
Realism and the nature of theory: a lesson from J H von Thünen for economists and geographers

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Abstract. It is argued that J H von Thünen was a realist who deliberately used unrealistic assumptions to pursue a true account of a major aspect of the determination of agricultural land-use patterns. The assumptions of the simplest model of concentric rings are examined to show that this highly unrealistic model deserves a realist interpretation: the idealising assumptions serve the purpose of neutralising the impact of a number of factors on the land-use pattern and thereby help focus on the causal contribution of one major factor, namely distance from the market. It is von Thünen's conviction that this factor and its causal contribution are real rather than fictional, and that his basic model truthfully captured them. The potential truth of von Thünen's simplest model does not require that its assumptions are true nor that the representation of the resulting land-use pattern is true. This reading of von Thünen's theory is contrasted with the traditional fictionalist 'as-if' interpretation of *Der isolierte Staat* espoused by Hans Vaihinger, Peter Hall, and others. It is pointed out that economists and geographers both hold notions of realism that fail to accommodate von Thünen's realism. Although economists tend to conflate realism and realisticness and therefore fail to understand that realism is compatible with the use of unrealistic assumptions, human geographers have adopted highly specific ideas of realism that fail to do justice to von Thünen's theory. Because much of theorising in both disciplines follows the Thünian strategy, there is an important lesson to be learnt both for supporters and for opponents of that strategy.

1 Introduction

One of the characteristic realist ideas is that there is a difference between appearance and reality, and that it is the task of inquiry to find access beyond what appears to be the case to what is really the case. In the following pages I make a higher order use of this thought and set out to show how a theory that appears to violate realist tenets is, really, fully consistent with realism. The argument requires a good grasp of the nature of scientific theory as well as of the nature of realism. Johann Heinrich von Thünen's *Der isolierte Staat in Beziehung auf Landwirtschaft und Nationalökonomie*, the first part of which was published in 1826, offers an exceptionally instructive illustration of the argument. The development of the argument will also enable me to correct the popular but mistaken interpretation of von Thünen as a nonrealist.

The heritage of von Thünen's work is shared by economists and geographers alike. The book is celebrated for containing a seminal theory of agricultural land use and, more generally, of the location of economic activities in space. Indeed, a broad tradition in location studies, or a family of parallel traditions, has been built upon Thünian insights. These aspects of von Thünen's work are now recognised by the newly launched 'geographical economics' whereas earlier generations of economists mentioned the book, if at all, as offering the first elaborate formulation of the marginal productivity theory of distribution.⁽¹⁾

Von Thünen's own evaluation of aspects of his work is different: he gives precedence to his methodological contribution over other achievements. He was very

⁽¹⁾There are exceptions to the relative neglect by economists of von Thünen's other contributions (see Blaug, 1985; Samuelson, 1983).

conscious of the novelty and significance of his method—a method that has since established itself as the dominant method of modelling in economics and geographical economics. In the preface to the second edition of *Der isolierte Staat* (1842) von Thünen says that

“This method of analysis has illuminated—and solved—so many problems in my life, and appears to me to be capable of such widespread application, that I regard it as the most important matter contained in all my work” (von Thünen, 1966, page 4).⁽²⁾

Indeed, von Thünen’s book is one of the first systematic applications in social science of the combined method of isolation (sometimes referred to as that of ‘abstraction’ or ‘idealisation’) and de-isolation (or of ‘decreasing abstraction’ or of ‘increasing approximation’). On this method, theorising proceeds first by stating a set of assumptions that are known to diverge from the actual characteristics of the real world, and then by relaxing these assumptions one by one so as to approach a more concrete and complex picture of reality. At the first stage, one isolates a small selection of whatever are regarded as (perhaps the most) relevant factors—perhaps just one such factor—and at later stages one de-isolates by incorporating other factors and features of the actual situation in order to get a more comprehensive and detailed account of it. This strategy directs the reasoning in von Thünen’s book, and the subsequent literature developing further versions of the von Thünen model exemplifies this same pattern of reasoning.

No systematic research seems to have been done on von Thünen’s method for many years. This is unfortunate, because von Thünen has an important yet easily ignored or misunderstood message to deliver. As will be seen, a detailed analysis of some key aspects of von Thünen’s theory and of his comments on his own theory and method provides a particularly illuminating and pedagogically useful lesson that has significant implications for many current issues concerning the goals and procedures of model and theory construction in economics, economic geography, and geographical economics. Focusing on the first part of *Die isolierte Staat* I argue that von Thünen was a realist about his ‘unrealistic’ theory of agricultural land-use patterns, and justifiably so: the appearances of his theory did not deceive him. This has three important consequences relevant to geographers and economists.

First, the received fictionalist reading of von Thünen’s theory seems mistaken—perhaps misled by the appearances of the theory. I show why there are good reasons to reject nonrealist, fictionalist interpretations that have gained support from people such as Peter Hall, editor of the English translation of *Der isolierte Staat*, and that go back to the as-if view of scientific theorising systematised by Hans Vaihinger.

Second, the concept of realism turns out to be in need of reconsideration. Some popular usages of ‘realism’ prevalent in human geography fail to accommodate the realist ambitions of von Thünen’s theory and method: von Thünen’s realism appears anomalous. In particular, these usages fail to help us understand, in realist terms, the nature of the kind of *theory* (and the accompanying models) that von Thünen constructed in his book. More generally, some of these usages tend to ‘monopolise’ a thick and narrow version of ‘realism’ as embodying *the* meaning of the term. By adopting a more abstract and thereby more widely applicable notion of realism—and one that is more in line with the use of the term ‘realism’ in philosophy—von Thünen’s realism can be accommodated (for versions and issues of realism, see Mäki, 1996; 2001a).

⁽²⁾ Whenever possible, I use the available English translation of the first part of von Thünen’s work (von Thünen, 1966). At some crucial points, however, the translation tends to mislead us. In such cases I provide my own translations of the German original.

