

2 Introduction

2.1 Interdisciplinarity of law and economics, sociology, psychology and information technology with regard to financial markets

The regulation of financial markets is a crucial aspect of the modern economy, with the goal of protecting consumers and preserving the financial system's integrity and stability. In recent years, in the wake of crises and other black swans – events which are unexpected but of major consequence and happen more often than one would statistically think (Taleb, 2007) – there has been increasing debate about the effectiveness of existing regulations and whether they need to be strengthened or modified.

While one might muse that the financial sector became a predator instead of a creator of wealth and that the financial industry has become too powerful and is not adequately regulated for the prevention of harmful practices such as predatory lending and financial fraud, others may argue that excessive regulation can stifle innovation and economic growth. In other words it might be deemed to not be Pareto efficient. Pareto efficiency, also known as Pareto optimality, refers to a state in which it is not possible to improve the well-being of one individual without decreasing the well-being of another. This concept is named after the Italian economist Vilfredo Pareto, who first described it in the early 20th century (Debreu, 1954, p. 588). Regulation is intended to prevent and counteract market failures, but it is a cost factor in its own right, which is why an optimum efficiency may not be achieved (Bergt, 2020, p. 244 fn 611).

As economist and Nobel laureate Milton Friedman famously said, "I think the government solution to a problem is usually as bad as the problem and very often makes the problem worse." (Friedman, M., 1975, p. 6). Critics of heavy-handed regulation argue that it can create unnecessary barriers to entry for new firms and limit competition, ultimately harming consumers.

One potential solution to this debate may be the implementation of more targeted and effective regulations. For example, rather than imposing blanket rules on the entire financial industry, regulators could focus on specific areas where there is a clear need for intervention, such as consumer protection or market integrity. This approach could allow for more flexibility and adaptability in the regulatory framework, while still achieving the overall

goals of protecting consumers and promoting stability; albeit potentially imposing a higher workload on public policy makers.

7 Overall, the regulation of financial markets is a complex and contentious issue, with valid arguments on both sides. Legislative regulators and those who make public policy must closely consider the effects of their decisions and work to strike a balance between the needs of economic development and innovation and consumer protection.

8 As such the present work aims to provide a conceptual overview of financial market regulation, delving into economic aspects of regulation and public policy making of traditional or centralized financial intermediaries also taking behavioral economic and investment psychological findings like the making of investment decisions, etc into consideration.

9 There have been numerous studies examining the psychological factors that influence investment behavior in (centralized) finance. One common finding is that investors and consumers may be influenced by a fear of missing out (FOMO), which can lead them to make impulsive or poorly informed investment decisions. The investment process may also be affected by cognitive biases, which are consistent patterns of deviation from rationality or normal judgment. These biases can lead individuals to make irrational or suboptimal decisions, such as overconfidence in their ability to predict market movements or a tendency to underestimate risk. Consumer and investor protection is an important issue in the field of finance, as it seeks to make sure that individuals take well-informed choices about their investments and are not taken advantage of by unscrupulous actors. Public policy can play a role in promoting investor and consumer protection by setting rules and standards for financial institutions and products, as well as by providing education and resources to help individuals make informed decisions (Barberis & Thaler, 2003, p. 1053; IOSCO Research Report on Financial Technologies (Fintech), 2017, p. 32).

10 These findings on where we are coming from on regulation of centralized finance shall be analyzed with regard to decentralized finance (DeFi). This conceptual literature review will assess the definition of decentralized finance and will briefly digress on the technological aspects of necessary underlying technologies for DeFi and what was coined by Schär as “*decentralization theater*” – the risk of deception in the decentralized finance (DeFi) industry, where some protocols may appear decentralized but are actually centralized (Schär, 2022) – as well as the lost sociology of law in Europe in that regard. Topics will be covered such as: Where are we standing now on peer-to-peer lateral exchange markets? What is

