

## PhD. Defence Opening Statement

Thank you Sir Rector Magnificus. It is my great pleasure to provide to the members of the committee and to my friends and colleagues an overview of my dissertation. I'll discuss what motivated my research, then summarize my research question before outlining two experiments conducted to test hypotheses raised by the research question. [slide 1]

First the motivation. In many European and other countries, the types of fixed pensions that were commonly provided in the past by governments and employers (i.e. pensions that pay guaranteed amounts during a retiree's lifetime) have proven to be much more expensive to provide than was forecast. This is due primarily to increases in longevity and low fertility, which mean longer periods of retirement and fewer working people to support retirees. Fixed pensions are being reduced in favor of retirement savings plans under which individuals are given more responsibility and bear more risk.

This shift is being done to reduce pension costs rather than for efficiency purposes; that is, politicians, employers and regulators do not necessarily believe that individuals are better than pension administrators at making these decisions. In fact, the evidence is that people are not very good at making retirement savings decisions. Behavioral economists have provided ample evidence that individuals who are given responsibility for their own retirement savings save too little, under-diversify their portfolios, pay excessive management fees and trade too much. These mistakes are attributed to certain biases and heuristics to which individuals seem to be subject. What has not yet been developed, however, is an overarching theory as to why we are subject to these biases and heuristics and why we depart from economists' conception of rationality in our retirement savings planning. The goal of my dissertation is to take the first steps towards developing and applying a specific framework within which to analyze retirement savings mistakes. [slide 2]

The framework I developed is ultimately based on Charles Darwin's theory of natural selection. In a nutshell, that theory states that heritable traits will be selected for if they help a being reproduce at a greater rate than those which do not have that trait. Using a very simple example, imagine a species of fish of which some have large fins and some have small fins and that fin size is heritable (i.e. large finned fish are more likely to produce large finned offspring than small finned fish). If large fins allow the fish to better avoid predators and therefore reproduce more than their small finned conspecifics, eventually all fish of that species will have large fins. Evolutionary psychologists apply this same logic

to explain human behavior; that is, they assert that behavioral traits are heritable and that those traits which help us better survive and reproduce will be selected for.

Evolutionary psychologists suggest, however, that to understand why modern-day humans behave the way we do, you must consider the behavioral traits that would have been useful for the survival of our distant ancestors (and not just those that are useful for survival in our current environment). During most of the time that the human brain was evolving, humans were hunter-gathers living in small groups. As well, over most of that time, our social structure, environment and technology changed very slowly. It is only when we started farming about 12,000 year ago (a blink of an eye in evolutionary terms) that our social structure, environment and technology rapidly changed, which threw up new problems that we needed to overcome to survive and reproduce. The evolutionary psychology theory is that, because these changes were so rapid, natural selection has not had sufficient time to produce brains that are optimized to solve these new problems. In other words, evolutionary psychologists say that our brains are better suited to solving the problems that hunter-gatherers faced than problems that arise in modern societies.

One modern problem that we face and which our hunter-gatherer ancestors did not face is saving for retirement, least of all because hunter-gatherers tended not to live to an old age. Saving for retirement using financial markets is something that has only become possible for most people over the last hundred years or so. That timeframe is not nearly long enough for our brains to have evolved to effortlessly solve problems such as how much to consume now versus how much to save and consume in decades from now. This is not to suggest that we cannot learn to become better at solving those problems. People do learn to be better at saving for retirement. However, because our brains have not evolved to specifically solve those tasks, solving them does not come easily to most people. [slide 3]

A pillar of evolutionary psychology is the concept of modularity. Unlike economists, evolutionary psychologists posit that the brain is not a general-purpose instrument. Rather, the brain evolved to solve specific problems that our distant ancestors needed to overcome to survive and reproduce, such as finding food, avoiding predators, finding a mate and raising children. [slide 4] As we do not have a retirement savings module, in making retirement savings decisions, metaphorically speaking, we perhaps borrow from other modules. For example, we may use risk assessment algorithms that were evolutionarily designed to solve problems such as foraging for food or challenging for status. As a result, the retirement savings decisions we make may depend on which evolutionarily

important issue is salient at the time of making the decision. We might make a different decision if mate-seeking is salient rather than, say, raising children.

Having developed the framework, the next chapter reports on the results of an experiment I conducted to test one part of the evolutionary analysis. [slide 5] By way of background, the evolutionary biologist, Robert Trivers, developed a theory that the sex that needs to invest more in its offspring will be more selective in choosing a mate than the sex that has a lower minimum investment. For humans, the minimum investment for a female is high (9 months of pregnancy followed by a period of nursing) while for men, the minimum investment is very low. In the time that a woman produces a child, a man could, in theory father hundreds of children. Accordingly, we would expect human males to have to compete for females rather than the other way around. One dimension along which males have historically competed is by acquiring resources (which indicate status and the ability to provide for children). Evolutionary psychologists theorize that males for whom mate-seeking is salient take greater risks to more quickly obtain resources or status to increase their chances of finding a mate. The question I test is whether males for whom mate-seeking is made salient under-diversify their investment portfolios more (and, accordingly, take greater risk) than those for whom mate-seeking is not made salient. [slide 6]

The experiment was conducted online. I recruited 202 male subjects, who were each paid a fixed fee of one pound fifty. I specified that to participate in the experiment, subjects had to have at least some investment experience. The other conditions are set out on the slide.

