



Australian Government

Department of Finance and Deregulation
Office of Best Practice Regulation

Influencing Consumer Behaviour: Improving Regulatory Design

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Glossary

Consumption: Purchasing of goods or services. This can include cars, food, a visit to the doctor, etc. Note: this does not refer to physically consuming a good.

Rational: Rationality in economics is defined as preferences which are complete and transitive.

Utility: Mapping of preferences over some set of goods and services. Utility provides a measure of satisfaction or happiness and can be expressed numerically.

Expected Utility: Weighted average of a possible utility value which could be realised, depending on which outcome is realised.

Expected Value: Weighted average of possible values which could be realised, depending on which outcome is realised.

Preference: Relative desire for a good or service against other goods, services and time periods.

Tangent: A line drawn such that it touches a curve without crossing it.

Nudge: A change to choice architecture which influences the decision of an individual without restricting, or raising the price of, the set of choices available.

Choice Architecture: The context within which a choice is made.

Summary

- The effectiveness of a regulatory intervention may depend on how successful that intervention is in changing consumer behaviour.
- This paper explores two broad frameworks for considering consumer behaviour: Rational Choice Theory and Behavioural Economics.
- Traditionally, approaches to consumer behaviour have been influenced by standard economic theory and models. These are based on the assumption of human rationality.
 - Rational choice theory assumes that consumers make choices such that their utility is maximised, subject to budget constraints.
 - Under rational choice theory, regulation which relaxes budget constraints, increases income, alters relative prices or changes consumer preferences will be effective in changing behaviour.
 - One implication of human rationality is that some economic models explain choices which fail to maximise utility by attributing such choices to either a lack of information or a misinterpretation of the available information. Consequently, there are many regulations which involve provision of either additional or “better” information to the marketplace.
- Behavioural economics draws on psychology and the behavioural sciences in assessing consumer behaviour. This field of research has found a number of cognitive, social and emotional variables can impact on choice. These variables include: reference points; framing; social factors; and time-inconsistent preferences.
- The extent to which these factors are indicative of sub-optimal behaviour, however, is not well understood. Specifically, to make this assessment comparison between the decisions which actually occurred and those which would have prevailed under rational choice theory is necessary. To achieve this, full understanding of all prices, costs (including opportunity costs), preferences and constraints that a consumer faces is required.
- The application of behavioural economics to policy design has not been widespread. However, recently a mechanism for translating the findings of behavioural economics to policy has been developed through ‘nudge’.
- Nudge uses insights of behavioural economics to change choice architecture with a view to influencing behaviour.

- Research has found that, in some circumstances, small alterations to choice architecture can give effect to disproportionately large behavioural changes. For example, including simple messages which reinforce social norms was found to influence electricity consumption.
- By focussing on choice architecture, nudge is generally end point or consumer, focussed. This approach does not preclude more direct, traditional regulation of business in order to facilitate change.
- To clarify, a distinction is made between three categories of interventions; a “pure” nudge; an “assisted” nudge; and a “shove”.
- Under certain conditions, some evidence suggests that nudge interventions can be:
 - cost-effective relative to more direct or traditional forms of government intervention;
 - used alongside existing regulatory approaches;
 - targeted in influence; and
 - easy to implement.
- While behavioural economics and rational choice theory provide a useful foundation for policy makers, both theories face challenges in their application to regulatory design.
- Policy-makers ought to be cognisant of these challenges and give consideration to the specifics of markets and market participants when applying any form of consumer theory for the purposes of designing, and predicting the effects of, regulatory policy.
- Insofar as behavioural economics and its application through nudge can be harnessed to improve regulatory design, its advancement is encouraged to be explored.
- This paper focuses on how findings of behavioural economics can be used in the design of regulation. The paper does not focus on the initial motivation for government intervention which generally should be based on evidence that demonstrates a market failure.

Introduction

Regulation may be necessary for the proper functioning of society and the economy. The aim is to deliver effective and efficient regulation: effective in addressing problems; efficient in maximising net benefits.¹ However, how effective and efficient regulatory interventions are may depend on how successful interventions are in changing people's behaviour.

This paper analyses two broad approaches to considering consumer behaviour: rational choice theory and behavioural economics.

Rational choice theory (also referred to in this paper as traditional or standard consumer theory) postulates that consumers rank preferences over all goods, make consumption choices based on these rankings, and do so such that their utility is maximised. It is further assumed that individuals rationally pursue their self-interest subject to all economics constraints (such as time, income and capital). Rational choice theory is both normative and positive. That is, it seeks to describe how people do behave, and also how they ought to behave.

Following this theory, and under certain conditions, regulation will impact on consumer behaviour when it: relaxes the consumer's budget constraint; alters relative prices of goods and/or services; and/or influences a consumer's preferences (such as through information disclosure or altering risk appetite). Examples of this type of regulation include: financial (dis)incentives; banning or limiting choices; and/or requiring the disclosure of certain information.

Building on the basic rational choice model, **behavioural economics** views economic choice as the product of cognitive variables. This approach postulates that consumers are subject to a range of psychological biases and use various heuristics (rules-of-thumb, educated guesses, and so on) when making choices. Behavioural economics is essentially a series of observations about how people do behave in certain situations. It is therefore purely positive.

¹ The Australian Government Best Practice Regulation Handbook June 2010; pg. 4

Following research in the field, key factors which affect decision making include: loss aversion, reference points (including defaults), social norms and time inconsistency of preferences, or 'hyperbolic discounting'.

The extent to which these factors are indicative of sub-optimal behaviour, however, is not well understood. Specifically, to make this assessment, comparison between the decisions which actually occurred and that which would have prevailed under rational choice theory is necessary. This statement follows from the normative aspect to rational choice theory. To achieve this, full understanding of all prices, costs (including opportunity costs), preferences and constraints that a consumer faces is required. In practical terms, obtaining information which provides these details is difficult.

Consequently, this paper focusses on how behavioural economics can be used in policy design. The paper does not focus on how behavioural economics could provide the basis of justification for government intervention, although, where particularly relevant, some analysis is provided.

Recently an approach for translating the findings of behavioural economics to policy design has been developed through 'nudge'. Nudge harnesses insights of behavioural economics to change choice architecture – the context in which choices are made – to influence behaviour.

Research has found that, in some circumstances, even small alterations to choice architecture can give effect to disproportionately large behavioural change. For example, including simple salient messages which reinforce existing social norms was found to influence consumers' electricity consumption.²

Nudge is end-point, or consumer, centric. That is, a nudge is viewed as an intervention which alters the behaviour of consumers without precluding, or altering the relative prices of, different choices. This approach does not preclude more direct, traditional regulation of business. For example, government policy may nudge consumers by requiring firms to change the messaging in a product disclosure statement, or alter how junk food is positioned in a cafeteria.

To clarify this point, we distinguish between a "pure" nudge; an "assisted" nudge and a "shove". A pure nudge refers to an intervention which alters choice architecture without placing any additional requirement on firms, while an assisted nudge requires business to alter their existing practice in some way. Alternatively, a

² See, for example, <http://makinglastingchange.com/2012/11/20/behavioral-economics-and-design/>

shove refers to an intervention which regulates both consumers and firms. This is expanded on in box one below.

Box one: Categories of Interventions

The set of government intervention options can be considered as follows:

Pure Nudge – Changes choice architecture without placing additional regulation on business. For example, pre-filling of Australian Tax Office (ATO) tax forms.

Assisted Nudge – Regulates firms to change choice architecture without directly regulating, and limiting the choices available to, consumers. For example, requiring business to disclose certain information in a certain way.

Shove – Directly regulates consumers and business, limiting the choices of both groups. For example, not allowing smoking in public places or on commercial premises.

Nudge interventions have been implemented across a number of countries, most prominently in the US and UK. This paper provides examples of these interventions and some specific applications in the Australian context. From the available research, nudge can be used as an additional tool which governments can use to address public policy problems. Additionally, some of this research suggests that, under certain conditions, nudge can be cost-effective; easy to implement; asymmetric and targeted in influence; and can be incorporated within existing regulatory approaches, or as an alternative to these approaches.

However, it is important that some assessment is made about all of the costs, prices, preferences and constraints that consumers face in making a decision. In the absence of this information, governments may nudge consumers to make sub-optimal decisions which reduce societal welfare. Given the inherent difficulties governments face in obtaining this information (such as the decentralised nature of the information), fully understanding if a nudge was welfare enhancing can be difficult to assess.

This paper first assesses the basic rational choice model; introduces behavioural economics; discusses how findings of behavioural economics can be incorporated into regulatory design; and finally concludes.

The Basic Rational Choice Model

A 'bundle of goods' can represent anything of interest to a consumer

Consumer choice in standard economic theory is the process of optimal decision making, formalised by utility functions which are founded by preferences. This approach assumes that consistent choices are made by people that aim to maximise their utility subject to economic constraints, prices and income.³

Rational choice theory offers both a normative and positive approach to consumer behaviour; that is, it seeks to describe both how consumers do and should behave.

Consumer Preferences

Consumers face a range of possible consumption bundles, of which ultimately one is chosen in any given interaction.⁴ Preferences are a way of characterising consumers' relative desire for these bundles – if they desire bundle A more, less or the same as bundle B – and provide the background for analysing why a given bundle was ultimately chosen.

A central assumption is that consumer preferences are exogenous to the rational choice model. They are taken as a given and little is said about the nature, structure or origin of consumer preferences.⁵ As will be discussed later, this implies that preferences are "reference independent" – i.e., they are not affected by the individual's transient position.⁶ For example, consumer choice ought not to be affected by a food label that states the product is '98% fat-free' or it 'contains 2% fat'.

Extending from this, it is generally assumed consumers can rank various consumption bundles.⁷ These rankings can be graphically shown through "indifference curves", which represent all combinations of bundles that provide the same satisfaction to a person.⁸

³ Institute for Fiscal Studies; *Tax and Benefit Policy: Insights from Behavioural Economics*; July 2012, pg. 13.

⁴ A consumption 'bundle' can include any number of goods or services. For example, bundle X could be beefburger, cheesecake and coffee and, bundle Y could be chocolate.

⁵ Jackson, Tim; *Motivating Sustainable Consumption* University of Surrey; January 2005

⁶ Camerer, Colin and Loewenstein, George; *Behavioural Economics: Past, Present, Future*; California University of Technology; October 2002

⁷ A consumer may prefer bundle X (beefburger, cheesecake and coffee) over bundle Y (cheeseburger, coke and ice-cream).

⁸ Pindyck, Robert and Rubinfeld, Daniel *Microeconomics*; Prentice Hall College Div; 1989, pg. 59

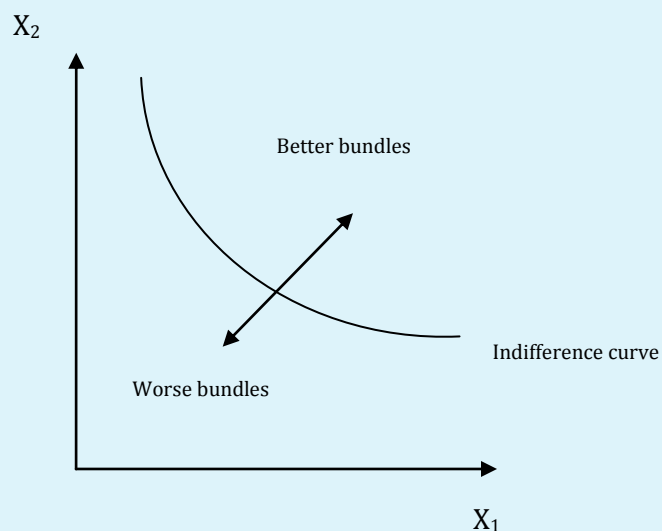
In order to describe and graphically present preferences through indifference curves, a number of conditions (axioms) are required to be met. These are discussed in Box two below with a discussion of the economic definition of rationality provided in [Appendix one](#).

Box two: Consumer Preferences and Indifference Curves

Varian (1992) notes that in order to describe preferences in general a number of fundamental assumptions (or axioms) are needed. These include:

- *Completeness* –Consumers can rank all possible bundles.
- *Transitivity* –If X is preferred to Y and Y to Z, then X must be preferred to Z.
- *Continuity* –If bundle Y is preferred to bundle Z and if bundle X is close to bundle Y, then bundle X must be preferred to bundle Z.

These conditions, along with the assumption that ‘more is preferred to less’ (monotonic preferences), allows indifference curves to be depicted as in the figure below.



As the figure shows, consumption bundles further away from the axis are always more preferred to those closer to the axis.

Source: Varian, Hal *Microeconomic Analysis* W. W. Norton & Company; 3rd edition 1992

Utility

Utility is a representation of preferences over a set of consumption bundles and provides a measure of value associated with the choices based on those

preferences. Essentially, more preferred bundles are assigned with higher values than less preferred bundles.

Economists distinguish between ordinal and cardinal utility. The former measure states that utility has no intrinsic economic meaning but that a set of consumption bundles can be ordered such that some bundles are considered better or worse by the individual. This implies utility is a subjective measure of satisfaction which cannot be compared or aggregated across different people. Alternatively, the cardinal treats utility as a value which has meaning in and of itself. Ordinal utility is generally used for the purpose of consumer choice.

The mechanism which conveys the value (the level of utility) of a given purchase is the utility function. Essentially, the utility function is a mathematical mapping of preferences to some value which governs the choices which a consumer makes.

Discussion of the utility function is expanded on in [Appendix two](#).

An optimal decision in one where no alternative decision could have led to a better outcome.

Optimal Choice

While preferences and utility provide the foundation to rational choice theory, optimal choice is the process which links this foundation to decision making in practice. The optimal choice process is one of making choices to *maximise utility*.⁹ In maximising utility, however, consumers are constrained by their wealth. This constraint is referred to as a budget constraint and represents the total amount of wealth a consumer can draw upon to purchase goods/services, save money or invest.