the role of the EU Markets in Crypto-assets Regulation (MiCAR) and the European Securities and Markets Authority's (ESMA) distributed ledger technology (DLT) pilot regime and how do these policies interconnect with existing regulation on centralized finance? What are the risks, prospects and chances of decentralized exchanges respectively decentralized trading venues or exchange markets. And most importantly – which investment psychological or behavioral economic findings with regard to traditional centralized finance may be transposed to public policy making concerning decentralized finance and where does it make sense based on research to regulate such markets, to what degree and in what way? For this purpose, it is not only relevant but necessary to make excursions into cross-cutting subjects such as law and some technological aspects of information technology. As the research matter on one hand intersects with economical, sociological and psychological areas and on the other hand with legal aspects of public policy and to some degree also with technological implications, the thesis at hand aims to provide a conceptual overview on the subject matter considering the different disciplines and their respective approaches. While the mentioned overlapping individual fields of study offer their respective perspective on the regulation of financial markets, the intertwining of these fields construes a complex subject matter, which shall be presented and penetrated in this work to analyze the insights resulting therefrom in order to act as a basis for upcoming research.

2.2 Sciences vs Humanities – the lost sociology of law in Europe?

The complexity also becomes apparent due to controversies with regard to interdisciplinary approaches which particularly also hold true for economical and sociological components of legal sciences. The sociology of law has seemingly atrophied in Europe in contrast to the USA for example, probably still going back to some degree to Hans Kelsen's hypothesis of the "Pure Theory of Law" or "reine Rechtslehre" in German – at least for some jurisdictions like Austria and other German speaking jurisdictions. 11

In this regard there is also a new school of thought emerging in American legal philosophy referred to as new legal realism. Suchman and Mertz discuss the intersection of empirical legal studies and new legal realism and the potential future of empirical research on law. Empirical legal studies describe a field that uses social science methods to study law, while new legal realism is a school of thought which emphasizes the functions of law in 12

people's daily lives and investigates it using multidisciplinary social science techniques. However empirical legal studies tend to focus specifically on legal questions in contrast to legal psychology and sociology of law. New legal realism in turn rather puts more weight on the utilization of both quantitative and qualitative social science methods and may also embrace mixed methods approaches (Suchman, Mertz, 2010, p. 555).

- 13 In the field of legal sciences, there is a distinction between normative and empirical questions. Normative questions concern what should be the case or what is considered morally right, while empirical questions concern what is actually the case or what can be observed in reality. In the process of applying the law, legal professionals typically first address normative questions by determining the statutory requirements or standards that apply to a particular case. They then move on to consider empirical questions by examining the specific facts of the case and comparing them to the established standards. Legal scholarship tends to focus more on normative questions, while the work of judges in the courtroom is to some degree empirical in nature but tends to be more descriptive and focused on clarifying the facts of a case. The study and consideration of empirical or sociological aspects of law, such as general causal relationships among social phenomena, has relatively little weight in public policy, legal practice and scholarship. However, there are some jurisdictions, e.g., the United States, where there is a long and distinguished history of empirical sociology of law (Petersen, 2010, p. 435).
- 14 Hopman argues that the theories of legal scholars Hans Kelsen (Pure Theory of Law) and Eugen Ehrlich ("Foundations of the sociology of law" or in German "Grundlegung der Soziologie des Rechts" from 1913), who are often seen as being on opposite ends of the legal theoretical spectrum, can be reconciled and should be seen as complementary rather than opposing. The author suggests that the theories of Kelsen and Ehrlich, which are typically seen as opposing, can actually be reconciled and seen as complementary. It is argued that combining both approaches, which focus on written legal codes and state law (Kelsen) and empirical data and society (Ehrlich), can provide a more comprehensive framework for understanding the legal systems within a given social field, including situations of legal pluralism as studied by Merry (Merry, 1988, p. 869). This argument is based on the idea that a synthesis of the two theories can be useful in studying the relationship between law and society (Hopman, 2021, p. 1).
- 15 One potential criticism of this interpretation is that it may not adequately address potential counterarguments or alternative viewpoints. For example,

it is possible that some may disagree with the author's suggestion that the theories of Kelsen and Ehrlich can be reconciled or may argue that one approach is more useful or valid than the other, especially as both authors left a history landmark in legal sciences and are undisputed authoritative figures in their fields, and essentially stated themselves that "what should be the case" (normative questions) and "what is the case" (empirical questions) has to be strictly separated and may not be intermixed. The arguments of Hopman may therefore be set aside by critics while it should be pointed out that this new perspective might also lead to a rethinking at the core of legal sciences. Combining both approaches can provide a more comprehensive understanding of the legal systems within a given social field, including situations of legal pluralism where multiple legal systems coexist. This does not necessarily mean that one approach is more valid than the other, but rather that both approaches can offer valuable insights and should be considered together in order to gain a more complete understanding of law and its relationship to society.

