

THE POSSIBILITY OF LEGAL LOGIC

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'I would submit that the mechanism of scientific advance rests on the interplay of fundamental philosophical research and research within the specialised disciplines. My assertions here should be read as themes for discussion, even where, for the sake of brevity, I present them in dogmatic terms. They are to be understood as the results of philosophical explorations, as searches for truth rather than as conclusive, uncontestable findings'. (Weinberger in MacCormick and Weinberger 1986, p. 31/2).

'One view about how to write a philosophy book holds that an author should think through all the details of the view he presents, and its problems, polishing and refining his view to present to the world a finished, complete, and elegant whole. This is not my view. At any rate, I believe that there also is a place and a function in our ongoing intellectual life for a less complete work, containing unfinished presentations, conjectures, open questions and problems, leads, side connections, as well as a main line of argument. There is room for words on subjects other than last words.' (Nozick 1974, p. xii).

1 Introduction

It is not without risk if an author calls his book 'Studies in legal logic'. The criticism he may expect is that there is no such thing as legal logic, and that studies in legal logic therefore have no subject. The critic may grant that logical reasoning is important, in the law as in many other fields, but, he can continue, this does not show that the logic that should be employed in the law is any different than logic as it is used elsewhere. Logic is a discipline that is relevant where arguments play an important role, but the standards it sets for arguments are everywhere the same. The subjects with which arguments deal vary from field to field, but the logical standards against which arguments are measured are everywhere the same. There is no special legal logic, just as there is no special strawberry logic.

A different way to make the same argument is to point out that logic deals with the validity of arguments, and that logical validity depends solely on the form of arguments, not on their content. A special legal logic would be characterized by its content, namely that it is about legal subjects, and for this very reason it would not be a 'real' logic, because 'real' logics are always formal in the sense that they deal only with the form of arguments.

I will try to meet this criticism head on, by arguing that there can be such a thing as legal logic. This chapter consists of two parts. First I discuss an argument why there is no need for a special legal logic that takes knowledge about the legal domain into account. I will argue that this line of reasoning is based upon the presupposition that it is possible to make a sharp distinction between form and content of an argument, and that this presumption is not correct with regard to real life arguments which are cast in natural language.

The second part of this chapter will be more constructive. Starting from a Quinean picture of the relation between logic and other beliefs, I will argue that it is a matter of choice which part of one's beliefs one takes as fixed and therefore as suitable to base a theory of valid reasoning upon. The answer to the question whether there should be a legal logic depends in this view on whether it is desirable to treat part of our beliefs about the law as fixed to a degree that it makes sense to turn that part into a legal logic.

2 Soeteman's argument

There is not one kind of logic, but there are many different logics. One can distinguish between classical and intuitionist logic, between propositional and predicate logic, between many different systems of alethic modal logic, epistemic logic, deontic logic and of logics of time, and between

monotonic and non-monotonic logics. I have seldom seen a dispute concerning the right of existence of any of these logics.¹

The claim to existence of a special legal logic has run into serious objections, however. Soeteman (1989) has argued forcefully that formal logic can play a role in the legal domain, but that there is no need for a special legal logic, in particular when this legal logic would be a 'material' or informal' logic as opposed to formal logic. Soeteman's primary target when he made this argument was Perelman (1961, 1963), who argued that in the law formal logic is not sufficient and that formal logic needs to be supplemented with an informal, or material logic that takes the peculiarities of the legal domain into account. In the law it should, for instance, be possible to derive that somebody is not liable to be punished, since she did not commit a crime forbidden by written law. The argument

P did not commit a crime forbidden by written law
Therefore: P is not liable to be punished

has the logical form a, therefore b, and this is not a valid form. So according to formal logic, this argument is invalid, while most lawyers would have little objections against it. It might therefore seem that such arguments should be declared valid by some other logic, which takes characteristics of the legal domain, in this case of the principle of the rule of law, into account.

