

# **Mental Accounting**

**Behavioral Economics**

**Patrick McAlvanah**

## **Consider the following examples:**

- 1) A finance professor safeguards against minor financial annoyances by setting up a designated amount each year to donate to charity. If an unplanned bill comes up (car repair) he simply deducts it from his charity account**
  
- 2) An economics professor was paid to give a talk in Switzerland, and spent an extra week there on vacation. At the time, prices in Switzerland were astronomical. However, he spent money freely despite the high prices because he had received the fee.**
  
- 3) A woman was shopping for a bedspread for her double bed. The spreads came in 3 sizes: double, queen, and king, for \$200, \$250, and \$300. However, one weekend they were on sale, all for \$150. The woman buys the king size quilt, even though it hangs over the edge of the bed.**

# **Mental Accounting**

**Accounting – the system of recording and summarizing business and financial transactions**

**Mental Accounting – How individuals and households practice the above**

**3 Key Aspects of mental accounting:**

**1) How outcomes are perceived and experienced, and how decisions are made and then subsequently evaluated.**

**Mental accounting allows for both ex-ante and ex-post cost-benefit analysis.**

# Mental Accounting

**2) The assignment of activities to specific accounts.**

**Both sources and uses of funds are labeled. Expenditures are grouped into categories (housing, food, entertainment...)**

**Funds to spend are also labeled, both flows (regular income versus bonus windfalls) and stocks (cash, home equity, portfolio)**

**3) The frequency with which mental accounts are evaluated and balanced**

**Daily, weekly, yearly? Note that this is a choice bracketing problem**

**“Never count your money while you’re sitting at the table”**

# Evaluation

Recall the properties of prospect theory's value function:

- 1) Gains and losses are evaluated relative to a reference point
- 2) Both gains and losses exhibit diminishing sensitivity – the difference between \$10 and \$20 is more noticeable than the difference between \$1010 and \$1020
- 3) Loss aversion:  $-v(-x) > v(x)$

# Evaluation

**Suppose you are about to purchase a calculator for \$40. The salesman informs you that the calculator is on sale for \$20 at the other branch of the store, which is located 20 minutes away. Would you make the trip to the other store?**

**Suppose you are about to purchase a jacket for \$190. The salesman informs you that the jacket is on sale for \$170 at the other branch of the store, which is located 20 minutes away. Would you make the trip to the other store?**

# Evaluation

The decision to drive to the store is a decision over whether  $u(-\$20) > u(-20 \text{ minutes})$  (or more technically,  $u(w - \$20) > u(-20 \text{ minutes})$ )

But the different answers imply that \$20 savings on the small purchase is a bigger deal than the \$20 savings on the big purchase

That is, people are evaluating whether:

$$[u(-\$190) - u(-\$170)] > u(-20 \text{ minutes})$$

$$[u(-\$40) - u(-\$20)] > u(-20 \text{ minutes})$$

# Utility

**How do consumers code purchases? One possibility is to code the acquisition of the good as a gain, and the money spent as a loss.**

**However, loss aversion over the money dimension makes this inefficient.**

**Suppose you value a soda at \$1.50, and the vending machine sells it for \$1.**

**Using the loss aversion estimate of 2.25, you would decline the purchase, even though it would make you better off.**

# Utility

Instead, the total utility of a purchase can be decomposed into:

Acquisition utility – The consumer surplus of the good. WTP for a good minus the actual price paid

Transaction Utility – The perceived value of the deal.

Consumers have a reference point  $r_i$  for commodity  $i$ , reflecting a fair price or what the commodity “should” cost.

Prices lower than the reference point for the transaction are viewed as gains, and prices higher than the reference point are viewed as losses. Loss aversion thus sets in at prices higher than the fair price

**Returning to the vending machine example, if I'm used to paying \$1 for sodas, then I will purchase the soda when I value it at \$1.50**

**My transaction utility is thus 0 and I solely derive consumer surplus**

**Why then buy a king size sheet for a double bed?**

**$U(\text{double}) = \text{decision utility}(\text{double}) + u[-150 - -(200)]$**

**$U(\text{king}) = \text{decision utility}(\text{king}) + u[-150 - -(300)]$**

**The latter term thus might overpower the diminished decision utility of extra long sheets.**

**Transaction utility can be based on either differences or relative differences. In the jacket/calculator problem, the \$20 savings on the small item feels more substantial because it constitutes a larger percentage of the item.**

