C. Research Program

C.I Behavioral Law and Economics

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Postdocs
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Claudia Cerrone, Ph.D. (economics, joined in 2016 from Royal Holloway)
Dr Stefanie Egidy (law, joined in 2016 from Würzburg and Yale Universities)
Dr Jens Frankenreiter (law, joined in 2017 from ETH Zurich)
Dr Dr Hanjo Hamann (law and economics, joined as postdoc in 2016)
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Dr Michael Kurschilgen (economics, left in 2015 for Technical University Munich)
Prof Aniol Llorente-Saguer, Ph.D. (economics, left in 2013 for Queen Mary)
Dr Dr Alexander Morell (law and economics)
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Dr Pedro Robalo (economics, joined in 2014 from University of Amsterdam, left in 2017 for the Portuguese Antitrust Authority)
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Prof Dr Andreas Glöckner (psychology, and Hagen University)
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Doctoral Students
Konstantin Chatziathanasiou (law) 2014
Lars Freund (economics) 2015
Svenja Hippel (economics) 2014
Leonhard Hoeft (law) 2014
Dr Marco Kleine (economics, Dr rer. pol. in 2015)
Dr Dr Pascal Langenbach (law and economics; Dr jur. in 2016, Dr rer. pol. in 2017, currently intern)
Dr Monika Leszczynska, née Ziolkowska (law, Dr jur. in 2016)
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Carina Hausladen (economics)
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The core mission of the group is research on behavioral law and economics. Hence in its core the work is interdisciplinary. Since the group is headed by a lawyer, this report is written from a legal angle. But much of the work in the group could also be interpreted as contributions to behavioral institutional economics, or to behavioral economics more broadly. The primary market for former postdocs in law is German law schools. To be considered in this market, postdocs must pass their *habilitation* and must have a portfolio that matches demand. To a lesser extent this constraint also affects doctoral students in law. This constraint explains why the lawyers in the group cannot exclusively focus on law and economics (whether behavioral or not), and must in particular be more plural in the methods they use, including doctrine. For the group, this framework condition is not only a limitation. It explains why it is, for each legal scholar in the group, important to find her personal way of combining rigorous empirical analysis with a substantial legal topic of obvious relevance for the discipline. What holds the group together is the commitment to serious empirical analysis, rather than one single legal topic.

The work of the group largely benefits from cooperation with the experimental economics group, the former economic theory group, with the three independent research groups, and with emeritus professor Werner Güth. Where the links are particularly prominent, this report hints at them. All PhD students are part of the International Max Planck Research School. Since 2016, PhD students in economics are jointly hired with the Cologne Graduate School. Students participate in both programs. Despite the fact that three students are paid by Cologne University, their work is covered by this report, since in practice there is deliberately no distinction according to formal attachment to either Cologne University or the institute.

From the vantage point of law, the group publishes on six issues: defining normative problems that call for legal intervention (1), understanding the effect of legal intervention (2), applications to specific areas of law (3), rule generation and rule application (4), empirical methods (5), and, last but not least, translations of empirical findings into the legal discourse (6).

C.I.1 Normative Problems that Call for Legal Intervention

Any legal intervention curtails individual freedom. Under German constitutional law, this statement even implies that any legal intervention is constructed as an interference with a constitutionally protected right; if no more specific right is applicable, the intervention falls under the purview of the general clause in Art. 2 I Basic Law. Consequently, any legal intervention needs justification. Under the principle of proportionality, it must pursue a legitimate aim, it must be conducive to achieving this aim, it must be the least intrusive intervention, and it may not be out of proportion, given the intensity of the intervention, on the one hand, and the pursued goal, on the other hand. While other constitutions are less encompassing, they also enshrine the principle of "teleological" interpretation: ambiguous legal rules should be interpreted such that they foster the goal the rule is meant to achieve. Even without invoking the constitution, this doctrinal principle follows from an interpretation of legal rules as attempts at governing society. In this perspective, interpretation should be attentive to the social purpose the rule is supposed to serve.

Any of these doctrinal approaches builds a bridge between interpreting the law and policy-making. It turns doctrine into a subsidiary exercise in legal policy-making. It is a technology for empowering administrative agencies and courts. This is why legal orders are differently upfront about this aspect of doctrine. But even if the language is more cautious (as, in particular, in the originalist school of US constitutional law), a certain dose of policy-making by adjudication is hard to avoid.

Whenever a legal scholar, explicitly or implicitly, engages in policy-making, she must get the facts right. In the first place, is there a normative problem that calls for legal intervention? In which precise ways can this problem be defined? In essence, this boils down to the law making a causal claim. There is a social ill. It

originates in the behavior of discernible individuals. As long as this behavior goes unchecked, the social ill will persist, or aggravate for that matter.

The classic illustration is what is in the name of the institute. Society faces a "**collective-goods** problem". If one borrows the assumption of "standard preferences" from (welfare) economics, the normative problem can be precisely defined. The explanatory model makes two interconnected assumptions: Individuals only care about their own utility, and they expect everybody else to do the same. If payoffs are such that (a) every individual makes the highest profit if all others cooperate and she defects and (b) every individual makes the lowest profit if she cooperates and all others defect, the situation can be modeled as a prisoner's dilemma. The game is dominance-solvable, meaning that the individual does not need beliefs about the choices of her (possibly unknown) interaction partners. Whatever they do, she is best off defecting. This feature of the game constitutes the dilemma. Multiple situations that have indeed met with legal intervention can be analyzed with this model, including most environmental problems, contributions to the provision of infrastructure, police and the military, or financial stability. In the past, all parts of the institute have analyzed many of these problems. The group has chiefly done so from a behavioral angle. It has aimed at understanding in which contexts and under which framework conditions the predictive power of the standard economic model is less good. In which cognitive and motivational ways must the standard model be modified? How robust are these qualifications (for a summary account, see Engel 2016c)?

In the years covered by this report, the group has continued to work on these issues. An experiment shows that, empirically, a classic 2x2 prisoner's dilemma with a binary action space constitutes a game of multiple motives. Individual profit, beliefs about choices of others (optimism), gains from cooperation (efficiency), aversion against advantageous inequity (social preferences), and risk and loss aversion are simultaneously needed to rationalize choices (Engel and Zhurakhovska 2016). This explanation is consistent with, but qualifies, the claim that most individuals are "conditionally cooperative": they cooperate if they know or expect enough others to cooperate as well.