The existence of a budget constraint gives rise to the concept of opportunity cost. Opportunity cost can be defined as the value of the second most preferred alternative that was forgone, as the most preferred item was chosen. That is, for a given level of consumption, an individual can only obtain more of good A by giving up some of good B.

Hence, utility maximisation is a matter of arranging spending permitted by the budget constraint to achieve the highest total utility possible.

In achieving this outcome, consumers think at the margins by considering how their utility may be impacted by the purchase of an additional unit of a product (i.e., purchasing one more coffee). The change to utility which results from this purchase is referred as the change in *Marginal Utility*.

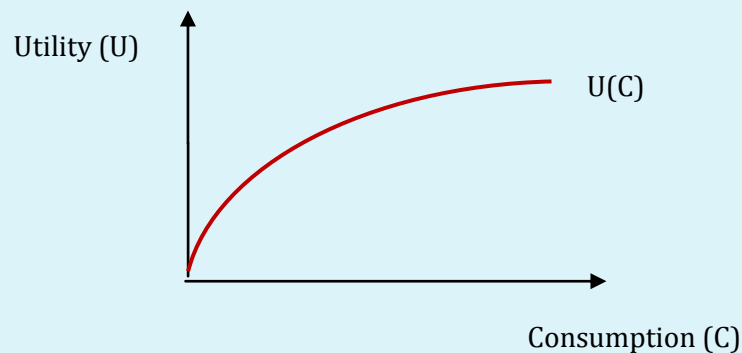
⁹ This section borrows heavily from Rittenberg, Libby, and Tregarthen, Timothy; *Principles of Microeconomics*; Flat World Knowledge, 2009. In particular, Chapter 7.

Ultimately, consumers choose by weighing up the marginal benefit (the increased benefit, utility, obtained by consuming an additional unit of a product) and marginal cost of making a given purchase. The decision rule (whether to purchase or not) states that should the marginal benefit of purchasing one item exceed its marginal cost, then the consumer will make the purchase. This decision rule is followed such that the marginal benefit of consuming across all goods is equated. This process is described in more detail in [Appendix three](#).

To further understand the concept of marginal utility, consider consuming pizza while watching a movie with friends. The marginal utility of consuming the first slice of pizza is likely to increase your total utility significantly. Similarly, consumption of the second slice will raise your utility significantly, but perhaps not as much as the first slice. By the time you reach your sixth slice, utility is probably still increasing, but the utility gain from the fifth to the sixth slice is likely to be much lower than the utility gain from the first to the second slice.

This process is known as the law of diminishing marginal utility and implies that all goods and services will have a concave utility function as shown in box three below.

Box three: Concave utility function



The concave utility function shows that as consumption (C) increases, total utility (U) increases, but at a decreasing rate.

Source: Rittenberg, Libby, and Tregarthen, Timothy; *Principles of Microeconomics*; Flat World Knowledge, 2009

Risk and Consumer Behaviour

In the discussion above, consumer behaviour was considered under conditions of certainty. However, many consumer decisions involve risk.¹⁰

Consider the residential mortgage market and borrowing rates. Assume that an individual can either borrow at a fixed or variable mortgage interest rate. The rate (fixed or variable) chosen by the borrower will depend, in part, on both current rates and expectations about future mortgage interest rates offered by lenders for both products. The borrower may consider different outcomes of future variable and fixed mortgage interest rates by assigning a probability to each outcome. For example, a borrower may assign 20 per cent probability of the current fixed mortgage interest rate being higher than the expected variable mortgage rate over the life of the loan.

In general, how a consumer values consumption in one state (outcome) as compared to another will depend on the probability that the state in question will actually occur. In other words, the rate at which a consumer is willing to substitute consumption if it rains (buy an umbrella) for consumption if it doesn't rain (buy swimwear) may be impacted by how likely the consumer thinks it will rain. The preferences for consumption in different states will depend on the beliefs of the individual about how likely those states are.

If a consumer has preferences about consumption in different circumstances, then utility functions can be used to describe preferences by assigning probability (denoted below as π) to these different circumstances occurring (equation below).

$$E(U) = \pi_1 U(c_1) + \pi_2 U(c_2)$$

That is, utility is a weighted sum of consumption in each state or event occurring, c_1 and c_2 , where the weights are given by the probabilities π_1 and π_2 . An example is provided in Box four to illustrate this process. Additionally, further discussion is provided in [Appendix four](#).

¹⁰ This section uses risk in the Knightian sense; that is, a situation where we do not know the outcome, but for which the odds of a given outcome are known with reasonable accuracy. This section does not consider uncertainty as defined as a situation where the outcomes and probabilities of an outcome are not known or readily estimated.

Box four: Risky Choice

Consider an individual with wealth of \$1 million and an investment that gives him a 50 per cent probability of making a profit of \$100,000 and a 50 per cent probability of losing \$100,000. His wealth will therefore be either \$1.1 million (50 per cent chance) in one state or \$0.9 million (50 per cent chance) in the alternative state. The expected utility is:

$$E(U) = \frac{1}{2} U(\$1.1m) + \frac{1}{2} U(\$0.9m)$$

Expected utility functions are useful in considering risky choice.¹¹ The probabilities assigned to a given event (and their “payouts”) and the choice made by consumers (or businesses and governments) will be influenced by individuals attitude toward risks (i.e., how willing consumers are to take on risk).

Summary

From a rational choice theory perspective, consumer choice is affected by: preferences, constraints and prices. Regulation through this view will change behaviour when one of these three components is altered. For example, the government could:

- increase (decrease) income for certain individuals to shift the budget constraint out (in), allowing more (less) consumption of all goods; or
- introduce a tax or subsidy for one good which would alter the price of that good, and change its consumption as consumers substitute toward the less expensive good at the cost of reducing consumption of the more expensive good; or
- change consumer preferences by running education campaigns or requiring more/different disclosure of products.

However, recent analysis and studies have suggested that the basic rational choice model can be built on by integrating the findings of research which investigates the factors which can affect consumer choice.¹² The next Section analyses the most prominent field of this research – behavioural economics.

¹¹ For detailed discussion on choice under uncertainty refer to: Kreps, David *Notes on the Theory of Choice*; Westview Press; 1988

¹² See, for example; Camerer, Colin *The Behavioural Challenge to Economics: Understanding Normal People*; June 2003; Glimcher, Paul et. al *Neuroeconomics: Decision Making and the Brain*; Academic Press; 1 edition October 2008; Kahneman, Daniel and Thaler, Richard “Anomalies: Utility Maximisation and Experienced Utility”; *Journal of Economic Perspectives* 20(1); pp. 221-234; (2006); Tapia, W. and J. Yermo, *Implications of Behavioural Economics for Mandatory Individual Account Pension Systems*; OECD Working Papers on Insurance and Private Pensions, No. 11, OECD Publishing (2007); Bertrand, Marianne; Marianne Bertran, Sendhil Mullainathan, and Eldar Shafir “A behavioural-economics view of poverty”; *The American Economic Review* 94 (2): 419–423 (May 2004); Sunstein, Cass “Empirically Informed Regulation”; *The University of Chicago Law Review* (78:1349) (2011)

Behavioural Economics

The rational choice model is useful because it provides a theoretical framework that can be applied to almost any form of economic and 'non-economic' behaviour, and makes refutable predictions.¹³ However, the model in its most basic form is subject to some limitations which can reduce its applicability to regulatory design. For example, experimental and empirical evidence gathered has, to varying degrees, conflicted with aspects of the traditional model analysed in the previous section. This research has generally been brought under the broad discipline of **behavioural economics**.

Behavioural economics can be defined as '*a method of economic analysis that applies psychological insights into human behaviour to explain economic decision-making.*'¹⁴ More specifically, this approach assesses how preferences and choices are impacted by cognitive, social and emotional variables. As such, behavioural economics can be summarised as essentially a series of observations about how people do behave. It is therefore purely positive.

Just as the simplifying assumptions of perfect competition and perfect information in the basic rational choice model have previously been relaxed, behavioural economics builds on the rational choice model by testing, and considering alternative assumptions, with regard to consumer behaviour. Broadly, two central assumptions of the basic rational choice model have been built on: exogenous preferences; and optimal choice.

Regarding the assumption of exogenous preferences (i.e., that consumers have a pre-determined optimal consumption bundle which is a function of their economic constraints and their individual preferences), research has shown that real-world preferences can depend on context or situations. As argued by Jonathan Levin and Paul Milgrom in their paper on choice theory: '*the way in which a choice is posed, the*

¹³ Camerer, Colin and Loewenstein, George; *Behavioural Economics: Past, Present, Future*; California University of Technology; October 2002

¹⁴ The Oxford Dictionary <http://oxforddictionaries.com/definition/behavioral%2Beconomics?region=us> 2012

social context of the decision, the emotional state of the decision-maker, the addition of seemingly extraneous items to the choice set, and a host of other environmental factors appear to influence choice behaviour.¹⁵ For example, simply labelling a product as '98% fat-free' may induce a different choice to the product being labelled as 'contains 2% fat'.

A second insight is that some choices may not be considered in the way the rational choice model assumes. For instance, choices may be, in some instances, based on intuitive reasoning, heuristics or instinct. Reliance on intuition and heuristics may be a reasonable approach to decision making given that people have limited cognitive capacity and often have to make numerous decision in short time frames. Indeed, *'instinctive judgement may often mimic preference maximization, particularly in familiar environments'*.¹⁶ However, reliance on heuristic reasoning or intuition in unfamiliar situations can lead to decisions which markedly depart from the optimal choice process characterised in the rational choice model.¹⁷

In distilling this array of factors, the central findings of behavioural economics are presented in box five and expanded on further below.

Box five: Behavioural Factors which Affect Choice

The behavioural factors which affect consumer choice can be broadly categorised as follows:

Loss Aversion - *People would rather not lose than not win.*

Reference Point – *People may evaluate changes relative to some reference point rather than objectively.*

- Priming – People's behaviour may be impacted if they are first exposed to certain sensations.
- Anchoring – People use an initial reference point in estimating values.
- Salience – Consumers are drawn to what seems relevant to them.

Time Inconsistency - *People may change their minds over time*

- Hyperbolic discounting – People may change their valuation of goods over time.
- Procrastination – Important decisions may be delayed.

Implications of Loss Aversion, Reference Point and Time Inconsistency

¹⁵ Levin, Jonathan and Milgrom, Paul; *Introduction to Choice Theory* Stanford University; September 2004; pg. 22

¹⁶ Ibid; pg. 23

¹⁷ Ibid; pg. 23

- Default choice – Consumers may ‘go-with-the-flow’.
- Endowment effect – Consumers may disproportionately value what they possess.
- Status quo bias – Consumers may be averse to change.

Social Factors – *Choice can be impacted by the choices of others*

- Social norms – People are influenced by the actions of those around them.
- Ego – Consumers behave in a way that supports the impression of a positive self-image.
- Messenger – Consumers are influenced by who communicates information.

Additional Factors

- Mental accounting – Consumers may be inconsistent in valuing money.
- Heuristics – People may use mental short-cuts when making choices.
- Affect – Emotions can be powerful in shaping consumer behaviour.



Loss Aversion

People would rather not lose than not win.

One of the central findings of behavioural economics is that people may be loss averse. That is, we prefer avoiding losses rather than acquiring equivalent gains.

- For example, in a publication by Tversky and Kahneman¹⁹, the authors’ document an experiment they ran with students from two U.S. universities. The students were asked to decide on their preferred option to address two problems. Both problems were based on the narrative *‘imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to*

¹⁸ Image sourced from <http://www.contrarian-investor.com/loss-aversion.html>; accessed 23 November 2012

¹⁹ Tversky, Amos and Kahneman, Daniel; ‘The Framing of Decisions and the Psychology of Choice’; *Science*, Vol. 211; January 1981

combat the disease have been proposed'. The first group of participants was presented with a choice between programs:

- A: 200 people will be saved with certainty; or
- B: 33% probability that 600 people will be saved, and 66% probability that none will be saved.

72% of the students opted for program A, with the remainder choosing B.

The second group of participants was presented with the choice between programs:

- C: 400 people will die with certainty; or
- D: 33% probability that nobody will die, and 66% probability that 600 people will die.

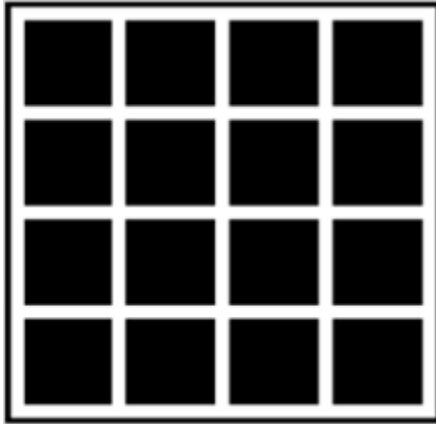
78% of the students opted for program D, with the remainder choosing C.

The reason these results are interesting from a behavioural perspective is that both problems are substantially the same. The only difference is that the first problem is described in terms of lives saved, while problem two is explained in terms of lives lost. Changing how the problem was framed altered the majority decision of the two groups: when the programs were presented in terms of lives saved, the participants preferred the secure program (they were risk averse). When the programs were presented in terms of expected deaths, participants chose the gamble (they were risk seeking).