Third, the custom in economics—and much of economic geography—to use the term ‘realism’ (and ‘unrealism’) to depict a variety of properties attributable to theories and models and their ‘assumptions’ often prevents economists and their neighbours from seeing that realism is consistent with the use of unrealistic assumptions and theories (Mäki, 1992a; 1994a). I show that von Thünen is a consistent *realist* who, perhaps paradoxically to the uninformed, employs drastically *unrealistic* assumptions in constructing his theory and models. Resolving the paradox presupposes making a distinction between realism and realisticness (Mäki, 1989; 1998a). It also presupposes understanding the functions of the individual assumptions that von Thünen employs, as well as seeing the difference between the assumptions of a model and the assertions of a theory. Scrutinising the role that unrealistic assumptions play in von Thünen’s realist strategy of theorising will help us to see von Thünen’s theory as a representative case of how realism and unrealisticness can be reconciled.

The analysis to follow focuses on the functions of unrealisticness in the assumptions that constitute the ‘abstract’ or isolative point of departure in von Thünen’s theoretical edifice, that is, the simplest version of the isolated state itself. Little attention will be paid to the de-isolative stages of the theoretical endeavour. I will also exclude considerations of the context of von Thünen’s theory, both in the form of the experiential and social – political – cultural background of constructing the theory [such as in the account of location theory as ‘locally produced’, pursued by Trevor Barnes (2003)] and in the form of its intended prospective practical or normative uses that von Thünen had in mind [such as those discussed by Joern Barnbrock (1974) and David Harvey (1981), concerning the doctrine of the frontier wage]. These important perspectives are complementary to mine and have no substantive implications for my conclusions. I will also refrain from discussing the many later extensions and developments of von Thünen’s model which display the same methodological characteristics as von Thünen’s original accomplishment. In order to deliver the philosophical news, I want to keep the exercise simple by sticking to the paradigmatic classic.

2 Land use in the isolated state

The *Isolated State* begins with the following words:

“Imagine a very large town, at the centre of a fertile plain which is crossed by no navigable river or canal. Throughout the plain the soil is capable of cultivation and of the same fertility. Far from the town, the plain turns into an uncultivated wilderness which cuts off all communication between this State and the outside world.

There are no other towns on the plain. The central town must therefore supply the rural areas with all manufactured products, and in return it will obtain all its provisions from the surrounding countryside.

The mines that provide the State with salt and metals are near the central town which, as it is the only one, we shall in future call simply ‘the Town’” (von Thünen, 1966, page 7).

Von Thünen then sets himself the task of investigation:

“What pattern of cultivation will take shape in these conditions?; and how will the farming system of different districts be affected by their distance from the Town?” (page 8).

The whole of von Thünen’s book is devoted to solving this problem, but he gives an outline of the solution right after posing the problem:

“It is on the whole obvious that near the Town will be grown those products which are heavy or bulky in relation to their value and hence so expensive to transport that the remoter districts are unable to supply them. Here too we shall find the highly perishable products, which must be used very quickly.

With increasing distance from the Town, the land will progressively be given up to products cheap to transport in relation to their value.

For this reason alone, fairly sharply differentiated concentric rings or belts will form around the Town, each with its own particular staple product. From ring to ring the staple product, and with it the entire farming system, will change; and in the various rings we shall find completely different farming systems” (page 8).

The resulting agricultural land-use pattern is thus represented as one of concentric rings around the Town. The pattern is determined by the cost of transporting the products to the Town where the market is located.

3 Assumptions of the theory

It will be instructive to list a selection of the assumptions underlying the initial version of von Thünen’s theory, its simplest model. As can be seen, not all of the required assumptions are contained in the opening two paragraphs of von Thünen’s book. Some of the additional assumptions are given by von Thünen himself in the later course of his book, and some others have been recognised as necessary by later commentators (for example, see Chisholm, 1968; Kellerman, 1989a). I have provided the final dissection of the set of assumptions into (almost) logically elementary statements. There are many ways to formulate and organise the assumptions, but the selective list below should be sufficient for our purposes.

1. The area is a plain, that is, there are no mountains, valleys, etc.
2. The plain is crossed by no navigable river or canal.
3. The soil in the area is throughout capable of cultivation.
4. The soil in the area is homogenous in fertility.
5. All communication between the area and the outside world is cut off by an uncultivated wilderness.
6. At the centre of the plain there is a town with no spatial dimensions; hence it is represented by a single point.
7. There are no other towns in the area.
8. All industrial activity in the state takes place in the town.
9. All markets and hence all interactions between the producers are located in the town.
10. The interaction between producers is restricted to the selling and buying of final products. In other words, there are no intermediate products and no nonmarket relationships between producers.
11. Transportation costs are directly proportional to distance and to the weight of the good.
12. All prices and transportation costs are fixed.
13. Production costs are constant over space.
14. The climate is uniform across the state.
15. The agents are rational maximisers.
16. The agents possess complete relevant information.

Not all of these assumptions will receive equal attention in what follows. Many of them would require a much more thorough analysis than is possible here.

Note that I have called sentences 1 to 16 ‘assumptions’ and not ‘hypotheses’, thus departing from the English translation of von Thünen’s book (von Thünen, 1966, page 7). Von Thünen’s own term—translatable as ‘presuppositions’ or ‘preconditions’—is “Voraussetzungen” (von Thünen, 1910, page 11). For reasons given in the next section, the term ‘hypothesis’ is not quite appropriate for characterising these sentences: they are not conjectures awaiting to be established as true or false. Von Thünen, just like the rest of us, believes that they are characteristically false.

4 Unrealisticness of the isolated state

Section 2 of von Thünen's book is entitled "Comparison of the isolated state with reality", and the second chapter of this part reports "Differences between the isolated state and reality":

"Actual countries differ from the isolated state in the following ways:

1. Nowhere in reality do we find soil of the same physical quality and at the same level of fertility throughout the entire country.
2. There is no large town that does not lie on a navigable river or canal.
3. Every sizeable state has in addition to its capital many small towns scattered throughout the land.
4. In reality the backward, pastoral regions hardly ever exert as depressing an influence on the price of animal products as in the Isolated State" (von Thünen, 1966, page 171).

