City, Territory and Architecture

RESEARCH ARTICLE

Rules and the production of built space: an investigation on compliant nomotropism

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Abstract

State-enforced norms regarding the production of built space play a central role in determining architectural and urban quality. When addressing to this issue, researchers concentrate on social, historical, political and technical aspects of architectural regulations, but their role is not often investigated in morphological terms. This research concentrates on two normative case studies regarding the assessment of the 'quantity of buildable space', which are extrapolated from Italian laws and local regulations and tested using the architectural project as a heuristic tool to understand their effects on architectural design. Two questions are addressed: (1) how can a rule have effects, such as hinder or promote specific (architectural) forms without addressing them directly, and (2) what are the mechanisms that allow these effects to take place? The study argues that building regulations, even in apparently neutral aspects, such as the definition of indexes, can result in perverse effects, namely effects that are neither intended nor planned, and that can encourage or hamper specific forms. It concludes with the assertion that regulations regarding architecture should be subject to a deep analysis to envisage possible distortions, using the design process as a method of assessment, in order to understand whether their influence on design choices can or not be acceptable or desirable.

Keywords: Architectural regulations, Indexes, Perverse effects, Unintended consequences

Introduction

The role played by state-enforced rules on architecture is often overlooked by architectural theorists, (Ben-Joseph 2005; Ben-Joseph and Szold 2005; Lehnerer 2009; Carmona 2016), and scholars rarely engage in the discussion of the effects of regulations on architectural quality.[1] Regulations are often seen by practitioners as a subject matter external to the discipline (Imrie 2007), with the consequence of perceiving them as a nuisance on the work rather than a stimulus to improve the design process. Some scholars advocate a deeper engagement of architects in the use of rules as design tools (Imrie and Street 2009), while others support the idea that rules, rather than be oriented to the achievement of a final state of facts, should engage with the ongoing development of cities (Garvin 2004). Others still advocate the rules to be more generic and relational than specific and directional (Moroni 2010), similarly to what Giancarlo De Carlo

(1964: 47) claimed to be necessary for any planning activity: to be open to the "possibility of its failure". Rules are, nonetheless, "justified on the basis of achieving social and economic goals" (Kayden 2004: i), and they are often said to prevent the bad effects that the privates, in the pursuit of profit, have on the urban environment with their actions (Lehnerer 2009). While all of the cited works concern the many aspects of the interrelationship between the domain of norms and the practice of architecture, they rarely engage in the description of the formal outcomes of which the systems of rules are responsible; rather, they tackle the social (Imrie 2007; Imrie and Street 2009, 2014), historical (Lehnerer 2009), technical and political (Ben-Joseph 2005; Ben-Joseph and Szold 2005) dimensions of the problem. Even if most of the cited works present accounts of specific phenomena regarding the unintended effects of norms on architecture, the

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[1] An exception to this general attitude can be found in Ross (2015).

creation of a theoretical framework under which they can be interpreted and controlled has not yet been attempted.

The aim of this study is therefore to open a discussion upon the effects of rules in general—be they state-enforced laws, local regulations or by-laws produced by independent authorities—on architectural form. In particular the work engages with the formal effects of rules that are not prescribed directly by the rules themselves, and that are not explicitly related to the aim of the rules, their *télos* (from the Greek τέλος, "scope, aim"), but nonetheless are somehow related to the existence of the rules, and are the result of the normative state of facts produced by the rules. The present work is not intended to be exhaustive upon the subject, but rather it represent the attempt to engage a discussion on an extremely relevant subject that is somehow underestimated. In order to do so, two issues are addressed.

The first issue is *epistemic*: it concerns the description of the phenomena by which a rule affects architectural form (but it can be extended beyond the disciplinary field of architecture, to embrace any regulated activity involving the design of forms) without addressing it directly. It tries to answer to the question: 'how can a rule produce,—or contribute in producing, or hinder, or prevent—certain specific formal outputs without explicitly prescribing/prohibiting them?'

The second issue addressed here is *praxeological*. It regards the role of these rules in producing what their described formal outcome is. It investigates the relationship between the rule and the form it produces and answers to the questions 'what are the mechanisms that allow these effects to take place? How can these rules *be effective* beyond their wording?'

Literature review

According to Imrie (2011: 136) "popular conception of building regulations [are] technical and value neutral" and most architects tend to interpret the normative sphere of architecture as such. This apparent neutrality of regulations is expressed through mathematical indexes in accordance with Ludwig Hilberseimer's (2012: 280) claim that "the general case, the law is respected and emphasized; the exception, however, is put aside, nuance is swept away, measure becomes master, chaos is forced to become form: logical, unambiguous, mathematics, law". When rules do not prescribe any architectural element or form, namely they can be considered "neutral" to form, their agency on architectural form is still, as argued hereafter, extremely important. This agency is nonetheless often unforeseen by the nomothetes and must be ascribed to the category of "unintended consequences".