- Some evidence suggests that there may be biological factors which underpin humans' loss aversion. For example an experiment was undertaken in 2006 which involved Capuchin Monkeys.²⁰ Two human experimenters offered the monkey's pieces of apple, only one of the experimenters displayed a single piece of apple at the beginning of the trial, while the other displayed two pieces of apples. The monkey which exchanged with the first experimenter received the single piece of apple on display. However, the monkeys which exchanged with the second experimenter had one of the two pieces of apple removed before delivery. Hence, both monkeys received one piece of apple, but one 'provider' would remove a second piece on delivery. Despite this equivalence of outcomes, 79% of choices indicated preferences for the

²⁰ Dubner, Stephen; Levitt, Stephen; *Monkey Business*; New York Times, <http://www.nytimes.com/2005/06/05/magazine/05FREAK.html?pagewanted=all>; 5 June 2005; Accessed 7 July 2012

one-piece of apple provider. There is some suggestion that these revealed preferences illustrate loss-aversion amongst monkeys.



Reference Point

People may evaluate changes relative to some reference point rather than in absolute terms.

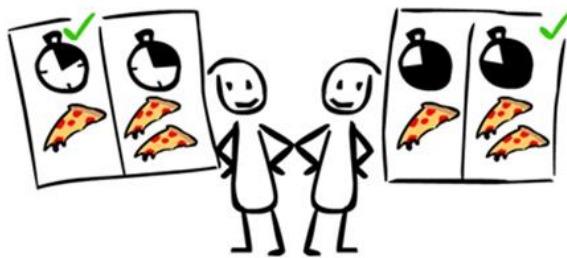
Research in behavioural economics has identified a number of different reference points which can alter a consumer's choice.

- Priming – Peoples' behaviour may be impacted if they are first exposed, or primed, to certain words, sensations and sights.
 - For example, referring to earlier work, Wansink, Just and Payne²¹ note that when 'movie-goers in a Philadelphia suburb were given large-size containers of stale, 14-day-old pop-corn, they still ate 38 percent more than those given the medium-sized containers despite the popcorn's poor taste'. The authors suggest that the tendency for consumers to be biased by these cues (larger packaging leading to greater food intake) may be, to some extent, as powerful as the taste of the food itself.
- Anchoring – Consumers may use an initial reference point in estimating the value of a choice.
 - For example, one study²² found that when a credit card statement had a 2% minimum payment on it, people repaid, on average, 22% of their bill; when there was no minimum re-payment, the average repayment reached 40%. Here, credit card holders anchored their repayments on the minimum repayment amount disclosed on the bill.

²¹ Wansink, B., Just, D.R., and Payne, C.R; "Mindless eating and healthy heuristics for the irrational"; *American Economic Review*, 99(2) pp. 165-169; (2009)

²² Stewart, Neil; 'The Cost of Anchoring on Minimum on Credit-Card Minimum Repayments'; *Psychological Science*; University of Warwick, 2009

- Similarly, Ariely, Loewenstein and Prelec²³ undertook an experiment which showed University students six ordinary products such as wine and chocolate. The students were asked whether they would buy each good at an amount equal to the last two digits of their social security number. They were then asked to state their valuation for each good. A high correlation was found between the students' reported valuations and the random final digits of their social security number. That is, *'it appears that the students had no firm valuation in mind and "anchored" their value to an essentially arbitrary suggestion (the social security number).'*²⁴
- Salience – Consumers are drawn to what seems relevant to them.
 - Human behaviour may be influenced by attention that is drawn to individuals.²⁵ In a busy, complex and information rich environment, people may filter out complex information and/or are more likely to register information that is simple and accessible. For example, the size of government expenditure on benefits of particular government reform are much more salient to consumers or taxpayers if they are expressed in amount per capita rather than as the overall amount.
 - Similarly, research in the US found that disclosing the amount of sales tax levied on a given product on the product's label, rather than adding it at the till, led to an 8% fall in sales over the experiment time period.²⁶



Time Inconsistency

People may change their minds over time

27

Hyperbolic Discounting – People may change their valuation of goods over time.

- According to Robinson and Hammit *'time preferences have been one of the most active and well-developed components of behavioural*

²³ Ariely, Dan, George Loewenstein, and Drazen Prelec; *Determinants of Anchoring Effects*; Working Paper, 2000.

²⁴ Levin, Jonathan and Milgrom, Paul; *Introduction to Choice Theory* Stanford University; September 2004; pg. 23

²⁵ Kahneman, Daniel and Thaler, Richard "Anomalies: Utility Maximisation and Experienced Utility"; *Journal of Economic Perspectives*; 20(1);pp. 221-234, 2006

²⁶ Institute for Government and the Cabinet Office; *MINDSPACE: Influencing Behaviour through Public Policy*; March 2010, pg 24

²⁷ Image sourced from <http://www.mu-sigma.com/analytics/blog/?p=178>; accessed 21 September 2012

*economics research*²⁸. Some studies have found consumers have a tendency to discount hyperbolically rather than exponentially. That is, consumers may have a higher discount rate on shorter time periods, and lower discount rates on longer time periods. For instance, from today's perspective the discount rate between two far off periods, t and $t+1$, is a long-term low interest rate. However, from time t perspective, the discount rate between t and $t+1$ is a short-term high discount rate. This type of change can be reflected in real life experiences. For example, today I may desire to quit smoking next year, but when next year arrives, my tastes may be to postpone quitting smoking.²⁹

Procrastination – People may put off important decisions.

- People may put off tasks that do not have well-defined or near term benefits, but have immediate costs (such as house-work). Similarly, people may overindulge in behaviour that does not have well-defined or long term costs, but have immediate benefits (such as eating unhealthy food).³⁰

Implications of Risk Aversion, Reference Points and Time Inconsistency

In practical terms, risk aversion, reference points and time inconsistency can lead to a number of biases in decision making. These include the endowment effect, status quo bias and default choices.

- Endowment effect – Consumers may disproportionately value what they possess, even if this possession is arbitrary.
 - An additional feature of consumer choice relating to loss aversion and reference points is the endowment effect, which is the view that consumers' willingness-to-pay (WTP) for a good is less than their willingness-to-accept (WTA) compensation for having that good removed. Under the basic rational choice model, WTP and WTA should be equal.
 - For example, Kahneman, Knetsch and Thaler³¹ undertook an experiment in which some subjects were given a mug and then given the chance to sell or trade it for an alternative good of equal price. It

²⁸ Robinson, Lisa and Hammitt, James; 'Behavioural Economics and the Conduct of Benefit-Cost Analysis: Towards Principles and Standards'; *Journal of Benefit-Cost Analysis* Vol 2, Issue 2; 2011, pg. 21

²⁹ Laibson, David; *Hyperbolic Discount Functions, Undersaving, and Savings Policy*; NBER Working Papers 5635, National Bureau of Economic Research

³⁰ Institute for fiscal studies; *Tax and Benefit Policy: Insights from Behavioural Economics*; IFS Commentary C125; pg. 25

³¹ Kahneman, Daniel, Knetsch, J. L., & Thaler, Richard. Experimental Tests of the Endowment Effect and the Coase Theorem. In E. L. Khalil (Ed.) , *The New Behavioral Economics*. Cheltenham, U.K. and Northampton, Mass Elgar; 2009

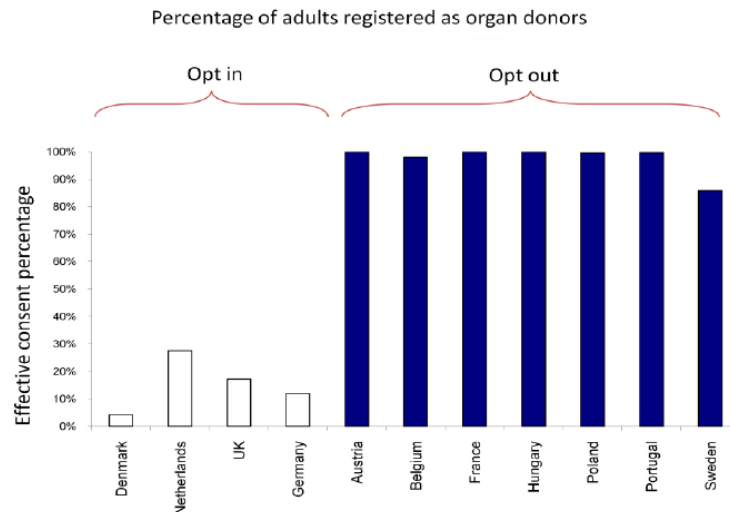
was found that subjects' WTA compensation for the mug was nearly twice as high as their WTP for it once ownership of the goods had been established.

- More recent studies, however, have cast doubt on some of these findings. For example, in experiments run by Charles Plott and Kathryn Zeiler³², no gap between WTA and WTP could be reported. The authors suggest that some findings of the endowment effect could be the result of participants (mis)understanding of the experiment, as opposed to an intrinsic consumer preference.
- Status Quo Bias – Consumers may be averse to change.
 - People may not change from an established way of doing things, even if the costs are low and benefits high. Otherwise stated, people may require some degree of compensation to account for the utility loss associated with moving from the status quo³³. This could be motivated by the value people place on familiarity and the utility loss associated with the unknown. Alternatively, it could be viewed as the premium required to compensate for the uncertainty associated with unfamiliar situations.
- Default choices – Consumers may engage in as little active choice as possible.
 - A default option is that which is automatically selected in the absence of an alternative selection. Some research has found that the default option is chosen more often than might be expected.
 - For instance, several studies³⁴ have found that when people are, by default, enrolled in a savings plan, the level of participation in the plan is far greater than when non-participation is the default.
 - Additionally, the different default options for organ donation have been found to contribute to vastly different rates of participation. As the graph below shows, those countries who require people to automatically opt-in to donating organs have far greater rates of organ donations than those where people are not donors by default.

³² Plott, Charles and Zeiler, Kathryn "The Willingness to Pay-Willingness to Accept gap, the 'Endowment Effect', Subject Misconceptions, and Experimental Procedures for Eliciting Valuations" *The American Economic Review*, Vol. 95, no. 3 June 2005; pp. 530-545

³³ Samuelson, William; Richard Zeckhauser; "Status Quo Bias in Decision Making". *Journal of Risk and Uncertainty*, 1988; pp. 7–59

³⁴ See Sunstein, Cass 'Empirically Informed Regulation' *The University of Chicago Law Review* (78:1349) 2011 for an overview



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Social Factors

Choice can be impacted by the choices of others

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- Norms – People may be influenced by the actions of those around them.
 - *'Individual behaviour is influenced by the perceived behaviour of others'.³⁷* Social and cultural norms can result in behavioural expectations. For example, offering a bus seat to an elderly person is widely accepted as a social norm and “non-compliance” is seen as a personal negative.

³⁵ Image sourced from <http://nudges.wordpress.com/2008/04/10/organ-donor-rate-data-from-around-the-world/>; accessed 12 September 2012

³⁶ Image sourced from <http://hmprescott.wordpress.com/2008/08/20/rethinking-the-drinking-age-a-historical-perspective/>; accessed 12 September 2012

³⁷ Hirshleifer, David; *The Blind Leading the Blind: Social Influence, Fads and Informational Cascades*, in Mariano Tommasi and Kathryn Ierulli, eds, *The New Economics of Human Behaviour* (Cambridge 1995); pg. 188/189

- Ego – Consumers behave in a way that supports the impression of a positive self-image.
 - Purchases by consumers may be influenced by image, belief and cultural and peer aspects. For example, “I must have the latest version of iPad” (even though it is not too dissimilar from the previous model). As Schultz notes ‘ego is intrinsic to all decisions’³⁸ which can lead to bias in decision-making, selective perception, bias towards past actions and choices, overconfidence and vested interest.

- Messenger – Consumers may be influenced by who communicates information.
 - People may be affected by the authority (perceived or otherwise) of the information provider. For example, one study found that health interventions delivered by health educators are more effective in changing behaviour than efforts by trained facilitators.³⁹
 - While the authority of the communicator matters, so too do peer effects. The ‘Health Buddy’ scheme in the U.K involved older students receiving healthy living lessons from their schoolteachers. The older students then delivered those lessons to younger buddies. Compared to a control group, both the older and younger students enrolled in the scheme showed an increase in healthy living knowledge and behaviour and beneficial effects on weight. Similarly, another study found a 1,000% increase in smoking amongst teenagers if two of their peers smoke, compared to a 26% increase if a parent does.⁴⁰

³⁸ Schultz, Randall; ‘Reality and New Product Decision Making’ University of Iowa, January 2002

³⁹ Webb and Sheeran ‘Does changing behavioural intentions engender behaviour change? A meta-analysis of the experimental evidence’; *Psychological Bulletin* 13: 249–268; 2006

⁴⁰ Institute for Government and the Cabinet Office; *MINDSPACE: Influencing Behaviour through Public Policy*; March 2010, pg 19



Additional Factors

Consumer choice may be impacted by a number of other factors including mental accounting, heuristics and emotions

- Mental Accounting – Consumers may be inconsistent in valuing money.
 - Some evidence suggests that consumers may think of money as sitting in different ‘mental budgets’ – such as salary, savings, expenses, etc. Similarly, there may be different ‘purchase accounts’ whereby we allocate a certain amount of money to a certain ‘account’ and may be reluctant to move between them. For instance, people may be willing to travel to a supermarket to receive a fuel discount voucher, which could save 4c per litre, but in the process ‘over-spend’ at the supermarket, undermining aggregate savings.

- Heuristics – People may use mental short-cuts when making choices.
 - In order to make sense of complicated choices, consumers may rely on rules-of-thumb or maintain consumer brands/products with which they are most familiar. In some instances, using rules-of-thumb and familiarity as a basis for choice can closely approximate the optimal choice process detailed previously in this paper, and can provide a useful means to distil numerous and complex choices.