This is an admission that many of the assumptions in von Thünen's simplest model are 'unrealistic' in the serious sense that there are major divergences between what the assumptions would appear to claim about the world and what really is the case. It should be obvious that the divergences are not restricted to those that von Thünen mentions in the passage quoted above (for example, see Passow, 1902, pages 26–28). It is such divergences between the assumptions of the theory and the real world that generate the appearance of the theory violating the tenets of realism.

In case the degree of unrealisticness in the assumptions constituting the initial version of one's theory is judged to be nonnegligible, the standard strategy is to relax some of the assumptions one by one, replacing them with more realistic ones and so to achieve a more encompassing and detailed picture of the complexities of the object. This has indeed happened in the case of von Thünen's theory. It begins in von Thünen's book with the introduction of a small town and a river to the isolated state, and it has later given rise to models in which fertility varies across the state or in which transport costs are nonlinearly related to distance or in which agents face uncertainty and risk (for example, see Cromley and Hanink, 1989; Day and Tinney, 1969; Kellerman, 1989b). Each such relaxation implies a modification in the resulting land-use pattern (for an illustration, see Peet, 1969, page 287).

Here are some popular ideas that I wish to challenge: (1) such steps of relaxation take us from an unrealistic representation to a more realistic one; (2) this is the only route towards increasing realisticness; and (3) realism is the appropriate philosophical position with respect to the heavily modified, 'realistic' versions of the theory at most. I want to question these views (1)–(3) by examining the unmodified and 'unrealistic' version of von Thünen's theory based on unrelaxed assumptions such as 1–16. I argue that one can be a realist also about this simple initial version.

One problem with the term 'unrealistic' is, of course, that it may mean a whole lot of different things, from semantic properties (such as being nonreferential or false) to pragmatic properties (such as being implausible or practically useless) of linguistic and other representations (see Mäki, 1989; 1998a). I will next examine some kinds and functions of unrealisticness in von Thünen's theory.

5 The isolated state: unrealistic assumptions and theoretical isolation

It seems to be close to a semiofficial reading of von Thünen's *Isolierte Staat* that it is an application of what later became known as fictionalist as-if methodology. Peter Hall, the editor of the abridged English translation of von Thünen's book, wrote that "here is the first use of the method of 'fiction', of 'As if'; a method which received philosophical recognition only two generations later, in the work of Vaihinger" (1966, page xxii). Hans Vaihinger, author of the seminal *Die Philosophie des Als Ob*

(1st edition, 1911), himself used von Thünen's *Isolierte Staat* as an example of fiction (Vaihinger, 1920, page 37). In the most extensive study of this subject, Erich Gutenberg argues that the theory fulfils the conditions of Vaihingerian fiction remarkably well; indeed, he regards it in certain respects as an 'ideal type' of fiction (Gutenberg, 1922, pages 70–71).

What does it mean to argue that von Thünen used 'the method of fiction' in the Vaihingerian sense? What is a fiction anyway? To summarise Vaihinger's own account, (Vaihingerian) fictions are (1) contradictory (they contradict reality and they may be internally contradictory); (2) provisional (the contradictions are to be eliminated at the end); (3) based on deliberately false assumptions; and (4) constrained by considerations of expediency and usefulness (Vaihinger, 1920, pages 172–174). These characteristics are far from unambiguous, but against this rough background there should be nothing surprising about the intuitive feeling that the isolated state is a fiction in some such sense.

The as-if formulation of scientific theory involves both the fictionalist and instrumentalist aspects of Vaihinger's view. A scientific theory does not assert that the world is so-and-so (that matter consists of atoms, that economic agents are completely egoistic, that agricultural land use is organised in concentric rings, etc). Rather, a theory is a recommendation that for some purposes it is convenient or useful to consider the world *as if* it were so-and-so (even though we know it is not). Or, to put the latter part of the sentence more precisely, the phenomena in the world are to be considered *as* they would be considered *if* the world were so-and-so even though, insofar as we can tell, it is not. I will have more to say about the as-if in the next section.

A detailed critical examination of Vaihingerian readings of von Thünen is given elsewhere (Mäki, 2003a). Here I move on to a task that I think is necessary for understanding von Thünen's method and for seeing how unrealistic assumptions in a theory can be justified from a realist point of view. I will first concentrate on the nature and functions of the individual assumptions and from this develop an account of the nature of the theory as a whole. This approach is of crucial strategic importance in that it helps us substitute a realist account of the theory for the fictionalist one, taking us beyond the antirealist appearances of the theory.

Before entering upon the examination of von Thünen's assumptions, I will provide a list of a few kinds of 'unrealisticness' relevant to our topic (see, Mäki, 1989; 1992a; 1992b; 1994a; 1998a). Let us say a representation is an *idealisation* if it is formulated or can be reformulated in terms of a variable that is assigned the value 0 or $|\infty|$ (or sometimes 1, depending on the scale). An idealisation, in other words, involves so-called limit concepts. Notions such as a frictionless surface and mass point in physics, as well as the horizontal demand curve and zero transaction costs in economics are dependent on idealisation in this sense. A representation is a *simplification* if its object is characterised in terms of fewer elements than it actually possesses. Examples include spherical planetary motions in astronomy and linear production functions in economics.

Idealisations and simplifications are, or give rise to, strictly false statements. They are unrealistic in that they fail to be 'nothing but true' of their objects. A representation may be unrealistic also in that it is partial, that it violates 'the whole truth'. Such representations involve *isolations*, for closer inspection, of tiny slices of the universe from the influence or involvement of its numerous other objects and aspects. Physical experiments in laboratory conditions are based on material isolation, whereas most isolations in disciplines such as human geography and economics are theoretical in character. It is useful to make a further distinction between *direct* and *indirect* theoretical isolation. Direct isolation is created by an idealising representation that

excludes the impact of some factors on the object under study by explicitly or implicitly neglecting them. Indirect isolation is effected by means of idealisations, simplifications, and other ‘unrealistic’ assumptions that neutralise the impact of their respective objects on the isolated objects. Von Thünen’s theory involves both direct and indirect isolation as we shall see. [For detailed discussions of the notion of isolation, see Mäki (1992a; 1994b).]