In terms of the broader context in which these theories were developed, 16 it is important to note that both Kelsen and Ehrlich were writing at a time when the study of law and society was a relatively new and rapidly evolving field. Kelsen was a prominent legal positivist who focused on the formal and written aspects of law, while Ehrlich was a pioneer in the field of sociology of law who emphasized the importance of studying empirical data and society in order to understand law. Both Kelsen and Ehrlich made significant contributions to the development of these fields and their theories have had a lasting impact on the study of law and society.

In this regard it should also be noted that Kelsen, who as a jurist is often 17 thought of as an opponent of sociology, actually almost became a sociologist and saw himself as one in the 1920s. Even the University of Frankfurt's Oppenheimer Chair in Sociology was almost given to him in 1929. Kelsen argued that sociology has two roles, for one describing inherent normative laws and for another exploring the circumstances under which a normative conception becomes effective through a causal-scientific approach. It may be concluded that Kelsen had a surprising shift towards sociology for the 1920s (Feldmann, 2021, p 316).

Additionally, it is also important to recognize that these theories have 18 evolved and been further developed over time, and there may be more recent approaches and perspectives that also contribute to our understanding of law and society.

- 19 Perhaps this opens the way leading to a new era of “scientification” of legal jurisprudence or putting the science back in legal sciences and doing away with empirically unprovable hypotheses inaccessible to validation like the Pure Theory of Law. It is important to note, that this work in no way wishes neither to discredit the achievements of the two aforementioned distinguished legal scholars and thus place itself on the sidelines of scholarly debate nor try to reconcile the theories but merely critically disseminates them and then moves on to scholarly works developed in this field since then.
- 20 Kelsen, while undoubtedly a luminary genius of legal logic and doctrine and virtuoso of modernist legal theory and also a realist, considering the *Zeitgeist* of his epoch and his quote “*Democracy is the form of government that resists its opponents the least. It seems to be its tragic fate that it must also feed its worst enemy at its own breast.*” (Klecatsky, Marcic, Schambeck, Kelsen et Merkl, 1968, p. 1417 et seq.), probably thwarted – inadvertently – empirical approaches due to his initial hypothesis of the Pure Theory of Law with regard to legal science for at least 100 years in Europe, if not more, even though he essentially renounced his own hypothesis as fictitious already in 1960. This phenomenon of a debunked myth, which still seemingly persists in the hearts and minds of people today and arguably to a large extent has the Austrian or German speaking legal education system in its grip, is well-known to cognitive psychologists.
- 21 Several studies indicate that the correction of false information memorized by people is difficult and attempts at correction frequently fail due to the inevitable focus on misinformation when trying to debunk it. This regularly increases the familiarity of the misinformation and makes it even more so believable (Lewandowsky, Ecker, Seifert, Schwarz et Cook, (2012), p. 106-131.). Simply repeating false information, even as absurd as flesh-eating bananas, may further strengthen a person’s conviction in this information (Schwarz, Newman et Leach, 2016, p. 85-95.). Even the correction strategy of myth vs fact has shown to convince people even further of the first rather than the latter (Schwarz, Sanna, Skurnik et Yoon, 2007, p.127-161). As words of warning before the actual false information have shown effective in alerting people and making them able to repel false pieces of information (Ecker, Lewandowsky et Tang, 2010, p. 1087-1100; Blank et Launay, 2014, p.77-88.), the present work follows this best-practice approach by starting with the hard truth (especially for any legal practitioner or expert, particularly from the German speaking jurisdictions and there

Austria and Liechtenstein) that the Pure Theory of Law by Kelsen is in fact fictitious– as he stated himself.

It may be argued that while jurisprudence studies law or legality directly 22
in various situations, sociology, respectively the sociology of law studies society in such cases. Ultimately, they explore the same phenomena. However, one approach in uncovering this relativism of values, as Kelsen would have called it, in its core is scientific and empirical (sociology of law), while the Pure Theory of Law is an unproven, and unfortunately unprovable hypothesis – a fact which was beknown to its propagator (Kelsen, 2017, Study edition of the 2nd edition 1960, p. 363 et seqq.).