- Affect – Emotions can be powerful in shaping consumer behaviour.
 - People experience different emotions on a daily basis which may influence decision-making. Emotional responses to words, images and events can influence judgments. One example of how emotions can shape individuals’ behaviour is graphic advertising on television regarding road accidents with the aim of improving road safety. Cameron et. al⁴² analyse the success of advertising campaigns in Victoria in the early 1990s and concluded that there are ‘*clear links between levels of TAC [Transport Accident Commission] publicity supporting the speed and alcohol enforcement programs and*

⁴¹ Image sourced from <http://bri-williams.blogspot.com.au/2012/05/mental-accounting-matters.html>; accessed 17 October 2012

⁴² Cameron, M; Haworth, N; Oxley, J; Newstead, S; and Le, T; *Evaluation of Transport Accident Commission Road Safety Television Advertising*; Monash University Accident Research Centre - Report #52; 1993

reductions in casualty crashes when other major factors are held constant'.

Summary

By building on the basic rational choice model, behavioural economics has developed a rich set of factors which can further impact on consumer choice. These include reference points, framing, social factors and time inconsistency in preferences. The following section brings together the discussion of the previous two sections to provide analysis and examples of how rational choice and behavioural economics offer a different approach to understanding consumer behaviour.

Comparing Rational Choice Theory and Behavioural Economics

Both rational choice theory and behavioural economics offer useful insights for considering consumer behaviour. This section analyses the differences in these approaches by providing a theoretical overview and then provides some examples taken from experiences largely in Australia.

Theoretical Overview

Rational choice theory and behavioural economics approach consumer behaviour from different reference points; the former largely takes preferences as given and does not deliberate over how those preferences are formed, while the latter typically focuses on the processes which lead to preference formation.

As such, rational choice theory generally views consumer choice as a logical process undertaken to maximise utility. Here, observing the choices made by individuals is sufficient to understand how utility is maximised; if a consumer's utility was not maximised by the choices they made, then they would have chosen something else.

Alternatively, the focus on preference processes in behavioural economics broadens the scope for judging choices and concluding that errors are made in decision making. Essentially, if the process which led to the formation of a preference was the product of factors which are not fundamental to, or appropriately indicative of, the individual's happiness, then the probability that an 'error' was made in that decision increases. This may occur, for example, when a choice is 'unduly' influenced by social norms.

Unlike with rational choice theory, the findings of behavioural economics imply that utility maximising behaviour may not be able to be understood through simply observing choices. Otherwise stated, from a behavioural perspective, utility and choice may differ. As noted by Bernheim and Rangel⁴³:

⁴³ Bernheim, B. D. and Rangel, A.; *Behavioural Public Economics*, entry for the New Palgrave Dictionary of Economics, 2nd edition, 2008.

Public economic analysis requires us to formulate models of human decision-making with two components – one describing choices, and the other describing well-being. Using the first component, we can forecast the effects of policy reforms on individuals' actions, as well as on prices and allocations. Using the second component, we can determine whether these changes benefit consumers or harm them.

To further understand this difference, consider the following case studies.

Case Studies

Obesity and Nutrition Labelling

Obesity has been increasingly recognised as a health issue. According to the Australian Institute of Health and Welfare (AIHW), Australia's obesity rates are among the highest in the world, with around 1 in 4 Australian adults classed as obese.⁴⁴

Consider how one could use a behavioural or rational choice framework to understand obesity. From a behavioural perspective, it could be argued that an overweight individual may not have deliberately chosen to become overweight but, due to certain biases in the formation of preferences (such as present-bias, social norms etc) inadvertently became overweight.

Alternatively, rational choice theory tells us that the individual was: aware of his own preferences; understood the health implications of eating certain food types; assessed the costs and benefits of enjoying consumption now versus being overweight in the future and; on this basis, chose a pattern of consumption that led him to being overweight. As Philipson states:

*'...obesity is an avoidable state, which can be adjusted through diet and behavioural modifications. Therefore, economists expect these adjustments in behaviour to take place if the benefits of adjustment exceed the costs.'*⁴⁵

The approach taken by the NSW Food Authority to the issue of obesity appears generally informed by the behavioural perspective. Indeed, a Better Regulation Statement by the NSW Food Authority considered whether to regulate the provision of nutritional information at the point of sale in standard menu retail food outlets in

⁴⁴ Australian Institute of Health and Welfare <http://www.aihw.gov.au/obesity-health-priority-area/> 2012

⁴⁵ Philipson, Thomas; "The World-Wide Growth in Obesity: An Economic Research Agenda"; *Health Economics*; issue 10; 2001 pp. 1-7

NSW.⁴⁶ The Statement's preferred option was to implement mandatory nutritional information disclosure requirements. The Statement noted that:

*"improved knowledge and understanding of both nutritional content of "fast food" products and nutritional information generally should lead to a change in consumer choices and a longer term decrease in both childhood and adult obesity associated with over-consumption of unhealthy foods"*⁴⁷.

The desired outcome being that individuals would use this information to update their consumption choices to be better aligned with their actual preferences.

To understand the impacts of this policy, the National Heart Foundation of Australia⁴⁸ examined recent literature on the impacts of nutrition labelling on menus at fast food restaurants. While it was acknowledged by the Heart Foundation that their review was not a systematic one, it noted that measuring the impact of menu labelling was complex and the evidence showed mixed findings. Some studies examined reported average energy reduction in calories when menu labelling was provided (up to 250 calories per day), other studies reported no impact, some had mixed results for men and women, while one study found increases in the kilojoule content of meals selected by men.

This research suggests that clear explanations of consumer behaviour are difficult to obtain. For instance, from a behavioural perspective, it could be argued that a) individuals failed to integrate the new information appropriately (and hence made little change to their consumption of fatty foods), or from a rational choice theory perspective, b) since there was little change to consumption, individuals were *already making optimal choices* based on relevant information (if this weren't the case, then their behaviour would have changed subsequent to the information disclosure).

Compulsory Savings

A number of governments have introduced rules necessitating that employers contribute money toward employees retirement savings (referred to as superannuation in Australia), while also offering incentives, such as lower marginal tax rates, for individuals to increase their long term savings.

The move to compulsory savings could be viewed as being influenced by some findings of behavioural economics. For instance, consistent with research on present-bias, it presumes that some people have a tendency to save too little. That

⁴⁶ New South Wales Food Authority; *Better Regulation Statement: Provision of Nutritional Information at Point of Sale in Standard Retail Food Outlets*; October 2010

⁴⁷ *Ibid*; pg. 6

⁴⁸ The Heart Foundation of Australia; *Food Labelling Law and Policy: Food Labelling Review*; May 2010

is, it is presumed that consumers discount hyperbolically and therefore may not save as much as they would like for when they are older. Schemes which are not compulsory, such as 'KiwiSaver' in New Zealand, make enrolment in the scheme the default option, which follows research on the status-quo bias and reference points.

Indeed, the Australian Government's review into superannuation – the 'Cooper Review' – posited that *'the key tenet of this approach (compulsory savings) is the concept of 'libertarian paternalism' – the idea that the outcomes experienced by inert or disengaged consumers should have inbuilt settings that most closely suit those consumers' objective needs, as assessed by the expert providers of the product or service in question'*.⁴⁹

Here, as in the case of nutrition labelling, the behavioural approach essentially posits that consumers do not have the capacity to understand their own preferences, and so are systematically making misinformed and sub-optimal choices which harm their long-term well being. Here, it is posited that there are other individuals, 'experts', who have a better understanding of consumer preferences and should regulate accordingly.

Alternatively, rational choice theory posits that consumers are in the best position to understand their own preferences. That some people may 'under-save' is a reflection of their valuation of time; the amount of money which consumers are willing to defer from current to future consumption is reflected by how much they value consuming in the present relative to the future. Those who value the future relatively highly will save relatively more than those who value the future relatively lowly. In this sense, there is no 'under' or 'over' savings – the amount people save is a reflection of their preferences.

Hence, from a rational choice theory perspective, where compulsory savings, such as superannuation, regulate that consumers save more than what they otherwise would have, it is necessarily the case that they are worse off as a result. This is because their savings level was already optimal given their preferences. By regulating individuals to save more than this amount, traditional economics argues that these individuals will have a lower utility.

Minimum Energy Performance Standards (MEPS)

The Department of Climate Change and Energy Efficiency (DCCEE) has implemented a number of policies mandating that certain products meet a Minimum Energy

⁴⁹ Australian Government; *Super System Review – Final Report: Overview and Recommendations*; pg. 9

Performance Standard (MEPS).⁵⁰ The main objective of these policies is to mitigate some of the impacts of green-house gas emissions.⁵¹

One argument why this would be required is that there exist impediments to consumers purchasing more efficient appliances, even though this may be in their long-term interest. For example a Regulation Impact Statement completed on MEPS for Air Conditioners argued that purchasing more energy efficient products would be *'in their (consumers) financial long term best interests'*.⁵² Here, the purchasing of a more energy efficient product may have a higher fixed, or start-up, cost relative to less efficient products. However, because the more efficient product uses less energy for ongoing use, over time, it may be a cheaper option due to lower ongoing power bills.

To explain this, the RIS posits that consumers (generally) lack the: *'information or the ability to understand and to effectively use the information'*; *'computation skills, time and motivation required to compare the life cycle costs of different air conditioners, so as to make informed financial choices regarding their air conditioner purchase'*; and *'ability to interpret the available technical information in order to make optimal decisions regarding air conditioner efficiency and operating costs'*.⁵³

Consider how the purchasing behaviour of consumers can be viewed from a behavioural and standard economic perspective.

From the discussion in the previous section, it could be argued that, from a behavioural perspective, consumers are relying on mental short-cuts when making their decision. That is, rather than approaching their choice in a deliberate manner, consumers may be using heuristics or could be subject to the biases (such as status quo bias) outlined in the preceding section. Alternatively, consumers may be hyperbolically discounting in this market; consumers here may understand the financial pay-back, but are relatively impatient, and do not want to wait a number of years to realise a 'return' on their purchase.

Conversely, from a rational choice theory perspective, three views could be presented. The first relates to risk; power bills are uncertain because the level of energy consumption in the future is not known, nor is the rate at which that consumption will be charged. Hence, the risk-averse consumer may prefer investing the difference in the initial capital cost of the more versus less expensive air-conditioner in a relatively riskless investment, such as a term-deposit or government

⁵⁰ For a list of mandated products see, <http://www.energyrating.gov.au/programs/e3-program/meps/about/>

⁵¹ Ministerial Council on Energy Decision RIS: MEPS for Air Conditioners <http://ris.finance.gov.au/2011/11/08/increases-in-minimum-energy-performance-standards-for-air-conditioners-ministerial-council-on-energy/> (2011)

⁵² Ibid. Pg 10

⁵³ Ibid. Pg. 14

bonds. Here, consumers may not purchase the more efficient air-conditioner due to the uncertainty associated with the pay back from lower ongoing bills.

The second view relates to the cost of acquiring information. Given that information is dispersed, difficult to locate and technical, there is a cost (opportunity cost and financial) for a consumer to obtain relevant information about the products in question. Should these costs be sufficiently high, they may not be outweighed by the payback in power bills associated with the more efficient product. Here, the more efficient air-conditioner is not in the financial interest of the consumer.

The third view relates to preferences. Consumers may prefer the less efficient air-conditioner for a number of non-financial reasons. For example, the consumer may prefer the size, look, and how the less efficient air-conditioner matches the décor of their house. There is a host of factors which would lead the consumer to demand a 'premium' for switching to the more efficient option, which must be high enough to compensate them for the utility loss associated from having a less aesthetically desirable air-conditioner. As such, it could be argued that this premium, in terms of savings from energy consumption, is not high enough to compensate them in present circumstances.

The difference in perspective here is driven by the deference that rational choice theory has toward the validity of decision making by the individual, relative to the behavioural perspective which more readily concludes that errors are frequent in consumer choice.

Approaches to Consumer Behaviour and Government Intervention

The preceding section analysed how a given decision could be interpreted from rational choice and behavioural perspectives. However, it is not just the case that there are two alternative explanations for considering why a decision was made. If the rational choice approach is accurate, then it follows that the observed decision was optimal. In this case, any government intervention which induces a change to behaviour will, by definition, make the individual worse off. Alternatively, if the behavioural approach is accurate, then regulation which alters this behaviour could potentially improve the individual's welfare.

However, the only way we can tell if a decision was sub-optimal is if that decision deviated from the decision that would have prevailed under rational choice theory. This statement follows from the normative aspect to rational choice theory. To make this assessment, a clear understanding of the individual's preferences, utility function as well as all costs (including opportunity costs), prices and constraints that the individual faces is required.

For example, before making an assessment whether purchasing a relatively energy inefficient appliance was against the individual's own best interest, a clear understanding of all of the factors considered in that purchase is required. Where this information is not obtained then there is uncertainty over the extent to which government policy could be helping or harming individuals.

While discussed in more detail in the next section, it is worth noting at this stage that the simple occurrence of behavioural change is not evidence of previous sub-optimal choices. For example, the increase in organ donors following the default change does not, *a priori*, imply that the previous supply of organ donors was sub-optimal. To make this assessment, a clear understanding of all costs to organ donation, such as time taken to fill out forms, is required. Once these costs have been accounted for, then it may be reasonable to consider the behavioural factors, such as status quo bias, which may have impeded an optimal level of organ donation.

Box six provides an example of one approach to consumer behaviour and government intervention.

Box six: Cleaning the Attic to Save Energy

The UK Behavioural Insights Team undertook a series of trials aimed at investigating approaches to improving household energy efficiency. Some research has found that one impediment to households taking financial incentives to reduce energy consumption by installing insulation is the time-cost of clearing out their attics.

Based on this research a trial was run in which insulation firms would, as a part of their service, clear the household's attic. It was found that this additional service led to a three-fold increase in the acceptance of an insulation grant.

This simple example shows that an impediment to energy efficiency was not necessarily based on a behavioural bias. Rather, it could be understood as a rational response to transaction costs – time taken to clean out an attic – which, once removed, enabled behaviour to change. However, based on the evidence provided, it would not be possible to conclude that the low level of grant take-up prior to the trial was sub-optimal. Further evidence on the level of transaction costs would be required to make this assessment.