Soeteman attacked this line of reasoning briefly stated, as follows: Either such an informal argument can be made formally valid by adding an acceptable premise to it, or it cannot. If it can be made valid, the best thing to do is to add this acceptable premise and remain satisfied with the resulting validity according to formal logic. If the argument cannot be made formally valid by adding an acceptable premise, it should be discarded as an invalid argument.

Our example argument can be made formally valid by adding the premise that only those who committed a crime forbidden by written law are liable to be punished. This premise reflects the acceptability of the inference step from the other premise to the conclusion. If such an acceptable additional premise cannot be found, this goes to show that the inference step was not acceptable after all, and it should not be declared valid by an informal logic either. For example, the argument

P is innocent of any crime.
Therefore: P is liable to be punished

needs the additional premise that those who are innocent of crimes are liable to be punished. This premise is not acceptable and therefore the argument cannot be made formally valid by adding an acceptable premise. This goes to show that it is a bad argument.

Summarised, Soeteman's attack against informal logic that makes use of domain knowledge, boils down to the following. Either the domain knowledge can be made into an acceptable additional premise which makes the argument formally valid. In this case formal logic suffices to show the argument's validity. Or this is not possible, and the verdict of formal logic that the argument is invalid turns out to be the correct one. In both cases formal logic suffices to show whether the argument is valid. In other words, as long as one is prepared to represent domain related information as additional premises, logic can remain formal in the sense of domain independent. It is not necessary to have 'material' inference rules that incorporate this domain related information. The conclusion that seems to follow immediately, is that there is no need for a logic based on special information concerning the legal domain: Legal logic seems superfluous.

3 Form versus content

Logic is a theory about the validity of arguments. Validity is in this connection an evaluative notion. An argument that is valid is pro tanto better than an argument that is invalid.² In the case of evaluative words, the criteria for their applicability is not given with their word meaning. People who speak the same language and who agree on what 'good' means (it is the most general word of recommendation)

¹ There are some exceptions, in particular concerning nonmonotonic logic. See for instance Alchourrón 1993, p. 69f. and Israel 1980. Quine is famous for his objections against all kinds of intentional logic. See several essays in his 1966.

² Obviously arguments can be evaluated from other perspectives than the logical one. Other perspectives will normally involve other standards and other good making characteristics. See also Strawson 1952, p. 1.

need not agree on the standards for a good baseball match. Similarly, people who speak the same language need not agree on the standards for logical validity.

However, one particular standard has gained widespread acceptance amongst logicians, and this is the standard for deductive validity. An argument is said to be deductively valid if and only if it is impossible that the premises of the argument are all true, while the conclusion is false.³

The expression 'deductive validity' suggests that there may be other kinds of validity, which are not deductive. Logical practice is different, however. The expression 'validity' is almost always used in the sense of deductive validity. For other qualities of arguments, which do not satisfy the standards for deductive validity, other expressions are used.⁴

It is generally taken for granted that the validity of an argument depends on the form of the argument, and not on its contents. For example, according to Strawson (1952, p. 26f.), it is the task of the logician to compile lists of statements which entail each other, and this task is subject to three restrictions.

First the entailments must be general. The statement that John is a bachelor entails that he is unmarried. However, logicians should not concern themselves with such specific entailments. General entailments such as between being a bachelor and being unmarried are more in the way of the logician.

The second restriction is that logicians should only concern themselves with general entailments based on the form, as opposed to the content, of the statements that entail each other. The entailment between being a bachelor and being unmarried is for instance based on content, on the subject of the statements involved. The entailment between the statements "All A's are B" and "p is an A" on the one hand, and the statement "p is a B" on the other hand, would qualify as relevant for logicians.

The third restriction mentioned by Strawson is that there should be system in the general form-based entailments with which the logician should concern himself. Axiomatisation is a way to bring about the system intended by Strawson.

In the present context I am most interested in the issue of form as opposed to content, because it seems to me that this distinction, clear as it may seem at first sight, is somewhat dubious. But let us first see what makes the distinction attractive.