Let us then look at von Thünen’s first ten assumptions.⁽³⁾ Assumptions 2, 7, and 10 look like *simplifications*. The situation is simplified by removing items from the actual situation, by imagining a state without such elements as navigable rivers and canals, other towns, intermediate products, and nonmarket relationships between the producers. Assumptions 1, 3, 4, 6, 8, and 9 seem to involve *idealisations*. To assume that all of the soil is capable of cultivation is to assume none of it is not. To assume that the area is a plain is to assume that the variable representing variation along the vertical dimension of the area has the value of zero. To assume that the soil is homogenous in fertility is to say that the variance of fertility across plots of land is nil. To assume that the town has no spatial dimensions is to assume that variables representing its three dimensions have the value of zero. To assume that all of industrial production and market exchange take place in the Town is to assume that none of it takes place elsewhere.

Finally, assumption 5 is an *isolation* by which the state is isolated from the rest of the world. It is very close to being a direct isolation, although it involves some indirectness, too, because an ‘uncultivated wilderness’ is assumed, serving the function of isolating the state. It could also be put without mentioning the wilderness at all, in the form of the straightforward idealising assumption that there is no communication and trade between the state and the rest of the world. Stating it as von Thünen did is convenient, though, because it serves a double purpose; namely, the assumption of wilderness also serves the purpose of postulating an area where land rent is zero—thus involving an idealisation. The assumption of wilderness thus implies two useful idealisations: the assumptions to the effect that foreign trade = 0 and land rent = 0.

The important thing to understand is that the isolation involved in assumption 5 serves to bring about another isolation which is fundamental to the whole of von Thünen’s theory—and, equally importantly, that this is indeed so with all other assumptions as well. The assumptions taken together help effect the *fundamental isolation* of the relationship between land use and distance or transportation costs from the influence of other factors. The idealisations serve to isolate the generation of patterns of agricultural land use from the influence of mountains and valleys, of uncultivable portions of land and variation in fertility, of the organisation of urban space, and of industrial production and market exchange taking place in nonurban space. The three simplifications, in turn, serve to exclude the impact of rivers, canals, other towns, intermediate products, and nonmarket relationships between producers.⁽⁴⁾

⁽³⁾ The following suggestions should not be taken as analyses of the ultimate logical and epistemic character of von Thünen’s assumptions. I will rather discuss the assumptions, most of them in von Thünen’s own verbal formulations, as they are customarily presented.

⁽⁴⁾ This idea is familiar to human geographers in a general form as evidenced by the following two examples: (1) von Thünen’s model “allows a logically connected system of forces to be advanced as the economic structure underlying the events portrayed. In constructing the model complicating factors were assumed away, providing a laboratory in which the interplay between a small number of essential causal influences and their relations with certain effects could be studied” (Peet, 1969, page 300). (2) *Der isolierte Staat* “was set up to illustrate the operation of a basic force, and its secondary assumptions... served to stabilize the situation so that the operation of that force could be analyzed more easily” (Sinclair, 1970, page 815). Note that Richard Peet and Robert Sinclair agree on this methodological point even though they disagree on the applicability of von Thünen’s model (see Peet, 1967; Sinclair, 1967).

There is a tempting idea that the title of von Thünen's book—*The Isolated State*—be read as suggesting a proper analysis of the character of unrealisticness in the theory. As we have seen, theoretical isolation is indeed the most significant element in von Thünen's method. However, its significance is not restricted to the direct isolation of the state from the rest of the world. This latter isolation plays a subservient role, because it is used by von Thünen to effect the fundamental isolation in the theory, the one that isolates the relation between land use and transportation costs from other factors. It is this subservient isolation that is obviously referred to in the title of von Thünen's book.⁽⁵⁾

6 Von Thünen's realism, the functions of unrealisticness, and as-if

An important methodological passage in von Thünen's book reads as follows.

“The principle that gave the isolated state its shape is also present in reality, but the phenomena which here bring it out manifest themselves in changed forms, since they are also influenced at the same time by several other relations and conditions. Just as a geometrician performs calculations with dimensionless points and widthless lines, neither of which can be found in reality, so we may divest an acting force [*eine wirkende Kraft*] of all incidental conditions and everything accidental, and only in this way can we recognize [*erkennen*] its role in producing the phenomena before us” (von Thünen, 1910, page 274; my translation).

This passage is one key to my interpretation. I take it as strong evidence for my claim that von Thünen conceives of his theory and method in a fashion that shares the basic tenets of generic realism. The version of realism that von Thünen implicitly appears to advocate comprises the ontological thesis that there is an economic reality with a definite causal structure that exists independently of our theoretical and statistical representations of it; and the semantic thesis that our representations may be true of limited but significant aspects of that reality without having to encompass all causally relevant large chunks of it. Truth, or veristic realisticness, of theory presupposes its unrealisticness in other senses. In order to truthfully depict a major ‘acting force’, a theory has to be unrealistic in the sense of being partial and idealising. This runs against the Vaihingerian, fictionalist reading of von Thünen. To see this, one is reminded that there are several ways of understanding the as-if formulation of theory, two of which are particularly relevant here (see Mäki, 1992b; 1998b; 2003b). One of them is fictionalist whereas the other is realist. A radically fictionalist formulation reads as follows:

(F) Patterns of agricultural land use are formed *as if* the force of transportation costs were real and acting (even though we know it is not).

It seems obvious that (F) is not what von Thünen himself would have been prepared to accept, given that he says, “The principle that gave the isolated state its shape is present also in reality”. Thus, a realist reading along the following lines would seem more plausible.

(R) Patterns of agricultural land use are shaped *as if* transportation costs were the sole real force acting upon them, in isolation from all other factors (even though we know it is not in fact so isolated).

⁽⁵⁾It is also noteworthy that the first part of an early draft of von Thünen's book was entitled, “Gestaltung des idealen Staates”. This might be taken as suggesting that idealisation is central to the theory. We have seen that idealisation does play an important role in the theory, but does not exhaust the sources of unrealisticness. Yet, the suggested reading of the title as being related to the notion of idealisation in our sense is extremely implausible. It is more likely that von Thünen had in mind the simple point that the state he construed as the object for theoretical analysis existed only as an idea, as a mentally constructed object; hence the ‘ideal state’ (see Ehrenberg, 1909, page 539).

