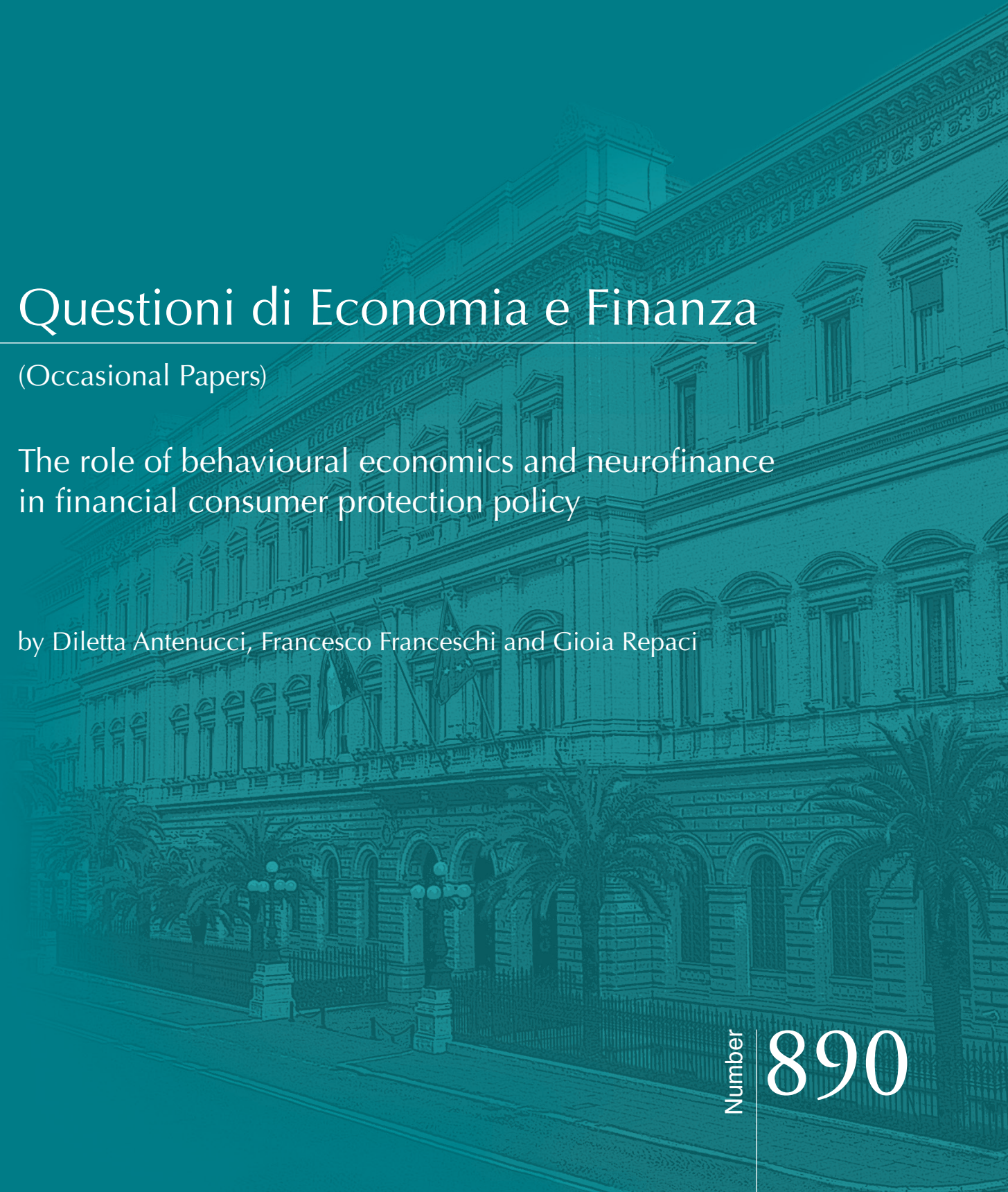
BANCA D'ITALIA
EUROSISTEMA

Questioni di Economia e Finanza

(Occasional Papers)

The role of behavioural economics and neurofinance in financial consumer protection policy

by Diletta Antenucci, Francesco Franceschi and Gioia Repaci



October 2024

Number 890

BANCA D'ITALIA
EUROSISTEMA

Questioni di Economia e Finanza

(Occasional Papers)

The role of behavioural economics and neurofinance in financial consumer protection policy

by Diletta Antenucci, Francesco Franceschi and Gioia Repaci

Number 890 – October 2024

The series Occasional Papers *presents studies and documents on issues pertaining to the institutional tasks of the Bank of Italy and the Eurosystem. The* Occasional Papers *appear alongside the* Working Papers *series which are specifically aimed at providing original contributions to economic research.*

The Occasional Papers *include studies conducted within the Bank of Italy, sometimes in cooperation with the Eurosystem or other institutions. The views expressed in the studies are those of the authors and do not involve the responsibility of the institutions to which they belong.*

The series is available online at www.bancaditalia.it .

ISSN 1972-6643 (online)

Designed by the Printing and Publishing Division of the Bank of Italy

THE ROLE OF BEHAVIOURAL ECONOMICS AND NEUROFINANCE IN FINANCIAL CONSUMER PROTECTION POLICY

by Diletta Antenucci*, Francesco Franceschi♦ and Gioia Repaci*

Abstract

This paper provides a concise but critical overview of the engagement of financial consumer protection authorities with approaches rooted in behavioural economics and neurofinance. We draw on a wide range of documents published by these authorities in recent years. In Specifically, we describe the goals these institutions expect to achieve by incorporating insights from behavioural economics and neurofinance into their activities, and whether they have been successful in doing so, based on some specific cases of policies actually implemented. We also highlight how and to what extent they have devoted internal resources to research and policy rooted in behavioural economics and neurofinance. Finally, we highlight the main empirical research methods they have used.

JEL Classification: D11, G21, G41.

Keywords: behavioural economics, neurofinance, neuroeconomics, consumer protection, decision-making process, behavioural and cognitive biases.

DOI: 10.32057/0.QEF.2024.890

* Banca d'Italia, Directorate General for Consumer Protection and Financial Education.

♦ Banca d'Italia, Financial Stability Directorate.

1. Introduction[3]

Financial institutions, whether banks, insurance companies or other intermediaries, offer retail investors and savers (consumers) a wide range of products, such as current and savings accounts, payment services, credit cards, mortgages and other loans, insurance and investment contracts. Maintaining consumer confidence and trust in a well-functioning financial services market promotes financial stability, efficiency and innovation, ultimately leading to higher economic growth. This, together with the need to protect the most vulnerable, is the main reason why almost all countries are committed to protecting consumers through regulatory, supervisory and enforcement frameworks in the financial sector.