The dependence of validity on form can easily be illustrated by means of some examples. The arguments

All judges are lawyers
Sheila is a judge
Therefore: Sheila is a lawyer

and

All human beings are mortal
Socrates is a human being
Therefore: Socrates is mortal

are taken to be valid for the same reason. They share the logical form

All A's are B's
x is an A
Therefore: x is a B

and this form is logically valid.⁵

³ This definition of logical validity can be found in slightly different forms in, for instance, Reichenbach 1947, p. 68, Allwood e.a. 1977, p. 15, and Haack 1978, p. 14. It is remarkable, however, that the definitions of deductive validity are seldom completely identical, and that their equivalence often depends on a shared background theory about the nature of deductive logic.

⁴ Strawson 1952, p. 237, for example, writes about inductive *support* that the premises of an inductive argument lend to its conclusion. In non-monotonic logic one can speak about conclusions that are, or are not, justified (by the premises). See for instance Prakken 1997, p. 170.

⁵ That the example about Socrates has this form only becomes clear when 'mortal' is replaced by 'mortal entity'. It is generally assumed that this is allowed, but this allowance is, again, based on a silent (ontological) presumption, such as that having a characteristic is from a logical point of view the same as belonging to the

The arguments

All judges are lawyers
Sheila is not a judge
Therefore: Sheila is not a lawyer

and

All thieves are punishable
John is not a thief
Therefore: John is not punishable

are taken to be invalid for the same reason. They share the logical form

All A's are B's
x is not an A
Therefore: x is not a B

and this form is logically invalid.

The intuitive notion of deductive validity, that it is impossible that the premises of a valid argument are all true while the conclusion is false, can be given a more precise rendering by means of the notions of an interpretation and a truth value. In propositional logic, every proposition is either true or false, *true* and *false* being called the *truth values* which a proposition can take.

The logical operators of propositional logic are defined in such a way that the truth value of a compound proposition, that is a proposition which contains one or more logical operators, depends solely on the truth values of the elementary propositions contained in it, and on the nature and the place of the operators that occur in it. For instance, the operator \sim is defined such that the proposition $\sim p$ is true if and only if the proposition p is false. The proposition $p \vee q$ is true if and only if either p is true, or q is true, or both are true.

The truth values of propositions depend on an interpretation. By means of an interpretation a truth value is assigned to every elementary proposition. Since the truth value of a compound proposition is determined by its logical form and the truth values of the elementary propositions contained in it, an assignment of truth values to elementary propositions automatically assigns truth values to compound propositions too. For instance, if the propositions p and q are respectively assigned the truth values true and false, this assignment assigns the truth value true to $\sim q$, and, as a consequence, the truth value true to $\sim p \vee \sim q$.

Given this notion of an interpretation, it is easy to give a precise definition of the deductive validity of an argument:

An argument is deductively valid, if and only if every interpretation that makes all the premises of the argument true, also makes the conclusion of the argument true.

Another way to say the same is:

An argument is deductively valid, if and only there is no interpretation that makes all the premises of the argument true, and that also makes the conclusion of the argument false.

Now it is easy to see why the validity of an argument depends on its logical form. Given the above definitions of validity, it is necessarily the case that arguments with the same logical form are all valid or all invalid.

Instead of proving this finding, I will illustrate it by means of two examples, one of a valid, and one of an invalid argument. Let us take the following as an example of a *valid* argument:

$\sim p \vee q$
 p
therefore: q

class of entities that share this characteristic. This presupposition already suggests the extensional nature of predicate logic.

This argument contains two different elementary propositions, and since every proposition has one out of two truth values, there are four different assignments of truth values to the propositions, represented in the following table:

	p	q	~p	~p ∨ q
1	t	t	f	t
2	t	f	f	f
3	f	t	t	t
4	f	f	t	t

The rows 1 to 4 of this table represent the four different interpretations that are possible for two elementary propositions. The first premise, $\sim p \vee q$, is true in the interpretations 1, 3, and 4. The second premise, p , is true under the first two interpretations. It turns out that only in the first interpretation both premises are true, and on this interpretation, the conclusion, q , is also true. In other words, the conclusion is true under all interpretations that make all the premises true, and therefore the argument is deductively valid.