Unarguably values of a society are relativistic in the sense that certain 23
values are agreed upon in a specific form of consensus in a social contract with defined participants and/or peers pursuant to the philosophical social contract theory. These values are in some form written down and stipulated as normative legal provisions, e.g., in a constitution.

This social contract should not be derived from some transcendental 24
basic norm which would be somewhat akin to circular reasoning and apodictic. Kelsen's basic norm or "*Grundnorm*" pursuant to his Pure Theory of Law is not set (as statutory law) and has no content. It is presupposed in order to conclude a legal order in itself. The basic norm is therefore a transcendental logical presupposition. The Pure Theory of Law treats transcendental laws, like the so-called natural law or the "reason law" as advocated by Kant, among others, as unscientific, as they place their source and legitimacy in a divine entity or divine laws (e.g., the Greek *logos* in philosophy). The aim of the Pure Theory of Law is to separate the scientific description of law from the extraneous admixtures of a sociological, psychological, biological, nature, among others. The Pure Theory of Law advocates the postulate of separation between the sphere of being, i.e., propositions about facts (that which is), and the sphere of ought, i.e., propositions about the normative (that which shall be), resulting in a methodological dualism. Kelsen believed that within a scientific depiction of a legal system, there must be something that ensures the cohesiveness of the hierarchy of legal principles. This element, referred to by Kelsen as a "basic norm" or "*Grundnorm*," is itself a legal principle that represents a real (but presupposed) norm. However, it is important to note that in his first edition of the "*Reine Rechtslehre*" Kelsen initially understood his basic norm as a hypothesis (Kelsen, 2020, Study edition of the 1st edition 1934, p. 77), while in his second edition he himself proceeds to regard the basic norm as a (legal) fiction. Later on, he further distanced himself from

his initial hypothesis (Kelsen, Ringhofer et Walter, 1979, p. 206): *“It should therefore be noted that the basic norm [...] is not a hypothesis - as what I myself have occasionally characterized it - but a fiction, which differs from the hypothesis in that it is accompanied, or is supposed to be accompanied, by the awareness that reality does not correspond to it [...]”*. What seems to have been solidified in the minds as well as in the legal curricula, at least of Austria and potentially also in other (at least German speaking) jurisdictions of Europe, however, is the myth of the original hypothesis.

25 With regard to Kelsen’s basic norm an analogy may be drawn to Sagan’s (1996) *“The dragon in my Garage”*. In this fictional dialogue published in *“The demon-haunted world: Science as a candle in the dark”* Sagan is discussing the concept of belief in something without concrete evidence to support it. He uses the example of a person claiming there is an invisible, incorporeal, heatless fire-breathing dragon in their garage as an example of a belief that cannot be tested or proven, and which is indistinguishable from a non-existing dragon. Sagan suggests that in the absence of evidence, such a claim is not valuable or meaningful, and that it may be more appropriate to consider the possibility that the person making the claim is experiencing a hallucination or other psychological issue. In turn he also discusses the idea of multiple people making similar claims with no concrete evidence, and the possibility that such claims could be true despite the lack of evidence (Sagan, 1996). The key takeaway from Sagan’s play of thought is that *“Your inability to invalidate my hypothesis is not at all the same thing as proving it true. Claims that cannot be tested, assertions immune to disproof are veridically worthless, whatever value they may have in inspiring us or in exciting our sense of wonder. What I’m asking you to do comes down to believing, in the absence of evidence, on my say-so. The only thing you’ve really learned from my insistence that there’s a dragon in my garage is that something funny is going on inside my head.”* (Sagan, 1996). Kelsen’s basic norm – as a symbol for the lost sociology of law (in parts of Europe) – is such an invisible, incorporeal, heatless fire-breathing dragon which is indistinguishable from a non-existing basic norm which may only inspire or excite one’s sense of wonders.

26 Kelsen arguably interpreted his pure theory of law in the Zeitgeist of his time meaning that legal sciences or law should be free from detrimental external influences and interests in the sense of corruption and the pure theory of law being a mechanism of checks and balances. This is of course still relevant today. As Jean-Jacque Rousseau emphasized, the national public power derives its legitimacy from its people, meaning that the government

acts as the executive branch of its sovereign and the government's power in turn is backed by the trust of the people. When public power (including the public policy process or legislative power, next to the executive and judiciary power) is used in deviation of these basic principles, problems of corruption arise (Liu, 2016, p. 171.). In other words, public power may be abused for the benefits of the private, nevertheless it remains questionable whether the pure theory of law is a valid instrument to counter such external influences or whether it would not be more beneficial to better understand such external influencing factors of sociological, psychological, biological, religious, ethical and political nature in order to then counter detrimental aspects of such externalities.