The standard test implements a very clean situation: all members of a randomly composed group are in the same boat. Many real-life dilemmas are of a different nature. Cooperation is good for a group of insiders, but bad for outsiders. A classic illustration is oligopoly. If an industry consists of a small number of suppliers, they may well succeed in overcoming the "competition dilemma" among them. But if they do and charge monopoly prices, the demand side of the market suffers. In an experiment, such a negative externality on passive outsiders reduces cooperation among insiders (Engel and Zhurakhovska 2014). Another experiment, however, finds that only a minority of insiders is willing to forego a large gain for themselves if this imposes serious harm on outsiders (Bland and Nikiforakis 2015). A conditionally cooperative individual needs information about the willingness of others to behave in a socially desirable way. This is where the theory of conditional cooperation from behavioral economics matches with the broken windows theory from the field of criminology. A paper uses reanalysis of a huge set with data from multiple public-goods experiments to test this claim (Engel, Beckenkamp et al. 2014). A follow-up paper manipulates first impressions. It turns out that selective information about cooperativeness only influences choices if it is surprising. If the context was cooperative in the first place, individuals become less cooperative if they receive bad information. If the context was uncooperative in the first place, individuals become more cooperative if they receive good information (Engel, Kube et al. 2016). Multiple contributions from other parts of the institute come under this rubric. How do conditional cooperators react if the size of the relevant population is unknown (Hillenbrand and Winter 2017)? Does heterogeneity of the relevant population make it more difficult for individuals to overcome the dilemma (Winter 2014; Dorrough, Glöckner et al. 2016; Bruttel and Güth 2017)? In which ways does imposing structure, by imposing a network in the sense of graph theory, affect cooperation (Angelowski, Di Cagno et al. 2017)?

Legal policymakers want to understand the cause of a social problem. In principle, lab experiments are excellent tools for the identification of causal effects. The experimenter may randomly draw participants

from a population, and may randomly expose some of them to a manipulation. If the choices of these participants substantially and significantly differ from the choices of other participants who have not been exposed to the manipulation, the causal effect of the manipulation is established. If the manipulation is sufficiently close to the legal intervention in question, legal policymakers learn whether this intervention is worthwhile (provided, obviously, that one trusts the experiment to be sufficiently externally valid). More often than not, this is the most an empirical legal scholar can achieve. In the spirit of program evaluation, she measures the effect of some legal intervention in terms of some well-defined outcome variable. But with this exercise, the legal scholar remains agnostic about driving forces. This makes it difficult to design alternative interventions that might be even more effective, less intrusive, less costly, or normatively more desirable. This explains why some of the work of the group has been devoted to isolating the behavioral forces that determine whether, to which degree, and under which framework conditions a social problem originates.

As a rule, isolating the effect of an intervention, and isolating a behavioral force that explains why an intervention is effective, cannot be achieved with the same manipulation. For the former research question, it is important that the experimental manipulation be sufficiently analogous to a potential legal rule. For the latter research question, it is important that the manipulation rules out competing explanations. A paper interested in the effectiveness of an institution tests the hypothesis that some intervention "works", i.e., effectively affects some outcome variable of normative interest. This hypothesis will often be theoretically motivated. But the paper cannot strictly test this theory. This is what can be done in experiments designed in the latter vein. This distinction explains why some of the work in the group has been focused on isolating behavioral driving forces, rather than the more complex situations that arguably call for legal intervention.

If one wants to isolate a behavioral effect, one must simplify the situation. Arguably many social problems originate in **selfishness**. Yet obviously in many contexts many individuals resist the temptation of making selfish choices. It is important for legal policy-making to understand these contextual variables better. An excellent tool for studying such variables is the dictator game. It takes out any strategic element. The dictator just has to trade off a smaller payoff for herself against a more balanced distribution of payoffs. Two experiments have investigated how inequity aversion is affected by uncertainty. In the field, donors can often not be sure whether a recipient really needs their help. It turns out that such uncertainty makes donors even more generous. They are averse against the risk of leaving the recipient with a (very) small payoff (Engel and Goerg 2016). In the field, donors can often not be sure either whether their donation truly reaches the intended recipient. An experiment shows that they are willing to pay extra money for making sure that the donation is effective. If such insurance is available, they become more likely to make a donation in the first place (Buijze, Engel et al. 2017). By contrast, giving the recipient a voice is not in her best interest. If she asks for more than the dictator would have been willing to give, this does not help her. But if she asks for less, the dictator happily reduces the transferred amount (Kleine, Langenbach et al. 2016). One might have thought that prisoners give less in the dictator game. Prison inmates are very likely guilty of serious crime. Criminals might be less socially minded than the average person in the street. Yet actually they give as much as students in the lab, and they give even more to a charity than to another prison inmate. Obviously selfishness is not a systematic cause of crime (Chmura, Engel et al. 2017). Work undertaken in the experimental economics group nicely complements this line of research: Which is the effect of risk attitudes and time preferences on the choices of dictators (Angerer, Glätzle-Rützler et al. 2015)? Do individuals become more generous when they decide as a team (Balafoutas, Kerschbamer et al. 2014)?

Further experiments revolve around the effect of uncertainty. Do individuals attach excessive weight to new information about a risk if they had to pay for this information (Robalo and Sayag 2017)? Does the option to share a risk with others make individuals more risk-seeking (Tausch, Potters et al. 2014)? Are individuals less willing to share risk if the level of risk is voluntarily chosen, rather than randomly allocated (Cettolin and Tausch 2015)?

A prominent criminological theory claims that an important determinant of criminal action is a lack of **self-control**. This makes it paramount for the law to understand this trait better. Arguably, group influence is important. It is easier to exert self-control if one's peers do the same. If the task has a deadline, this creates a strategic game. Theory predicts that the peer effect could be beneficial (Cerrone 2016). Previous theories also predicts that individuals who are aware of their self-control problems are better able to avoid them, but in the lab the opposite is found (Cerrone and Lades 2017). Once more, there is complementary work from the experimental economics group (Sutter, Yilmaz et al. 2015).