According to this formulation, transportation costs are real, and they do have an appreciable impact on land-use patterns, which, however, “are also influenced at the same time by several other relations and conditions”. Therefore, the land-use patterns “manifest themselves in changed forms” compared with the imaginary situation in the isolated state. The key realist point is simple: *in the real world, the assumed isolation does not exist, whereas the isolated force does exist. It is the isolation that is fiction, not the isolated force.*

If it is the case that “The principle that gave the isolated state its shape is present also in reality” as von Thünen believes, then it is only natural to hold also that the simple model depicting that really active principle is true about it—even though the required *ceteris paribus* clause holding other things constant in the model is not true of the real world. Indeed, this is what von Thünen does believe: “that the result obtained by studying one factor only at a time, holding all others constant, is not a false result, but merely incomplete, and it will remain so until every other factor has been subjected to a similar inquiry. Thus every research, into any aspect of the problem, however small, contributes to the building of the great edifice” (von Thünen, 1966, page 247).

Von Thünen is well aware of his method and the possible reactions to it. This is shown by what he says in the preface to the second edition of his book (1842). The following quotation gives further support to a realist reading of his theory.

“I hope the reader who is willing to spend some time and attention on my work will not take exception to the imaginary assumptions I make at the beginning because they do not correspond to conditions in reality, and that he will not reject these assumptions as arbitrary or pointless. They are a necessary part of my argument, allowing me to establish the operation of a certain factor, a factor whose operation we see but dimly in reality, where it is in incessant conflict with others of its kind” (von Thünen, 1966, pages 3–4).⁽⁶⁾

As von Thünen says, the ‘imaginary assumptions’ bringing about the fundamental isolation are made at the beginning of his theoretical presentation. Later on, some of them are supposed to be relaxed one by one, so as to bring the description closer to the actual situation in land-use configurations. This theoretical process of de-isolation amounts to a gradual elimination of the fundamental isolation or, in other words, to the opening up of a theoretically closed system so as to let many other factors provide their causal contribution to the pattern of land use. Some of these other factors are generally relevant, whereas some others are only locally relevant. Von Thünen believes that transportation costs constitute the central factor, hence it is the item to begin with in the theoretical endeavour. This seems to run against the fourth of Vaihinger’s conditions for something to be a fiction: the point of departure in von Thünen’s theory would *not* seem to be merely a matter of instrumental expediency. In consequence, if we wish to call von Thünen’s theory a fiction, we are best advised not to use the term in its purely Vaihingerian sense. Peter Hall’s statement is not to be accepted literally.

⁽⁶⁾ In his introduction to part 2, von Thünen makes a similar remark: “To free one factor, distance from the market, from its permanent association with all other factors, to see its working and ascertain its significance, we had to postulate a large town built, not on a navigable river, but at the centre of a plain whose soil is everywhere of the same inherent quality and at the same level of fertility” (von Thünen, 1966, page 227).

7 Assumptions and assertions: false models in the service of true theories

The following seems to be a convenient way of understanding von Thünen's exercise. His account of land use, as we have presented it thus far, involves three classes of representations:

(A) assumptions (such as 1–16 as formulated above);
 (B) the description of the resulting land-use pattern (that of concentric rings);
 (C) the claim that distance is a major causal factor shaping actual land-use patterns.
 As for the relations between (A), (B), and (C), we may say that (B) is logically dependent on (A) in that (B) is an implication of the set of assumptions (but see Morgan, 1973). (C) is also dependent on (A) in that (A) serves to eliminate the impact of all other factors except for that of distance or transportation costs and thereby to illuminate the latter. The important difference between (A) and (B) on the one hand, and (C), on the other, is that (A) and (B) are not among the *assertions* of von Thünen's theory: he did not wish to assert that, as a matter of actual fact, the world is as (A) and (B) represent it. Thus there is no truth claim accompanying them, not even a stated hypothetical possibility of being true. On the contrary, they are recognised as false if taken as claims about the world. In contrast, (C) is a major assertion of von Thünen's theory. It is intended as a true claim about the causal role of an aspect of actual social reality: von Thünen believed it to be true (whether the later research tradition building upon his work is entirely committed to its truth is a different question).

Employing a distinction between model and theory, we can put the idea as follows. The assumptions constituting set (A) defines a *model*—in this case, von Thünen's simplest model. Within this model, a land-use pattern as represented by (B) will be generated. This model is an abstract object and, if transformed into a set of claims about the actual world, it is just false. The simplest model serves as the point of departure for developing more complex models: von Thünen and his followers have relaxed some of the assumptions and thereby modified the resulting land-use pattern. We may say that such modifications of both (A) and (B), while still false, will have brought us closer to the truth about the actual world—but only insofar as the whole set of causally relevant factors and the resulting land-use pattern are concerned. The important point is that this process of modification will do nothing to alter the possible truth, or closeness to the truth, of (C). Claim (C) is a claim of von Thünen's *theory*, and it is retained—and its truth-value is retained—across such modifications. Von Thünen's theory makes truth claims about the causal contribution of various factors, and to accomplish this it utilizes a series of false models. An allegedly true theory is parasitic upon false models.

Not all falsehoods serve the purpose of pursuing truths. Although some falsehoods are useful and even necessary for the pursuit of truths, some others may be very harmful. Von Thünen is proud of his method of theoretical isolation, and takes it as necessary for scientific cognition: “Without abstracting from reality we can attain no scientific knowledge” (1966, page 229). But he is not blind to some of the epistemic risks involved in the application of this method. There is the danger that “mentally we separate what in reality is interdependent” (page 229). This suggests an ontological constraint on theoretical isolations: there are objective interdependencies in the real world, and our theoretical isolations should treat them respectfully. The divisions within our theory should be in line with the divisions in reality: factors that in reality are separate can be theoretically isolated and treated one at a time, whereas those that are not separate cannot. This is a realist constraint on theorising: the world has its own structure and theory must be faithful to it. Von Thünen is aware of the possibility that any given theory, his own included, may not completely meet this constraint.