The United Nations have laid out a set of principles for good practices to ensure that businesses deal fairly and honestly with consumers at all stages of the relationship (United Nations, 2016). These principles include recommendations on fair and equitable treatment, commercial conduct, disclosure and transparency, education and awareness, privacy, and consumer complaints and redress. In the same vein, the OECD has also set out high-level principles for financial consumer protection (OECD, 2022). In particular, the OECD highlights the impact, opportunities and risks of digitalisation and technological advances, as well as sustainable finance, on financial consumers. The World Bank instead took a different approach, identifying best practices across a wide range of products, including banking services (deposits and loans), insurance, private pensions, securities and retail payments (World Bank, 2017).

Alongside these principles and actual experiences, there is a growing recognition among policymakers and academics that regulation, supervision and disclosure are often not fully effective due to the inherent complexity of financial products and the fact that people may have low levels of financial literacy, be subject to behavioural and cognitive biases, or be unable to extract all the relevant information from disclosure documents. A growing number of authorities in many countries are therefore bringing in expertise in behavioural economics and neurofinance to help shape consumer policy.

Behavioural economics is an interdisciplinary field that combines psychology and economics, and approaches consumer choice in a different way from classical economic theories, which rely on assumptions that are often violated in the real world. For example, textbook economic models assume perfect rationality and the ability to process available information. The classical concept of rationality implies that individuals, when faced with a choice between several possible alternatives, are always able to compare them, have the ability to collect and analyse all available information, associate probabilities and gains with each

([3]) The authors thank for their comments Massimiliano Affinito, Magda Bianco, Riccardo de Bonis, Ludovica Galotto, Tommaso Macrelli, Francesco Privitera, and all participants to the webinar held at the Bank of Italy. The usual disclaimer applies. The views expressed are those of the authors only and do not involve the responsibility of the Banca d'Italia.

possible outcome, and finally choose the optimal solution. However, these assumptions are not always in line with empirical evidence, which shows that some individuals make systematic errors in their reasoning and decision-making. These errors are such because they violate the principle of rationality, which, according to the axiomatic approach, is defined by the completeness and transitivity of preferences. In our context, no other measure should be used to judge whether a decision is right or wrong.

By studying people's decisions, behavioural economics has shown that choices are heavily influenced by various factors - psychological, emotional, cultural and social - that are not included in standard economic models, or that economic agents do not always behave in a way consistent with utility maximization. This stream of research has benefited from a multidisciplinary approach combining economics and psychology, and has shown that human reasoning systematically deviates from rationality.

One of the most striking examples is the fact that, when faced with a choice, people tend to simplify the decision-making process and the use of available information. This often results in sub-optimal decisions: although the use of mental shortcuts (heuristics) can sometimes lead to satisfactory results, the exclusion of relevant information can also lead to significant errors. This can happen because of the way the information is presented or because attention is drawn to peripheral (irrelevant) information ("framing effect"). ([4]) These behavioural errors, along with many others, fall under the definition of "cognitive biases" and have been studied extensively (e.g., Kahneman, 2003 and 2011).

Another of the best known cognitive biases is anchoring. Anchoring creates an inertial effect: when making decisions, individuals focus on information that is used as a reference point and becomes an anchor, influencing subsequent decisions. In addition, individuals can be influenced by "overconfidence" in their own ability to make choices and predictions. For example, there is an almost instinctive tendency to favour information that confirms the correctness of one's assumptions, while ignoring contrary possibilities (the so-called "confirmation bias"). Other biases involve the fear of making the wrong decision. For some people, this fear may lead them to blame others for their choices (the so-called "attribution bias"); others may imitate the behaviour of others in order to share any responsibility (the so-called "herd behaviour"); others may choose not to change their initial decisions, even when

([4]) There are various declinations of the framing effect. One of these is the representation of the consequences of a choice. According to rational choice theory, representing the same consequence differently should not affect the final decision. However, the framing effect can lead to different choices: for example, if a gain is presented people opt for the certain option; if a loss is presented people prefer the riskier alternative. This is what is known as risk-risk framing. A very common framing effect is so-called price framing, which is used as a marketing tool to represent the price of a product. In this regard, it has been shown that the final purchase decision is influenced by two aspects: the odd price and the increased focus on the left-hand figures (e.g., 9.99 euros is often used instead of 10 euros). These two elements create a real illusion of convenience when in reality the price difference is almost nonexistent. Another example of the framing effect is "visual framing", which refers to language, the order in which information is provided, and even the layout used. For example, the use of data and graphs has been found to lead to better decisions than merely narrative and descriptive information.

doing so would be optimal (the so-called "immobility bias"). Of course, the same agent may be affected by more than one of these biases.

By taking these biases into account, behavioural economists have developed what is known as nudge theory. A nudge is an intervention that does not take away a consumer's choice, but is designed to point them in the direction of a perceived better option. Knowledge of behavioural biases can therefore be used to predict and anticipate the mistakes that individuals may make, and can be used by regulators, for example, to nudge people towards virtuous behaviour without preventing them from making free and autonomous choices. Nudging is currently the most widely used policy response to address behavioural biases in several areas (Banerjee and John, 2022). Many types of nudges have been identified in public policy practice: standards, campaigns, commitments, disclosure mechanisms, transaction shortcuts, improved design strategies, and warnings and reminders.

In addition to behavioural economics studies, neurofinance has recently emerged as a new field of research (Affinito, Galotto and Privitera, 2024). Neurofinance studies what happens in the human brain when an economic decision is made. Thanks to some non-invasive neural research tools - such as eye-tracking and facial expression recognition - it is possible to study the neurobiological basis of decision-making and understand how people actually make their choices.

However, the authorities' focus on behavioural biases must not go so far as to deny the responsibility of individuals for the consequences of their actions. Policies that take account of behavioural and neurological aspects must help agents to understand the range of options available to them and the likely impact and risks of each on their wealth.

In this paper, we provide a brief overview of how key financial consumer protection institutions are using insights from behavioural economics and neurofinance to strengthen their ability to pursue their institutional goals. We first introduce the institutions that are more advanced in their attempts to benefit from behavioural economics and neurofinance (Section 2), and describe in Section 3 how they are adapting their organisations in response to these new policy approaches. Section 4 focuses on research methods from an empirical perspective, while section 5 provides an overview of how behavioural economics can contribute to more effective protection of vulnerable consumers, and section 6 provides some examples of policies that have actually been implemented. Section 7 focuses instead on policies based on neuroeconomics. Section 8 concludes.