When legal scholars first hear about standard economic models, their reaction is usually skeptical. The assumption that individuals care exclusively about their personal well-being does not match their experiences. In recent years, behavioral economics has become more and more interested in understanding, modeling, and testing this concern. An important part of the research undertaken in the group contributes to this endeavor. If individuals are asked to elaborate their personal injunctive **norm**, this makes their choices more socially minded, but only if they are asked to define the lower bound of acceptable behavior, rather than the normative ideal (Engel and Kurschilgen 2015). In the lab, participants are willing to follow arbitrary costly rules. This willingness is even more pronounced if they can condition their own choice on the willingness of their peers to follow the same rule (Desmet and Engel 2017). In his PhD thesis, Leonhard Hoeft establishes the link to legal philosophy. Alexander Schneeberger tries to disentangle the effects of social preferences and of following rules. Eugenio Verrina wants to test the power of narratives in triggering rule-guided behavior. There is a strong link to the work undertaken by Fabian Winter and Amalia Alvarez on the effect, diffusion, and stability of social norms against hate speech, and to the work undertaken by Anna Baumert, Mengyao Li and Julia Sasse on the willingness of individuals to stand up against norm violations even if this is costly or risky for them.

An individual who maximizes expected profit chooses the level of investment into a possibly profitable activity by assessing anticipated returns. Investment in education is an application. A model shows that **disappointment aversion** may lead to severe underinvestment, calling for policies that help future students with expectation management (Anderberg and Cerrone 2017).

Many legal rules can be interpreted as interventions aiming at keeping an **anticommons** problem in check. A classic illustration is a piece of land jointly owned by multiple heirs. If each of them tries to squeeze out most of the surplus, the land never trades. Two experiments investigate the psychological forces behind this problem. It turns out that the incentive problem is indeed critical, while the endowment effect does not play a substantial role (Glöckner, Tontrup et al. 2015).

If this increases her expected profit, in the economic textbook individuals would be happy to **lie**. A substantial literature shows that this is not how typical experimental populations behave. But this literature largely neglects "white lies". An experiment shows that participants in their majority prefer to lie about the attractiveness of another participant if this may lead to hard feelings. If, however, the assessment is given anonymously, they report truthfully (Gneezy, Gravert et al. 2017). This finding has obvious implications for the design of institutions for quality assessment. The work on lying aversion ties into research undertaken in the behavioral economics group (Volz, Vogeley et al. 2015) and in the psychology group (Hochman, Glöckner et al. 2016).

Informed consent is a standard legal technology for creating justification. But quite often individuals prefer not to know. They would want their doctor to decide upon the appropriate treatment, rather than explaining to them in detail the potentially lethal risks involved. If they are lagging behind, they would prefer not to learn their rank so as to maintain their courage. Employers might commit to not investigating personal circumstances, like the age of the applicant, to avoid being biased. As a first step, a paper with a taxonomy of the desire not to know has been published (Hertwig and Engel 2016). It will be followed by a

week-long high-level conference in 2019, convoked under the auspices of the Frankfurt Institute for Advanced Studies.

C.I.2 Behavioral Analysis of Legal Intervention

From a textbook law-and-economics perspective, legal intervention shapes the opportunity structure. While often thought-provoking, this perspective can be questioned from a behavioral angle. One prominent application is the **Coase theorem**. It posits that efficiency obtains, irrespective of the original allocation of property rights, if the following four conditions are fulfilled: (1) property rights are well defined, (2) contracts can be enforced, (3) preferences are common knowledge, (4) the transaction cost is zero. Under appropriate conditions (that are always fulfilled in the two-person case), the theorem can even be strengthened by dropping the first condition. In an experiment, this claim has been put to the test. There is some inefficiency, resulting from a clash of fairness norms. But the degree of inefficiency does not depend on the presence of property rights (Bar-Gill and Engel 2016). This result stands an interesting tension with a finding from the behavioral economics group: the more credible the protection of property rights is in a country, the more individuals are willing to exert productive effort (Ahn, Balafoutas et al. 2016). Interestingly, a seemingly straightforward extension of the first experiment reveals a qualification. If individuals are allowed to take a foreign good against (differently high) compensation, efficient outcomes are still frequent. But this socially desirable effect does not result from trading away the take option. Rather, takers show respect for the fact that the original owner had to earn the commodity in a real-effort task. Deals frequently fail since fairness preferences are heterogeneous, with choices either reflecting threat points, or favoring the equal split, or showing the more respect for ownership the smaller the compensation is when the good is taken (Bar-Gill and Engel 2017).

Common law and continental law have different convictions about the conditions for creating legal commitment. In principle, on the continent a mere promise may bind in law. By contrast, common law requires "consideration". A **promise** is legally binding only if it has been given in exchange for a counterpromise, or another valuable good or service. When push comes to shove, the differences between both legal families are relatively small. But doctrine also serves an expressive function. It guides how the law's subjects see the issue. An experiment tests the resulting moral intuitions in the lab. If consideration is required, participants believe that all participants make more ambitious promises. But they themselves make a more cautious promise. These two effects cancel out, so that promises are not more likely to be kept with consideration (Engel and Schmelzer 2017). A further experiment is motivated by the debate in behavioral economics over the motive for keeping promises. The experiment shows that guilt aversion is critical, but that it matters much more in narrow social circumstances (Morell 2015). From an incentive perspective, a tenured contract that may be terminated at will and a fixed term contract that is regularly renewed are equivalent. Yet, if both options are made available to experimental participants, the fixed-term contract is considered as less kind and triggers less effort (Cromwell, Goerg et al. 2016). Contractual lawyers believe that written form prevents individuals from entering unwise contractual obligations. An incentivized experiment proves this belief to be well founded (Leszczynska 2016b).

Under common law, the standard **remedy** for breach of contract is expectation damages. Under continental law, the standard is specific performance. The common law solution is ex-post efficient. But is it also ex-ante efficient? This question is tested experimentally. The design excludes aversion against others willfully breaking their promises. Nonetheless there is less trade if specific performance is not guaranteed, provided the preference for the traded commodity is sufficiently pronounced (Engel and Freund 2017). There is a close link to an experiment from the experimental economics group on the efficient breach of contract doctrine (Bigoni, Bortolotti et al. 2017). Another experiment shows that stipulating liquidated damages can

have a downside akin to the hidden cost of control. The contractual partner interprets the clause as a sign of distrust, and reduces productive effort (Depoorter, Freund et al. 2017).