8 Interim summary: von Thünen's realism

In my reading of von Thünen, he is a realist who has a particularly good understanding of the way in which a researcher pursuing truth about essential aspects of his or her object of study has to employ assumptions that are distinctly unrealistic. Although there are many kinds of unrealism involved in the assumptions of von Thünen's theory, the theory as a whole is based on the employment of indirect isolation. This isolation, however, is not the same as the one referred to in the title of von Thünen's book, *Der isolierte Staat*. None of the kinds of unrealism present in the theory is sufficient to render a consistently fictionalist interpretation along Vaihingerian lines completely sound: Peter Hall's reading seems mistaken. A realist interpretation looks more plausible.⁽⁷⁾

The above analysis of von Thünen's theory and his views about it has given a clue as to what I find an appropriate *abstract* notion of realism (for example, Mäki, 1989; 2001a; 2002). As an abstract *ontological* doctrine, realism states that "X exists" or that "X is the sort of thing that might exist". More concrete versions of ontological realism can be acquired by substituting for X 'the world', 'universals', or 'de re necessities', 'natural kinds', 'causal powers', 'physical things', 'mental states', 'social structures', as well as the various instances of such generic things. In each such case the meaning of 'exists' may be adjusted suitably, but it is minimally required that, whatever is taken or conjectured to exist, exists independently of any inquiry into it. Ontological realism of some sort is presupposed in any formulation of an abstract notion of *semantic* realism, which is a thesis or a set of theses about how linguistic or other representations relate to whatever there is in the world. It suggests that, for example, linguistic items may refer to something that exists and may represent its features truthfully, where truth is an objective and nonepistemic property that a linguistic representation has or does not have partly in virtue of the way the world is. To say truth is non-epistemic is to say that it is independent of belief, justification, recognition, and other such epistemic matters (thus, for example, truth is not to be equated with warranted assertability or ideal acceptability, as in versions of pragmatism).

My analysis of von Thünen implies that he espouses ontological and semantic realism in these abstract forms. Distance, or transportation costs, and their causal capacities in shaping land-use patterns exist independently of von Thünen's and anybody else's inquiry into them. Furthermore, and importantly, because no theory of the world encompasses the whole of it, but instead isolates only a slice of it, we need a realist notion of partial truth that is applicable to such isolative theories (see Mäki, 1994b). The ontological correlate of such a notion of partial truth is the idea that the world is organised into what are variously called major and minor causes, or essential and relatively inessential factors (or, to continue the list of such pairs, important/unimportant, relevant/irrelevant, central/peripheral factors).

As von Thünen believes he has managed to capture the contribution of one major factor to the determination of land use, such an ontologically grounded notion of partial truth is implied in von Thünen's realism. It is important to understand that his theory is a purportedly true representation of the contribution of this major 'force' rather than of the resulting land-use pattern (of which it would be false).

Now it is obvious that textual or other evidence does not give us very safe grounds for attempting more specific interpretations of von Thünen's views on these matters. In particular, we have to abstain from further speculations concerning the notions of

⁽⁷⁾Lacking detailed documentation, I would also question Harvey's (1981, page 2) statement to the effect that "the concept of 'the isolated state' obviously draws upon the tradition of speculative and philosophical idealism."

truth and true representation, notions that are somewhat controversial today. What seems obvious is that von Thünen's commentaries on his theory and method suggest that he thinks the truth attributable to his theory has the properties of objectivity and partiality. Not much more can be said without making the interpretation much more conjectural.

9 The lesson for economists

The most vexing methodological controversy in economics concerns what economists habitually call the 'realism' of assumptions such as those of profit maximisation, transitive preferences, perfect and symmetrical information, perfect competition, homogenous capital and consumer goods, diminishing returns, zero transaction costs, full employment equilibrium, and so on. In this usage, 'realism' and 'unrealism' are taken to denote a variety of properties of those assumptions.

I have attributed realism to von Thünen himself rather than to his theory. I have argued that von Thünen advocates realism *about* his theory. I have not argued that he is in favour of realism *in* theory or that he defends the realism *of* his theory or its assumptions. Given these latter usages of the term 'realism', prevalent in economics and some of economic geography, it would be difficult if not impossible to defend the idea that von Thünen was both an advocate of realism (in taking distance to be real and his theory to be true about its causal role) and unrealism (in deliberately employing unrealistic assumptions in his theory). The notion of realism in the economists' daily usage fails to accommodate von Thünen's realism.

The above usage of 'realism' in economics tends to mislead us. In their proper usage, 'realism' and 'nonrealism' or 'antirealism' (*not* 'unrealism', an unword) denote philosophical doctrines about the nature of the world, knowledge, language, and their interrelationships. I have attributed realism to von Thünen in this philosophically authentic sense of the term. We are advised to adopt the terms 'realisticness and 'unrealisticness' to denote the various properties of economic theories and their constituent assumptions, such as their being referential, true or false, observational or operational, comprehensive or partial, plausible or counterintuitive, confirmed or disconfirmed by evidence. These are some of the properties that economists have in mind when attributing 'realism' or 'unrealism' to economic theories or their assumptions. In an improved vocabulary, 'realism' refers to a theory of theories (among other things) whereas 'realisticness' refers to members in a family of properties of theories (Mäki, 1989; 1994a; 1998a).

Failure to draw the distinction between realism and realisticness and between their various subcategories has led many commentators to adopt the view that once an economist holds a theory with unrealistic assumptions he or she is thereby committed to an antirealist position concerning the theory and science in general. This has happened in the case of interpreting Milton Friedman's classic essay "The methodology of positive economics" (1953). Friedman defended the heavily criticised 'unrealism' (that is, unrealisticness) of the assumptions of neoclassical microeconomic theory by arguing that such unrealisticness does not matter provided the predictions entailed by the theory hold, or hold better than the predictions of rival theories. From this many commentators have concluded that Friedman subscribes to a consistent antirealist instrumentalism about economic theory (for example, Boland, 1979; Wong, 1973).