2. Financial consumer protection authorities involved in behavioural economics and neurofinance

Around the world, several financial and banking consumer protection authorities are exploring whether and how advances in behavioural economics and neurofinance can strengthen their ability to achieve their institutional objectives. This section provides a brief

overview of the authorities that are actively researching behavioural economics and neurofinance, with a particular focus on those that are explicitly seeking to advance knowledge with a view to enriching their consumer protection toolbox.

The Dutch Authority for the Financial Markets (AFM), which is responsible for promoting fairness and transparency in the financial markets, is one of the institutions in the banking and financial sector that is exploring a behavioural approach. In 2016, AFM published a document informing the market of its willingness to consider behavioural insights in order to align its attention and interventions with actual consumer choices (AFM and the application of behavioural insights, 2016). To achieve this, the AFM invited all market participants to actively participate in this new project. The AFM has outlined four main goals: i) online devices should support sound decisions; ii) information should be effective in supporting sound decisions; iii) products should be aligned with financial wellbeing; iv) for new financial products, behavioural risks should be identified. To achieve these goals, the AFM has integrated behavioural economics into its activities by actively working to identify risks, encourage the financial sector to be aware of behavioural insights, promote the importance of taking behavioural insights into account among policymakers, and develop tools for supervision.

In the UK, the Financial Conduct Authority (FCA) has been actively involved in producing high quality research in behavioural economics since its inception. In one of the first occasional papers on the subject, the FCA stated that in order to achieve its strategic objective of a well-functioning financial services market, it is necessary to have a thorough understanding of how consumers behave and make choices, and also of the types of mistakes they make (Applying Behavioural Economics at the Financial Conduct Authority, 2013). The FCA therefore sees behavioural economics as a relevant tool for achieving and ensuring an appropriate level of consumer protection.

Another important example is the Australian Securities and Investments Commissions (ASIC), which carries out its mandate in financial services and consumer credit (ASIC and Behavioural Economics: Regulating for the Real People, 2016). ASIC has approached behavioural economics from a regulatory perspective. Currently, financial regulation in Australia is based on the traditional approach, which systematically uses disclosure as a regulatory tool. This approach assumes rational consumer behaviour, which is often unrealistic in practice. ASIC concludes that disclosure needs to be complemented in the regulatory toolkit by behavioural analysis as a key component of a well-functioning market.

Also significant is the experience of the Central Bank of Ireland, which since 2016 has been funding a research programme called PRICE Lab, entrusted to the Economic and Social Research Institute (ESRI), also in coordination with other national regulators. As part of this programme, several laboratory experiments have been carried out to explore how consumers make their choices.

At a more general level, there are examples of institutions recognising the potential scope for behavioural economics in tailoring regulation and policy. For example, the European Commission aims to integrate the behavioural approach into EU policy instruments and decision-making processes (The evolution of behavioural analysis in the European Commission, 2021).

In Italy, there is a growing interest in benefiting from research in behavioural economics and neurofinance in order to better design and implement policies to protect financial consumers. The first steps have been taken in the context of financial education, both by the Bank of Italy (De Bonis, Guida, Romagnoli, Staderini, 2022) ([5]) and by Consob (Linciano, 2020). In particular, Consob has been carrying out in-depth studies on the subject since 2010, publishing a research paper that, after reviewing behavioural studies and experimental evidence on investment choices, proposes several interventions aimed at increasing the effectiveness of transparency, conduct rules and financial education. In this context, the Consob Observatory on Investment Choices of Italian Households was established in 2014 to collect data on the financial knowledge, attitudes, behavioural errors and investment choices of Italian financial decision-makers in order to adopt an evidence-based approach. As a result, Consob has conducted research on issues related to the disclosure of financial instruments, intermediaries' rules of conduct and financial education.

The level of development of studies and policy applications for financial consumer protection is very different between behavioural economics and neurofinance, with the former being much more advanced. Not yet widely used are the analytical tools of neuroeconomics, which studies the neurobiological basis of decision-making to understand how consumers and investors actually make economic and financial choices. Neuroeconomics and neurofinance aim to reconstruct and measure what happens in the brain when economic decisions are made. Although limited, there are examples of the use of neurofinance tools. As is often the case, the first experiences came from the United States. Indeed, the study of consumer behaviour is one of the objectives of the Consumer Financial Protection Bureau (CFPB), the government agency that provides oversight to ensure that banks and financial institutions treat their customers fairly and that the marketplace is fair, transparent, and competitive. The CFPB, together with the Department of Justice, has taken the first initiatives to use neurological evidence to strengthen the tools for protecting and safeguarding the elderly, a population most vulnerable to fraud.

([5]) Please refers also to the following webpages: https://economiapertutti.bancaditalia.it/informazioni-di-base/decalogo/10-trappole/index.html; https://economiapertutti.bancaditalia.it/quiz/.

3. Organizational aspects

One aspect of particular interest is whether and how financial consumer protection institutions are making organisational arrangements to fully integrate behavioural economics and neurofinance into their regular institutional work. For example, it is interesting to understand whether there are units within the institutions dedicated to research in these areas or responsible for implementing these new approaches in actual regulation and policy-making. Similarly, it is important to examine whether regulators and supervisors are collaborating with academic researchers to promote the use of behavioural economics and neuroeconomics analytical tools. In this section, we provide a brief overview of these issues with a view to identifying possible best practices.

Institutions that have embraced behavioural economics have done so in different ways. Some institutions have set up in-house teams specialising in behavioural economics. Others have adopted a simpler model without any impact on their organisation. In many cases, forms of collaboration with academia and market participants have been developed.

The first approach (in-house teams) has been followed by the Netherlands (AFM), the UK (FCA), Australia (ASIC), as well as the European Commission and the US (CFPB). In particular, in the Netherlands, AFM established a specialised team (Consumer Behaviour Team) in 2016 to improve the understanding of consumer decision-making and apply this knowledge to increase the effectiveness of supervision of financial operators. In the UK, the FCA has established a Behavioural Economics and Design Unit, which uses behavioural science to improve understanding of the most common choices and mistakes made by consumers. In 2023, the team comprised 9 FTE and included staff with research skills in both economics and psychology. In addition, team members have developed significant experience in applying behavioural insights to improve supervision and policy.