# Utility

**However, this means that some decisions will be sensitive to the reference price, even when it's arbitrary**

**You are on the beach on a hot day. How much would you be willing to pay for a bottle of beer from the nearby [fancy resort hotel / small run-down grocery store]**

**Median for the hotel: \$2.65**

**Median for the store: \$1.50**

**Thus, a consumer willing to pay \$4 for a beer from the hotel but only \$2 from the small grocery store, will miss out on positive consumer surplus if the store is charging \$3.**

# Evaluation

**If someone wanted to maximize their happiness, how should they combine multiple events? Due to the value function:**

**1) Gains should be segregated.**

**Due to the concavity of gains,  $u(x) + u(y) > u(x+y)$**

**That is, someone who wins \$100 prize and also wins a \$50 prize is happier than someone who wins a \$150**

**2) Losses should be integrated.**

**The opposite holds for losses, due to convexity:**

**$u(-x) + u(-y) < u(-x-y)$  Someone who has to pay \$100 fine and a \$50 fine is worse off than someone who has to pay a \$150 fine**

**3) Small losses should be integrated in with larger gains**

**This is to offset loss aversion. Suppose  $y > x$ . If  $u(-x)$  and  $u(y)$  are evaluated separately, loss aversion for  $x$  would kick in and might outweigh the  $u(y)$**

**But by segregating,  $u(y-x)$  is guaranteed to be positive.**

**4) Small gains should be segregated against larger losses.**

**Small gains are silver linings. Due to diminishing marginal sensitivity, receiving a small gain separately will be better than slightly reducing a large loss.**

**This explains the behavior of the finance professor's charity account and the Swiss vacation. The finance professor integrates all of his losses together to offset the multiple loss aversions. The economics professor combines a previous gain with a current loss to prevent loss aversion from ever setting in.**

# Evaluation

**Why not carry this to the extreme? Why not code a \$5 gain as 5 \$1 gains then, or even 500 pennies?**

- 1) Limits to self-deception – We may have guards against intentional self-deception. When the decision itself segregates or integrates, utility increases, but not when the segregation is clearly an artifact of self-deception.**
- 2) Threshold / Peanuts effect – gains or losses need to be above some minimum threshold to be perceived**

# Utility

**Another aspect of mental accounting is when to open and when to close an account.**

**A realized loss is always more painful than a paper loss. As such, people will go to length to avoid closing accounts in the red.**

**Real accounting example: Sharp discontinuity of change in earnings per share at zero: Firms are much more likely to report exceeding last quarter's EPS by a penny than missing it by a penny**

**Mental accounting example: Disposition effect in stocks**

# Sunk Costs

**Suppose you paid \$100 in advance for tickets to a basketball game. On the day of the game, there is a terrible blizzard? Do you drive to the game?**

**Suppose you'd gotten the tickets to the game for free. On the day of the game, there is a terrible blizzard? Do you drive to the game?**

**Recall the standard prediction – sunk costs should have no effect on decision making.**

**So why the difference?**

# Sunk Cost

**Mental accounting explanation:**

**For the normal transaction, purchasing the tickets “opens a basketball game account” with a negative balance of \$100. When the consumer attends the game, he updates and closes the account.**

**However, if the consumer does not attend the game, he would have to close it in the red, and loss aversion would set in.**

**The cost of doing this might outweigh the cost of driving in the blizzard.**

# Sunk Cost

**Real world examples:**

**3 groups for people purchasing season tickets for a campus theater group:**

**1 group paid full price (no discount), 1 group got a small (13%) discount, 1 group got a large (47%) discount**

**- Those who paid full price attended more shows than the other groups, although eventually declined to the same rate**

**Health club memberships that come every 6 months – attendance is highest in the month of the bill, declines over the next 5 months, and then jumps up again**

# Budgeting

**Money is often grouped into categories or labels.**

**Money is often labeled at three levels:**

- 1) Expenditures are grouped into budgets (food, housing, entertainment)**
- 2) Wealth is divided into accounts (checking, retirement)**
- 3) Income is divided into categories (regular, windfall)**