A public-goods experiment is used to investigate whether the expectation of having to pay compensation deters socially undesirable behavior. This effect is a precondition for tort law being a tool for governing behavior, for instance to curb environmental damage. In the experiment, compensation rules are such that a participant who maximizes profit would not be deterred from keeping her entire endowment. Nonetheless, participants contribute more to the public good, in particular if the amount to be paid or the probability of having to pay this amount are relatively high (Eisenberg and Engel 2014). A further experiment unpacks the behavioral mechanisms behind the effect. Merely clarifying socially optimal behavior already has a beneficial effect. There is an additional effect if participants are blamed for violating this norm, even if this has no pecuniary consequences. There is a further effect if blaming comes with a non-deterrent obligation to compensate the victim (Eisenberg and Engel 2016).

Punishment is a standard legal intervention against socially undesirable behavior. Putting the sanctioning effect of the obligation to pay damages aside, it can be rooted in either criminal or administrative law. A public-goods experiment shows that, in a heterogeneous population, sanctions are even instrumental if their expected value is too low to deter a selfish individual. The beneficial effect results from conditionally cooperative individuals who are not sufficiently averse to exploiting others (Engel 2014b). The criminology literature claims that, when it comes to deterring crime, certainty is more important than severity. An experiment replicates this finding from the field only if the expected value of the sanction is strong enough to deter a selfish individual. In criminal law practice, this condition is rarely fulfilled (Engel and Nagin 2015). A further experiment shows that there is a substantial difference between the reaction to the level of certainty or severity, and changes in either dimension of punishment. Even if one regime initially works better, policymakers cannot simply go back to it. These two findings suggest an explanation for the ratcheting up of criminal sanctions in many countries (Engel 2016b). There is a related paper from the experimental economics group (Lergetporer, Angerer et al. 2014).

In the lab, the willingness of bystanders to engage in costly punishment is pronounced. A field experiment on littering in Cologne's main railway station shows that this also happens in a naturalistic setting, and with one-shot interaction. However, only a minority of individuals exhibit this behavior. That said, individuals are more prepared to withhold help in response to perceived violations of social norms (Balafoutas, Nikiforakis et al. 2014; 2016). Withholding help also proves an effective sanction in the lab (Nikiforakis and Mitchell 2014). Third-party punishers run a serious risk of counter-punishment (Balafoutas, Grechenig et al. 2014). The ability of groups to overcome a social dilemma without central intervention is also severely reduced if induced valuations for a public good are heterogeneous (Gangadharan, Nikiforakis et al. 2017).

Auctions are a classic topic at the intersection of law and economics. Standard theory points to a trade-off: while the second-price auction is incentive-compatible, it is prone to collusion. If auction designers dread the risk of collusion more than paying a somewhat excessive price, they may prefer to run a first-price auction. An experiment points to a hitherto overlooked concern. During the negotiations over bid-rigging, bidders signal information that distorts beliefs of their counterparts. This is why, in the experiment, a first-price auction is as susceptible to collusion as a second-price auction (Llorente-Saguer and Zultan 2017). A further experiment investigates how auction outcomes are affected by bidders lacking information about the valuations of their competitors (Brookins and Ryvkin 2014). There is a link to work by the experimental economics group on behaviorally informed market design (Kirchler, Huber et al. 2015).

For normative reasons, many valuable goods are not exchanged against money. Classic illustrations are donor organs, college admission, or the assignment of clerks to prestigious internships. In economics, the design of **mechanisms** that achieve allocation without compensation is an active field. Yet, thus far, legal scholarship has paid little attention. Two experiments cast light on the behavioral qualifications of mecha-

nisms that are equivalent when assuming standard preferences. A first challenge is cognitive. For the mechanism to be strategy-proof, individuals must see through it. This is easier with random serial dictatorship than with top trading cycles (Schmelzer 2017). A second challenge is motivational. All mechanisms require randomness. Yet, those who have had a bad draw prefer to get a second chance, even if this implies that, in expectation, their chances of receiving a commodity that is high up on their preference list is somewhat reduced (Schmelzer 2016).

In previous years, the institute had been very interested in understanding the power of behaviorally motivated legal interventions, and **defaults** in particular (see the *habilitation* thesis by Bechtold 2010). An experiment points to an important behavioral downside: default rules create an endowment effect (Marcin and Nicklisch 2017). The interest of the group in "soft" interventions has also triggered a field experiment by a former researcher from Martin Hellwig's group on "Nudges at the Dentist" (Altmann and Traxler 2014).

For quite a while, behavioral law and economics scholars have been interested in the "**expressive function**" of the law. One aspect of this function concerns the construction of the situation. An experiment shows how important this can be. While making one individual a leader mitigates a social dilemma if this dilemma is framed as a give-some game, the effect vanishes if the same game is framed as a take-some game (Frackenpohl, Hillenbrand et al. 2016).

From the standard law-and-economics perspective, legal intervention is effective because it changes the opportunity structure. This line of argument presupposes that the law's subjects calculate the cost and benefit of following versus breaking the law whenever they happen to be in a situation regulated by law. For many choices under the purview of the law, this behavioral assumption is strong. Arguably most of the time most individuals do not even consider the option of breaking the law. They just follow the law because this is their **routine**. While routinization is thus highly beneficial for governance by law, there is a downside. The law is permanently under construction because it reacts to changes in the environment, or to shifts in the normative assessment of some course of behavior. Legal reform then requires more than a change in rules. The law's subjects must unlearn their previous routine and develop a new one. An experiment shows that this concern is real, but that participants adapt much faster and much better if they can observe role models (Betsch, Lindow et al. 2015).