While the Pure Theory of Law is certainly one of the most valuable and 27 influential legal theories of the past millennia, let's propose our own hypothesis as an outset, which will however not be validated in this paper. This hypothesis would state that the aforementioned consensus mechanisms, inherent to any social contract that establishes the core (yet relative and on a cosmic scale even ephemeral) values of a society at a given point in time, are prone to the many distortions and cognitive biases in human decision making. If this was the case, the sociology of law, as an empirical field of study would have its *raison d'être*. If societal values are relativistic, it goes without saying that it should at least be understood how we reach these decisions on which values we want to live by, bind ourselves and adhere to in a social contract, e.g., through constitutional law or stipulating other legal statutes and provisions pursuant to Adolf J. Merkl's and Kelsen's hierarchy of legal structure (Kelsen, 2017, p. 228 et seqq). Furthermore, it should be analyzed whether decisions made with regard to public policy are at all capable of implementing and achieving the intended goals – whether decisions are efficient with regard to the intended goals or mere miss and hit or pure guesswork. With Kelsen's Pure Theory of Law, it is much like with his quote on democracy – it should not allow itself to be influenced by interests that are alien to it and yet this is precisely the case if put in reality. However, Kelsen (Klecatsky et al, 1968, p. 1417 et seq.) was well aware of this discrepancy between ideology and reality – of that which shall be (*"Sollen"*) and that which is (*"Sein"*): *"And despite this opposition to social reality, perhaps even because of this opposition, the idea of freedom is and remains the eternal basic dominant of all political speculation and thus forms, as it were, the counterpoint of all social theory and state practice."* Given that idealistic notions may never be, it may very well be best to focus on the things which actually "are" and how they appear respectively how they are

(empirically) called into existence (*nooumena* and *phainoumena* pursuant to Kant's Critique of Pure Reason, both of which still refer to "that which is" if one was so inclined to interpret these two terms in the context of "Sein" and "Sollen", albeit both Kant's definition of *nooumena* and Kelsen's definition of the basic norm changed over time. Kant's definition before the Critique of Pure Reason probably aligned with Kelsen's initial formulation of the basic norm as a hypothesis as a "Sollen" which is intelligible yet not sensible in the words of Kant – cp. Kant, 1900; also cp. Kelsen, 2017, Study edition of the 2nd edition 1960, p. 363 et seqq.).

- 28 With all this in mind the hope remains – in the proverbial Pandora's box – that the empirical "scientification" of legal sciences will await us in the 21st century, away from pseudoscience, paving a way towards a science of jurisprudence. For lack of a better name, it shall not be called the "science of law" as the field of legal sciences are without a doubt already scientific in terms of humanities, or "empirical law", which may be misunderstood to refer only to empirical legal studies. Instead, the terminology is likely best to be kept within the frames of the sociology of law. Given that law is a set of norms that regulate social coexistence, it appears only obvious that aspects of sociology should play a major role in legal sciences. What has long since happened to physics and astronomy as well as other science studies, gradually is appearing in economic, sociologic and psychologic sciences, may yet emerge for legal sciences (particularly in central Europe). For this to happen it would likely also require further education in economic and sociological sciences with at least a modicum of behavioral economics in the curricula of legal sciences for future lawyers, judges, policy makers and others who are either involved in the legislative procedure or in the execution of these legal norms.

2.3 Scope & Research Subject

- 29 The research issue has been outlined to some degree under section 2.1 (margin number 10). The specific research question to be assessed is: "*Which objectives of financial market regulation make sense with regard to decentralized finance, taking into account insights from behavioral economics and regulatory policy?*" As this work is of conceptual nature in form of a literature review and not empirically in itself it is also the aim to attempt to identify, define and outline areas of research to be empirically investigated in the future. The focus lies on regulated intermediaries, not

on the perceived regulation by consumers. Thus, centralized intermediaries bridging the centralized and decentralized systems and peers in the decentralized finance (DeFi) ecosystem are analyzed and it is assessed whether intervention through regulation in the financial ecosystem should be considered, and if so in which form, based on behavioral economic and public policy findings.