In Australia, since 2014, ASIC has established an in-house team of specialists (Behavioural Research and Policy Unit) to explore new regulatory approaches by placing behavioural analytics tools at the heart of its activities, also seeking to influence practitioner behaviour and accountability.

As early as 2007, the Commission started to explore the possibility of integrating behavioural economics tools into its policy-making and regulatory processes. A first unit dedicated to behavioural economic analysis was set up in 2016, and a dedicated research centre, the Competence Centre on Behavioural Insights, was launched in 2019 to conduct research on behavioural processes and provide expert support to other Commission departments to integrate its findings into the design of various Union policies. Finally, the US CFPB has also established a unit to conduct research and analysis on the mechanisms of consumer decision-making through surveys, experiments and collaboration with market participants (Decision-Making and Behavioural Studies).

In addition, in the United States, the Netherlands and Ireland, the institutions have developed various types of cooperation with the market and academia. One of the most important examples is the PriceLab research programme set up by the Economic and Social Research Institute (ESRI) and jointly funded by the Central Bank of Ireland, the Competition and Consumer Protection Commission (merger of the former National Consumer Agency and the Competition Authority), the Energy Regulation Commission and the Communications Regulation Commission. Another example is the above-mentioned research conducted by the CFPB with the US Department of Justice in collaboration with academia.

4. Empirical research methods used by regulators and supervisors

Public authorities are interested in understanding how consumers behave and make decisions in the real world, and in analysing situations where there is some form of market failure that justifies their intervention. To achieve this goal, they need to apply the more general insights of behavioural economics and neurofinance to more specific areas within their mandate. The emphasis here is on empirical research: theoretical contributions tend to be in the hands of academics, while public authorities are more likely to conduct empirical research to provide evidence to strengthen and motivate their policies.

One of the main research tools is surveys, which allow a target group of people to be asked a series of questions based on the situation under study. This approach is less costly than simulated situations or field experiments, and more people can be reached. In addition, selection problems may be less severe than with other research tools. However, it is often difficult to draw causal inferences from surveys because they do not allow us to observe people's behaviour in response to a controlled change in the variable(s) of interest.

A second research tool is experiments, which can be divided into laboratory and field or real-life experiments. The laboratory experiments are conducted in a controlled, simulated environment with a group of volunteers and a predefined set of rules and information. It is crucial to take this into account when considering the results, as the behaviour of a participant in a laboratory setting may differ from their behaviour in a real-life context. This discrepancy can potentially affect the reliability of the results as evidence. These types of studies are usually designed to achieve clear identification of the effects of interest, possibly with very little confounding, and offer the possibility of rapid testing. However, these studies are quite costly and may have limitations in terms of the external validity of their results. In fact, simulated situations may differ from the real-world choices that researchers want to study, and as participation in these experiments is voluntary, significant selection problems may arise. In real-life experiments, the analyses are carried out in a real environment and allow for a full assessment of the behaviour of the people subjected to the experiment. However, selection problems remain significant. In this case, although they usually require greater investment, the

results provide a more realistic and robust basis for evaluating the so-called "treatment effect", i.e. the difference between the results that approximates the effect of the interventions on behaviour and decision making. The "treatment effect" provides insights into how external factors influence economic choices and inform policy decisions.

Both laboratory and field experiments are usually conducted using the randomised controlled trial (RCT) method. The target group of people is randomly divided into two groups: the control group and the treatment group. People assigned to the former receive no treatment (sometimes they receive a placebo) and represent the counterfactual (what would have happened without treatment) of the second group. The treatment group is exposed to the treatment. Differences in the outcome of interest between the two groups can be causally interpreted as the effect of the treatment; for this purpose, the two groups usually have similar characteristics, so that differences can be more reliably attributed to the treatment being tested.

Neuroeconomics uses different research methods based on non-invasive neural research tools (Affinito, Galotto and Privitera, 2023). This approach is completely different from that used by traditional economists, and even from that used by behavioural economists. Indeed, neuroeconomics aims to incorporate a whole range of biological variables into economic models. Through advances in technology and neuroimaging techniques, neuroeconomics analyses brain processes and neurochemical tests at different stages of economic decision making (e.g. before, after and during), trying to establish a link between brain activity and its response to economic activity. The main tools used are functional MRI (magnetic resonance imaging), eye tracking and facial expression recognition, which allow neural, motor and cognitive functions to be mapped to areas of the brain.

5. How institutions can use the results of behavioural economics experiments

The results of behavioural economics experiments can be used by institutions in several areas: policy-making, regulation and supervision. Incorporating behavioural insights into the regulatory process can help ensure that regulation takes into account consumers' actual behaviour, the errors they most frequently make, and the biases that influence their choices.

In some systems, the impact of a potential regulatory intervention is tested before it is introduced to assess its effect on consumer choice. In such cases, experiments aim to test the impact of a potential intervention that could help the consumer in the decision-making process, in order to assess whether it is a positive nudge and thus can positively influence the consumer's decision. In other cases, behavioural economics experiments may be used to evaluate ex-post a regulation that has already been adopted. In such cases, a behavioural economics study would aim to assess the effectiveness of a regulation, to check whether such

a regulation has achieved the objective for which it was introduced and, if so, to identify a different measure to be implemented in order to pursue those objectives. ([6])

A very significant example of the use of behavioural economics in the regulatory and policy-making process is provided by the European Commission. It aims to integrate the behavioural approach into EU policy instruments and its own decision-making process. To this end, the European Commission has defined the so-called "do it approach" (define, observe, identify, test), which consists of four phases: (i) define and identify the behavioural elements relevant to the policy; (ii) observe and understand them through experiments, research and behavioural surveys; (iii) identify policy options; (iv) test the effectiveness of these policy options. ([7]) For example, this approach has recently been used in preliminary studies for the revision of the Distance Marketing of Consumer Financial Services Directive (Directive 2002/65/EC). ([8]) The experiments conducted replicated the advertising and pre-contractual stages of the purchase process of two relevant products - current accounts and personal loans - and identified some tricks to encourage informed consumer choice. The European Commission also conducted a behavioural economics experiment as part of a study to provide a clear and up-to-date analysis of household and consumer over-indebtedness. Specifically, the experiment aimed to assess the ability of households and consumers to make informed and optimal credit decisions (see paragraph 6.2.). ([9])

In addition, the results of behavioural economics experiments can be used as part of supervisory activities. Supervision can benefit from behavioural analysis in order to obtain signals on the nature of interaction between market participants and customers, and to provide guidance to market participants on the most appropriate ways to interact with customers in order to improve the quality of relationships between intermediaries and customers.