**These categorizations would be inconsequential if funds were fungible between them**

# Budgeting

**Expenses must first be noticed and then placed into the appropriate mental account.**

**However, due to the peanuts / threshold effect, small routine activities might not get booked (eating out for lunch, getting coffee)**

**Firms can exploit this in either direction:**

**Charity requests or public good donations – only 27 cents a day, rather than the noticeable \$100**

**Anti-smoking devices – emphasize savings of \$730 a day rather than \$2 a day**

# Budgeting

**Non-fungible budgets can influence consumption.**

**In real accounting, if budgets cannot be carried over from one year to the next, one department might be desperately trying to scrounge together money while another is looking for things to spend it on to make sure next year's isn't cut.**

**Mental accounting:**

**Two groups of subjects asked if they would buy tickets to a play.**

**1/2 told had spent \$50 earlier in the week on a basketball game  
(same budget)**

**1/2 told they had spent \$50 earlier in the week on a parking ticket  
(different budget)**

# Budgeting

**Suppose you set aside [\$25 a week / \$100 per month] for entertainment. It is the [last day of the week / 7th of the month] and you have already spent \$25 on entertainment. Tonight there is a concert you'd like to attend; tickets cost \$15.**

**[8% versus 39%] Intertemporal non-fungibility can affect demand**

**Some budgets might intentionally be set too low to avoid self-control problems**

**I might enjoy an occasional \$30 bottle of wine. But, due to self-control problems, I can't trust myself to not go overboard.**

**As such, I either eliminate wine from my budget, or only limit myself to three buck chuck.**

**Implication – If I received wine as a gift, that wouldn't break my accounting rule, and I would greatly value it.**

**This may be one reason why gifts are more popular than direct cash transfers – people might not be able to use the cash themselves for the good with the highest MU / P due to budgeting / self control issues**

**This certainly helps explain why most gifts are hedonic rather than utilitarian**

**Example – NFL Pro Bowl. The NFL had problems getting players to show up at the all-star game. Monetary incentives are largely ineffective for players with 7-figure salaries.**

**Solution: Moving the game to Hawaii, including 2 first-class tickets and accommodations**

# Budgeting

**Sources of income can also affect budgeting and hence consumption.**

**Both sources and expenditures can be viewed on a serious / frivolous scale**

**Winning the office football pool – frivolous**

**Income tax refund – serious**

**Eating out – frivolous**

**Paying the bills – serious**

**People have a tendency to match the seriousness of some windfall source to the seriousness of its use**

# Budgeting

**Finding \$300 in a jacket pocket < \$300 raise**

**Likewise, ear-marking has a strong impact. Spending on Dutch children's clothing tends to be more sensitive to changes in the Dutch child allowance than to changes in other income**

**This might be one explanation for why firms pay dividends rather than repurchase shares**

**Dividends yield a simple self-control rule – spend the dividend but don't touch the principle**

**If firms repurchased shares, a consumer would have to dip into their capital periodically, and might be tempted to overspend and wear down the principle too quickly**

# Self Control

**Consumers may strategically use different accounts to mitigate self control problems – Mental Accounting meets Golden Eggs and Animal Spirits**

**Recall the gist of previous lectures:**

**Consumers WANT to spread out and smooth consumption over the life-cycle (long-run self) However, due to present-bias, in each individual period they are tempted to over-spend**

**It requires costly willpower to overcome the desires of the short-run self and comply with the long-run self**

**A cheaper solution is to restrict future choices by imposing constraints that alter budgets**

# Self Control

Suppose there are 3 different mental accounts:

Consumers save  $s$  for retirement:

- 1) Current income:  $I = (1-s)*Y$
- 2) Current wealth:  $A = \Sigma (1-s)*Y - c$
- 3) Future wealth:  $F = sY$

