decrease over the monthly pay (not monthly calendar) cycle
Is this driven by transaction verification motives or opportunity costs?

- Transaction verification? Individuals are 62% more likely to log in once and 94.2% more likely to log in twice or more on a payday (payments post in the morning)
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  - Individual cash holdings and liquidity are positively correlated with paying attention on paydays
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Transaction verification? Individuals are 62% more likely to log in once and 94.2% more likely to log in twice or more on a payday (payments post in the morning)
  - We observe the same magnitudes in responses for irregular and exogenous payments
  - Individual cash holdings and liquidity are positively correlated with paying attention on paydays

Opportunity costs? There is no relationship between spending and paying attention on paydays
How does individual attention vary with cash holdings and liquidity?

- Budgeting and planning? Individual cash and liquidity are positively correlated with paying attention
- We look at holdings relative to individual’s own histories controlling for individual, day-of-week, month-by-year, and holiday fixed effects (no self selection on time-invariant (un)observables)
How does individual attention vary with saving and spending?

- Savings are positively correlated with logins
- Individuals log in less frequently when they spend a lot
  - Opportunity costs explanation? There is no (or a positive) relationship between logging in after spending (or cash holdings)
Looking at payment effects on attention

- Individuals pay attention when they set up a credit-card payment
- Endogenous, controlling for individual, day-of-week, day-of-month, month-by-year, and holiday fixed effects
Looking at payment effects on attention

The effects of exogenous credit-card due dates on logins

- We only use bank-imposed automatic-payment dates (exogenous variation in the due date via Saturdays, Sundays, and holidays) and control for income payments
- Budgeting and planning? Paying attention on credit-card due dates depends negatively on liquidity
How does individual attention vary with overdrafts and current account balances?

- Budgeting and planning? Individuals log in more often when they have positive balances and least often for intermediate amounts of overdrafts.
- Regression coefficient of a positive balance on logins: 8.1% relative increase controlling for individual fixed effects, day-of-week, month-by-year, and holiday fixed effects as well as income payments.
Carlin, Olafsson, and Pagel (2016) find that the smartphone app introduction caused a substantial increase in logins and a trend reversal in financial fee and penalty payments.
Causal effect of attention: results

- Exploit introduction of the smartphone app on November 14, 2014 (plausibly exogenous)
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- Exploit introduction of the smartphone app on November 14, 2014 (plausibly exogenous)
- Use polynomial and local time functional as IV strategy to estimate a local average treatment effect (LATE) of the increased logins for individuals whose log in behavior was influenced by the app introduction

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<th>Total Logins</th>
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<td>0.0835***</td>
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<td></td>
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\max \left\{ \gamma \beta \int v(u(c) - u(\tilde{c}))dF(\tilde{c})I(a) + \beta u(c) \right\}
\]

with \( c = \tilde{y} - \tilde{b} - fI(\tilde{y} - \tilde{b} > 0)(1 - I(a)) \)
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\max \{ \gamma \beta \int v(u(c) - u(\tilde{c}))dF(\tilde{c})I(a) + \beta u(c) \} \\
\text{with } c = \tilde{y} - \tilde{b} - fl(\tilde{y} - \tilde{b} > 0)(1 - I(a))
\]

he will pay attention if

\[
E[\gamma \beta \eta (\lambda - 1) \int_{\tilde{s}}^{\infty} (u(\mu + \sigma \tilde{s}) - u(\mu + \sigma \tilde{S}))dF(\tilde{S})] + E[\beta u(\mu + \sigma \tilde{s})] \\
> E[\beta u(\mu + \sigma \tilde{s} - fl(\mu + \sigma \tilde{s} > 0))] 
\]
Inattention and cash cushions for small risks

For any concave $u(\cdot)$, formalizing the intuition in terms of the risk premium for paying attention in the presence of small risks:

$$\frac{\partial \pi}{\partial \sigma} \bigg|_{\sigma \to 0} = -E[\gamma \beta \eta (\lambda - 1) u'(\mu) \int_{\tilde{s}}^{\infty} (\tilde{s} - \tilde{S}) dF(\tilde{S})] - E[\beta \tilde{s} u'(\mu)] > 0$$

\[ \downarrow \text{if } \mu \uparrow \]

Proposition

For the standard or hyperbolic-discounting agent ($\eta = 0$ or $\eta > 0$ and $\lambda = 1$), the risk premium for paying attention in the presence of small risks is zero (the agents are second-order risk averse). In contrast, for the news-utility agent ($\eta > 0$ and $\lambda > 1$), the risk premium for paying attention is positive. Additionally, the risk premium for paying attention is decreasing in expected cash holdings $\mu$ if $u(\cdot)$ is concave.
Calibration exercise

- Consumption utility: \( u(c) = \frac{c^{1-\theta}}{1-\theta} \) with \( \theta = 4 \)
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\( \Delta \approx 3.1 \) for \( \eta \approx 1 \) and \( \lambda \approx 2 \) (Kahneman and Tversky, 1979)

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\]

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Real outcomes: we observe spending, savings, and financial mistakes.
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