([6]) A behavioural economics study was conducted in the US to determine whether a new regulation was effective in producing the desired improvements (Regulating Consumer Financial Products: Evidence from Credit Cards, 2015). The study focused on the Card Act (passed in 2009), which introduced consumer protection measures and disclosure requirements for consumer credit cards. In particular, the Card Act required fees to be "reasonable and proportionate", introduced limits on interest rate increases that credit card issuers can charge, and required banks to give consumers 45 days' notice of interest rate increases or other significant changes in terms and conditions. The effects of the CARD Act were estimated using a difference-in-differences research design, comparing outcomes for consumer credit cards (treatment group) and small business credit cards (control group) that were not subject to the CARD Act. The role of the control and monitoring groups was to establish a counterfactual of what would have happened to consumer credit cards if the law had not been implemented. The results show that the Cards Act was successful in reducing the cost of credit without any offsetting increase in other costs or reduction in the volume of credit. In addition, it was found that the disclosure requirements imposed by the CARD Act had a small but significant impact on borrower behavior.

([7]) To obtain further details on the activity of the European Commission, please refer to the following website: https://knowledge4policy.ec.europa.eu/behavioural-insights/about-behavioural-insights_en.

([8]) For further details, please refers to the following document: https://op.europa.eu/en/publication-detail/-/publication/a3cb68db-a676-11ea-bb7a-01aa75ed71a1/language-en/format-PDF/source-search.

[9] For further details, please refers to the following document: Study on European consumers' over-indebtedness and its implications - Final report | European Commission (europa.eu)

In several cases, the results of behavioural economics studies have been used by supervisors to provide policy guidance to operators, for example on the best options for choice architecture. Section 6 describes some experiments, including a brief description of the main uses made of the results.

6. Some examples of experiments conducted by behavioural economics institutions in the field of consumer credit

Much behavioural research has been carried out in the field of banking and finance. This section provides a brief description of some of the experiments carried out on consumer credit agreements, as this type of credit is particularly relevant from a customer protection perspective. In particular, the experiments described below have been carried out by the Dutch Authority for the Financial Markets (AFM) and PriceLab, the Irish research programme, and have also been selected to show how institutions could use the results of such experiments in their current activities. Reference is also made to a recent experiment carried out by the European Commission.

6.1 The effect of warnings

One research topic that both AFM and PriceLab are investigating is the evaluation of the effects of warnings, which are a typical example of a nudge. Several experiments have been conducted on this topic. In particular, the two experiments described below illustrate two different ways in which behavioural economics can be applied to the regulatory process. In the first case, the study aims to assess the effectiveness of a regulation that has already been adopted. In the second case, the study aims to test the impact of a potential intervention that could help the consumer in the decision-making process, in order to assess whether it represents a positive nudge and thus can positively influence the consumer's decision.

The first study has been carried out by the AFM in cooperation with the Ministry of Finance and concerns the effect of a credit warning - "Beware! Borrowing money costs money' - on consumer behaviour (AFM, Caution! Borrowing money costs money, 2016). Financial institutions have been required to include such a warning in consumer credit advertisements since 2009. The warning was introduced by regulation in response to rising levels of consumer debt and the increase in problematic debt, with the aim of drawing attention to the consequences of indebtedness. ([10]) The objectives of the credit warning can be

([10]) Consumer debt in the Netherlands rose sharply between 1992 and 2004. As a result, the legislator wanted to put an end to "aggressive and misleading" credit advertising on television. First, the introduction of a ban was evaluated and a study was commissioned to demonstrate the link between credit advertising and excessive lending. This study did not show a causal link that would justify a ban on credit advertising. As an alternative, the legislator decided to introduce a credit warning and asked the AFM to develop it. The AFM presented various phrases and symbols to many consumers, and the current phrase and symbol were chosen on the basis that consumers expected this phrase to have the greatest warning effect.

summarised as follows: to encourage consumers to think carefully about their choices; to raise awareness by highlighting the consequences of borrowing; and to counter the positive image presented in some advertising that borrowing for consumer purchases is perfectly normal. There was no prior research on the impact of the warning on behaviour.

The study was carried out in cooperation with a Dutch bank that offers consumer loans and took place on the bank's website. It is therefore a real-life experiment carried out as a randomised controlled trial. ([11]) The study, conducted by AFM, aimed to determine whether the warning was effective in encouraging consumers to make more rational decisions. In particular, the study assessed the impact of a credit warning on the number of clicks consumers made on the banner, the way consumers browsed the site and the decisions they made. In order to observe this effect, different versions of the credit warning were displayed in the online sales environment of the credit provider over a period of two months. Consumers were randomly divided into groups that were exposed to either the existing warning, an alternative warning or no credit warning at all. The study found no effect of the credit warning on the frequency with which consumers clicked on banners, the way they browsed online or the choices they made when requesting a quote.

On this basis, the study concludes that a credit warning has no short-term impact on consumer behaviour (neurofinance comes to the same conclusions; Affinito, Galotto and Privitera, 2023). The study shows that the warning has no effect on consumer behaviour because consumers do not make considered decisions as a result of the warning. In particular, the study does not find any influence of the credit warning on the frequency with which consumers click on banners, the way they browse online and the choices they make when requesting a quote. The AFM also conducted a survey asking consumers for their opinion on the usefulness of credit alerts. Despite the fact that the experiment showed that the warning

([11]) The experiment has been carried out satisfying several stringent conditions:
1) Random allocation to various versions of the warning: it is used an application that offers the possibility to allocate visitors randomly to different conditions.
2) Sufficient observations for every version of the warning: at his end, the experiment has been divided into four test periods, which each lasted two weeks. In each test period, the behavior of the visitors has been compared between one or two versions of the warning and the original credit warning.
3) The assessed policy has a clear behavior objective. In the experiment carried out the (behavior) objective of the credit warning was deeply assessed based on policy documents and then the objectives (e.g. making more well-considered decisions) has been translated into measurable objectives (e.g. more frequent, longer browsing).
4) By ensuring that each visitor sees only one version of the warning, it is relatively easy to test the effect of each version of the warning and to prevent behaviour being influenced by different versions of the warning.
Theoretically, this is possible because the consumer credit provider's test application - by installing cookies - monitors which visitor has been assigned to which version and, in the event of a repeat visit, the visitor is assigned to the version previously displayed.
However, this condition could not always be met because the test application did not always work optimally and consumers could visit the site from multiple devices (phone, laptop and iPad) and initially appear as three unique visitors.

had no effect, the survey showed that consumers have confidence in the effectiveness of the warning in influencing their behaviour.