Moroni (2012) analysed the question of unintended consequences in relation to urban planning and argued there is one generic theory and two more specific theories. In particular, he affirmed that unintended consequences are inherent to complex social systems and can be described as "a disparity between an action's original purpose and its results" (Moroni 2012: 269). The specific theories regard, on the one side, the "bad" effects of such action, namely the perverse consequences, and, on the other side, the "good" effects, which he names virtuous consequences.

The concept of perverse effect was first introduced in reference to the social action by the French sociologist Boudon (2016), which referred to the fact that when the agents of a society act rationally with respect to the actions of the state, seeking to maximise their profit, often the "composition" of their actions can lead to the ineffectiveness of the social action. In Boudon's discourse, these effects are ascribable to the fact that the *télos* (from the Greek τέλος, "scope") of the social action can be overturned by the composition of the single agent's acts performed rationally-instrumentally[2] towards a goal, ending up in the determination of an overall effect on society that contradicts the original *télos* of the social action. While the perverse effects (*effets pervers*) in Boudon's discourse regard the composition of a multitude of actions, Moroni uses the term in relation to *any* bad unforeseen consequence.

The actions of the designers that are oriented by the rules can be framed under the category of nomotropism, namely the attitude of a rule to modify the actions of individuals, not in the mere adherence to its prescriptions but by generating specific behaviours by its sole existence. This phenomenon was first described by the Italian philosopher of law Amedeo Giovanni Conte (2000, 2011), and notably it has been examined further in relation to urban planning by Chiodelli and Moroni (2014), who asserted that existing state-enforced rules affect even unregulated settlements. The idea of nomotropism comprises all behaviours originated by the existence of a law. In their study, Chiodelli and Moroni, following Di Lucia (2002), referred to two distinct kinds of effectiveness of the rule: Y-effectiveness, which entails that the actions of the addressees are made in compliance with the rule, and X-effectiveness, which in contrast entails the adaptation of the actions of the addressees to the rules, without considering the compliance, but rather "in light of rules". While Chiodelli and Moroni's study focused on non-compliant nomotropism, this essay shows that nomotropism in architecture exists even in cases of compliancy

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and that its role is not to be underestimated, playing a central part in the definition of the formal outputs of design subject to regulations and, therefore, to the built environment in its entirety.

Methodology

In order to address the first question, namely 'how can rules produce specific formal outputs without explicitly prescribing them', this enquiry engages with a 'normative set', consisting in a series of norms, based on Italian building laws, that presents a structure that can be found by designers in an actual Italian context of building design. This "normative set" is comprised of state enforced norms and local regulations addressing a single building issue, chosen for its pervasiveness and importance, namely the "quantity of buildable space". Regulating the quantity of built is a crucial aspect in determining liveability and sustainability of a city (or one of its parts), playing a central role in defining density. The main instrument for this purpose can consist either of a combined provision of different parameters (e.g. maximum building height/minimum floor height/lot coverage ratio) or a quantity of a comprehensive unit of measure of given space, which is our case. FAR (floor area ratio) is such a comprehensive unit of measure. It is based on a ratio consisting of "floor surface/lot surface" (e.g. how many m^2 can be built per m^2 of the lot). Its principle resides in the fact that built space is normally meant to be stepped on. Consequently, it does not engage with height, which can be regulated by minimum and maximum heights either of the single floors or of the building. For the purposes of the norm, the effectiveness of FAR relates to the fact that to conduct an ordinary activity, such as sleep, eat or work, a floor space is required, regardless of the internal height.

The land use index (LUI) is another comprehensive index and is the most important quantitative control factor in Italy.[3] It is based on a ratio consisting of "built volume/lot surface" (i.e. how many m^3 can be built per m^2 of the lot). LUI is established through national laws and enforced by local authorities through comprehensive planning systems. Being a volumetric unity, it not only entails a surface control but also establishes a direct and unavoidable relation between the footprint of the building and its height. Whereas local regulations and by-laws can provide other quantitative indexes besides

LUI, it does not, typically, need other specifications. It is important to consider that this normative set is extrapolated from a wider "normative state of facts" in which other rules can modify the scope of the normative set taken into account. However, this consideration does not alter the validity and scope of the work in its fundamental aspects. While FAR accounts only for walkable surfaces and thus is measurable by the plan, LUI needs further data: are balconies included or excluded from the measurement? Does a passage (i.e. a hole in the building) constitute volume or not? These issues are addressed in the local regulations and expressed in the normative set considered for this enquiry.