It is important to notice that the meanings of the propositions p and q are irrelevant for the validity of the argument. The only property of the proposition that seems to play a role, is whether it is true or false. It does not matter which facts make it true or false. Moreover, even the truth values of p and q turn in the end out to be irrelevant, because the validity of an argument depends on *all* interpretations, that is on all combinations of truth values of the propositions. Which assignment of truth values corresponds to the real world is irrelevant.

This goes to show that the validity of arguments in the language of propositional logic does not depend on the content of these arguments, as reflected in the meanings or the truth values of the propositions involved in the arguments. By considering *all* assignments of truth values, it is investigated whether it is *possible* that true premises go together with a false conclusion. If there is *no* interpretation of the propositions that lead to true premises and a false conclusion, it is *impossible* that this combination occurs. And this is precisely what is meant with the validity of the argument.

Let us take the following as an example of an *invalid* argument:

$p \vee q$
 p
 therefore: q

This argument contains two different elementary propositions, and since every proposition has one out of two truth values, there are four different assignments of truth values to the propositions, represented in the following table:

	p	q	p ∨ q
1	t	t	t
2	t	f	t
3	f	t	t
4	f	f	f

Again, the rows 1 to 4 of this table represent the four different interpretations that are possible for two elementary propositions. The first premise of the argument, $p \vee q$, is true in the interpretations 1, 2, and 3. The second premise, p , is true under the first two interpretations. It turns out that both premises are true in the first and the second interpretation. In the first interpretation, the conclusion, q , is also true. In the second interpretation, however, the conclusion is false. In other words, there exists an interpretation, namely the second one, that makes all the premises true, and the conclusion false. Therefore the argument is not deductively valid.

The same can also be said in somewhat different words. It is *possible*, namely if p is true and q is false, that both premises of the argument are true, while its conclusion is false. Therefore the argument is deductively invalid. Notice that the notion of possibility is made precise by translating it into the existence of an interpretation. Something is possible if there exists an interpretation on which it is the

case. Again, the validity of the argument has nothing to do with the subject of the propositions involved in it. Only the form, exemplified in the nature and positioning of the logical operators and the identity of the propositions occurring in the argument determine the argument's validity.

4 The relativity of logical form

The attack against informal, or 'material' logic as launched by Soeteman boils down to it that informal logics make use of inference rules that contain information about the domain in question. In other words, these inference rules not only refer to the forms of the arguments, but also to their contents. It is possible to take the contents out of the inference rule and represent it in an additional premise. The inference rule that remains when the content is taken out of it then only deals with the form of the argument.

The first thing to be remarked about this argument is that it can only demonstrate that it is possible to replace a 'material' inference rule by the combination of a formal inference rule and a premise, but not that it is desirable to do so. So the most that this argument might show is that logics based on material inference rules are superfluous, not that they are undesirable.

The second remarkable point is that Soeteman's argument makes heavily use of the distinction between the form and the content of arguments. I will argue that this distinction is not very clear, however, and that this unclarity makes the move from content to form less attractive than it might seem at first sight.