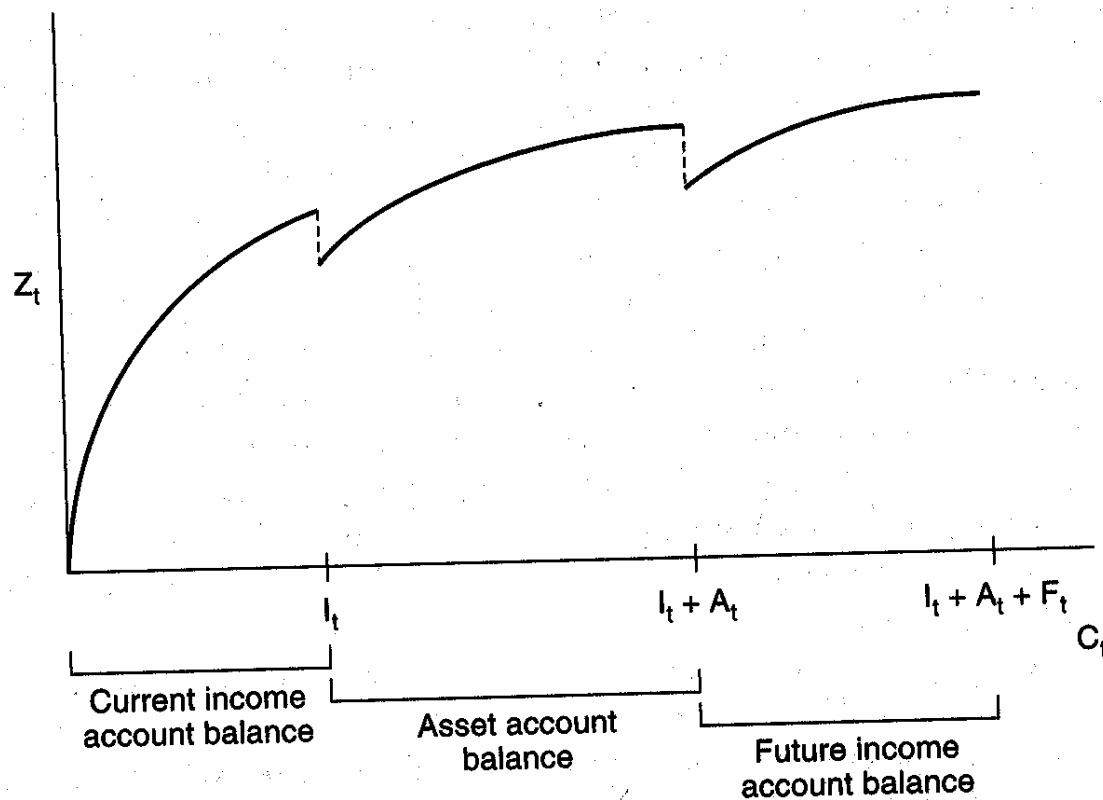
More realistically,  $A$  is composed of sub-accounts. For example, college funds

Small windfalls are likely to be coded as current income, whereas larger windfalls will get coded as current wealth.

**Suppose the temptation to spend a marginal dollar depends on the location:**

**Current income is the most tempting, followed by current assets, and then future wealth**

**Why? Consuming from either A or F yields a fixed disutility penalty from invading the account:**



# Self Control

**This implies differential Marginal Propensities to Consume:**

$$1 \sim dC / dl > dC / dA > dC / dF \sim 0$$

**Hypothetical Question to MBAs:**

**Suppose you have been given a special bonus at work, and your take home pay will increase by \$200 per month for 12 months.**

**How much would you expect monthly consumption to increase?                      Median: \$100 month / \$1200 year**

**Suppose you have been given a special bonus at work of \$2400.**

**How much would you expect monthly consumption to increase?                      Median: \$400 the 1<sup>st</sup> month, \$35 each month after / \$785 year**

**Note that MPC is affected by the distribution of the payout.**

# Self Control

**A distant relative has left you a small inheritance of \$2,400. You will not receive the money for 5 years. During this time, the money is in an interest bearing account. How much would you expect consumption to increase this year? Median: \$0**

**Tests with actual data:**

**MPC from labor income – 0.9**

**MPC from capital income – 0.7**

**Retirement History Survey – for all consumption categories (except vacations), the expenditure elasticity is highest for current income, smaller for current assets, and zero (statistically insignificant) for home equity and future wealth**

# Self Control

**This model also predicts that consumption will track income.**

**Why? Suppose there is a negative shock. Although it may be optimal to smooth out consumption, it might be suboptimal to raid the asset account unless the fluctuation is large.**

**Policy Implications:**

**If the government wants to alter savings rates, usually it concentrates on either the level of income or the (after-tax) return on saving.**

**However, it could also alter the distribution of tax refunds:**

**Encourage consumption: monthly refunds**

**Encourage savings: yearly refund**