C.I.3 Applications

Antitrust has been one of the first topics for close collaboration between lawyers and economists. A meta-study organizes collusion experiments undertaken during more than half a century, and demonstrates in which ways this evidence can inform the decision about clearing a merger (Engel 2015b). Experiments further increase the available evidence. In the field, it is rare that isolated individuals compete with each other. Usually competitors are firms. One behaviorally important difference is the possibility of outsiders to second-guess decision-making within a competing firm. If experimental participants have this information and the competing teams are similar, they become less aggressive (Kurschilgen, Morell et al. 2017). By contrast, if bidders in a contest are not informed about the number of competitors, they bid more aggressively than predicted by standard theory (Boosey, Brookins et al. 2017). These results generalize: whether participants act cooperatively (which in an oligopoly context would imply that they try to collude) or competitively critically hinges on the construction of the situation. An experiment shows that this construction is open to purposeful intervention. If an otherwise identical 2x2 prisoner's dilemma with binary action space is presented without a frame, framed as a joint project, or framed as defending against a joint enemy, the results are indistinguishable. Participants are quite willing to run the risk of cooperation. By contrast, if the game is framed as competition, cooperation rates drop (Engel and Rand 2014). This is good news for

antitrust. The risk of collusion looms not as large as the interpretation of oligopoly as a prisoner's dilemma might have suggested.

Insurance is a quintessential industry constructed by law. An experiment points to a hitherto overlooked business opportunity. When given a chance, experimental participants are willing to pay substantial amounts to insure against the possibility that a donation might not reach the intended recipient. In the field, this is a pervasive concern. Offering this product is also desirable from a welfare perspective: If the insurance option is provided, many more participants decide to make a donation to a charity (Buijze, Engel et al. 2017). Interestingly, after the working paper was published, Munich Re approached the institute since they were considering to offer such an insurance as a commercial product. The insurance industry runs the risk of fraud. An experiment isolates a determinant. One might have thought that fraud is more frequent if the insurance is compulsory. After all, individuals did not have a chance to decide freely whether insuring against the risk is worthwhile. Interestingly, the opposite result obtains. Those intended to exploit the insurance company self-select into taking out insurance (Freund and Tausch 2017). This closely ties in with work undertaken by the experimental economics group. In a field experiment, they show that providers of computer repair services are significantly more likely to sell unnecessary services if they know the customer to be insured (Kerschbamer, Neururer et al. 2016). This is part of a line of research on the provision of credence goods (Beck, Kerschbamer et al. 2014; Kerschbamer, Sutter et al. 2017).

Even if lawyers do not normally use language from behavioral economics, they have always been attentive to behavioral effects in **business to consumer** relations. An experiment shows that one behavioral concern is well founded: Rollback rebates are "sticky" and allow providers to prevent customers from shifting to competitors (Morell, Glöckner et al. 2015).

The group has also worked on questions of **corporate law**. An experiment shows that merely declaring that a manager should balance shareholder interests with stakeholder interests is not effective if such choices run against the manager's incentives (Fischer, Goerg et al. 2015). This casts doubt on so-called social enterprise legislation. Another experiment probes the effectiveness of European Union legislation aimed at protecting investors. It shows that the mere use of company logos on rate of return declarations biases choice in favor of prominent stocks (Hillenbrand and Schmelzer 2015). Recent legislation aims at increasing the number of females on executive boards. An experiment tests a claim frequently made by policymakers: Gender diversity will increase productivity. In the experiment, the opposite holds true (Dorrough, Leszczyńska et al. 2016). However, an experiment from the experimental economics group shows that gender-based quotas are frequently chosen endogenously and do not negatively affect efficiency (Balafoutas, Davis et al. 2016).

A lab-in-the-field experiment shows that Chinese participants in the role of **employers** discriminate wages by the province of origin of migrant workers (Chmura, Goerg et al. 2016). This is related to a cross-national experiment from the psychology group. Participants from six countries play a sender-receiver game with participants from other countries. They are asked about beliefs and choices. Both dependent variables show pronounced nationality stereotypes (Dorrough and Glöckner 2016).

Two experiments look at the relationship between an employee and her employer. This is a prototypical principal-agent problem, since the principal is usually not in a position to observe the agent's effort perfectly. One possibility to overcome the problem is to just ask. In the experiment, this turns out to be a poor intervention. Agents frequently overreport effort. This creates distrust, both between the employer and the employees and among the employees. The characteristic gift exchange logic is impaired (Kleine and Kube 2015). Legal orders vary widely when it comes to accepting non-compete clauses. The rationale of such clauses is a concern employers may have: Employees may obviate the employer's investment in their human capital, or may deprive the employer of valuable customer relations. But value for the employer typically results from matching effort by the employee, for instance in extending the customer base. One

might therefore expect employees to react to the clause by reducing effort in the first place. In an experiment, interestingly, no detrimental effect on employee effort was observed (Bünstorf, Engel et al. 2016).

The traditional law and economics interpretation of **intellectual property** rests on the claim that intellectual achievements are (pure) public goods. Others can put them to productive use without reducing their value. In this logic, the legal order introduces a temporal monopoly to establish a quid pro quo: the inventor may exclude others from using the achievement as long as they have not paid for it. This creates incentives for the inventor to engage in socially productive innovation in the first place. This line of argument neglects that appropriating foreign innovations is rarely free of charge. In a lab experiment, introducing a positive cost of appropriation almost perfectly removes the incentive problem. This even holds if appropriation reduces the profit the inventor makes from her own innovation (Engel and Kleine 2015). In the US, the incentive interpretation also dominates the copyright discourse. European law thinks otherwise. It sees the main motive for protecting intellectual creativity in the author's self-esteem. She wants to be recognized also, but not exclusively, by a chance for making money with her work. In a field experiment, photo artists are presented with a series of second-price auctions to elicit their willingness to trade the possibility of a buyer to use their work without mentioning their name, to alter the work, or to destroy it. In their large majority, participants are unwilling to trade these rights in the first place. If they are happy to grant either right, they ask for very high prices (Bechtold and Engel 2017).

Tax evasion is a prominent application of compliance with legal rules that is hard to enforce merely by a threat with sanctions. For some kinds of income, detection is conspicuously difficult. This is why interventions aiming at fostering voluntary tax compliance are of high practical relevance. Two PhD students plan to work on this. Eugenio Verrina wants to investigate the framework conditions for voluntary tax compliance. Cornelius Schneider wants to understand how tax compliance depends on the match of tax policies with prevalent redistribution preferences. This line of research strongly benefits from work undertaken in other parts of the institute: Do attempts at tax evasion reduce the efficiency of markets for credence goods (Balafoutas, Beck et al. 2015)? Is tax compliance systematically more pronounced in some countries than in others (Andrighetto, Zhang et al. 2016; Zhang, Andrighetto et al. 2016)?