Friedman's essay is multiply ambiguous, and so much so that it is impossible to attribute a single coherent methodological view to him. However, using the strategy of our analysis of von Thünen, it is possible to provide a realist interpretation of Friedman's conception. Even his advocacy of the as-if formulation of economic theory can be

interpreted in a realist fashion (Mäki, 1992b; 2000; 2003b). It follows from this that from a realist point of view it is a mistake to dismiss any economic theory, neoclassical theory included, just by pointing out that its assumptions are unrealistic, even in the sense of being utterly false. A much more refined analysis would be needed to substantiate such a conclusion, because all theories are bound to contain unrealistic elements. Special attention has to be paid to the role unrealistic assumptions play in a theory.

Some of the major ingredients for such a more refined analysis are available in von Thünen's work and my interpretation of it. A given theory can be criticised for departing from the essential aspects of the object, while it is quite justified to depart from the relatively less essential aspects. However, for such a criticism to be possible at all, one has to have interpreted the theory in a realist fashion in the first place: rival conceptions of what constitute the essential aspects to be theoretically isolated must be based on a realist conception of the tasks of scientific theorising (see Mäki, 1994a; 2001c).

The lesson for economists is based on an understanding of the distinction between realism and realisticness. One can be a realist and use unrealistic assumptions quite consistently at the same time; more strongly, a realist has to employ unrealistic assumptions to get to truths about limited but causally significant aspects of reality. Economists holding theories with unrealistic assumptions do not have to rush to antirealist positions *merely* because they employ such assumptions.

10 The lesson for geographers

How does the claim that von Thünen is a realist relate to the way in which the notion of realism has recently been understood by geographers? In contrast to economics, no similar category mistake in the usage of the term seems dominant in geography. Without any pretence of being exhaustive, I will give a few examples of some of the recent uses of 'realism' by geographers and point out how von Thünen's realism appears to be anomalous from their perspective.

Let us start with Yi-Fu Tuan's discussion of the contrast between 'realism' and 'fantasy'. Here, 'realism' acquires one of its most popular lay meanings. Realism and fantasy, Tuan writes, are "traits" attributable both to individuals and to cultures, and realism is necessary for human survival. Individuals are realists if they do not "have their heads in the clouds" and if they are "sticklers for facts". Realists are suspicious of "stories of talking animals or of extraterrestrials", because "they depart *too far* from what the world is really like" (Tuan, 1990, pages 435–436; emphasis added). Tuan also suggests that such a notion of realism "emerges naturally" in a "project" such as geography, since "geographical knowledge is absolutely necessary for survival. Like all animals, humans must be able to appraise their environment realistically" (pages 436, 440).⁽⁸⁾

It is illuminating to see why this notion of realism is unable to accommodate von Thünen's realism. First, the argument from survival undermines the distinction between realism and those versions of instrumentalism (the traditional opponent of realism) that have been inspired by Darwinism, such as those of John Dewey and (with qualifications) Hans Vaihinger. For instance, Vaihinger is usually taken to have conceived of scientific and other theories, not as necessarily 'realistic' at all, but as fictional instruments for the survival of the human species. I have argued that von Thünen's theory does not conform to such a Vaihingerian interpretation. It does not follow from this, however, that it would conform to Tuan's survivalist notion of realism either.

⁽⁸⁾ In a footnote (page 445), Tuan admits that "'realism' has, of course, a variety of meanings" and then goes on to explain that his realism is "a concept used primarily in literary and art criticism, and its opposite is fantasy."

Second, it is notable that Tuan's notion of realism does not incorporate an idea of theory proper. Realism in general connotes being "pragmatic" (page 435) and "practical" (page 436). Realism in geography refers to knowledge which is "down-to-earth": overwhelmingly, the world's store of geographical knowledge is empirical—the where, how many, and how of things" (page 441). The realistic geography necessary for survival appears as heavily empirical and descriptive; no account of a theoretical and explanatory geography is provided. I have suggested that the case of von Thünen involves a realist idea of explanatory theory.

Third, I have shown that von Thünen managed to steer a consistently realist course in theorising about land-use patterns precisely because he used fantasy to depart radically from "what the world is really like" (without, let it be admitted, postulating anything as fantastic as talking animals and extraterrestrials). Such a combination of 'fantasy' and 'realism' is not dealt with by Tuan. This will also reveal how problematical it is to hold a notion of degrees of departure from reality (as in Tuan's notion of "too far") which is blind to the objective modalities of the world. A 'small' departure from the essential aspects of a real object is much more serious than a 'large' departure from its relatively inessential aspects. As we have seen, von Thünen is not blind to the presumed modalities of his research object.

Evidently, we need some other idea of realism than Tuan's to understand von Thünen's case. Let us try some other connotations of 'realism', used currently to identify an approach or even a school of thought within geography.

One such connotation of 'realism' popular in current geography makes realism adhere to a specific cosmology and cosmogony of society, namely to a spatial theory of structuration. "Realist researchers proceed from a world view that takes as given [sic] the existence of unseen social structures that both influence, and are influenced by, the actions of individuals. Realists identify the structures and agents present in society, and the way they tend to act.... In realism, place is integral to the structure of social relations" (Lawson and Staeheli, 1990, page 13). Such a marrying of realism and structuration theory is very popular elsewhere in human geography, too (for example, Johnston, 1986a, pages 114–116; 1986b, pages 58–62). I have no difficulty in granting that realism will encourage the pursuit of such a spatial and processual theory of society, and also that such a theory most naturally invites a realist interpretation. However, it is a completely different matter to view the relationship between the two as conceptual. The authentic meaning of 'realism' is too general and abstract for being burdened with a general theory of the structure and dynamics of society (see Mäki and Oinas, 2004). Again, I argue that von Thünen is a firm and consistent realist irrespective of whether or not he held a structuration theory of society.

Still another usage of 'realism' that seems to enjoy some popularity in geography takes the term as a label for a more or less specific approach in geographic research. We might call it *comprehensivism*. According to such a view, "in doing empirical research we cannot deal with one force in isolation. Rather we encounter multiple forces operating simultaneously, and theory must accommodate this" (Lawson and Staeheli, 1990, page 14). Comprehensivism is, no doubt, a wise strategy for doing *empirical and policy-oriented* research, given the rich and changing complexity of characteristic research objects in human geography. Again, however, we are left without a realist notion of theory and theoretical research of the kind that we find in von Thünen's book, given that he is dealing with 'one force in isolation'. Von Thünen's realist view of his theory of land use appears anomalous also from the point of view of such a comprehensivist usage of 'realism'.