The results of this experiment were used by the AFM to make a recommendation to the Treasury, pointing out that, in this case, behavioural evidence showed that awareness-raising through the warning was often ineffective in stimulating better decisions, and urging the Treasury to identify more concrete objectives and, more generally, to use the evidence from this study when identifying the objectives of warnings and possible alternative measures.

The second experiment was carried out as part of PRICE LAB to test whether a regulatory warning participants of a high interest rate by market standards would have an impact on decisions (PRICE LAB, An Experimental Investigation of Personal Loan Choices, 2016). Specifically, the experiment - which was designed to address a number of research questions (see also section 6.2) - analysed, among other things, whether a 'high-cost loan' warning included in loans above a certain annual percentage rate (APR) of 15% could deter consumers from choosing these contracts. ([12]) This type of experiment makes it possible to examine the impact of a potential intervention (the "warning") that could help consumers choose between credit offers. It was conducted using laboratory experimental tools and participants were asked to choose between two alternative credit offers. ([13])

In the choice tasks, participants were presented with two alternative products and asked to decide which they preferred; the task was repeated a number of times with different pairs of offers, assuming they had to pay the instalments with their current monthly income. ([14]) The result of the experiment was that the 'high cost loan' warning reduced the likelihood of choosing the high APR loan. Specifically, the experiment shows the likelihood that participants would choose the loan with the higher APR based on the presence of a warning on the loan with the higher APR and not on the loan with the lower APR. As the loans shown in each trial had the same APR difference on average, regardless of whether the two rates were

([12]) In Ireland regulation, moneylenders are obligated to post such a warning for loans in excess of 23 per cent. For personal loans, given the spread of APRs in the market, we set the warning level at 15 per cent.

([13]) Choice tasks are a standard technique in consumer research. More in particular, a choice experiment consists in "*A forced-choice task used to elicit preferences. The method involves asking individuals to make a choice between hypothetical alternatives, such as two different loans*".
In the experiment carried out by PRICE Lab it has been introduced two innovations to standard choice task. Firstly, while in most studies of this sort, product and price information is provided in lists, tables and blocks of text, in this experiment all information have been presented with attractive images and graphics, introduced with an animation in order to make the choice experiments more closely resemble the real marketing environment. Moreover, a 'tournament' incentive of a €50 shopping voucher has been offered for at least one in every ten participants who attends PRICE Lab in order to motivate participants to concentrate across multiple trials.

([14]) Participants undertook a repeated choice task in which they decided which of two loans they preferred. Any time the APR on a loan exceeded 15 per cent, it triggered a warning statement, which appeared alongside the APR balloon and simply stated 'Warning! This is a high cost loan'. Participants undertook 39 trials in each experimental run, making a total of 156 decisions. The participants consisted of 25 adults aged between 18 and 70 years.

close to 15 per cent, any difference suggests that the warning had an impact on decisions. In this respect, there was a small overall difference of 3.4 percentage points.

The result of the experiment therefore suggests that the warning had a modest but discernible deterrent effect on consumers' choices. They were slightly less inclined to choose a personal loan when presented with the accompanying warning. ([15]) Based on this finding, the study explored the possible policy implications. Such an experiment showed that the introduction of a mandatory 'high cost loan' warning in the personal loan market could influence some consumers and lead them to choose loans with lower APRs. In addition, the provision of such a warning could have an impact on the APRs offered by providers, as they would avoid the warning for reputational reasons. Finally, from a regulatory point of view, the introduction of the warning would require the definition of a mechanism to set the appropriate APR threshold above which the warning must be displayed and to modify it as market conditions change.

6.2 The architecture of choice

Another issue examined by both the Dutch and Irish authorities relates to choice architecture, i.e. the way in which information is presented. Choice architecture is certainly one of the most studied issues in behavioural economics applied to consumer protection. In particular, the experiments presented below aim to explore how an appropriate choice architecture could promote responsible lending.

The first study was conducted by the AFM and was based on the assumption that an appropriately designed choice architecture can promote responsible borrowing among consumers, and that to this end, practical research is essential to find out the extent to which elements of the choice architecture can steer consumers in a certain direction (AFM, Making it easier to borrow responsibly, 2019).

The research focused on online consumer credit application forms and the effects of the presence of default options (showing a default option on the screen) or active customer choice (leaving the relevant field blank). It was a real-life experiment carried out in cooperation with a market operator (FREO), and changes were made to the credit application form, in particular with regard to the amount of credit, the monthly instalment, the duration of the credit and the total cost, offering the alternative between default options (and different options) or active customer choice. ([16]) Then it was evaluated how this changes impacts on the consumer's decision.

([15]) At this regard the experimental could have underestimated this effect considering that choices were repeated over many trials, so some insensitivity to the warning may have developed with repeated viewing.

([16]) For example, some people were presented with a form where the loan amount appeared on the screen by default (and in this case different amounts were also shown), while others had the field left blank. Similarly, the loan amount was retained and the monthly payment was displayed either by default or by leaving the field blank.

The study then looks at how these changes affect consumers' choices. The study shows that default settings influence consumers' choices, affecting them more in terms of the amount of monthly repayments and to a lesser extent in terms of the total amount borrowed. This difference could be explained by the fact that people are likely to have an idea of how much they want to borrow in advance, but not how much they want (or are able) to repay each month. In addition, default options affect some people more than others, such as those on lower incomes. Careful design of the choice architecture can therefore help vulnerable people make a choice that is right for them. The experiments also showed that actively choosing the duration of the credit (rather than the amount of the monthly instalment) leads to a longer duration, while actively choosing the total cost (rather than the monthly instalment) leads to fewer credit applications and shorter repayment periods. As a result, the experiment clearly showed that the design of the choice architecture can help consumers not to take on more debt than necessary and not to borrow for longer than necessary.

The outcome of this experiment was used by the AFM to provide policy guidance to operators. In particular, the Authority encouraged operators to consider carefully the design of their choice architecture, taking into account how people actually behave in practice, and emphasised that it expects creditors to take consumers' interests into account appropriately at the various stages of consumer credit underwriting, for example in the online application form. In this respect, the Authority did not prescribe how providers should design their choice architecture, but it did provide some suggestions to providers: (i) keep standard loan amounts to a minimum to prevent consumers from borrowing more than they need; (ii) offer consumers the possibility to actively choose a monthly instalment to encourage them to keep the duration of the loan as short as possible; (iii) ensure that consumers are actively shown the total cost of the loan during the online application process. Finally, based on the results of this experiment, the AFM also called on policymakers and other regulators to reconsider the effectiveness and design of the choice architecture as a policy and supervisory tool, emphasising the importance of robust research on changes to this choice architecture.