After having constructed the normative set as representative of an actual normative state of facts, a series of design operations are conducted, in order to compare different formal choices and highlight the convenience of determinate formal configurations based on the normative set considered. The *praxis* of design, *the project of architecture*, will be used as a heuristic instrument to simulate the conditions, intended as the normative state of facts, in which architect can found themselves operating. Two design operations are conducted to highlight morphological conditions: the first one takes into consideration the relevance of the LUI index—compared with the FAR index—in the subdivision of a building in horizontal slices, as opposed to the varied double height spaces and indoor balconies. It is conducted using the famous LeCorbusier's Maison Citrohan of 1919. The second shows the unprofitable—under the normative set considered—use of loggias unless they're open on two sides instead of just one. It is simply conducted designing a *loggia* for an unspecified building under the normative set presented.

The aim of this operation is to bring to light the convenience in the use of certain formal configurations, which are not related to the *télos* of the normative set considered—which is only to 'control the quantity of built space'—but that nonetheless are 'discovered' by architects through the design process during the application of the normative state of facts.

To answer to the second question "what are the mechanisms that allow these effects to take place?" the notion of nomotropism is considered. It is argued that such effects pertain to the category of nomotropic phenomena, and that these, even if occurring in the case of a non-compliant building—as shown by Chiodelli and Moroni (2014), even in unregulated settlement—can be found in the case of compliant buildings and can have an extremely important role in determining architectural form.

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[3] Volumetric indexes are established by the Law "17/08/1942, n. 1150 "urban planning law" art. 41-quinquies/6 where a maximum LUI is established (3m3/m2) for the municipalities without an approved land-use plan and are enforced and used by all the local land-use plans as the principal parameter in determining the quantity of buildable space.
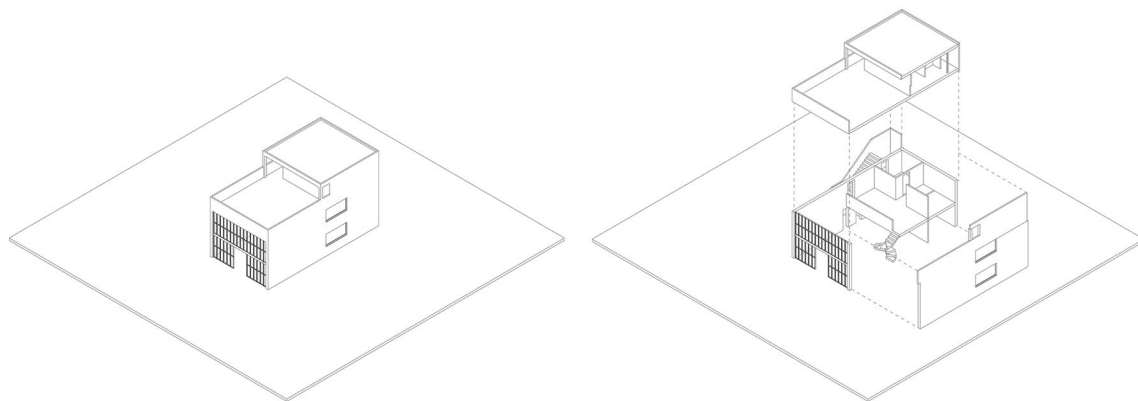
Fig. 1 LeCorbusier's 1919 *Maison Citrohan*

Regulating the quantity of built space

For the purposes of the work, we will consider a specific 'normative set' of LUI calculation, with the following scheme:[4]

  i.   Balconies are excluded.
  ii. Every covered surface closed on three sides is included.
  iii. Such spaces under a specified depth (x) are excluded.
  iv. All the spaces with a ceiling under a certain height (y) are excluded.

The rationale of these specifications is typically not explicit, although it is assumable that (i) is intended to allow, if not encourage, the use of balconies in building design, (ii) is intended to limit the quantity of exterior spaces that, avoiding the measurement of volume, can lead to an overexploitation of the lot, (iii) allows a certain amount of exterior enclosed space and (iv) excludes from calculations small technical spaces. This setting of the LUI calculation, even if based on what apparently is a series of reasonable normative choices, can entail distortions on the building form. The following subsections illustrate two cases of such distortion.

The horizontal slice

The first operation shows how the use of LUI can discourage double-height ceilings or indoor balconies as opposed to the FAR. Double-height spaces are an element of architectural history and modern architecture. Le Corbusier used them in several projects, including *Maison Citrohan* and the *unitè d'habitation*, two projects that aimed to develop a high-quality housing scheme for the masses. The importance of this element resides in the fact that it allows for the creation of unexpected and interesting architectural settings, without requiring a great expense. It offers the opportunity to provide a house with a space of monumental importance, allowing a greater amount of natural light to potentially flow in and an enhanced ventilation if needed. For this operation the 1919 *Maison Citrohan* itself will be used (Fig. 1). Ludwig Hilberseimer (2012: 177) wrote "Le Corbusier has made many attempts at perfecting the form of the small house. His most remarkable is the Maison Citrohan, which in spite of its small area provides a very comfortable dwelling".