Source: UK Cabinet Office *Behaviour Change and Energy Use*

Summary

Both rational choice theory and behavioural economics provide a useful approach for understanding and predicting consumer behaviour. As the above case studies

illustrate, however, these approaches view choices as different processes and, as such, offer a different perspective on why a given choice was ultimately made.

The next section refocusses on behavioural economics and analyses how this approach has built on the basic rational choice model in designing policy.

Using Behavioural Economics to Influence Choice

By building on the basic rational choice model, behavioural economics has provided us with a richer understanding of the factors which affect choice. For example, it has highlighted that, under certain conditions, choices can be impacted by the context and presentation of those choices, rather than just the underlying product. The challenge for policy makers is how to use the findings of behavioural economics to make practical improvements to the design of regulation.

The most prominent tool for translating the findings of behavioural economics to policy design has been “nudge”. As argued by the Institute of Fiscal Studies, *‘the use of ‘nudges’ as a new policy tool is perhaps the most visible sign of the influence that behavioural economics has had on policymakers in recent years’*.⁵⁴

As defined by Thaler and Sunstein:

*‘A nudge ... is any aspect of the choice architecture that alters people’s behaviour in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting the fruit at eye level counts as a nudge. Banning junk food does not.’*⁵⁵

Otherwise stated, behavioural economics can be translated into practical policy design through changing choice architecture – the context within which choices are made - with a view to influencing (nudging) behavioural change.

The definition provided above is end-point, or consumer, centric. That is, nudge is viewed as an intervention which alters the behaviour of consumers without precluding, or altering the relative prices of, different choices. This approach does not preclude more direct, traditional regulation of firms. For example, government

⁵⁴ Institute of Fiscal Studies Tax and Benefit Policy: Insights from Behavioural Economics IFS Commentary C125

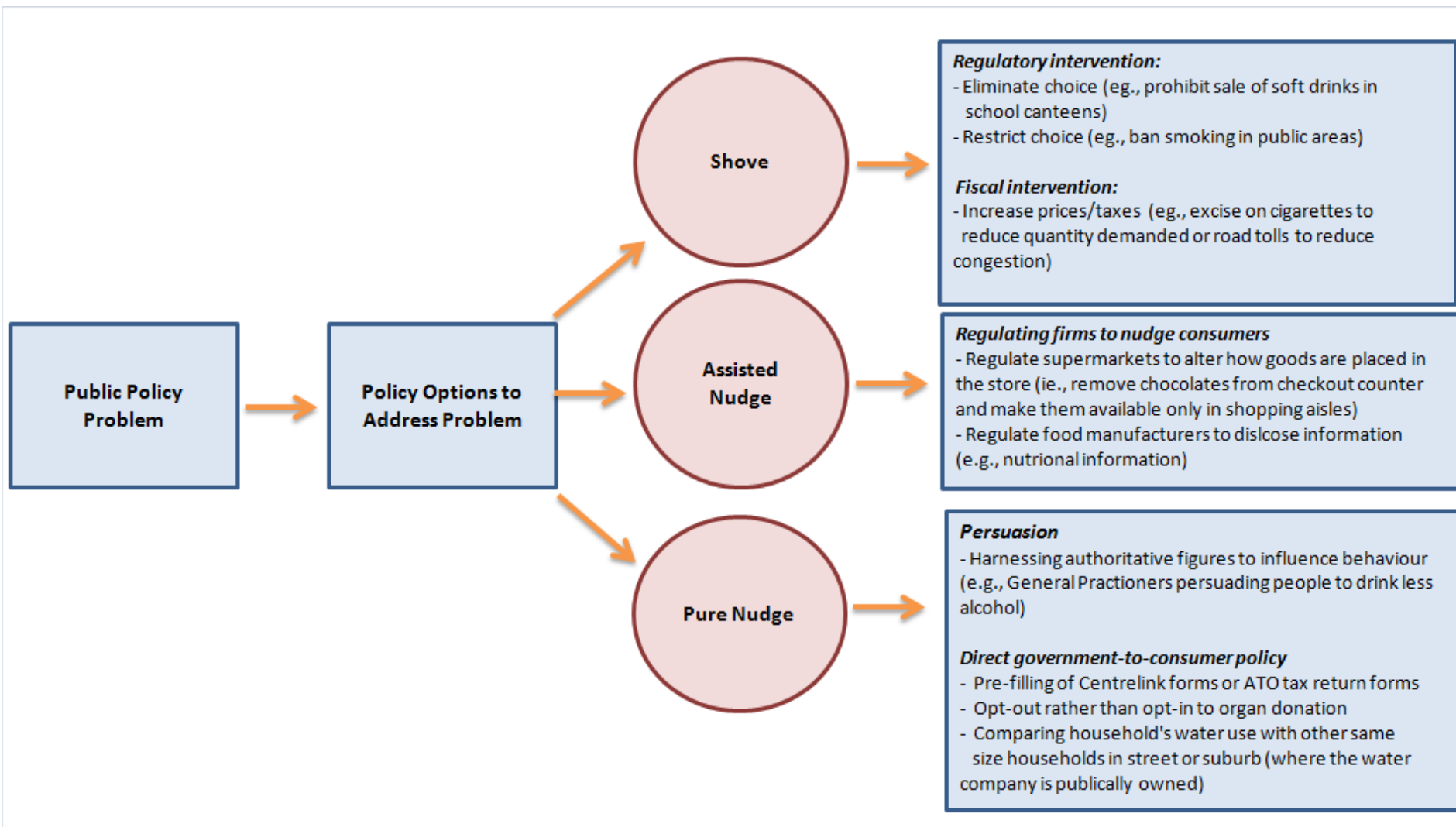
⁵⁵ Sunstein, Cass and Thaler, Richard; *Nudge: Improving Decisions About Health, Wealth and Happiness*; Yale University Press; 2008; pg. 6

policy may nudge consumers by requiring firms to change the messaging in a product disclosure statement, or alter how junk food is positioned in a cafeteria. Here, consumers are nudged because the alteration of the context within which they are choosing may influence their choices without restricting the set of choices available. Firms are regulated because they are required to alter the position of junk food in their cafeteria – their choices are evidently restricted.

To clarify this point, we distinguish between a “pure” nudge; an “assisted” nudge and a “shove”. A pure nudge refers to interventions which alter choice architecture without placing any additional requirements on firms. This could include alterations to existing policy which don’t rely on firms as an intermediary (such as government promotion of healthy eating). An assisted nudge refers to an intervention which alters the choice architecture by requiring some change to current business practice, as in the cafeteria example above. A shove is any policy which isn’t captured by the previous two definitions, such as taxation. Therefore, a shove alters the behaviour of consumers by regulating, for example, a change in relative prices. The flow chart below illustrates these approaches in more detail, and how they can be used in policy design.

As presented in the chart below, shoving and nudging (pure and assisted) entail the broad options that a government can implement to address a given public policy problem. Nudge can be viewed as an additional tool which government can use to address a given problem. As examples below show, nudges can be used as alternatives to traditional policy, used within a given regulatory framework or used alongside more traditional interventions.

At this stage, it is worth noting that there is often no clear line between a ‘nudge’ and a ‘shove’ as it may not always be apparent at what point changing choice architecture, in practical terms, restricts choices. For example, while moving junk food toward the back of a cafeteria may not constitute a restriction of choice, moving the junk food behind the counter, or requiring that customers request junk food items, could, in practice, eliminate that choice if they are not aware those products are available.



Nudge in Practice

In recent years, nudge has been put into practice in a number of countries. The most prominent of which has been through the Office of Information and Regulatory Affairs (OIRA) in the US and the Behavioural Insights Team (BIT) located in the UK's Cabinet Office. Examples and discussion provided below largely build on work done in, or people involved with, these organisations. Additionally, the examples provide more guidance on the differences between a 'pure' and 'assisted' nudge.



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Information Disclosure

Providing succinct and salient messages can assist in disclosing important information.

Often there are requirements, either for business or government, to disclose certain information about products or services which they are providing. This often comes in the form of Product Disclosure Statements (PDSs), key fact sheets, or physical labelling on products, such as nutritional content for food.

Information disclosure is often a useful regulatory tool for responding to asymmetric or inadequate information problems, assisting in expanding the information set available to consumers. Ideally, this additional information could be used to assist consumers in making more informed choices about their purchases and improving the overall operation of a given market.

In many instances, information disclosure in its current form can be highly effective in achieving the above stated objectives. For example, it has also been found that corporate disclosure is a critical component of an efficient market.⁵⁷ However, in practice, at times, this type of information can be complex, difficult to understand and timely to consume. Further, in some instances, even where information is

⁵⁶ Image sourced from <http://www.defenceupdate.mdanational.com.au/mandatory-disclosure-of-confidentialhealth-information/>; accessed on 17 November 2012

⁵⁷ Healy, Paul and Palepu, Krishna; "Information Asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature" *Journal of Accounting and Economics* vol. 31 (2001); pp. 405-440

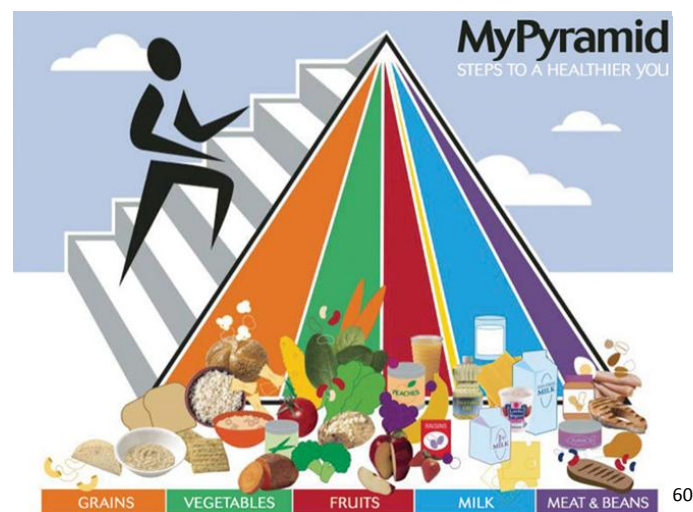
accurate, its disclosure may be ineffective if it is presented in an ‘*abstract, vague, detailed, complex, or poorly framed*’ manner.⁵⁸ To further understand this, consider two examples of information disclosure below: healthy eating and better investments.

Healthy Eating⁵⁹

Type of Nudge: Pure Nudge

Why: The policy change relates to a government promotion and doesn’t require any mandatory changes on behalf of business to facilitate the change.

Consider initiatives to promote healthy eating in the US. For some time, the United States Department of Agriculture (USDA) used the food pyramid to promote healthy eating.



The Pyramid has been criticised as being ineffective and providing insufficiently clear information. One critic cited in Sunstein (2011) stated that ‘*its meaning is almost completely opaque. To learn what the Food Pyramid has to say about food, you must be willing to decipher the Pyramid’s markings. The language and concepts here are so hopelessly abstracted from people’s actual experience with food that the message confuses and demoralizes.*’⁶¹

Partly in response to these criticisms, the USDA switched from using the food pyramid to a ‘*new, simpler icon, consisting of a plate with clear markings for fruits, vegetables, grains, and proteins.*’ The plate is accompanied by ‘10 tips to a great

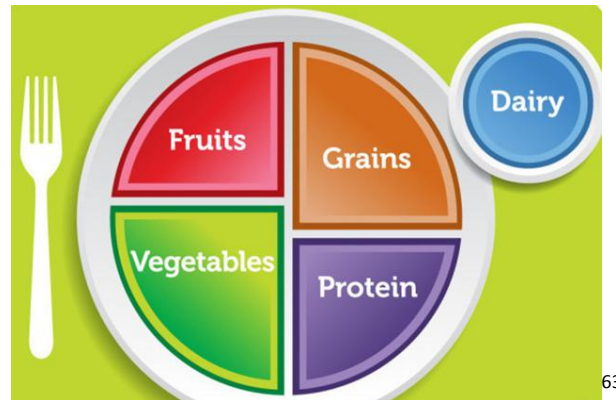
⁵⁸ Sunstein, Cass; ‘Empirically Informed Regulation’; *The University of Chicago Law Review*; Vol. 78, 2011

⁵⁹ Adapted from Ibid

⁶⁰ Image sourced from http://www.huffingtonpost.com/2011/06/02/food-pyramid-usda_n_870375.html; accessed on 23 October 2012

⁶¹ Sunstein, Cass; ‘Empirically Informed Regulation’; *The University of Chicago Law Review*; Vol. 78, 2011 pg. 1378

plate' summary, which include simple, short and salient messages on how to change food choices. These messages include 'enjoy your food, but eat less' and 'make half your plate fruit and vegetables.'⁶²



Some have argued that the plate, owing to its framing is likely to alter people's food selection. For example Toby Smithson, R.D., a national spokesperson for the American Dietetic Association stated 'it's such a recognizable image...everybody has seen a plate, used a plate. It's much easier to visualize when it's something we use on a daily basis.'⁶⁴ Dr. Margo Wootan of the Centre for Science in The Public Interest agrees, stating that 'with the old pyramids, it was very hard to translate the recommendations into what you should eat...this (the food plate) is very straightforward. It takes a lot of the guesswork out.'⁶⁵

This alteration was a simple, low-cost way for the USDA to more effectively relay information to consumers without requiring additional regulation of firms.

Investment Disclosure

Type of Nudge: Assisted Nudge

Why: Would require businesses to alter what and how they disclose certain information in order to influence consumer understanding of products offered.

The requirement for entities to disclose certain information about their financial products is a central feature of Australia's financial regulatory system. For example, the Australian Securities and Investments Commission (ASIC) routinely issues guides and requirements as toward the type of, and how, information is to be disclosed.