The second experiment on choice architecture was conducted within Pricelab to assess whether consumer choices change depending on what information is made explicit or left implicit (PRICE LAB, An Experimental Investigation of Personal Loan Choices, 2016). ([17]) In particular, the experiment focused on testing whether consumer decisions differ depending on whether information about the monthly payment or the cost of the loan is made explicit at

Finally, the effect of allowing visitors to choose the amount of the monthly repayments, i.e. the number of months in which they wished to repay the loan or the total cost of the loan, within pre-defined ranges was evaluated.

([17]) The experiment was conducted as part of the same research that dealt with the credit warning, described in paragraph 6.1.

the time of the decision. ([18]) The results showed that choices depended strongly on what information was made explicit and what was left implicit at the time of the decision. When two loans had the same principal but differed in APR, consumers were more likely to choose the longer loan when information about the monthly payment was made explicit, and more likely to choose the shorter loan when information about the total cost was made explicit, than when all information was shown or when neither the total cost nor the monthly payment was shown. ([19])

The research has highlighted that the key findings have implications for consumer protection, showing that consumers' decisions can be influenced by the timing and manner in which information is presented. In this case, according to the study, the results suggest a number of possible regulatory interventions that could help consumers make better decisions by presenting them with useful information when they need to make a decision. For example, it was suggested that the results might suggest the case for more prescriptive rules on the provision of information about instalment size and total cost. It was suggested that it might be useful to ensure that information on total cost and monthly payment is presented in the same way at the time of the credit decision.

Finally, the European Commission recently conducted a behavioural experiment to assess the ability of families and consumers to make informed and optimal credit choices. The study aimed to assess how respondents choose between credit offers, their ability to select the most advantageous offer and how marketing techniques, loan amounts and the presence of a simplified credit label summarising key information influence this decision-making process. Realistic scenarios were created and participants with different financial situations were repeatedly asked to choose between credit offers with different levels of convenience.

Throughout the experiment, the honesty of the information provided in marketing materials and on the credit provider's website was manipulated (ranging from potentially misleading to moderately accurate), as were the loan amounts (€500 or €4,500) and the availability of a visually prominent credit label summarising key aspects of the loan. After the experiment, participants were asked to examine an example of the SECCI - Standard European Consumer Credit Information (form required by Directive 2008/48/EC on credit agreements for consumers) to assess their objective and subjective understanding of the information and their evaluation of the form.

([18]) The experiment showed several pairs of offers for a personal loan; for each presentation, participants had to choose which offer they preferred; the choice was made in one of four conditions in which different information was explicitly shown. In particular, the loan amount was kept constant (€7,500); the loan term and APR were always shown; the conditions varied according to whether: (i) the monthly repayment and finance charges were explicitly shown; (ii) only the monthly repayment was shown; (iii) only the finance charges were shown; (iv) the monthly repayment and finance charges were not shown.

([19]) APR is the annual rate that is charged for borrowing, expressed as a single percentage number that represents the actual yearly cost of funds over the term of a loan. This includes any fees or additional costs associated with the transaction. Calculation of APR is standardised within the European Union.

The experiment showed that: (i) consumers' decisions about credit offers are influenced by the honesty of the information provided in marketing materials and on websites. In particular, when the total amount of credit is prominently displayed, consumers are more likely to choose the most convenient offer; (ii) differences in consumers' financial circumstances affect their choice between credit offers, in particular those facing difficulties in meeting monthly expenses appear to be more prone to make sub-optimal decisions; (iii) without explicit instructions, only a minority of consumers refer to SECCI forms when making decisions. However, when prompted, consumers generally have a positive view of SECCI forms, suggesting that increasing consumer awareness of their value may lead to more frequent consultation; (iv) due to the complexity of information often found in SECCI forms and potential cognitive limitations among consumers, there may be an advantage in summarising information in a simple and visually prominent credit label. While both labelled and unlabelled forms are rated similarly overall, consumers tend to prefer SECCI forms with credit labels, suggesting that they make it easier to find and understand information about the APR.

7. An example of research carried out by institutions in the field of neurofinance

Most of the initiatives undertaken by institutions relate to behavioural economics. There are no experiments in neurofinance at the institutional level. However, some examples can be found in the US, where some initiatives have been launched to strengthen consumer protection policies through a neurofinance approach. In particular, there are initiatives aimed at strengthening the protection of the elderly against fraud, especially financial fraud. ([20]) The elderly segment is of particular interest because it represents a particularly vulnerable population, which also experiences a physiological decline in cognitive abilities that is much easier to observe from a neurological point of view. In particular, three physiological factors have been identified that make older people more vulnerable to fraud. First, as we age, we process information more slowly. This makes people more susceptible to a false sense of urgency, reduces their ability to realise they have been scammed until it is too late, or makes them more easily overwhelmed. Secondly, ageing leads to a decrease in memory efficiency. This increases the risk of paying twice for goods or services, or reduces their ability to identify people they can trust and ask for help. Thirdly, frontal lobe problems reduce the ability to think through options, make recourse to emotional reasoning more likely and undermine the efficiency of decision-making.

These initiatives by the CFPB and the US Department of Justice have benefited from input from the academic and scientific communities. They have made it clear that the reduction in the ability to process information, the decline in memory efficiency and the increased tendency to make decisions based on emotions rather than reason (due to physiological

([20]) https://www.justice.gov/elderjustice/video/neuroscience-behind-financial-scams

changes in the frontal lobe) make older people particularly vulnerable to financial fraud, or at least reduce their ability to make appropriate decisions. Based on this scientific evidence, very preliminary policy initiatives have been planned to strengthen the protection of the elderly. Firstly, cooperation between public authorities and the scientific/medical community has been promoted, and initiatives have been launched to raise awareness among market operators and citizens. Secondly, the exchange of best practices in the market was promoted with financial institutions and, in the long term, guidelines for them, e.g. on how to present products to the elderly, should be identified to facilitate their full understanding. Third, they identified warning signs that correlate with a decline in cognitive ability and an increase in the risk of fraud: changes in financial behaviour, disorganisation, reduced chequebook management skills, frequent arithmetic errors, confusion about financial concepts.