In the experiment, subjects were randomly allocated to either the treatment group or to the control group. [slide 7] Those in the treatment group viewed and rated a series of photographs of Victoria's Secret models. The purpose of having them view those photos was to make mate-seeking salient to them. Those in the control group viewed and rated photographs of colorful butterflies. [slide 8] After they viewed the photographs, subjects in both groups were asked to allocate a hypothetical \$10,000 among three stocks. The purpose of the experiment was to see whether those in the treatment group (i.e. those for whom mate-seeking was made salient) diversified among the stocks to a lesser extent than those in the control group. [slide 9]

The results. Those who viewed the photographs of models under-diversified more than those in the control group and the effect was statistically significant. Interestingly, it was males who were in a

romantic relationship whose behavior was most affected by viewing the Victoria's Secret photos [show on slide]. One reason for this may be that single males were already in a mate-seeking frame of mind and that viewing the photos had no additional effect on them. In terms of the magnitude of the effect, it was equivalent to moving from an equal split among 3 stocks to investing 20% in one of the stocks and 40% in each of the other two risky stocks. In summary, the experiment provided evidence that males make different asset diversification decisions when mate-seeking is made salient. Of course, this is only one experiment, and the results do not prove that asset diversification decisions depend on which evolutionarily important domain is relevant. But it is consistent with the view that people "borrow" from other modules in making asset diversification decisions. [slide 10]

The policy implication. People might be better off having fewer investment choices or having professionally chosen portfolios, as asset diversification decisions may depend on what happens to be salient to them at the time they make that decision. For example, they may make different decisions if they saw a story of a terror attack on the morning news (which tends to make people risk-averse) rather than a story about an attractive movie star. [slide 11]

In the next chapter, I develop a theory that many of the bad retirement savings decisions result from a desire to minimize the feeling of regret. Psychologists describe regret as a painful emotion; even the anticipation of regret can provoke psychic pain. Accordingly, people like to avoid regret where they can. Evolutionary psychologists say that the capacity to feel regret persists because it induces people to make better decisions. Our ancestors who had the capacity to experience regret made better decisions and survived and reproduced at a greater rate than those who could not feel regret. Therefore, regret became pervasive in the human population. In fact, a desire to avoid regret has been shown experimentally to cause people to take more time in making decisions and to make better decisions. For example, people who were unable to experience regret because of a brain injury tended not to learn from their earlier mistakes when choosing among lotteries. In summary, regret may be beneficial to us in the same way that the capacity to feel physical pain induces us not to put our hands in a fire (i.e. we engage in fitness enhancing behavior to avoid pain).

Two conditions are necessary for a person to experience regret with respect to a decision. The person must both feel responsible for the decision and be at least able to imagine the counterfactual (i.e. the outcome that would have prevailed had another choice been made). [slide 12] Retirement savings plans usually have a default investment and contribution rate. People have a strong tendency to stick to

these defaults and to make the same decisions as their peers, even when doing so is demonstrably not best for them. My hypothesis is that sticking to defaults and making the same decisions as peers is the regret minimizing decision, and that is why people do it. Sticking to defaults and peer choices might make people feel less responsible for their decisions than if they opt out (e.g. if something goes wrong, they are not responsible because the fault lies with the person who set the default). Opting out may also mean that they are more likely to know the counterfactual if most of their friends or colleagues do not opt out. Thus, sticking to defaults and peer preferences may be a regret minimizing strategy, but one that does not necessarily lead to the best financial outcomes.

The last substantive chapter reports on an online experiment conducted with Pieter Desmet. We tested whether people stick to defaults and peer choices because opting out of the default or peer-preferred option induces regret over and above the regret associated with the underlying choices. [slide 13] For this online experiment, we recruited 301 subjects who were randomly allocated to one of three treatments. Subjects in each treatment decided between one of two lotteries, Lottery A and Lottery B. The payouts on both lotteries were determined by the same random draw of 1 of 3 colored marbles. [elaborate using slide 13] In the first treatment, they simply chose between two lotteries, in the second, Lottery B was set as the default, and in the third, subjects were told that Lottery B was preferred by subjects in an earlier experiment. Like economics experiments, this experiment was incentivized – one in twenty participants were paid based on the outcome of the lottery they decided for. [slide 14] After making the choice, subjects reported (i) the regret they would feel if their chosen lottery paid out less than the lottery they did not choose and (ii) the regret they would have felt if they had chosen the other lottery and that other lottery paid out less than the one they had in fact chosen. [slide 15]

We found that the default had a large effect on lottery choice – the percentage who chose Lottery B increased from 34% in the free choice treatment to over 55% when Lottery B was set as the default. In the Peer Effect treatment, the percentage choosing Lottery B increased from 34% to over 40%, but the increase was not statistically significant. [slide 16]

Our key regret result is that subjects felt more regret when they opted out of or imagined opting out of the default lottery than when they simply chose that lottery in the free choice treatment (3.31 versus 2.98, on a 5 point Likert scale). However, there was no significant increase in reported regret for those who chose or imagined choosing Lottery B. These results lend support to the hypothesis that people stick to defaults because opting out induces regret over and above the regret associated with the

underlying choice. We found similar results when the peer effects treatment was compared to the free choice treatment. [slide 17]

An implication of this result is that people are not making retirement savings decisions only to maximize retirement income, but also to minimize regret. There is no reason to believe that the regret minimizing decision is also the decision that maximizes retirement income. Another implication is that, if we know why defaults and peer effects work, we may be able to develop better defaults and use peer effects more effectively.

I wish I could go into more detail on the results, but my time is up. Thank you very much for your attention.