Legal orders are united in their fight against **corruption**, but they are divided in the legislative reactions. One group of legal orders exposes private parties who approach a public official, and the public official who accepts such offers, to equally severe sanctions. A second group of legal orders punishes officials more harshly. This asymmetry can be justified on deontological grounds. Transforming public office into a source of personal income is even more blameworthy. However, an experiment points to an overlooked downside of this approach. The prospect of at most being punished lightly provides the private party with a cheap technology for enforcing the corrupt deal (Engel, Goerg et al. 2016). Again, there is related work from other parts of the institute. How does the prevalence of corruption in a country affect the performance of firms (Hanousek and Kochanova 2016)? How can a culture of corruption in a country be changed (Zhang 2015)?

Legal orders differ in their construction of **privacy**. While it is essentially regarded as a property right in the US, it is regarded as an inalienable moral right in most of Europe. But both families of legal orders agree in their considering privacy as a private good. A conceptual paper challenges this perspective and demonstrates why, in the age of big data even more than before, a person's privacy is not only her personal affair. The more information she makes publicly available, the more parties that are interested learn about others. This not only holds for individuals with whom a person interacts. Rich personal information also makes it possible for machine-learning algorithms to gain ever more reliable generic knowledge about cues that have strong predictive power. This is why privacy should be constructed as a public good (Fairfield and Engel 2015). An experiment shows how easy it is to induce individuals to give up their privacy rights. Merely making the consent option salient suffices (Hermstrüwer and Dickert 2017).

The experimental work on punishment has already been covered in an earlier section. It builds a natural link to **criminal law** (for a survey of experimental criminal law, see Engel 2016a). An experiment uses a public good to test one of the standard institutions of criminal law. Many convicts, in particular first offenders, are put on probation, rather than directly being incarcerated. Yet, preserved individual liberty is conditional on not committing further crime during the probation period. Otherwise the criminal sanction for the first and the second convictions compound. The experiment shows that probation substantially weakens deterrence. While they are on probation, individuals are indeed cautious not to violate the norm. But as soon as the probation period expires, they start to misbehave again (Engel, Hennig-Schmidt et al. 2015).

Thus far, **scientific disintegrity** has not yet triggered targeted legal interventions. But a series of prominent scandals and the replication crisis have put the problem back on the screen of institution designers. A theory paper analyses the problem with the toolbox of public-goods models (Engel 2015a). It complements multiple contributions of the psychologists at the institute to test the replicability of findings and to improve the situation for the future (Collaboration 2015; Kidwell, Lazarević et al. 2016; Bouwmeester, Verkoeijen et al. 2017).

C.I.4 Rule Generation and Rule Application

Legal rules are not out there. They are purposeful creations. The group has been interested in behavioral effects that play themselves out in the process of making new law. Constitutions use different **voting schemes**. A theory paper compares unanimity with majority rule that is combined with veto power. The latter turns out to be superior under wide conditions (Bouton, Llorente-Saguer et al. 2015). This prediction also finds support in the lab (Bouton, Llorente-Saguer et al. 2017). Another experiment shows that approval voting outperforms the plurality rule as a technology for the aggregation of distributed information (Bouton, Castanheira et al. 2016). A further experiment creates a conflict between the socially optimal sharing of private information and private gains from lying. It finds a majority of naive participants who tell the truth, while they are exploited by more sophisticated participants who lie (Le Quement and Marcin 2016).

Democracy is **government** of the people, **by the people**, for the people, as Abraham Lincoln so aptly put it. Yet to bring this vision to life, the people must engage with governing their country. At the least, they must vote. Since chances to be pivotal are negligible in large constituencies, it is "rational" for them not to go. An experiment shows that individuals with pronounced social preferences are indeed more likely to go voting (Robalo, Schram et al. 2017). Direct democracy involves citizens more directly into the process of rule-making. A vignette study exploits the fact that many of the German *länder* have recently strengthened direct democratic elements in their local constitutions. Participants are asked to rate the degree of acceptance for a series of currently prominent decisions, provided they were either taken by the local parliamentary assembly, or by referendum. The difference in procedure only matters if the individual declares that the respective issue is of high importance for her personally (Towfigh, Goerg et al. 2016). While Parliament has power to repeal any statute introduced by earlier parliamentary assemblies, it is rare that it exercises this power. Most of the statutes continue to be in force, even if those who have voted for them passed away long ago. In an experiment, the fact that a rule meant to overcome a social dilemma has been introduced by a previous group of participants does not help current participants achieve more efficient outcomes, while rules they have adopted themselves do have this beneficial effect (Langenbach and Tausch 2017).

The legal discourse predominantly treats rules as arbitrary choices. The decision about their contents "has to be taken politically". Constitutional law first and foremost contains these choices by procedural rules.

Even in countries like Germany, with an encompassing constitutional order and a powerful constitutional court, "gouvernement des juges" is seen as a serious mistake. This stands in contrast to welfare economics. The goal is precisely defined: allocative efficiency. The aim is finding procedures, **mechanisms** that is, that promise to come as close as possible to this goal. Interestingly, behavioral analysis is only just starting to touch this enterprise. An experiment makes a contribution. It puts participants into the role of a ruler and manipulates whether this ruler has to live with an audience that may misrepresent their types, whether the ruler knows that the rule will be applied to herself, and whether she knows her own valuation of the public good when choosing the rule. Rulers are strikingly overoptimistic regarding the willingness of participants to reveal their types (Engel and Hippel 2017). This highlights a behavioral challenge for democratic governance. A related experiment shows that designated punishment authorities abuse their power by themselves undercutting the behavioral norm they impose on their group in a public good (Hoeft and Mill 2017).

In a governance perspective, legal rules are tools for social betterment. Political science has long pointed to the risk of an implementation deficit. It is not enough for the rule to address a social ill effectively that it is in force; it must also be implemented. Consequently the **diffusion of legal innovation** cannot be taken for granted. A paper exploits the fact that Israel has recently introduced class-action, and that a registration requirement gives access to complete data. These data show that the new remedy has taken several years to become widely used. The adoption curve is almost perfectly exponential. The paper demonstrates that social influence (merely copying what other law firms do), social learning (reacting to the fees other law firms have received), and individual learning (reacting to previous success or failure of this one law firm) independently explain the decision to file a new class-action suit (Engel, Klement et al. 2017).