2.4 Methodology

The methodology with regard to the work at hand is of literature-based conceptual nature. The aim of this literature review is to include relevant and current economical, sociological and psychological findings on regulation of centralized financial markets on the one hand and synthesize them with existing legal implications on the other hand in order to also give an outlook on future public policies in the field of decentralized finance, also taking into account the technological foundations of distributed ledger technology. From the perspective of the legal sciences law texts and other legal sources are used as primary legal literature, like the European Markets in Crypto-assets Regulation (MiCAR; COM/2020/593 final) with regard to the regulation of centralized intermediaries dealing with assets based on decentralized technologies which are as such at an intersection with decentralized finance. Other legal literature on centralized finance and financial markets or secondary European legislation may be consulted, like the Markets in Financial Instruments Directive as amended (MiFID II; Directive 2014/65/EU), the Central Securities Depositories Regulation (CSDR; Regulation (EU) No 909/2014), the Electronic Money Directive (EMD II; Directive 2009/110/EC) etc, each as amended, among others. 30

A literature review is a written summary of published research on a specific subject. It could simply be a list of sources summarized, or it could have an organizational structure that includes a summary and synthesis of the information. A literature review is different from an academic research paper, as a literature review's primary goal is to summarize and synthesize the existing arguments, concepts and ideas on the topic. Literature reviews are commonly written in the sciences and social sciences and can serve various purposes, such as providing an overview of a topic, keeping professionals up to date with current research in a field, and providing a solid background for a research paper's investigation. The body of the review may be organized chronologically, thematically, or methodologically, 31

depending on the focus of the review. The process of writing a literature review involves finding and evaluating sources, identifying key themes, and synthesizing and organizing the information. The final work should be a well-organized and concise overview of the current state of knowledge on the topic. The summary and synthesis of ideas is done with the goal of defining questions and providing a perspective on topics to be explored further (Anson et Schwegler, 2000; Jones, Bizarro et Selfe, 1997; Lamb, 2006; Rosen et Behrens, 2000; Troyka 2002).

- 32 A literature review aims to identify specific research questions, provide context for one's own research, and improve understanding of theoretical concepts and terminology in the field. The process of preparing a literature review involves defining the focus of the review, conceptualizing the topic, finding relevant literature, analyzing and synthesizing the literature, and defining research questions based on the literature studied (Becker, 2012). Cooper's (1988) taxonomy of literature reviews classifies them based on their focus (results, methods, theories, or application), goals (integration, critique, or identification of key challenges), perspective (neutral presentation or taking a position), coverage (full, selective, representative or central), organization (historical, conceptual, or methodological), and target audience (experts, science community, practice/policy, or the public) (Cooper, 1988). The literature search is a systematic and comprehensive search for all types of publications on a particular topic. It aims to identify key people, organizations, and texts in the field, evaluate the quality of different sources of information, and identify gaps in previous research. Different sources of literature include books, articles in scientific journals, and grey literature such as theses and technical reports. The focus of the search should be on high-quality literature such as peer-reviewed articles and conference proceedings. However, the search should not be limited by methodology, geographic region or a small set of journals. To plan the search effectively, it is helpful to consider the purpose of the search, the specific search question, any constraints on the search, the expected coverage of the search, and the resources available for the search. It is also important to document the search process and keep track of the literature found (Becker, 2012).

| Characteristic | Categories | | | |
|----------------|------------------------|--------------------------|-----------------------------|-------------------|
| Focus | Research outcomes | Methods | Theories | Applications |
| Goal | Integration | Criticism | Central Issues | |
| Perspective | Neutral representation | | Espousal of position | |
| Coverage | Exhaustive | Exhaustive and selective | Representative | Central / Pivotal |
| Organization | Historical | Conceptual | | Methodological |
| Audience | Specialized scholars | General scholars | Practitioners / Politicians | General public |

Figure 1: Taxonomy of Literature Reviews (Becker, 2012), following Cooper, 1988, with categories applied on this work being emphasized in green.

