A macroeconomic analysis of the land market in the count of Flanders and the duchy of Brabant. (fifteenth and sixteenth century)

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Abstract

The rise of factor markets during the transition from the middle ages into the early modern was of crucial importance for long term economic growth. The transmission of property through the market however remains understudied, especially in the Southern Low Countries.
In this paper we construct a formal model to analyse the land market both at the regional and interregional level. We found that regional variations in land prices within Brabant and Flanders can for a large part be explained by differences in future net revenues. A similar economic rationality determined land prices at the local level. Further more, evidence showed that while short-term inter-temporal price fluctuations could occur, overall price levels in the fifteenth century were stable. During the sixteenth century however, deflated land prices rose markedly. While the former fluctuations were due to short-term shock, the persistent price rise in the latter period was caused by structural changes.
Overall, our research yields two conclusions. First, economic rationality seemed to drive price formation on both the regional and interregional level. Second, the increased availability of credit from the late fifteenth century onwards consistently drove real prices upwards. Further research is necessary to find out whether credit was a push of pull factor in this respect.

Introduction

In 1499 Jan Winterbeke bought a farmstead in Wambeke, a small parish some 20 kilometres west of Brussels. Four years later, he expanded his holdings with two plots of land (totalling 0,62 hectares) for 3.080 Brabant groats.[1] In the spring of 1538, Jan passed away and his widow, together with her two surviving children sold the same farmstead and land to Christiaan Baers for 6.300 Brabant groats, in nominal terms more than the double of what the late Jan paid for it 40 years earlier.[2] During his lifetime, Jan had only twice been active on the local land market, with the clear intention to be able to start his own farm and provide an income for his wife and future children. His wife and children participated only once in the rural land market, when selling the farm of their late husband and father respectively. The farmstead Christiaan Baers bought in 1538 on the other hand, wasn't his first nor his last purchase on the rural land market. Between 1532 and 1548 the lawyer, either living locally in Wambeke but more probably a burgher of Brussels, managed to accumulate no less than 3 farmsteads and several plots of land, ranging from marsh, arable land and meadows to woodlands. His total holding size in the domain of Overzenne totalled at least a very respectable 9,5 hectares. Apart being an active buyer of land, he was also an active creditor, since he bought rents 5 times within the same period, for a total amount of 15.600 Brabant groat.[3]

During the fifteenth and sixteenth century, the rural societies in North-Western Europe were confronted with a twofold evolution. First, the countryside increasingly became enclosed within a broader regional, national and in some cases even international economic network. The emergence of such a networks is illustrated nicely by the flourishing of the Brabantine fairs in the late fourteenth and fifteenth century (regional and national network), followed by the rise of Antwerp as an international staple market in the sixteenth century (international network).[4] The inclusion of the countryside within a broader economic network brought along the commodification of the countryside. This development not only refers to the emergence of secondary towns where agricultural produce was bought and sold, but even more so to the increasing commodification of production factors.[5] The latter evolution entailed that landownership became increasingly polarised within society. A few social groups managed to accumulate substantial property portfolios, whereas the bulk of the rural society saw their farms dwindling in size.[6] The economic life courses of Jan Winterbeke and Christaan Baers illustrate this evolution perfectly. The Winterbekes can be identified as the prototype peasant.

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1 State Archives Brussels (SAB), Chamber of Accounts, Manorial Accounts of Overzenne, 4737-4738.

2 SAB, Chamber of Accounts, Manorial Accounts of Overzenne, 4740.

3 SAB, Chamber of Accounts, Manorial Accounts of Overzenne, 4740-4741.

4 Of course, local and regional markets for agricultural surpluses existed in pre-Black Death Europe, but it is generally acknowledged that the Black Death played a key role. Only due to the drastic population declines around the middle of the fourteenth century, the necessary rise in real income and purchasing power was achieved to underpin urban demand. On its turn, this sparked the emergence of secondary market towns, who in turn played a key role in the commercialisation and commodification of the rural countryside. (H. Van der Wee, 1967 and M. Limberger 2008)

5 B. Van Bavel 2010, pp. 162-198.

6 S. Cavaciocchi 2004, B. van Bavel and P. Hoppenbrouwers 2004, B. van Bavel & R. Hoyle 2010, L. Feller and C. Wickham 2005.