Judges enjoy constitutionally protected **independence**. From a rational choice perspective, this could be troubling news. If the constitution removes constraints, why do judges not simply maximize personal well-being, at the expense of a society that pays for their services? An experiment shows that the fact of having been assigned an office, and a clear task that requires impartiality, has a strong motivating force (Engel and Zhurakhovska 2017). Another experiment shows that prosecutors are significantly more willing to put aside their personal advantage if the incentive structure is framed as criminal procedure (Engel and Reuben 2015). But a paper using a new comprehensive dataset about decision-making by the European Court of Justice shows that judges appointed to the ECJ by an integration-friendly Member-State government are more likely to cite judgments authored by judges from a similar political background (Frankenreiter 2017b). Advisory opinions issued by the advocates general are related to the integration preferences of their countries of origin (Frankenreiter 2017a). A provocative paper has posited that the outcome of criminal procedure in Israel depends on whether decisions are made before or after lunch. Using simulation, a paper from the psychology group shows that the effect must be heavily overestimated, if it exists at all (Glöckner 2016). Judges routinely have to decide knowing that the evidentiary basis remains incomplete. A theory paper models their choice as satisficing, rather than maximizing, based on subjective definitions of the state space and subjective probabilities (Engel and Güth 2015).

The behavioral analysis of judicial decision-making is a topic with a considerable history, not so much in law and economics, but in law and psychology. By contrast, the behavioral analysis of the decisions made by **regulators** and administrators is much less advanced. One experiment focuses on regulatory agencies. They are endowed with strong intervention rights to countervail the risk that dominant firms will abuse power, to the detriment of demand. These powers create an opportunity for regulatory micromanagement. Both conceptually and empirically, there are good reasons to doubt that micromanagement is normatively desirable. A seemingly elegant technique for cutting the Gordian knot is price cap regulation. The statute constrains regulatory intervention to rare moments in time. Until the next moment for intervention arrives, regulated firms may be sure that the price cap will be in force. An experiment shows a downside. Experimental regulators are overly cautious, for fear of being responsible for experimental firms making a very small profit or no profit at all (Engel and Heine 2017).

Behavioral effects are also important on the opposite side of an **administrative relationship**. An experiment measures the attitude of the addressee of administrative intervention towards the administrator by an unannounced, subsequent dictator game that gives the addressee an opportunity to reward the administrator. Rewards are significantly higher if the addressee had the opportunity to express herself before the administrator decides (the addressee decides before she learns the administrator's decision) (Kleine, Langenbach et al. 2014). Another experiment shows that the obligation for an experimental authority to justify their punishment decisions in a public good makes punishment more effective, but only if those reasons are made public (Engel and Zhurakhovska 2013). Punishment is also more effective if the experimental authority has been voted into office, rather than being randomly assigned to it (Marcin, Robalo et al. 2016). This shows a behavioral effect of procedural legitimacy.

Legal academia can be seen as a subsidiary actor for the generation and application of rules. In Germany, the link between legal academia and legislation, the judiciary, and administration is particularly strong. Two empirical papers investigate aspects of German legal academia. The analysis of a large-scale dataset suggests that the state exam is biased against female students (Towfigh, Traxler et al. 2014). The second paper exploits the fact that, as a practical matter, becoming a law professor in Germany requires one to pass a *habilitation*. A time series of all (published) habitation theses since 1960 reveals a "hog cycle". If eight years ago there were too few candidates for professorship on the market, eight years later there are too many, and vice versa (Engel and Hamann 2016).

C.I.5 Methods

Lab **experiments** are natural tools for identifying behavioral effects. Usually the group follows the experimental economics tradition, and in particular the ban on cheating, and incentivizes choices whenever possible. Another practice in experimental economics is also motivated by generating clean data. The typical economic experiment is stripped of context. Participants do not learn the research question, but are just exposed to a naked incentive structure. An experiment shows that this comes at a price. In the baseline, participants face a naked 2x2 prisoner's dilemma. Treatments add frames. If the interaction is framed as a joint project, or defending oneself against a joint enemy, results are not distinguishable from the baseline. But cooperation drops if the game is framed as competition. This shows that decontextualisation is a double-edged sword. Participants must make sense of the design. If it comes without an explicit frame, participants frame the game for the experimenter. Paradoxically, a design feature meant to increase control reduces experimental control (Engel and Rand 2014).

Legal argument tends to be multifaceted. This richness is hard to capture with a classic experimental design. In the interest of cleanly identifying the effect of interest, the situation is simplified such that confounds are ruled out. **Eye-tracking** offers the possibility to maintain a much greater degree of the characteristic multidimensionality. The following project is an application: According to the prevalent dual process theory of moral decision-making, deontological decisions should feature a relatively shorter and less complex decision process, while utilitarian decisions should require more information search and deliberation (Rahal, Hoeft et al. 2017). A further method for tracing the development of legal discourse is **citation analysis** (Hamann 2014a), and **computer linguistics** as applied to legal text; this is what Hanjo Hamann uses in a project financed by the Heidelberg Academy.

The credibility of experimental findings rests on **statistical** testing. While the focus of the group is applied, it occasionally has contributed to statistical questions as well. The typical data from public-goods experiments exhibits patterned heterogeneity. While the majority is more or less willing to cooperate, a substantial minority behaves as predicted by economic textbooks and completely free-rides. Capturing this heterogeneity by a Tobit regression is not fully satisfactory. One assumes that participants who have not made a

positive contribution to the public project would even have taken money away from the remaining members of the group if the design had not made this impossible. An alternative statistical approach is a double hurdle model. It assumes that there can be two reasons why a participant does not contribute to the project: she may be of a selfish type, or she may react to circumstances that she considers to be insufficiently promising. A paper not only introduces the theory behind this estimator, but also offers software to use it in Stata (Engel and Moffatt 2014).

Standard economic models assume risk neutrality. Empirically, the majority of experimental populations are risk-averse, while a non-negligible minority are even risk-seeking. This explains why, after the main experiment, risk aversion is measured routinely. This is usually done using the test developed by Holt and Laury. It asks participants to make 10 choices between two lotteries. If participants are consistent, at one point they switch from the lottery with the smaller to the lottery with the larger spread. Usually the switching point, or its translation into a score of constant relative risk aversion, is then used for explanation. This approach does not work for participants who switch more than once. The standard approach in the literature is to drop observations from such participants altogether. Using data from a pertinent experiment, a paper shows that and why this procedure creates bias, and discusses alternative statistical approaches (Engel and Kirchkamp 2016).