For the purposes of this experiment, we need to relate the house to a building lot. We chose to hypothesize[5] a lot area of 1000 m^2 having:

FAR:
GROUND FLOOR: 79 m^2
FIRST FLOOR: 42 m^2
SECOND FLOOR: 89 m^2
TOTAL: 210 m^2
FAR: 210 m^2/1000 m^2 = 0.21
LUI:

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[4] It is a rather common case though not the only one. A series of examples may help clarify the extreme variability of these parameters. In Avellino, the x value is the equal to the width of the loggia. In Salerno and Cagliari, it is 2 m. In Quartucciu, it is 2.5 m. In Tuscany, a regional by-law sets a value of 2 m, widely used in a series of municipalities. In Agrigento, balconies are excluded if opened for at least 30% of their surface. In Potenza, the space of balconies and loggias count only if their total surface exceeds 35% of the overall surface of the house. In Naples, it is 15% of the overall surface. In Riccia, only porches can be excluded when open to public use. In Pescara, Frosinone and Siena, porches are always included in the calculation unless they protrude from the building, In Umbria, a regional by-law excludes from the calculation every space open on at least one side. The same applies to Treia and Modena.

[5] It is important to stress the fact that the building lot surface is irrelevant to the comparison between FAR and LUI, given that both have it as their denominator, but it is nonetheless needed to carry on the design hypothesis.
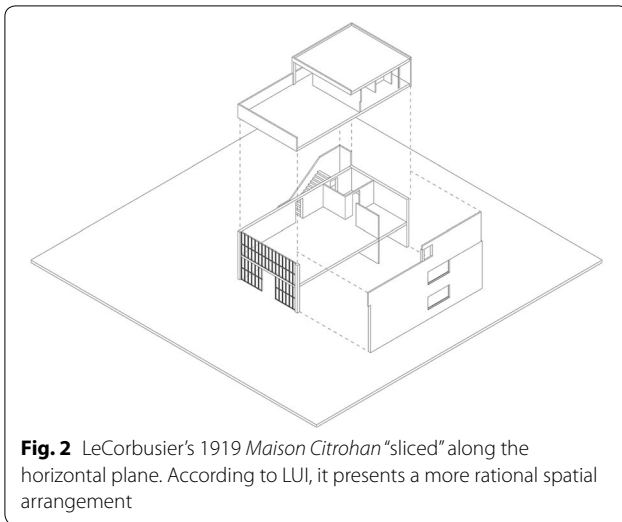
Fig. 2 LeCorbusier's 1919 *Maison Citrohan* "sliced" along the horizontal plane. According to LUI, it presents a more rational spatial arrangement

(for x = 0 and y = 2.15 m, which is the internal height planned by the Swiss architect)

MAIN BULK: 70.9 m^2 (section) × 6.6 m (depth) = ~ 468 m^3

EXTERNAL STAIRS: 24.5 m^2 (section) × 1.3 m (depth) = ~ 32 m^3

TOTAL: ~ 500 m^3

LUI: 500 m^3/1000 m^2 = ~ 0.5 m^3/m^2

FAR and LUI are related through the height of the floor, which in LeCorbusier's projects is a narrow 2.15 m. The ratio FAR/LUI, though, is ~ 2.38 m because it considers the living room's double-height.

The next step of this demonstration consists in extending the first floor slab, eliminating the double height, separating the two spaces originally meant to be one and eliminating the spiral staircases, thereby granting access to the upper floor from the external staircase (as done here) or leaving just the space for the staircase (Fig. 2), having thus:

FAR

GROUND FLOOR: 79 m^2

FIRST FLOOR: 79 m^2

SECOND FLOOR: 89 m^2

TOTAL: 247 m^2

FAR: 247 m^2/1000 m^2 = ~ 0.25

There are no changes in LUI, which remains

LUI: ~ 500 m^3/1000 m^2 = ~ 0.5 m^3/m^2

By considering as a control unit of measure the walkable surfaces, FAR allows for the usage of double-height spaces without "consuming" units of the given quantity. LUI, on the other hand, entailing the volume of the buildings, counts the double-height space as "used space". The regulation strategy for both is to create a "scarce good", forcing the actions of the designers to adhere to univocally determined and measurable quantities. In this case, though, this quantity is not neutral to form. Those interested in saving buildable volume will be encouraged in giving away the chance of realizing a double-height space, determining, without explicitly declaring, the propagation of buildings made by the overlay of "horizontal slices" rather than "onerous" varied spaces. Predictably, the double-height space, being a "scarce good" for the effects of the regulatory regime, is more easily destined to be built by high-income individuals, whereas low-income ones are more likely to save the space they can afford.