For formal languages, the notion of logical form can be defined in a precise way. With respect to arguments in natural language, the opposite seems to be the case. Take for instance the following argument:

All thieves are punishable
John is a thief
Therefore: John is punishable

If we translate this argument into the language of propositional logic, it receives the following logical form:

p
 q
Therefore: r

That arguments of this form are invalid is immediately clear from the interpretation on which p and q are both true, while r is false. Should we therefore conclude that the original argument is invalid? That would be too hasty, because the same argument can also be translated in the formal language of predicate logic. Then it receives the following logical form, which is a valid argument form under predicate logic:

$\forall x(\text{Thieve}(x) \rightarrow \text{Punishable}(x))$
 $\text{Thief}(\text{john})$
Therefore: $\text{Punishable}(\text{john})$

It turns out that an argument which has an invalid form under one logic has a valid form under some other logic. In other words, the logical form of an argument seems not to be something that is independently given, but something that is relative to the formalism in which the argument is expressed. By choosing for a particular formalism, one implicitly also chooses along which lines one wants to distinguish form from content. Strawson (1952, p. 52) goes so far as to characterise logical form of statements, and consequently also of informal arguments, by reference to systems of formal logic:

'We may say that two statements are of the same logical form when they could correctly be made by the use of sentences which exemplify the same logical formula and in which logical constants have the same logical use which is the standard use for the given system of rules.'

It is, however, possible to transform the example argument into one that is valid under propositional logic too. This can be done by adding a premise, namely $(p \wedge q) \rightarrow r$. This premise might be read

as 'If p and q are both true, then r is true'. In the present example it should be read as 'If both all thieves are punishable and John is a thief, then John is punishable'.

The argument adduced by Soeteman against special legal logics can therefore also be adduced against predicate logic. It is superfluous next to propositional logic. If one wants to construct an informal argument as logically valid, one can do so in propositional logic by adding the necessary premise. If this premise is unacceptable, this goes to show that the informal argument in question was invalid after all.

That this approach to predicate logic has not received wide acceptance goes to show that there are no fundamental objections against adopting a more powerful logic, that recognises more logical form, where a weaker logic might have sufficed. Soeteman's line of argument, based on the replacement of form in a more powerful logic by content in a weaker logic, is generally not followed in the relation between predicate logic and propositional logic.

There is no need to follow it in the relation between special legal logics and predicate logic either. Logical form is not something that is given with an argument, independent of what one intuitively considers to be form.⁶ It more or less a matter of logical taste whether one works with a more powerful logic, which recognises more logical form, or whether one prefers a weaker logic, which recognises less form and consequently demands more premises to recognise an argument's validity. On beforehand then, there seems to be no objection against taking elements from the legal domain and incorporating them in a special legal logic, which recognises more logical form than, for instance, predicate logic.

5 A holistic theory of logic

It would be too hasty, however, to draw the conclusion that there are no objections against allowing any kind of legal 'knowledge' to be part of a system of logic. Some logics are better than some other logics. Good logics characterise precisely those arguments as logically valid which are intuitively considered to be valid. If a logic characterises an intuitively valid argument as invalid this merely shows that the logic in question is not a good one.

The observation that intuitive judgements concerning the validity of arguments can be used to judge the quality of logics, while logics can be used to judge the validity of arguments suggests a parallel to a familiar theme from the philosophy of science which I will exploit here. Let me start with a real life example, stemming from the time when I received some elementary education in chemistry. My teacher wanted to demonstrate that if two substances, say A and B, were put together, some specific chemical reaction would take place, with the effect that a new substance, say C, would result. This new substance C would be recognisable by its colour, which was different from the colours of A and B. The teacher took the substances A and B from two jars labelled 'A' and 'B'. He put them together in a third jar and shook it. However, instead of exhibiting the colour of the substance C, nothing special happened, even after shaking the jar for the second time. Somewhat frustrated my teacher then gave as his explanation of this happening that one of the substances was probably spoiled by the long time that it had been kept in the school.

'Logical' as this explanation may sound at first hearing, it is not so obvious from a more philosophical perspective. Why not assume that this experiment tested the chemical theory that putting together A and B results in a reaction in which C is generated and that the outcome of the experiment falsified this theory? Or that in fact C was generated, but that on this particular occasion C did not have its normal colour? Or that somebody put a different substance in the jar labelled 'A'? Or that there were some exceptional circumstances in the school room which made that the general chemical law was not applicable? Or why not assume in general (rather than only under exceptional circumstances) that the truth (or validity?) of the chemical theory is logically compatible with cases in which the law does not hold?