⁶² United States Department of Agriculture <http://www.choosemyplate.gov/foodgroups/downloads/TenTips/DGTipsheet1ChooseMyPlate.pdf>
⁶³ Image sourced from http://www.huffingtonpost.com/2011/06/02/food-pyramid-usda_n_870375.html; accessed on 23 October 2012

⁶⁴ The Huffington Post USDA Food Pyramid is out: Is the new Food Plate Better http://www.huffingtonpost.com/2011/06/02/food-pyramid-usda_n_870375.html

⁶⁵ Ibid

However, at times, this information can be complex, time-consuming to digest and long, with some Product Disclosure Statements (PDSs) being over 100 pages long.

In response to the perception that inadequate or inappropriate information disclosure played some role in facilitating the Global Financial Crisis, the ‘Squam Lake’ group of finance professors proposed that investment funds provide disclosure modelled on mandatory food labelling. The idea is that food labels which are designed to fit on small surfaces typically include short, sharp and succinct messages about key elements of a product. The *sapere research group*, referring to the ‘Squam lake’ paper argues that this type of discloser is generally more focussed than typical financial PDSs and ‘thus better attuned to the limits of human information processing.’⁶⁶

The table below⁶⁷, adapted from the *sapere research group*, provides part of the proposed investment disclosure food-type label proposed by the Squam Lake group. A notable exclusion from the table is information on past returns. According to a study referenced by the research group, the reason for the exclusion is that many retail investors mistakenly assume that high past returns indicate high future returns, which generally isn’t true.⁶⁸

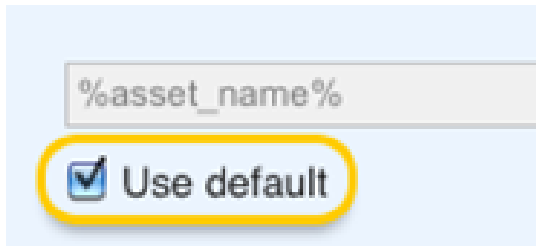
Fund Name	Classic Market Index			
Fund Type	U.S. Equity			
	Annual	Buy	Sell	10-Year
Fees and Expenses	0.30%	0.00%	0.00%	4.67%
Possible 10-year Payoffs (per \$100)	5%	50%	Average	95%
	\$49.54	\$132.27	\$158.07	\$353.16
Turnover	4.00%			
Annual Volatility	20.00%			

This approach to product disclosure can be a simple and low-cost way of drawing prospective investor’s attention to key information.

⁶⁶ Irwin, Timothy; “Implications of behavioural Economics for Regulatory Reform in New Zealand”; *Sapere Research Group*; December 2012; pg 32

⁶⁷ Image sourced from Ibid; pg. 33

⁶⁸ Ibid; pg. 32



Retirement Savings

Insights from behavioural economics, such as the power of defaults, provide guidance about how to change people's decisions about retirement

Type of Nudge: Pure or assisted depending on how it is implemented.

Why: Often businesses are required to comply with, and implement, certain changes. Some policies do not mandate changes to current practice.

Some research has indicated that people may save too little as defined by their own long term preferences. This could be the result of the tendency of people to hyperbolically discount, that is, defer loss and over consume pleasure, or procrastinate. Additionally, it could also be because some, particularly lower income earners, don't earn enough to defer money for the future.

In response, many countries have implemented policies to encourage savings. Often this comes in the form of tax incentives, generally by allowing contributions to be tax deductible, or taxed at relatively low rate. Some governments also match voluntary contributions up to some level. However, using tax as the instrument with which to promote savings can be blunt; costly; and timely for government to legislate, implement and oversee.

An alternative approach, pursued by some governments, is to promote or require auto-enrolment in retirement savings scheme. Under this approach, people automatically are enrolled in a long-term savings scheme, which they are free to opt-out of, rather than, as is generally the case, opt-in.

In the United States, for example, auto-enrolment was approved in the Pension Protection Act of 2006 which made it legal for companies to make opt-in the default

for their pension plans. According to *the economist* 57% of private-sector companies used auto-enrolment in 2010.⁶⁹

Similarly, a feature of Britain's National Employment Savings Trust (NEST), due to commence in the near future, is auto-enrolment. Initially aimed at targeting all those without a private retirement savings plan, it is intended that all employers will be required to provide one.

In Australia, where employer contributions are compulsory, the importance of defaults has been at the centre of the recent introduction of MySuper. For example, the 'Cooper' review of superannuation wrote '*the current superannuation system assumes that all members want to make choices about their superannuation and are interested in receiving a variety of superannuation related services.*'⁷⁰ However, the report continues, '*direct engagement in superannuation decision-making is not currently a priority for a large portion of the population.*'⁷¹ Hence, the report argued the importance of ensuring the default option was appropriate for the type of person likely to not make an active superannuation choice.

Reducing reliance on more traditional approaches, such as tax incentives, to increase savings rates by nudging individuals confers societal benefits by reducing cost to government while maintaining consumer choice. Here, many auto-enrolment schemes have seen savings levels increase whilst still preserving the freedom of consumers to opt-out.

⁶⁹ The Economist; *A Nudge and a Wink* <http://www.economist.com/node/18433194>; accessed on 12 October 2012

⁷⁰ Super System Review; *Final Report: Chapter 1*; pg. 5

⁷¹ *Ibid*; pg. 7



Reducing Energy Use

Nudging people toward reducing energy consumption can be a useful complement to existing policies.

Type of nudge: Pure or assisted

Why: Government may require utility companies to alter information in bills sent to consumers, while in some countries utility companies are public owned.

Various governments have implemented policies and programs which are aimed at reducing consumption of energy intensive products. The Australian Government, for example, has introduced various Minimum Energy Performance Standards (MEPs) for appliances.

These approaches can be effective economy-wide measures to help reduce pollution and carbon emissions. However, as with using tax incentives to promote savings, these measures can be costly, cumbersome and difficult to implement.

To complement these approaches, policy makers could use insights from behavioural economics.

For example, a study⁷² in the US tested how social norms could be used to influence household electricity use. All of the trialled households received information about how much energy they used in previous weeks and information about the average energy consumption of households in their neighbourhood. However, half of the households received only the information about comparative neighbourhood energy use, while the other half received a message conveying approval or disapproval of their energy consumption; those who consumed less than the average received a smiley-face on their notice, while those who consumed more than the average received a sad-face.

The researchers found some notable results. For households who were above-average energy users, only receiving comparative energy use information, and receiving this information with a sad-face reduced their energy consumer. However, for below average energy users, receiving information only actually led to an

⁷² Schultz, et. al The constructive, destructive, and reconstructive power of social norms; *Psychological Science*; 2007

increase in their energy consumption, while those who also received the smiley face maintained the below average energy consumption.

The results highlight that using social norms can be an approach policy makers can harness to alter behaviour but, at the same time, it is central that there is an initial understanding of how, or what direction, those social norms work in. Using certain social norms, along with other approaches, such as emoticons, may be necessary to achieve the desired behavioural change.



Paying Tax Debt on Time

A low cost way of getting people to pay their tax debt on time

Type of Nudge: Pure

Why: No requirements placed on business while influencing the behaviour of consumers.

One issue which has arisen for governments which use the Pay-as-you-go (PAYG) tax system is that many people do not pay their debts on time. In these cases, authorities often rely on time and resource intensive penalties to discourage people from missing their tax return due date. Alternatively, nudge has been shown to offer a simple, cost-effective solution which doesn't require any additional regulation or penalties.

For instance, the behavioural insights team in the British Government introduced a trial⁷⁴ to test how effective the use of social norms might be in encouraging people to pay their tax debts. In the initial trial a range of different messages were tested in letters sent to 140,000 taxpayers. Residents received either a control letter (which contained no social norm) or one of a number of different social norm messages. All of the social norm letters contained the statement that '9 out of 10 people in Britain pay their tax on time', but some also mentioned the fact that most people in the recipient's local area, or postcode, had already paid their tax.

⁷³ Image sourced from <http://www.lebanontownhall.org/department.htm?id=q7yqxdog>; accessed on 17 October 2012

⁷⁴ Dudman, Jane Cabinet Office Nudge Report Highlights Fraud Savings <http://www.guardian.co.uk/public-leaders-network/2012/feb/06/nudge-report-saves-millions-fraud> (6 February 2012), accessed 13 June 2012

Referring to the social norm of a particular area gave impressive results - there was a 15 percentage point increase in compliance from the old-style control letter which contained no social norm.

In addition to effectively influencing behaviour, such initiatives have been found to generate a net-revenue-gain for the government, with a complementary trial netting approximately one million pounds of extra tax collected.

Nudging and Optimisation – A Caveat

The examples provided in this section are all essentially focussed on policy design, rather than public policy problems. That is, discussion is not provided regarding the efficacy of the original motivation behind the intervention. Rather, discussion is provided on how that problem could be addressed through nudge.

As discussed earlier, this paper draws a distinction between public policy problems and options to address these problems, and focuses on the latter rather than on identifying if there is a problem or market failure in the first place. However, the most important element of public policy is to first determine if there is actually a problem worthy of government intervention. In general, this involves an assessment of market failures, where individually optimal behaviour leads to sub-optimal social outcomes.

As alluded to in the *Approaches to Consumer Behaviour and Government Intervention* Section, it is crucial that a strong case for intervention is first made. In the absence of this knowledge, government policy may nudge individuals toward worse outcomes by encouraging sub-optimal decisions. For example, if there is not an evidence-based understanding of the market failures which are causing sub-optimal savings levels, then a nudge which induces an increase in savings could be dynamically inefficient, resulting in a reduction in social welfare.

Once again, a necessary condition of welfare-enhancing public policy is a full understanding of all costs, prices, preferences and constraints faced by consumers.

Nudge as an Asymmetric Intervention

The implementation of nudge policies has raised the notion of *asymmetric interventions*.⁷⁵ A policy intervention is asymmetric where it changes the behaviour, or impacts on those, who are subject to the behavioural biases outlined in the above section (or who are the specific target of government intervention) without imposing greater than trivial costs on those who are not. This type of intervention can be contrasted with heavy forms of intervention, such as tax changes or product bans, which impact on the behaviour of all consumers in a given market, irrespective of their cognitive biases public policy problem or government objective.

For example, requiring that certain information about financial products be disclosed in a particular way may only change the behaviour of those who, prior to the requirement, were investing, at least in part, on the basis of a behavioural bias. At the same time those who were already making appropriately informed investments will not change their behaviour and so no additional direct costs are imparted on this group⁷⁶.

To further understand the asymmetric nature of some nudge interventions, consider the example provided in box seven below.

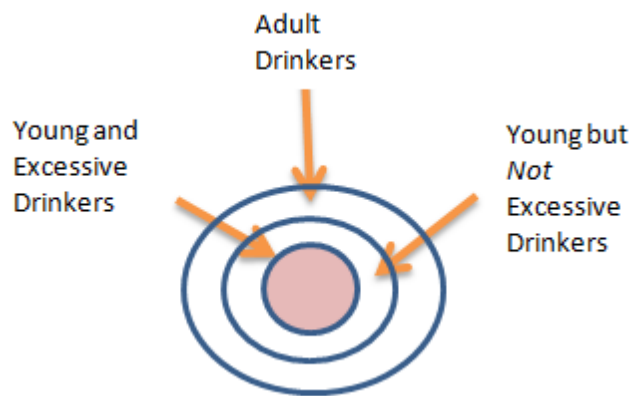
Box seven: Asymmetric Nudge – an example

The 2008 69% tax increase on ‘alco-pops’ (ready-to-mix or pre-mixed alcoholic beverages) by the Australian Government was aimed at reducing the level of excessive drinking by young adults.

While the intervention may have been successful in altering the behaviour of the ‘target’ group – young adults who drink excessively – it may also have impacted on others outside of this group. For example, as illustrated in the diagram below, the ‘target’ group can be seen as a subset of a larger population of those who drink alcohol. By applying the pre-mixed drinks tax irrespective of the consumer, all those who consume this form of beverage have been impacted by the intervention.

⁷⁵ See, for example, Thaler, Richard and Sunstein, Cass; ‘Libertarian Paternalism’; *The American Economic Review* Vol. 93, No. 2: 2003

⁷⁶ We acknowledge that, insofar as the information provision requirement results in an increase in costs for business, these costs may be passed on to investors to some extent, therefore altering prices.



An alternative, nudge-style intervention which could assist in influencing choice amongst the ‘target’ group of drinkers is to harness existing social norms to affect behavioural change.

Indeed, the social norm approach was followed in The United States state of Montana. Officials in Montana implemented a large-scale educational campaign, one that has stressed the fact that strong majorities of citizens of Montana do not drink. One advertisement attempted to correct misperceived norms on college campuses by asserting, ‘most (81 percent) of Montana college students have four or fewer alcoholic drinks each week.’ Montana also applies the same approach to cigarette smoking with an advertisement suggesting that ‘most (70 percent) of Montana teens are tobacco free.’

According to subsequent research, the strategy has produced big improvements in the accuracy of social perceptions and also statistically significant decreases in smoking.⁷⁷ The approach by Montana demonstrates how officials can use insights of behavioural economics alongside existing regulation to meet given government objectives.

Summary

By drawing on the findings of behavioural economics, nudge interventions have been implemented across a number of different policy areas. As some of the examples above demonstrate, such as reducing energy use, even short, simple and cost-effective interventions can achieve notable results, without the need to rely on more costly and time consuming legislation and regulation.

⁷⁷ Sunstein, Cass and Thaler, Richard; *Nudge: Improving Decisions About Health, Wealth and Happiness*; Yale University Press; 2008;pg 68

Challenges in Regulatory Design

Consumer theory offers a useful foundation for regulatory design; it can provide policy-makers with bearings and a sense of direction regarding how individuals may react to policy, and can, at times, and under certain conditions, provide a close approximation to actual behaviour.