Two-sided loggias

The second operation will consider a traditional architectural element of southern Europe, widely used in contemporary architecture. Loggias are, normally, exterior spaces excavated in the volume of the building. They are not protruding from the building façade and are often articulated by columns. They are essentially roofed exterior spaces enclosed on three sides out of four. While under the FAR index these spaces would be counted as surface, and therefore be onerous (unless otherwise specified) from the perspective of the regulation, LUI needs to clarify a priori whether its realisation entails a consumption of buildable space or not. For this reason, the LUI calculation can entail that any outside space does/ does not imply such consumption or specify spatial situations by which it can vary.

As aforementioned, often LUI local regulations specify a (x) depth within which the loggia is not included in the total LUI calculation. This means that a discrete length exceeding x (x + ε) will result in all the volume of the loggia included in the LUI calculation, suggesting a predetermined depth measure (Fig. 3) to "save buildable space". While this regulatory instrument can be regarded as a mean to guarantee, as far as possible, a balcony to every apartment, it ends up discouraging wider or smaller balconies; in other words, it poses the risk of a standardisation. Even if this standardisation is not desirable or undesirable *per se*, it overrides the design choices regardless of their impact on the city. The relevant fact is that the norm does neither imposes a duty on designers, nor does force them to adhere to unambiguous elements when designing balconies. Furthermore, this setting is easily avoidable, by simply designing different balconies: unfortunately, this choice can entail, in a design process, losing an important quota of space potentially suited for inhabiting or generating income.
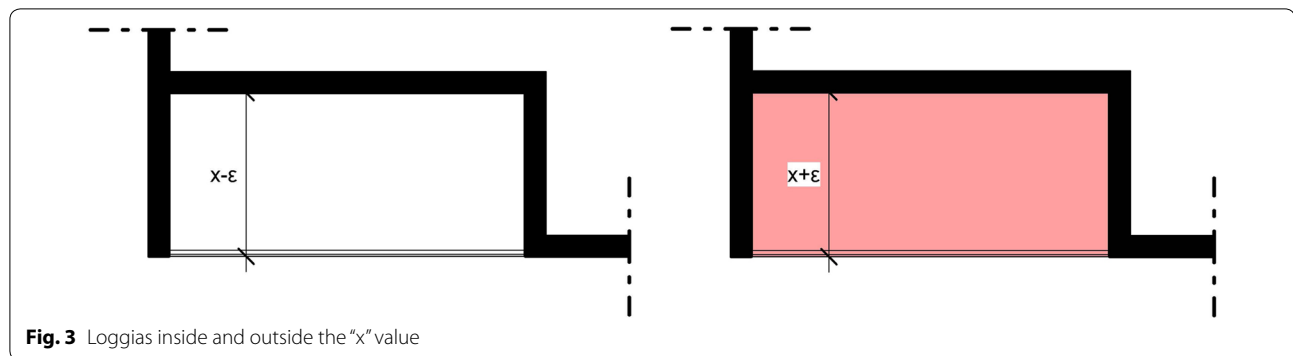
Fig. 3 Loggias inside and outside the "x" value

A common strategy to avoid the "consumption" of volume entailed by the deeper loggias, in the regulatory regime specified above, is to let two sides open instead of just one. This obviously changes the architectonic features of the element, resulting in a two-side-open space (Fig. 4). This may seem trivial, a sort of hack even, but this formal consequence of the law is extremely common, and had interested a number of buildings in several cities (Fig. 5). Although apparently neutral, this norm suggests a predetermined architectonic form through the imposition of calculation thresholds.

Nomotropic architecture

The phenomenon of nomotropism—from the Greek *nomos* (νομος, "law") and *tropos* (τρόπος, "direction")—as described by the Italian philosopher Amedeo Giovanni Conte, in his essay "Nomotropismo: agire in funzione di regole" (2000), consists in a behaviour that is originated by the existence of a rule but that, at the same time, do not entail compliance with the rule itself.

Compliant behaviours can be nomotropic, but not all nomotropic behaviour imply compliance. Compliant behaviours are not nomotropic when the agent is behaving in accordance with the rule without considering it. This can happen because the agent *does not know* the rule, but its behaviour is nonetheless respectful of the rule. It can be the case even that the agent *does not need* the rule to behave in a certain way, given that not all our actions are guided by rules. Conversely, non-compliant behaviours can be nomotropic when the agent is, for example, hiding the evidence of his non-compliancy. As Max Weber observed "is in light of a rule to which he does not adhere that the burglar hides the stolen goods".[6] The act of hiding does not entail compliance nor not compliance with the rule *do not steal*: It is in fact *neutral*
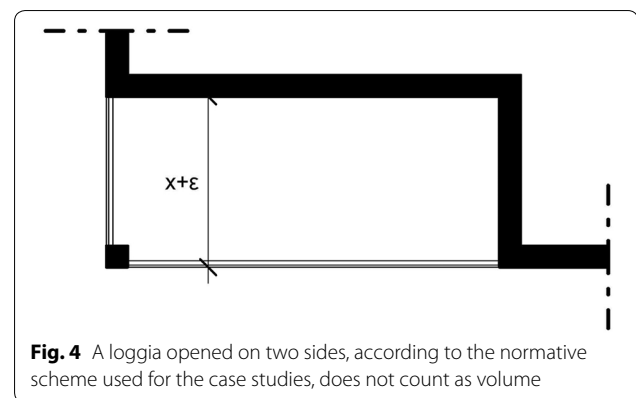

Fig. 4 A loggia opened on two sides, according to the normative scheme used for the case studies, does not count as volume

to the rule. Nonetheless it is generated by it, and without the rule the act of hiding makes little or no sense.