It seems that the closest we can get in human geography to a notion of realism adequate enough to accommodate von Thünen's version is that of Andrew Sayer. His

notion of realism incorporates the idea of good theory isolating what is essential in the object of study (for example, Sayer, 1982; 1984; 1985; 2000).⁽⁹⁾ This is precisely what we need in order to understand von Thünen's position. Sayer goes on to incorporate into his notion of realism ingredients such as the metaphysics of 'necessary and internal relations' and the requirement that good theories be descriptively respectful for such relations. The concept of realism thereby acquires more specific and narrow contents. Whether von Thünen's theory manages to satisfy such additional requirements fully is not clear. As we saw in the section discussing the epistemic risks of von Thünen's method, he does seem to hold at least a weak version of some such metaphysics: he warns against separating "what in reality is interdependent" (von Thünen, 1966, page 229). However, my point again is that von Thünen held a genuinely realist view irrespective of whether he also held all such additional metaphysical ideas. His may be a minimal realism with simple metaphysics, but it is realism nonetheless.

Sayer also argues that regional geography after the "quantitative revolution" has had little to do with realism, because, "while it was possible, by the deductive method, to generate idealized landscapes that were characterized by regularities, these turned out to bear little resemblance to actual ones" (1985, page 160). However, "occasionally even mainstream geographers stumble across realist methods, if only temporarily and unknowingly" (page 161). Von Thünen, of course, was not such a geographer, but his method is a paradigmatic example of a way of theorising that is nowadays widely accepted and applied by a variety of economic geographers and geographical economists (compare Marchionni, 2004). I have argued that his is a realist way of theorising and that he was exceptionally well aware of this. It follows that, even if the 'idealised landscape' created by von Thünen did not bear full 'resemblance' to the 'actual ones', he believed that his theory had managed to depict the most important causal factor shaping the actual landscape. It also follows that von Thünen did not 'stumble across realist methods unknowingly' but instead very knowingly. Recall that it was precisely his realist method that von Thünen reported was "the most important matter contained in all my work".

11 Conclusion

One may fail to recognise von Thünen's realism for various reasons. The Vaihingerians may have failed because they did not see the distinction between an isolation being a fiction and an isolated force or relation being a fiction (and the related distinction between two kinds of as-if statements). Economists and geographical economists talking about the 'realism' (that is, realisticness) of assumptions and theories may have difficulty seeing that realism as a theory of theories is quite compatible with 'unrealism' (that is, unrealisticness) as a property of one's theories and their constituent parts. The recent realist school in geography may fail to do justice to the abstract notion of realism that we have felt safe to attribute to von Thünen because of the very concrete and therefore narrow notions of realism that have been adopted.

It is no news that 'realism' is a multiply ambiguous term widely used by geographers, economists, philosophers, scholars in other disciplines, and lay people. Most of the usages of the term are quite justified, provided they are not taken to designate *the* exclusive concept of realism. This proviso does not seem to be always satisfied in human geography. Because the concepts of realism popular in human geography tend to be very concrete and narrow, it is not surprising that their application tends

⁽⁹⁾Note that where I use the term 'isolation', Sayer usually adopts the term 'abstraction'. In my framework, 'abstraction' denotes a special case of isolation whereby universals or quasi-universals are isolated (see Mäki, 1992a).

to portray cases of theory and method as nonrealist even though those cases are consonant with some other concrete concept of realism or with some abstract concept of realism.⁽¹⁰⁾ I have argued for an abstract conception of realism and have managed to accommodate von Thünen's realism.

Further investigation is needed to determine what concrete concept of realism would apply to the case of von Thünen, but this should not prevent us from seeing that he is a realist. Note that an abstract concept of realism is compatible with a number of concrete concepts, while a given concrete concept often is not as such compatible with other concrete concepts.

It is important to understand what is *not* implied by the attribution of realism to von Thünen. It is not suggested that von Thünen was right in thinking that his theory managed to capture the truth about the fundamental determinants of agricultural land-use patterns. Nor is anything implied about where and when the theory might be true or how we might set out to test its truth.⁽¹¹⁾ Instead, it is suggested that von Thünen's theory and method have the characteristics that a minimal and generic philosophical idea of realism requires in that they served in an attempt to discover truths about objective reality. Von Thünen's theory is a serious attempt to capture a slice of the objective structure of social reality, and it should be treated accordingly, not as an imaginary fiction. Radically fictionalist readings of von Thünen's theory fail to do justice to it.

I am suggesting that we have to keep two issues separate. One is the issue of *interpreting* scientific theories in a realist or in a nonrealist fashion. The other is the issue of *appraising* rival theories according to whatever criteria of goodness we find appropriate. In the present paper I have concentrated exclusively on the first issue. I have suggested nothing regarding whether von Thünen's theory or its subsequent developments have taken us closer than its rivals to the truth about the spatial aspects of the economy, nor have I suggested anything concerning the appropriate criteria of theory appraisal. The crucial but difficult issue is, of course, the question of which (already available or yet to be invented) theory involves the most adequate isolations, that is, which theory has managed to isolate and truthfully describe the most essential aspects of the object under consideration (see Mäki, 1994a). In order to be able to pose this question of appraisal at all, we need to have interpreted the rival theories in a realist fashion in the first place. It is a mistake to rule out of court some of the rival theories by defining the notion of realism in a misleadingly narrow way. Scientific disagreements that are primarily of theoretical and empirical nature should not be cast as reflecting deep philosophical divides and cannot be resolved by way of mere philosophical argument or definitional stipulation.

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⁽¹⁰⁾ For a more detailed critical discussion of the received notion of realism in human geography, see Mäki and Oinas (2004).

⁽¹¹⁾ For attempts to test von Thünen's model and discussions about the temporal and spatial boundaries of its applicability (for example, see Griffin, 1973; Horvath, 1969; Sinclair, 1967).

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