⁶ See on this point also Quine 1986, p. 96. Verheij 1999 argues that validity is relativised to the context of a particular logic (see also Haack 1978, p. 13f.) and uses this conclusion to argue why a dedicated legal logic is possible.

It turns out that there are many different ways to account for the outcome of the experiment, which are from a logical perspective very different in nature. The experiment might be represented logically as follows:

Law 1: If A and B are put together, C results
Facts: A and B are put together
Therefore: C results

Law 2: If C results, the resulting colour is X
Intermediate conclusion: C results
Therefore: The resulting colour is X

Actual outcome: The resulting colour is not X.

The strategy taken by the teacher (one of the substances was spoiled) was to make an exception to the first law. Apparently this law does not hold if one of the substances is spoiled. Another interpretation would be that the spoiling of one of the substances implied that the substance in question was not really substance A or substance B anymore. Under this interpretation the premise Facts would be false. Again another solution would be to assume that law 2, about the colour of substance C, was wrong, or amenable to exceptions. And the most drastic way out would be to assume that the logic in which the experiment was described is wrong. All the premises are true and nevertheless the conclusion is false, so the logic must be incorrect.⁷

All that the experiment shows is that either not all the premises are true, or that the outcome was described wrongly, or that the logic is incorrect. Somehow one must make a choice from these options in order to account for the outcome of the experiment. The point of this is that such an experiment has no unequivocal outcome. It does not show that either chemical law 1, or chemical law 2 is false. Neither does it show that the substances in the jars were not A and B. And it also does not show that the logic used to describe the argument is incorrect. But the experiment does show that at least one of these elements of the experiment must be revised.⁸ Quine (1953, p. 41), following Duhem, observed in this connection

'that our statements about the external world face the tribunal of sense experience not individually but as a corporate body'.

I would like to add that the corporate body is not juxtaposed to our sense experience, but includes the propositional expressions of our sense experience. Experience adds propositions to the complex whole of our presumed knowledge, and if the results are unacceptable the totality of the presumed knowledge must be made acceptable again, by modifying it.⁹ The modifications can take place on any level of the whole, from removing or modifying the sentences that express sense experiences, via removing or modifying laws that generalise connections between types of facts, to adopting a different logic. Even the standards by means of which we evaluate a whole of presumed knowledge as acceptable, and the standards of rationality that should guide the process of adaptation are part of the whole that is the object of mutual adaptation. As becomes clear from these examples, the notion of knowledge at stake here is rather comprehensive, and includes not only traditional empirical knowledge, but also constraints on worlds which we consider to be possible and standards for rationality.

As a matter of empirical fact, it turns out that we are more inclined to modify or throw away some parts of this complex whole than to throw away or modify other parts. Those parts which we are least

⁷ Since the logic involved is unspecified, it is not clear what would be the proof that the logic is incorrect. The occurrence of exceptions to laws, for instance, might also prove the logic to be incorrect. This would for instance be the case if predicate logic, or any other monotonic logic, were used.

⁸ Obviously one can add even more elements of the experiment which might be in need of revision, such as the assumption that the colours of the substance were correctly observed, etc. But this does not subtract from the point that I want to make.

⁹ It would beg the question to use the expression 'inconsistent' instead of the more neutral 'unacceptable' in this connection, because it presupposes an independent logic by means of which consistency can be established.

inclined to change, turned into a theory about valid reasoning, we call 'logic'.¹⁰ On this view, logic is not opposed to domain knowledge, as it is on the traditional view. There is a continuum in our presumed knowledge, ranging from accidental beliefs which we are willing to revise on the slightest evidence that they are false, through firm beliefs which we only prepared to give up on the basis of strong counter evidence, corroborated laws which we use to derive beliefs from other beliefs and which we only give up if we can find better ones, to 'logical' laws, of which we cannot even imagine circumstances under which we are prepared to give them up. And yet, even some logical laws have become the object of discussion, such as the law of the excluded middle, which is not accepted in so-called constructive or intuitionist logics.