The same notation is used by Chiodelli and Moroni (2014) to describe some phenomena regarding unauthorized settlements. They refer to the *Gecekondular*, a Turkish word meaning "built during the night", which stands for unauthorized buildings, typical of Turkish suburbs. In this case, "the penalties for illicit building depend on whether the building has been completed or is still under construction" (Chiodelli and Moroni 2014: 164), and if it is completed in its building envelope, demolition is less likely to take place. In the violation of land use rules, they wittingly work in the shortest time possible to avoid demolition. The practice of building overnight does not entail any form of compliance with the rule. As a matter of fact, it is indifferent to the legitimacy of the building. Nonetheless, "Those who complete their building in a short space of time act in light of rules of possible demolition" (2014: 164).

The two operations conducted in the previous chapter show that the actions of the designers can be influenced by the rules. The resulting forms are not prescribed by the law, nonetheless they are generated by it. The norm produces forms, in other words is *morphogenetic*.

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[6] Conte (2000: 23), translated by the author. Conte claims he adopted this very example from Max Weber. The same example is also used in Di Lucia (2002: 88).

Fig. 5 Nomotropic architectures. From the upper left-hand corner: Avellino, Salerno, Cagliari, Quartucciu, Agrigento and Siena

Moreover, the designers that wittingly sacrifice a double-height space to obtain an extra-room do not simply adhere to the LUI rule, rather, they produce forms that are convenient *in light of rules*. They adhere to the rules, but the production of the forms—*the horizontal slices*—do not respond to any recommendation of the rules.

In the same way a designer deciding to open on two sides the loggias of a housing building in order to save "cube metres" that can exploit to build, for instance, one more floor, is not acting in observance of rules that prescribe that formal outcome. Nonetheless the loggia open on two sides is specifically designed to avoid the consumption of space and is thus a product of the normative set, which makes little or no sense outside that specific normative set.

We have thus two different kind of "products" of the normative set. The first "product" is the outcome desired by the nomothetes, and in our case is a quantity of built space that allows a certain density, which is deemed desirable. In the cases shown above, the normative set considered does not prescribe any specific form, and, within that specific quantity of cube metres per square metre, gives leeway to the designers. The second "product" is derived from the strategy of the designers to, in this case, maximise the quantity of built. While the first

effectiveness is desirable and corresponds to the *télos* of the norm, the second is a by-product of the first. Not only this second kind of effectiveness is neutral to the first—in fact, it does not change the obligation to adhere to the indexes—but it can be considered as a potential obstruction in regard to the unfolding of the design process, in other words, it is a perverse effect in the sense Moroni (2012) uses the term. These two kinds of effectiveness of the law have been already identified: Chiodelli and Moroni, distinguished them as "Y-effectiveness" which accounts for actions taken in accordingly with the *télos* of the norm, and "X-effectiveness" which occurs "when an action is performed in light of rules" but is, as in the examples seen above, neutral to the rule. Chiodelli and Moroni (2014) referred to nomotropism as relevant for the description of the relationship between unauthorized settlements and urban policies. Nonetheless, nomotropic phenomena in architecture, do not regard solely unauthorized settlements. More specifically, their example regards a specific kind of nomotropism: non-compliant nomotropism.

In the case described in the previous paragraph, the compliance (Y-effectiveness) is combined with other phenomena (X-effectiveness) that are related not to the rule's *télos*, but to its implementation. Moreover,

Table 1 Different kinds of nomotropism in architecture

	Presence of nomotropic side-phenomena (X)	Absence of nomotropic side-phenomena (-X)
Non-compliance (-Y)	*Gecekondular* (Chiodelli and Moroni 2014)	The Brazen Offender (Rosa 2016)
Compliance (Y)	Morphogenetic norms	Plain compliancy

non-compliance can also exist without any form of nomotropism, given that a rule can be totally ignored, as in some cases in the Italian phenomenon of "abusivismo", described by Rosa (2016) as "*The Brazen Offender*", namely those who build where it is simply forbidden and totally ignore the prohibition.

