

## ASK: NUS ECONOMISTS

# The neuroeconomics of risk-taking and gambling

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■ *What is neuroeconomics and how does it help us understand behaviour such as gambling?*

Major crises in the past decades have repeatedly reminded us how little we understand the international “macroeconomy”. Following the global financial meltdown after the collapse of Lehman Brothers, many have lamented how decades of research in behavioural economics have failed to help us understand how individuals make financial decisions or how institutions manage risks.

The biological revolution of the past 40 years has put researchers in a position where they can now go beyond psychology and tackle one of the deepest and most puzzling problems of the modern era – the biological basis of human choice. Such research has given rise to the still nascent field of neuroeconomics.

Research in neuroeconomics began in earnest in the late 1990s with the discovery that dopamine neurons in monkeys are activated by unanticipated rewards such as drops of apple juice. Subsequent studies in both humans and animals have extended these findings. They reveal specific brain regions encoding risk-taking, genetic markers contributing to altruism and pharmacological drugs enhancing trust and trustworthiness in social interactions.

More recent studies involving identical and fraternal twins have demonstrated significant “heritability” of the propensity to take risks. Follow-up research has identified specific genes that account for individual differences in risk-taking. One study involving participants choosing be-

tween winning \$200 with a 1 per cent chance and the certainty of receiving \$2 found that the propensity to go for the long shot is associated with a variant of the monoamine oxidase A gene (MAOA). This gene is also known as the “warrior gene”. This is because of early reports associating it with aggression and impulsiveness. Interestingly, other studies have linked this same MAOA variant with a tendency to default on credit-card repayments.

Financial risk-taking underpins much of the investment and entrepreneurial activities that lie at the heart of a modern economy. This is especially so for Singapore, one of the world’s financial hubs. With the 2010 opening of Marina Bay Sands and Resorts World Sentosa, gaming revenues last year reached US\$5.85 billion (S\$7.2 billion). This is the third-largest in the world after Macau and Las Vegas. Losses for each resident adult totalled US\$1,200 in 2011, second only to Australia.

Gambling has a well-deserved reputation for being highly addictive. It is also widely acknowledged as having the potential to produce negative social consequences. Tales of pathological gamblers being driven to crime and bankruptcy are not uncommon. It is little wonder that Singaporeans from all walks of life are wary of having casinos in their midst. This is so even when the integrated resorts were intended to add to the range of recreational activities in the city state. Singapore’s uncharacteristically bold step of creating an industry for recreational risk-taking is remarkable. The Government even set up a casino next to the financial district.

There is a thin line between taking risk responsibly and taking risk for fun. This is reflected in the famous quip by John Maynard

Keynes in his paradigm-shifting work in 1936 on *The General Theory of Employment, Interest, And Money* – a work which remains highly influential to this day. In the book, Keynes wrote: “It is usually agreed that casinos should, in the public interest, be inaccessible and expensive. And perhaps the same is true of stock exchanges.”

In it, he also shares an observation about the role of biology in human choice: “Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as the result of animal spirits – a spontaneous urge to action rather than inaction.”

By bringing together behavioural economics, neuroscience and molecular genetics, neuroeconomics promises to deliver a better understanding of the nature of risk-taking and gambling at the biological level. This will contribute to a more scientific understanding of decision-making as well as mental well-being. Ultimately, neuroeconomics can contribute to policy formulation when it comes to regulating both casinos and financial markets.

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