However, there are challenges with applying consumer theory direct to policy ‘on-the-ground’ without an appropriate understanding of the market and market participants.

For instance, using rational choice theory can provide a useful basis for assessing the long-term impacts of taxation policy changes, for example, but may not be ‘fit-for-purpose’ in other environments. For example, consider the policy change regarding ‘foreign bank’ ATM fees. Prior to 2009 these fees often appeared indirectly to bank users through account keeping fees, while post-2009 these fees have been required to be disclosed directly to the user at point of use. However, since the amount of the fee, relative prices, and economic incentives were generally unchanged, an application of rational choice theory would maintain that the use of ‘foreign’ relative to ‘home’ ATMs should be relatively unchanged.

However, it was found that after the fee disclosure policy change, the use of ‘foreign bank’ ATMs dropped by approximately 40%. A conclusion offered by a paper⁷⁸ prepared by the Reserve Bank of Australia (RBA) is that it was not just the fee (economics incentives), but constant reaffirmation of it which may have changed behaviour. In this example, the straight application of rational choice theory may not have provided policy makers with a complete understanding of likely consumer reaction to the policy change.

Similarly, some challenges relating to the application of nudge to policy design have also been raised. For instance, there exists *‘uncertainty over how lasting many of the effects (of nudge) are; how effects that work in one set of circumstances will work in another; and whether effects that work well with one segment of the population will work well with another.’*⁷⁹

⁷⁸ Reserve Bank of Australia; *ATM fees, pricing, and consumer behaviour: An Analysis of ATM Network Reform in Australia*; Research Discussion Paper – August 2012

⁷⁹ Institute for Government and the Cabinet Office; *MINDSPACE: Influencing Behaviour through Public Policy*; March 2010, pg. 10

Additionally, the House of Lords report on *Behavioural Change* found that there are 'large gaps' in our understanding about human behaviour. Specifically, the report highlighted that our understanding of how emotional processes regulate everyday behaviour and the extent to which behavioural change interventions could be transferred across different cultural groups could be improved.⁸⁰

The Report further found that *'the majority of experimental evidence about behaviour change relates to individual approaches...much of the evidence is limited and it is rare that evidence can be extrapolated from those interventions to the wider population...'*⁸¹ While there is a significant amount of research about how the behaviour of specific groups or individuals can be affected by nudge, *'there is less experimental evidence about what works to influence behaviour when working with or at community or population levels'*.⁸²

These findings led the report to conclude that *'there is a lack of applied research at a population level to support specific interventions to change the behaviour of large groups of people'* including a lack of evidence on cost-effectiveness and long-term impact.⁸³

Another criticism of this approach has focussed on whether designing cues to prompt desirable behaviour can translate into sustainable public policy on a macro-level, or whether the proposals merely provide *'technocratic solutions to mainly minor problems'*.⁸⁴ Indeed, an article by Bonell and colleagues in the British Medical Journal expressed concern that *'to date, few nudging interventions have been evaluated for their effectiveness in changing behaviour in general populations and none, to our knowledge, has been evaluated for its ability to achieve sustained change of the kind needed to improve health in the long term.'*⁸⁵

Limitations in Understanding how People Behave

Difficulties in using either the rational choice or behavioural approach to understanding human behaviour may be due, at least in part, to the very nature of information and regulatory policy.

Information

In a world where information is open and easy and free to obtain, policy makers could possess reasonable certainty over the likely reaction of individuals to their

⁸⁰ House of Lords; *Report on Behavioural Change*; July 2011; pg. 18

⁸¹ Ibid pg. 18

⁸² Ibid pg. 18

⁸³ Ibid pg. 18

⁸⁴ Chakraborty, A; 'Cameron's hijacking of Nudge theory is a classic example of how big ideas get corrupted', *Guardian*, 7 December 2010

⁸⁵ Bonell, C. et al. 'One Nudge Forward, Two Steps Back', *British Medical Journal*, 342: d401; 2011

policy interventions. Or, at the least, the potential to gather, store and use this information would exist. It is more likely in reality, however, that complete information about why individuals make choices and how those individuals may react to regulatory changes is possessed *only by those individuals*. That is, information regarding consumer behaviour is scattered across communities and individuals and is not available at a centralised location.⁸⁶ The decentralised nature of information limits the ability of governments to apply consumer theory to inform policy design because, by definition, governments are likely to possess less information about an individual's behaviour than the individual themselves.

Because government's work with partial information relative to individuals, so called 'unexpected behaviour' can arise where the actions of an individual deviate from how government, or the theory used as a basis for policy design, predicted. On occasions, the information sets of governments and individuals can deviate significantly. As the example in box eight demonstrates, the divergence of information limits the ability of governments to understand individuals' utility functions and therefore design regulation in a manner which predictably influences behaviour.

Box eight: Farmers not Accepting Assistance

One of the measures the Australian Government has provided to assist farmers throughout drought periods is to provide them with financial assistance such as income support. This presents an opportunity for farmers to obtain money to assist with periods of notable hardship. An audit undertaken on assistance provided to farmers for the droughts in 2002/3 found that, *'in some areas, uptake of drought assistance was less than anticipated.'*⁸⁷ For example one area in Victoria reached only 30 per cent of the anticipated level of assistance.

Whilst a number of factors could impact on uptake, such as transactions costs associated with receiving payments, these findings suggest that the utility functions of farmers was poorly understood. For instance, farmers may have refused assistance on the basis of pride or community norms. That is, farmers receive utility from assistance, but also lose utility if their pride is undermined. Hence, the assistance may not have been generous enough to compensate farmers for the utility loss associated with lost pride and community involvement.

⁸⁶ See, for example; Hayek, Friedrich 'The Use of Knowledge in Society' *The American Economic Review* 35(4) 1945; Pp. 519-530

⁸⁷ Australian National Audit Office *Drought Assistance*; 2 June 2005, pg. 19

Using History in Regulatory Design

Even with incomplete information, policy makers may be able to use historical data (how individuals reacted to similar policies in the past) in designing regulation. However, this approach also presents challenges because using historical observations to predict future behaviour is limited.⁸⁸ Specifically, given decisions are influenced by the policy environment in which those decisions take place, changes to the policy environment, such as through a change in regulation, will change how individuals make decisions. But given a new regulation will cause the policy environment, by definition, to be new, at least some elements of how people behave will also necessarily be unpredictable and novel. To understand this further, consider the example provided in the box nine below.

Box nine: Break-down in the Phillips Curve Relation

The Phillips Curve refers to a historical inverse relationship between the rate of unemployment and inflation. Simply stated, the higher the rate of inflation, the lower the rate of unemployment in an economy. An implication of this apparent relationship for economic policy was that governments could actively pursue policies which raised the rate of inflation to cause reductions in the rate of unemployment.

However, in the 1970s countries such as the US and UK experienced stagflation, which refers to relatively high levels of both inflation and unemployment, a relationship not accounted for by the Phillips Curve. An explanation forwarded for this break down is that monetary authorities attempted to exploit the relationship to reduce unemployment and economic actors adapted their expectations to the new policy environment. This could occur, for example, where the employment decision of firms is altered through rising inflation forecasts.

The break-down of the Phillips Curve relationship presents one of the most well-known examples of observed economic relationships changing with changes to the policy environment.

Policy design can be a challenging process in which governments are limited by imperfect information and difficulties in predicting behavioural change. Both theories of consumer behaviour presented in this paper provide a useful basis for approximating how consumers may react to policy changes. However, effective application of these theories requires a contextual understanding of the market and market participants. Insofar as behavioural economics, and its application to regulatory design through ‘nudge’, offer insights for improving regulatory design and

⁸⁸ Lucas, Robert; ‘Econometric Policy Evaluation’ *Carnegie-Rochester Conference Series on Public Policy*. 1(1) 1976; Pp. 19-46

enhancing our understanding of human behaviour, its advancement is encouraged to be explored further.

Conclusion

Regulation may be necessary for the proper functioning of society and the economy. The aim is to deliver effective and efficient regulation: effective in addressing problems; efficient in maximising net benefits.⁸⁹ However, how effective and efficient regulatory interventions are in meeting a government's objective will often depend on how successful interventions are in changing people's behaviour.

Two approaches to understanding consumer behaviour, rational choice theory and behavioural economics, both assist policy makers in implementing appropriately designed regulations.

Rational choice theory postulates that consumers rank preferences over all goods, make consumption choices based on these rankings, and do so such that their utility is maximised. It further assumes that individuals act rationally in their own best interests, subject to budget constraints.

Following this theory, and under certain conditions, regulation will impact on consumer choice when it: relaxes the consumer's budget constraint; alters relative prices of goods and/or services; and/or influences a consumer's preferences. Examples of this type of regulation include: financial (dis)incentives; banning or limiting choices; and/or requiring the disclosure of certain information.

Building on the basic rational choice model, 'behavioural economics' views economic decision making as the product of cognitive variables. This approach postulates that consumers use various heuristics (rules-of-thumb, educated guesses, and so on) and mental short-cuts when making choices. Following research in the field, key factors which affect decision making include: reference points, framing, social factors and time inconsistency of preferences. However, it remains an open question whether some of these behaviours, such as mental short-cuts, are utility maximising or not.

To date, the application of behavioural economics to practical policy design has not been widespread. However, recently a mechanism for translating the findings of behavioural economics to policy has been developed through 'nudge'. Nudge

⁸⁹ The Australian Government *Best Practice Regulation Handbook*; June 2010; pg. 4

harnesses insights of behavioural economics to change choice architecture – the context in which choices are made – to influence behaviour.

Research has found that, in some circumstances, even small alterations to choice architecture can give effect to disproportionately large behavioural changes. For example, including simple salient messages which reinforce existing social norms was found to influence consumer's electricity consumption.

By focussing on choice architecture, nudge is generally end point or consumer, focussed. This approach does not preclude more direct, traditional regulation of business in order to facilitate changes to the choice architecture, and, therefore, influence consumer choices. To clarify this point, a distinction is made between three categories of interventions; a "pure" nudge; an "assisted" nudge; and a "shove". A pure nudge refers to interventions which alter choice architecture without placing any additional requirement on business. An assisted nudge refers to interventions which place some regulation business to alter choice architecture, while a 'shove' refers to interventions which directly regulate both consumers and business, limiting the choices available to both groups.

Regardless of how nudge interventions are applied, they often offer low-cost, easy-to-implement options for governments which can be used instead of, or alongside, existing regulatory approaches.

However, some aspects of nudge can be improved. For instance, the impacts of nudge interventions sustained at the population level are not yet well understood. Similarly, as nudge is an evolving policy era, the distinction between 'nudges' and 'shoves' can be blurred.

While behavioural economics and rational choice theory provide a useful foundation for policy makers, both theories face challenges in their application to regulatory design. Specifically, governments possess incomplete information about individuals preferences (e.g., they don't know the shape of society's utility function) and so therefore generally possess less information about why individuals act in a given way than those individuals themselves. Additionally, governments are generally unable to use historical data or experience to predict future behavioural change resulting from policy changes.

Policy-makers ought to be cognisant of these limitations and give consideration to the specifics of markets and market participants when applying any form of consumer theory for the purposes of designing, and predicting the effects of, regulatory policy.

Nonetheless, insofar as behavioural economics and its application through nudge can be harnessed to improve regulatory design and enhance our understanding of human behaviour, its advancement is encouraged to be explored further.

Appendix One: Rational Behaviour

In economics an individual is said to be rational where his/her preferences are both complete and transitive. Below are some examples to demonstrate this definition.

An Example of Irrational Behaviour

As stated above, consumers are acting irrationally where their preferences are not complete or transitive. This can be highlighted through the following example of just perceptible differences. If we ask an individual to choose between two very similar shades of grey for painting, she may be unable to tell the difference between the two colours and therefore be indifferent between the two. Suppose we offer another choice between the lighter of the two shades of grey and a slightly lighter shade. Once again, she may be unable to tell the difference. If we continue this, letting each shade of grey offered get slightly lighter and lighter, she may express indifference at each pair of colours offered. Yet, if we offer her a choice between the final colour offered, which would be nearly white, and the initial colour offered, there is likely to be enough difference for her to prefer one colour over the other. Hence, because she has expressed indifference between each set of colours from first to last, but is not indifferent between the last and first colour, the consumer has intransitive preferences, and so is irrational.⁹⁰

Examples of Rational Behaviour

Many choices can be incorporated within the standard economic model of rational behaviour. For instance, donating money to charities, volunteering, or giving bequests can all be considered 'goods'. These are goods in the sense that the individual places a positive value on their occurrence (i.e., gains happiness from doing them). Indeed, there is extensive literature which incorporates bequests into the standard economic model.⁹¹

Similarly, some research has been done on addiction and rational behaviour. For example, Becker and Murphy⁹² show how smoking can be explained by rational

⁹⁰ Mas-Colell, Andreu; Whinston, Michael and Green, Jerry: *Microeconomic Theory* Oxford University Press, USA (June 15, 1995)

⁹¹ See, for example, Caballe, Jordi; 'Endogenous Growth, Human Capital, and Bequests in a Life-Cycle Model' *Oxford Economic Papers*, Oxford University Press, vol. 47(1), pp. 156-81, (January 1995)

⁹² Becker, G. and K. Murphy (1988) "A theory of rational addiction". *Journal of Political Economy*, 96, pp. 675-700

choice theory. In their paper, a smoker is modelled to understand that smoking a cigarette today will increase his desire to smoke a cigarette tomorrow, and also induce negative health consequences. The choice of the smoker amounts to comparing the discounted benefits and costs of smoking, including the financial and health costs. As with any other good, the individual smokes if the discounted benefits outweigh the costs.

Appendix Two: Utility Function

The utility function is essentially a mathematical mapping of preferences to some value which governs the choices which a consumer makes.