We have four theoretical categories of effectiveness of a law with respect to an act, resulting from the interpolation between X-effectiveness and Y-effectiveness: (i) in which the act is non-compliant and there are nomotropic phenomena, which is the case of *gecekondular* (Chiodelli and Moroni 2014); (ii) in which the act is compliant and there is the presence of nomotropic phenomena, as is the case of the previous paragraph; (iii) in which the act is non-compliant and there is not even the presence of nomotropic phenomena, which occur, as aforementioned in Italian *abusivismo*, but that can regard unauthorised settlement; and (iv) in which the act is performed in accordance with the law, but there are no other observable formal side effects of the compliancy (Table 1).

The expression "Compliant nomotropism" is therefore intended to define a situation in which the actions of the addressees are compliant with the law, but in addition to the simple compliancy there is another component of the behaviour, which is moved by the existence of a law, that cannot be correctly interpreted without knowing the existence of the law itself but is not prescribed by the law.

Norms as instruments

While Y-effectiveness accounts only for the compliance with the norms' statement, X-effectiveness regards the wider effects of the norm, visible—in the case of architecture and the built environment—in its material form. As Ross (2015) pointed out, when laws are concretely materialized in the city's fabric, they acquire qualities that their verbal delegates do not express and become, somehow, autonomous, leading to results that can be indifferent to their rationales or even counter-productive.[7]

These results, even if unforeseen or unintended by the nomothetes, are predictable through a design process and, due to the form of their statement and the inherent rigidity of the assessment mechanisms, can be wittingly exploited to elude the norm's rationale.

Nomotropic phenomena regard a variety of different fields and rules, but architectural nomotropism[8] can entail formal mechanisms that the designer implements to exploit the parameters on which the rule relies. A parameter highlighted in the case studies previously described is the threshold, namely the election of a determinate value of a given measure, to determine maximums and minimums: maximum eights, minimum distances, etc. Indeed, the use of thresholds in architecture has a long story. Building regulations in 13th century Italy represent one of the earliest attempts to expressly regulate a city's growth through the imposition of thresholds of maximum height: Bologna's numerous towers were considered to pose a military threat *ad offendundum vel ad damnificandum*.[9] A regulation issued in Bologna in 1252 imposed a maximum height of "15 pontes", a unit of measure between 1.18 m and 1.40 m derived from the height of the scaffoldings, posing an end to the proliferation of Bologna's towers (Caldarelli 1988). Manuel De Solà Morales (1999) observed these parameters are a dominant criterion in the constitution of formal features of modern peripheries, where the "distance between built objects is not determined by chance, unlike the space between them" (1999, 110), and advocates the use of distances and voids as a design tool, not to fill this void with design opportunities but to devise the empty spaces as "'interesting' distances, critically chosen for their figurative capacity and their environmental and scenic rationality" (1999: 111).

Such parameters are widely used in the definition of architectural objects through objectively measurable qualities to prescribe or prohibit their use. An example is the legal definition of "Patio", which is common to a variety of Italian local regulations,[10] and states that "Patio:

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[7] It is the case of L. Ross (2015) when referring to the "Lagos setback rule".

[8] I am referring here to the mere "X-effectiveness", while "nomotropism" in A.G. Conte's view is used to describe to broader phenomenon comprising both Y and X effectiveness.

[9] "Suitable to perpetrate offence or damage".

[10] For instance Teulada, Serrenti, San Sperate, Noto, Matino and Palma di Montechiaro.

It is meant the [open] space inside a building of one or more floors, with minimum perpendicular distances between windowed or not windowed walls facing each other of 4 m for one floor buildings and 6 metres for two or more floor buildings".[11]

Notably, this wording coincides with what John R. Searle ([1995]) called constitutive rules: it can be transcribed in the famous form "X counts as Y in context C":

> *[An open space inside a building of one or more floors with minimum perpendicular distances between windowed or not windowed walls facing each other of 4 metres for one floor buildings and 6 metres for two or more floor buildings] counts as [a Patio] in [the municipality of C].*

Definitions such as this are indeed meta-norms—i.e. norms used to determine elements recurring in other norms—but their effect is to produce, in the context of validity of the norm, an institutional version of the "patio" and other elements that exist prior to the law, which, in other words, are traditional. Given the traditional flexibility and adaptability of architectural elements such as the patio, the lawmaker tries to establish an apparently objective definition of what is a patio to, for example, prescribe the possibility to open windows on it or not. The actions of the designer can, in these examples, be oriented by the rules, and the designer can avoid or pursue determinate forms to comply with the rules, for example by limiting the measures of the eventual patios or by using a form that makes it difficult to calculate an explicit, univocal distance. Under certain circumstances, the behaviour of the designers can adapt to the wording of the norm through a specific form which is distant from the norm's *télos*.