Using Cooper's abovementioned taxonomy as depicted in the table, the focus of this paper lies on theories, with its goals on integration and identification of key challenges and central issues, the perspective of a neutral presentation with a taking of position or recommendation with regard to potential future public policy on the regulation of decentralized finance at the conclusion. The coverage is central, focusing on relevant literature with regard to the research matter as defined hereinafter. The organization is of conceptual nature with the target audience being predominantly the science community, practitioners and policy makers.

The objective of this review is to examine the literature related to investment psychology in financial markets, behavioral finance and economics, public policy, financial market regulation, decentralized finance, and crypto asset market regulation. To systematically search for and select literature for this conceptual review, the following methodology was employed to ensure the comprehensiveness, actuality, and relevance with regard to the research matter:

- **Study Design and Scope:** The research question, subject and scope of the literature review were defined and specified clearly pursuant to section "2. Introduction", in particular under section "2.3 Scope & Research Subject" in connection with Section 2.1 margin number 10.
- **Database Selection and Search Strategy:** Relevant databases such as Google Scholar and Scopus were searched using keywords and filters

to narrow down the results related to “*investment psychological findings financial market*” (total results at time of search in Google Scholar: about 1,810,000), “*investment decisions and biases*” (total results: about 1,460,000), “*behavioral finance*” (total results: about 5,320,000), “*behavioral economics*” (total results: about 6,150,000), “*regulatory public policy*” (total results: about 4,310,000), “*financial market regulation / public policy*” (total results: about 3,930,000), “*decentralized finance*” (total results: about 928,000) and “*markets in crypto assets regulation*” (total results: about 37,200) both individually and combined with each other. The initial search using the eight keyword combinations yielded approximately 23,945,200 studies. This huge number of studies could not possibly be evaluated within the scope of this work. Only search results of 1,000 studies per search were displayed. Sorting by relevance was applied and the search was then further limited to 100 studies per search, totaling 800 studies.

- Search patterns were refined with asterisks to find related works (e.g., the search term “finan*” for both “finance” and “financial”).
- **Eligibility Criteria & Quality Assessment:** Studies should be in English or have an available English translation. To ensure the quality of the research, peer-reviewed studies were prioritized. Studies should pertain to one or more of the following topics: investment psychology in financial markets, behavioral finance, behavioral economics, public policy, financial market regulation, decentralized finance, and crypto asset market regulation. High-impact journals were prioritized, and citation tracking was employed to determine the most influential papers in the respective field and with regard to the respective search term.
- **Time Constraints:** The search was not limited timewise; however, a focus was set on works published after the year 2000, with the exception of basic literature and central works, particularly in the context of an introductory historical digression.
- **Cited Reference Search:** Cited reference searching was used to determine influential research and to locate current research based on such previous influential research. This was conducted in order to subsequently include corresponding articles since the original publication. Cited references were also searched to find out how many times and where a publication is being cited and who is citing a particular paper. This approach also aimed to uncover a broader set of relevant literature.

- **Author Search:** Based on this, search for authors who have published relevant works in the fields covered in this review have also been identified and their works have been included.
- Additionally, the search pattern has been supplemented with the keywords that are keyworded in the respective article.
- **Inclusion of Other Relevant Works:** Works that had gained notable attention in other ways, such as at conferences or in the media, were also considered for inclusion. Regulatory documentation and government documents were also included, while other grey literature was not used.
- **Screening and Selection:** All studies identified this way were screened based on their titles and abstracts for relevance to the topic and research question (initial screening). After the initial screening, filtering out duplicates and considering the eligibility criteria, a total of 542 studies out of 800 remained.
- The full text of potentially eligible studies was assessed for inclusion in the review. After the quality assessment process and further detailed evaluation of the content, 312 studies and articles were finally included in the review.

The methodological approach taken in this research involves a selective, localized and exemplary assessment of three key decisions from the Austrian Supreme Court and European Court of Justice to understand how the focus of banking regulation has evolved in practice in the legal landscape to put regulatory goals into perspective, considering the contrasting interests of individual investor protection and collective financial market stability. In order to gain a comprehensive understanding of regulatory goals and to put the scientific findings into perspective, it is necessary to examine pertinent legislation and regulatory documents. The focus was on capturing the overarching objectives and policy implications rather than detailed provisions. This is done in parallel with the review of the scientific literature (data extraction and synthesis). From the final set of selected documents, information was extracted and synthesized to provide insights on regulatory goals as defined by legislators. 35