When working with observational data, identification of causal effects is often challenging. One popular way out is exploiting "**natural experiments**". One compares a treatment group that has been exposed to a random shock with a control group that has not been affected. An experiment shows that this seemingly elegant solution can be problematic. One measures how a population reacts to a change in circumstances, rather than its level. However, the ultimate research question is often the level effect. In the experiment (using a stealing game with differences between certainty and severity), the difference between levels and changes is pronounced (Engel 2016b).

To a large degree, the empirical legal movement is fueled by lawyers applying these established empirical methods from the social sciences to legal research questions. This is a highly successful endeavor. Yet, as the field matures, it is time to discuss autonomous **empirical methods for the law**. A conceptual paper contrasts the characteristic normative research questions of legal scholars with the philosophy of frequentist statistics. Frequently, for the law, the avoidance of false positives (in the parlance of frequentist statistics, having a sufficiently low p-value) is of lesser importance than avoiding false negatives. A classic case in point is the precautionary principle. This calls for adjusting the significance level (obviously only if better evidence is not to be had). An even deeper challenge originates in the fact that legal problems are rarely well-defined. This prevents the researcher from formulating a clear hypothesis. Quite often, the law is ultimately not interested in explanation, but in prediction. This invites machine-learning techniques. Finally, as soon as legal choices are regularly based on empirical evidence, the law has to be prepared for attempts at strategically perturbing this evidence. A potential remedy might be to pit evidence against counter-evidence, in the spirit of the adversarial principle (Engel 2017). In a related exercise, the (legal) PhD thesis by Hanjo Hamann defines the conditions for "evidence-based law" (Hamann 2014b).

C.I.6 Translation

At its core, the group contributes to empirical legal scholarship, and to behavioral research more generally. Papers are written with the intention of submitting them to good peer-reviewed journals. This requires that they live up to the expectations of these journals. Usually this implies adequate technical sophistication. But these papers are not intended to be self-reflective voices from the ivory tower. They are meant to inform the legal discourse. Now most legal scholars do not see themselves as social scientists. They have no training in modeling and data analysis. Of course, the more technical papers present the research question, the key

findings, and the discussion of broader implications in plain English. But this need not necessarily suffice to reach the legal audience. Acknowledging this challenge, in some way or other, all lawyers from the group have been engaged with translation.

A book edited by Emanuel Towfigh and Niels Petersen **introduces lawyers to the toolbox of economics**. The book has come out in the second edition in German (Towfigh and Petersen 2017) and in the first edition in English (Towfigh and Petersen 2015). A handbook entry introduces lawyers to empirical methods for behavioral analysis (Engel 2014a). A further paper zeroes in on the advantages of the experimental method for law (Chatziathanasiou and Leszczynska 2017). Another paper defines the scope for empirical input into legislation (Steinbach 2015b). Yet another book offers a systematic account of economic arguments in public international law (van Aaken and Steinbach 2017). A legal PhD thesis structures the emerging field of evidence-based law (Hamann 2014b). Papers that have been published in first-rate law journals argue for taking empirical claims more seriously (Towfigh 2014; Hamann and Hoeft 2017).

During the period covered by this report, four legal scholars passed their ***habilitation***. All of them have written books that strongly benefit from the interdisciplinary context of the institute. But rightly all these books speak to the legal community, and largely do so without technical jargon. Since they want to address the legal discourse, these books take much more context into consideration than would be advisable for a peer-reviewed publication. In a way, these books contextualize the social science work undertaken by the group. Niels Petersen asks whether constitutional courts have (ab)used the proportionality principle as a technique for self-empowerment. Using a comprehensive dataset of cases from Germany, South Africa, and Canada, he finds hardly any evidence for this frequently made claim (Petersen 2015). An English version of the book has been published with Cambridge University Press (Petersen 2017b). Emanuel Towfigh is concerned that political parties have become so good at winning elections that they become dysfunctional for striking the democratic balance between striving for power and integrating society (Towfigh 2015). Jörn Lüdemann is convinced that the mainstream of German public law is on the wrong track if it aims at distilling legal principles of ever greater generality. He calls for taking the specifics of the concrete problem the law wants to address much more seriously (Lüdemann 2016). Armin Steinbach observes a cacophony of "rationality" arguments in legal discourse and offers a more principled, systematic view (Steinbach 2017b). Similar considerations motivate ongoing *habilitation* projects. Alexander Morell aims at grounding the procedural doctrine of prima facie evidence in a better understanding of empirical evidence. Stefanie Egidy plans to study strategic litigation, using empirical observations from the German constitutional court. Hanjo Hamann wants to investigate the proper scope for demoscopy in the application of private law standards. Yoan Hermstrüwer wants to readjust the constitutional borderline between tax and non-tax levies, with a specific eye on behavioral effects.

In their **PhD theses**, lawyers can be more upfront about social science methods. Still they are well advised to flesh out the implications for the mainstream legal discourse, which usually encompasses doctrinal implications. In that spirit, Yoan Hermstrüwer uses behavioral insights to define the need for legal intervention in the interest of protecting privacy (Hermstrüwer 2016). Pascal Langenbach investigates the effect of the addressee being heard in administrative procedure, exploiting findings from two experiments he has run (Langenbach 2017). Monika Leszczyńska combines an experiment on quota rules with a doctrinal piece, and another experiment on the duration of contracts with top managers with a legal policy piece (Leszczyńska 2016a). Konstantin Chatziathanasiou relies on a decontextualised experiment to back up his interpretation of Art. 146 GG. The fact that the German constitution makes itself explicitly open to abolition could have contributed to its remarkable stability. Leonhard Hoeft uses several experiments to find out whether the legal theory by H. L. A. Hart can be grounded in behavioral data.

Multiple essays published in good law journals strengthen these translation efforts. They are covered by the individual research portraits of the lawyers in the group. The following have been published in particularly

esteemed journals: Hamann 2014c, Morell 2014, Petersen 2014, Steinbach 2015a, Steinbach 2016a, Steinbach 2016b, Morell 2017, Petersen 2017a, and Steinbach 2017a.

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