Conclusions

The articles constitute an attempt in the construction of a theoretical framework for the study of legal phenomena on architectural form. It consisted in answering two questions: first, it shows how rules can hinder or promote specific forms without addressing them directly. In particular, it asserts that such rules can orient the actions of designers to maximise profitability, suggesting particular forms or encouraging their use and spread. While these mechanisms are indeed unforeseen and unexpected by nomothetes, and their effects can be considered related to the phenomenon of unintended consequences of the law, the study argues that their influence is such that it hampers the unfolding of a rational design process and thus have to be ascribed to the category of "perverse effects". This influence, which potentially produces forms as a direct consequence, can be tested and verified using design instruments.

Second, the article suggests that this influence occurs not in the execution of a legitimate rationale of the law, but rather "*in light*" of it, as a by-product of the law. Following Chiodelli and Moroni ([2014]) we identified it as a nomotropic phenomenon related to the X-effectiveness of the law. Differently from the phenomena associated with nomotropism in the field of urban planning described by Chiodelli and Moroni ([2014]), these phenomena regard nomotropic "X-effects" and can occur even in case of compliance.

We argue that these effects are of crucial importance in determining the formal outputs in the contexts where they are applied, and that these rules should be subject to a deeper understanding, given that the extent and the binding force of norms makes them of utter importance for architectural quality. Regulators should seriously consider the impact of rules on the built environment to limit their perverse effects on the design process. The number of thresholds, indexes and objects "institutionalised" should be limited, or a certain amount of flexibility should be provided, to enhance the acceptability of such distortions on the design process.

A possible development of this work may be focused in the research of nomotropic phenomena in other normative sets and investigate further the relation between the intentional act of design and its relationship with norms in morphological terms.

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[11] In Italian: "Si intende lo spazio interno di un edificio ad uno o più piani, con distanze minime tra superfici finestrate o non, tra loro prospicienti, non inferiori a metri 4 per edifici ad un piano ed a metri 6 per edifici a più piani" (From the technical specifications [NTA] of the municipality of Teulada).

References
Ben-Joseph E (2005) The code of the city: standards and the hidden language of place making. MIT Press, Cambridge

Ben-Joseph E, Szold TS (2005) Regulating place: standards and the shaping of urban America. Routledge, New York

Boudon R (2016) The unintended consequences of social action. Palgrave Macmillan, London

Caldarelli M (1988) Statuti urbanistico-edilizi del XIII secolo. In: Casciato M, Mornati S, Scavizzi CP (eds) Proceedings of the Il modo di costruire. pp. 49–60

Carmona M (2016) Design governance: theorizing an urban design sub-field. J Urban Des 21:705–730

Chiodelli F, Moroni S (2014) The complex nexus between informality and the law: reconsidering unauthorised settlements in light of the concept of nomotropism. Geoforum 51:161–168

Conte AG (2000) Nomotropismo: agire in funzione di regole. Franco Angeli, Milano

Conte AG (2011) Sociologia filosofica del diritto. Giappichelli, Turin

De Carlo G (1964) La pianificazione territoriale urbanistica nell'area torinese: atti del seminario tenuto nel corso di pianificazione territoriale urbanistica dell'Istituto universitario di architettura di Venezia nei giorni 3 e 4 aprile 1964. Marsilio, Padova

de Solà Morales M (1999) La distanza interessante. Lotus Quaderni 23 Progettare Città—design cities, pp. 104–107

Di Lucia P (2002) Efficacia senza adempimento. Franco Angeli, Milano

Garvin A (2004) Regulating the public interest. Perspecta 35, Building codes

Hilberseimer L (2012) Metropolisarchitecture and selected essays. GSAPP Books, New York

Imrie R (2007) The interrelationships between building regulations and architects' practices. Environ Plann B Plan Des 34:925–943

Imrie R (2011) Architectural design and regulation. Wiley & Blackwell, Oxford

Imrie R, Street E (2009) Regulating design: the practices of architecture, governance and control. Urban Stud 46:2507–2518. https://doi.org/10.1177/0042098009346068

Imrie R, Street E (2014) Autonomy and the socialisation of architects. J Archit 19:723–739

Kayden JS (2004) Understanding the "code" of codes. Perspecta 35. Yale University Press, New Haven

Lehnerer A (2009) Grand urban rules. 010 Publishers, Amsterdam

Moroni S (2010) Rethinking the theory and practice of land-use regulation: towards nomocracy. Plan Theory 9:137–155

Moroni S (2012) Land-use planning and the question of unintended consequences. The Spatial Market Process. pp. 265–288

Rosa E (2016) Rules, transgressions and nomotropism: the complex relationship between planning and Italian Abusivismo. Geogr Res Forum 36:110–126

Ross L (2015) On the materiality of law: spatial and legal appropriations of the Lagos set-back. Archit Theory Rev 20:247–265

Searle J (1995) The construction of social reality. Free Press, New York

Weber M (1981) Some categories of interpretive sociology. Sociol Q 22(2):151–180

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