The same thing can be formulated in a different way. Our beliefs and standards are all part of an interconnected whole, which we attempt to make as 'coherent' as possible, where the standards for coherence are part of the system we try to make coherent. Let us call this whole a 'world view'. Logic belongs to that part of a world view which we are least prepared to give up if the world view is less coherent than we find acceptable. Obviously, the borderline between logic and other parts of a world view is not sharply defined. There is no clear demarcation between logic and other beliefs or standards. Moreover, there is no reason why we should create such a clear demarcation, because there is no fundamental difference between logical and other 'knowledge' which could serve as the basis for a demarcation. Even logic is in principle amenable to revision, even though it will not be revised easily. In particular it is not prone to be corrected merely on the basis of empirical evidence. Making changes in one's logic implies making changes in one's overall world view¹¹, and this is not something which is done on the basis of mere observational knowledge.

6 The possibility of a special legal logic

The picture sketched of the nature of logic in the previous section is much more liberal than that sketched in the sections before. Logic is not anymore confined to propositions that stand in necessary truth value based relations because of the meanings of the logical operators that occur within them. It deals with all connections between propositions which we hold to be 'necessary' because we are not prepared to change them in the case of incompatible beliefs. Such necessary connections may be based on the meanings of logical operators, and therefore logic in the traditional sense is part of the holistic logic proposed here. But other necessary connections than those based on the meanings of logical operators fall under the scope of logic too. The relations between what is permitted and what is forbidden, between what is possible and what is impossible, and between what will always be the case and what is the case tomorrow are examples of logical relations which cannot be based on the meanings of logical operators only. Not coincidentally these relations are already the object of logical research, in particular of deontic, modal, and temporal logic respectively. The practice of logic has sometimes been stronger than its theoretical foundations.¹²

The more liberal picture of logic proposed here leaves room for a special legal logic. The task of such a logic would be to explore (semi-)necessary relations that belong specifically to the domain of law. Obviously it is not certain on beforehand that there are such special legal necessary relations, and if there are none, legal logic has no object. Such a conclusion would be the result of logical research in the legal domain, however, and even this might be called research in legal logic.

But there is stronger evidence that legal logic has an object. There is a long standing tradition of logical research concerning the relations between central legal concepts such as rights, obligations, permissions, prohibitions, liabilities, responsibilities, powers, validity, etc.¹³ Much of this research deserves to be called logical research. Moreover, the last decade there has been a flowering in the

¹⁰ See Quine 1986, p. 100.

¹¹ See, again, Quine 1986, p. 100.

¹² Obviously it is possible to define new, more powerful logics with new operators. These operators can be *given* the meanings which make that the relations between the mentioned notions become merely semantic. This does not show that the relations were meaning relations from the beginning, but merely that it is possible to introduce words the meanings of which exhibit relations that were independently necessary.

¹³ To mention only a small part of the relevant literature: Hohfeld 1913, Von Wright 1963, Hilpinen 1971 and 1981, and Allen and Saxon 1993.

research of legal logic inspired by results in the more general field of defeasible reasoning.¹⁴ In combination with the jurisprudential work of Dworkin (1978) and Alexy (1979 and 1985) about the relation between legal rules and legal principles this has resulted in refined theories about the logic of rules and principles.¹⁵ The same research on defeasible reasoning also promises to contribute to a topic which stands in the centre of recent jurisprudential discussion, that is the possibility to 'weigh' seemingly incommensurable principles and goals.¹⁶ In short, legal logic is not only possible on theoretical grounds, but has been demonstrated to exist.

¹⁴ A good impression of the results can be found in Prakken and Sartor eds. 1997.

¹⁵ See for instance Verheij e.a. 1998.

¹⁶ See for instance Chang (ed.) 1997 and Burg 2000.