8. Final remarks

This paper summarises the experience of financial consumer protection regulators and supervisors with research and policy rooted in behavioural economics and neurofinance. We try to enucleate the main elements of a growing but still very fragmented world. Many institutions are pursuing the idea that more effective consumer protection requires a deep understanding of people's choices and their recurrent departures from rationality.

We have presented the institutions that are more active in this field and have also tried to analyse whether and how they are adapting their organisations. It appears that close collaboration with academics is essential in order to develop policies that are solidly based on theoretical and empirical research. In a few cases, institutions have created specialised internal units that carry out their own research: they mostly take an empirical perspective, leaving theory and complex experiments to academics or to joint projects.

The second part of the paper takes a closer look at the policies that these authorities actually implement. We begin with an overview of how they expect behavioural economics to contribute concretely to a more effective protection of vulnerable consumers. We then provide some examples of policies that have been implemented recently, highlighting that the evidence on their success is quite mixed.

Overall, the analysis of what institutions are doing shows that behavioural economics and neurofinance have the potential to significantly strengthen the toolkit for financial consumer protection. However, it is important to recognise that international experience is still rather limited and not always accompanied by cases of clear success. In terms of cost-benefit analysis, it is important to recognise that while research in this area is quite complex and costly, its translation into policy is relatively cheap. For example, evidence from behavioural economics and neurofinance may suggest how to better present information to consumers; the

subsequent policy may then consist of just a few changes to the documentation that consumers are asked to read and sign.

Given the high complexity and cost of research in behavioural economics and neurofinance (for example, it often requires articulated experiments or advanced medical equipment), collaboration with academics is essential to exploit synergies. Specialised units created within institutions should work with academics on research projects, develop a network of experts in the field and interested in applications to financial consumer protection, and, more importantly, devote their main efforts to designing possible policy changes.

References

Affinito M., Galotto L., Privitera F. (2024), The case for mindful customer protection A review and some thoughts on neuroeconomics and neurofinance, Banca d'Italia, Questioni di economia e finanza, 888, 2024.

AFM (2016). AFM and the application of behavioural insights. Published: October 2016.

AFM (2016). Caution! Borrowing money costs money. A study of the effectiveness of a warning in credit advertisements. Published on December 2016.

AFM (2019). Making it easier to borrow responsibly. The effect of online choice architecture on consumer borrowing behavior. Date of publication: 26 November 2019.

AFM (2019). A closer look at consumer borrowing. An analysis of decision-making behaviour and potential interventions in the consumer credit market. Date of publication: 17 May 2019.

Agarwal S., Chomsisengphet S., Mahoney N., Stroebel J. (2015). Regulating Consumer Financial Products: Evidence from Credit Cards. The Quarterly Journal of Economics, Volume 130, Issue 1, February 2015, Pages 111–164.

Banerjee, S., John, P. (2023). Nudge and nudging in public policy. In: van Gerven, M., Allison, C.R. & Schubert, K. (Eds.) Springer encyclopedia of public policy. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4314881

Caterina R. (2012). Psicologia della decisione e tutela del consumatore, Analisi giuridica dell'economia. Il Mulino No. 1/2012.

De Bonis R., Guida M., Romagnoli A. and Staderini A. (2022). Educazione finanziaria: presupposti, politiche ed esperienza della Banca d'Italia. Questioni di economia e finanza, 726, 2022.

Erta K., Hunt S., Iscenko Z. and Brambley W. (2013). Applying Behavioural Economics at the Financial Conduct Authority. FCA Occasional Paper No. 1. Date of publication: 9 April 2013.

European Commission (2019). Consumers, Health, Agriculture and Food Executive Agency, Suter, J., Landzaat, W., Natriaj, A. et al., Behavioural study on the digitalisation of the marketing and distance selling of retail financial services – Final report, Publications Office, https://data.europa.eu/doi/10.2818/982380.

European Commission (2021). The evolution of behavioral analysis in the European Commission.

European Commission (2023). Study on European consumers' over-indebtedness and its implications. Final Report.

Kahneman D. (2003). Maps of Bounded Rationality: Psychology for Behavioral Economics. The American Economic Review, Vol. 93, No. 5 (Dec., 2003), pp. 1449-1475.

Kahneman D. (2011). Thinking, fast and slow. Farrar, Straus and Giroux.

Kell P. (2016). "ASIC and behavioural economics: Regulating for real people", Speech, The Impacts of Behavioural Economics on Financial Markets Regulations Symposium, (Brisbane, October 18th, 2016).

Kenning P., Linzmajer M. (2010). Consumer neuroscience: an overview of an emerging discipline with implications for consumer policy. Journal für Verbraucherschutz und Lebensmittelsicherheit, 6, 111-125.

Lunn P. and M. Bohacek (2016). An Experimental Investigation of Personal Loan Choices, Dublin: Central Bank of Ireland, Commission for Communications Regulation, Commission for Energy Regulation, Competition and Consumer Protection Commission, ESRI. Published on July 2016.

Linciano N. (2010). Cognitive biases and instability of preferences in the portfolio choices of retail investors. Consob. Working papers No. 66.

Linciano N. and Soccorso P. (2017). Conoscenze finanziarie, attitudini e scelte di investimento degli italiani, Quaderni di finanza. Le sfide dell'educazione finanziaria. La rilevazione di conoscenze e bisogni formativi, l'individuazione dei destinatari delle iniziative, la definizione di una comunicazione efficace. Consob No. 84.

Morera U. and Marchisio E. (2012). Finanza, mercati, clienti e regole… ma soprattutto persone, Analisi giuridica dell'economia. Il Mulino No. 1.

PriceLab (2016). An Investigation of Consumers' Capabilities with Complex Products. Published on May 2016.

OECD (2022). G20/OECD High-Level Principles on Financial. Consumer Protection. https://web-archive.oecd.org/2022-12-12/648348-G20_OECD%20FCP%20Principles.pdf

Tversky A. and Kahneman D. (1974). Judgment under Uncertainty: Heuristics and Biases. Science, Vol. 185, No. 4157.

Tversky A. and Kahneman D. (1981). The Framing of Decisions and the Psychology of Choice. Science, Vol. 211, No. 4481.

United Nations (2016). United Nations Guidelines for Consumer Protection. https://unctad.org/system/files/official-document/ditccplpmisc2016d1_en.pdf

World Bank (2017). Good Practices for Financial Consumer Protection, 2017 Edition. World Bank, Washington, DC. http://hdl.handle.net/10986/28996 License: CC BY 3.0 IGO.