For example, consider consumer choice for two goods (sushi and pizza) at different income levels over different periods as depicted in table 2.1 below. The shares of income spent on the two goods are relatively constant.

Table 2.1: Consumer behaviour and Utility

Period	Quantity		Price		Income	Share of income spent on:		Utility
	sushi	pizza	sushi	pizza		sushi	pizza	
1	25	75	1	1	100	0.25	0.75	57.0
2	24	38	1	2	100	0.24	0.76	33.9
3	13	74	2	1	100	0.26	0.74	47.9
4	48	76	1	2	200	0.24	0.76	67.8
5	25	150	2	1	200	0.25	0.75	95.8

Source: Adapted from Varian (1996).

Broadly, the average expenditure shares are one quarter of income on sushi and three quarters of income on pizza. Based on observed consumer behaviour, the consumer is maximising utility given the following “fitted” utility function⁹³:

$$u(x_1, x_2) = X1^{0.25}X2^{0.75}$$

Or, in the example above:

$$u(\text{sushi}, \text{pizza}) = \text{Shushi}^{0.25}\text{Pizza}^{0.75}$$

Using the above function, utility for the various quantities (bundles) can be estimated (last column in table 1) given the income and prices for each good (utility is the highest in period 5 and the lowest in period 2).

As such, knowing the utility function can be useful in predicting consumer behaviour. For example, suppose a new regulation increases the price of pizza to 3 (while the price of sushi is at 2 and income is 200). Based on the above utility function, the demand for sushi is 25 and the demand for pizza is 50.⁹⁴

⁹³ The utility function is a Cobb-Douglas utility function where the consumer's utility is maximised by consuming a certain proportion of income on good 1 and good 2.

⁹⁴ The demand for sushi is $0.25 \cdot (200/2)$ and the demand for pizza is $0.75 \cdot (200/3)$. Utility is then calculated by substituting these demand values into the (Cobb-Douglas) utility function.

Appendix Three: Optimal Decision Making

The process of optimal decision making can be explained through marginal benefits and costs (the increased benefit or cost obtained by consuming an additional unit of a product).

For example, the marginal benefit gained in a given purchase is the utility gained by spending an additional \$1 on a good. The marginal cost is the utility lost by spending \$1 less on another good.

The utility gained by spending an additional \$1 on a good is the marginal utility of the good divided by its price. For good X, this writes as:

$$\frac{MU_x}{P_x}$$

The value here is the marginal benefit of consuming X. This can also be thought of as the satisfaction derived from the last dollar spent on X.

The loss in utility from spending \$1 less on another good, say good Y, is:

$$\frac{MU_y}{P_y}$$

The value here is the marginal cost of consuming X. This is the forgone utility gain of consuming X.

To understand the process of choosing between X and Y, say for example that the marginal benefit of consuming X is greater than the marginal benefit of consuming Y (which is also the marginal cost of consuming X). That is:

$$\frac{MU_x}{P_x} > \frac{MU_y}{P_y}$$

Here, the consumer can increase utility by shifting consumption away from Y and toward X. As rational choice theory assumes that consumers seek to maximise utility, it is predicted that the consumer will continue to shift consumption from Y to X until the marginal benefit of consuming X is equated to the marginal cost of

consuming X. The above inequality becomes equated through this process due to the law of diminishing marginal utility, which tells us that the marginal utility of good X decreases as the consumption of X increases, while the marginal utility of Y increases as the consumption of Y decreases. That is, the consumer will shift consumption toward X until:

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$$

Alternatively, this can be expressed as:

$$\frac{P_y}{P_x} = \frac{MU_y}{MU_x}$$

The ratio on the right hand side is known as the *Marginal Rate of Substitution (MRS)*, and describes the maximum amount of good a consumer is willing to give up to obtain another good.

That is:

$$\frac{P_y}{P_x} = MRS_{y,x}$$

This equation shows that, as prices change, the rate at which the consumer is willing to substitute between two goods changes. Here, as the price of good Y rises, the consumer is willing to substitute away more Y to obtain X.

Extending this to all goods and services, the following condition captures how consumers choose under rational choice theory:

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = \frac{MU_c}{P_c} = \dots = \frac{MU_n}{P_n}$$

This equation gives the utility-maximising condition; utility is maximised when total expenditure equals the budget available and where the ratios of the marginal utilities to prices are equal for all goods and services.

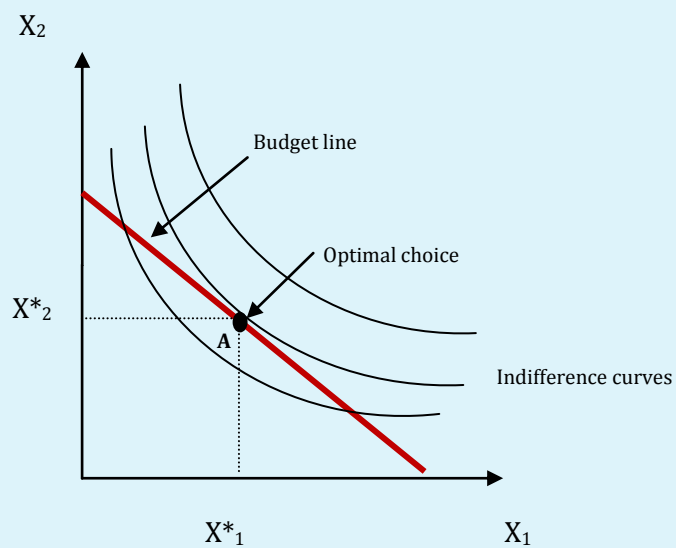
Graphically, the optimal choice for a consumer can be shown where the indifference curve is tangent to the budget line (Box 3.1).

This point is optimal because, a) the indifference curve represents the consumer's preference for two bundles of goods and the marginal rate of substitution between these goods (which equals the slope of the curve), and, b) since the consumer would like more than less, exhausting all of his resources on the bundle of goods on offer represents the highest level of satisfaction obtainable.

Box 3.1: Optimal Choice

As discussed in the body of the document, consumer preferences are assumed to be well behaved and have a preference for bundles of goods that “sit on higher indifference curves”. However, the consumer’s choice is subject to their budget constraint. In the chart below, the consumer can spend all of his income on X_2 and none on X_1 (or vice versa) or spend all of his income on a combination of these goods.

The highest indifference curve that touches the budget line is the optimal choice for the consumer (the indifference curve is tangent to the budget line or the marginal rate of substitution for good X_1 is equal to the marginal rate of substitution for good X_2). This occurs at point A in the chart below. Bundles below the indifference curve at point A are less preferred and bundles above the indifference curve at point A are more preferred but not attainable given the budget constraint.

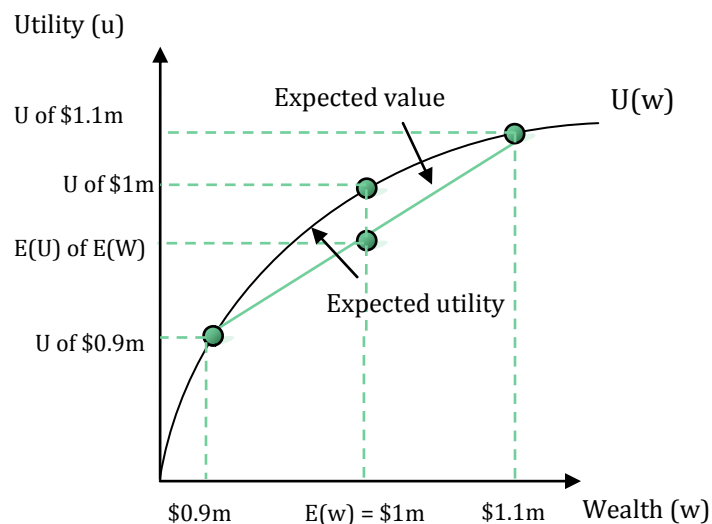


Source: Varian, Hal *Microeconomic Analysis* W. W. Norton & Company; 3rd edition (March 17, 1992)

Appendix Four: Risk Attitude and Utility

Individual's attitudes towards risk can be considered as risk-averse, risk-loving and risk-neutral. To understand these categories consider an individual who faces a choice between taking a gamble which has an expected value of \$X or receiving \$X with certainty. The risk averse, loving and neutral individual will always prefer the certain amount, gamble or will be indifferent, respectively.

A risk-averse individual is depicted in the graph below.



Source: Adapted from Varian, Hal *Microeconomic Analysis* W. W. Norton & Company; 3rd edition (March 17, 1992)

Risk-averse consumer behaviour is represented by a concave utility function (for example, a logarithmic utility function). The more concave the utility function, the more risk averse the person will be. For risk-loving consumer, the utility function is convex (for example, exponential function), while a risk-neutral consumer has a linear utility function, that is, the person's expected value of the gamble is equal to the expected utility of the gamble.

Because of diminishing marginal utility, each additional dollar of income is worth less than the last. Therefore, the reduction in utility from a \$100 loss is greater in magnitude than the increase in utility from a \$100 windfall. So, in a sense, risk aversion is actually a consequence of the law of diminishing marginal returns and rational consumers should always be risk averse.

Appendix Five: Behavioural Economics in Practice

Hand Washing⁹⁵

Motivated by a consideration of how optimism bias can impact individuals behaviour, Adam Grant of the University of Pennsylvania showed how changing the emphasis of a sign led to changes in hand-washing by doctors. Specifically, Grant and his co-author were concerned about the optimistic view that some people hold regarding their low perceived probability of getting sick. To test this, the authors came up with two signs to post over dispensers for soap and hand sanitizer. One said “hand hygiene prevents you from catching diseases.” The other said “hand hygiene prevents patients from catching diseases.” They posted these signs above different dispensers in a hospital and recorded how often people washed, measuring how much soap and gel was used— and having trained observers spy on their colleagues.

Healthcare professionals were much more likely to wash their hands if they were reminded that they were keeping patients safe. The patient sign increased soap and gel use by 33% per dispenser, and healthcare professionals were 10% more likely to wash their hands. The sign about personal risks did not achieve an appreciable change to the frequency of hand washing.

However, the study did not find out if there were any improvements in patient health. That is, it is not known if doctors were ‘under-washing’ their hands initially. Therefore, it is not clear that the marginal benefit of additional hand washes outweighed the marginal costs.

Reducing Speeding #1⁹⁶

An intervention in the UK tried to provoke drivers to reduce their driving speed at dangerous curves without relying on ‘heavier’ preventive or punitive measures. By

⁹⁵ O'Connor, Anahad Getting Doctors to Wash Their Hands <http://well.blogs.nytimes.com/2011/09/01/getting-doctors-to-wash-their-hands/>; (1 September 2011), accessed 21 June 2012

⁹⁶ Institute for Government and the Cabinet Office; *MINDSPACE: Influencing Behaviour through Public Policy*; March 2010, pg. 16

painting a series of white stripes onto the road that were initially evenly spaced but got closer together as drivers reach a dangerous curve was found to effectively alter their driving behaviour.

This environmental design gives the sensation that driving speed is increasing, which in turn triggers the driver's natural instinct to slow down. Importantly, the cost of sending such a visual signal was close to zero, and certainly lower than a number of preventive or punitive measures, such as fines, but the effectiveness was very significant.

Reducing Speeding #2⁹⁷

As opposed to simply fining drivers who exceed the speed limit in monitored zones, a speed camera lottery trial was set up in Sweden in an attempt to change driver's behaviour. A speed camera in Stockholm was programmed to photograph every vehicle passing through an intersection. Drivers who were speeding were fined and the paid fines were then placed into a money pool. Drivers who were not speeding were sent a lottery ticket for a chance to win a share of collected fines.

Over three days, almost 25,000 cars were photographed, although no numbers are available that show how many were caught speeding. The experiment was able to reduce the average speed of cars travelling through a school zone from 32km/h before the system's installation to 25km/h. The Swedish road traffic authority is now considering expanding the experiment to include kindergartens and residential areas using a series of portable systems.

Reducing Littering⁹⁸

Research led by Pelle Hansen of Roskilde University in Amsterdam investigated the effectiveness of using a litter-reducing approach in Copenhagen. First the researchers handed out free caramels to pedestrians. Then they counted the number of wrappers on the street, in the street's garbage cans, on side streets and in bicycle baskets.

Finally, they placed green footprints that led to the bins, handed out caramels again and repeated the counting exercise. The result was a 46% decrease in wrappers ending up on the streets. The authors argue that the experiment worked by increasing the salience of rubbish bins, which may have otherwise been inconveniently located or difficult to view and reinforcing social norms through making the occurrence of littering more visible to others.

⁹⁷ Schultz, Jonathan Speed Camera Lottery Wins VW Fun Theory Contest; <http://wheels.blogs.nytimes.com/2010/11/30/speed-camera-lottery-wins-vw-fun-theory-contest/> (30 November 2011), Accessed 20 June 2012

⁹⁸ Hansen, Pelle Green Nudge: Nudging Litter into the Bin; <http://www.inudgeyou.com/green-nudge-nudging-litter-into-the-bin/> (16 February 2012), accessed 20 June 2012

Healthier Eating⁹⁹

The framing of consumption choices and the social norms around those choices can influence how individuals behave. These findings were tested by researchers at New Mexico State University regarding grocery shopping choice. In their study, the researchers marked a line with yellow duct tape across the wedge of shopping carts, and placed a sign on the cart asking shoppers to place fruit and vegetables in front of the tape, and other groceries behind. They found an increase in purchasing of fruit and vegetables of 102% over the trial period at the trialled supermarkets in Las Cruces.

⁹⁹ Taylor, Lesley The Secret to Healthier Shopping: Duct Tape <http://www.healthzone.ca/health/dietfitness/diet/article/847543--the-secret-to-healthier-grocery-shopping-duct-tape> (13 August 2012), accessed June 13 2012

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