Since they had hardly any landownership, insufficient viable, they were forced either to lease additional plots or come up with alternative income-yielding strategies. Christiaan Baers on the other hand, personifies the other end of the economic ladder of the (rural) society. Local elites, ecclesiastical institutions, noblemen and burghers all managed to increase their holding sizes during the fifteenth and sixteenth centuries.

Although an increased commodification of production factors does not necessarily lead to an increasingly unequal distribution of these production factors, a certain causality between one another cannot be denied. Without a 'market' on which land could be exchanged, no redistribution would have occurred. On the other hand the redistribution of property forced peasants to explore alternative income yielding strategies, such as producing cash-crops or developing proto-industrial activities.
The central goal of this paper is to sketch the emergence of a market for land in Flanders and Brabant during the fifteenth and sixteenth century. The evolutions mentioned above raise several pertinent questions, which will be addressed further along in this paper. In broad terms, these questions pertain to the macro and microeconomic workings and consequences of the land market. For example how do land prices compare between regions, and what possible explanations could there be for the observed differences? How did the proximity to towns affect land prices? How did land prices evolve over time? As noted earlier, nominal prices doubled between the start and the middle of the sixteenth century. From the perspective of the economic historian, the more interesting question however is how prices evolved in real terms. Did land become cheaper or more expensive? Was this a gradual evolution throughout the fifteenth and sixteenth century or not?

This paper is structured in two parts and a general conclusion. In the first part some information is given concerning the used sources, the methodology and the current historiographical debates. The second part, gives a macroeconomic overview of the land market and sketches the most important price determinants. This will be done in two ways. First a cross-sectional assessment of land prices in Brabant and Flanders in the middle of the sixteenth century will be given. Second, price movements throughout the fifteenth and sixteenth century will be analysed for the case study of Overzenne, a region near Brussels. Finally, a short conclusion is given.

Sources, methodology and structure

To answer the questions sketched in the introduction, two main sources will be used. For the macroeconomic cross-sectional analysis section, data from Alva's 100th- penny tax will be used. This tax, which was implemented in the 1570s, brought along a major fiscal reform in the Low Countries.[7] For the first time personal wealth, both movable and immovable, was taxed to augment the nascent Spanish state's income. Direct taxes did exist before the second half of the sixteenth century, but were mainly based on population figures to divide royal taxes between the municipalities. At the local level, the most frequent form of taxation was indirect, namely a variety of excises on consumption goods and basic foodstuffs.[8] Although the goal of this tax reform was to create a long lasting unified fiscal system within the Spanish Netherlands, the attempt remained short lived.

The accounts of the aforementioned tax provide vital information as to the land market in the Southern Netherlands in the second half of the sixteenth century. First, through the surviving tax lists the fiscal value of land can easily retrieved. Second, since every household's property portfolio (both free- and leasehold) was recorded, the average holding and plot size, as well as the distribution between leasehold and freehold within a parish can be calculated. Third, combining total population figures with the tax lists allows us to reconstruct the social property distribution within the community. Further along this paper these data, supplemented with extra information concerning for example soil quality, net grain yields, population density and distance to towns will be used to trace and explain observed price differences between several regions in the Spanish Netherlands.

For the microeconomic analysis, I will use material evidence from the ducal domain of Overzenne, a locality situated approximately 15 to 20 kilometres west of Brussels in the Southern Low countries, as a case study. The choice for this locality was prompted by two factors. First, as I will show later, the domain of Overzenne was (in terms of population numbers) hardly affected by the general economic and political crisis of the 1480's. Since population remained reasonably stable throughout the fifteenth and sixteenth century, population pressure should therefore not have had any effect on the observed fluctuation in price nor on the average plot size over the period under investigation.

The second reason for selecting Overzenne as a case study stems from the source problem one encounters when investigating the rural land market in the fifteenth and sixteenth century. When researching the land market in a particular locality, the aldermen registers might seem a logical starting point at first. These sources contain detailed information about a vast array of transactions between private persons, including property deeds. However, using aldermen registers for investigating the land market has two major drawbacks. First, since land transactions only make up a relatively small percentage of the total number of transactions, vastly outnumbered by rent transactions, one would almost be looking for a needle in a haystack. Second, while the aldermen registers of major cities in the Southern Low Countries are available from as early as the fourteenth century, this is not the case for localities in their

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7 M. Limberger, 2004, pp. 2-4.

8 M.A. Arnould 1946, pp.19-20, T. Van Aelst 2000, pp.134-135, A. Kreglinger 1845, pp. 104-105, M. 't Hart and M. Limberger 2006, p.43, M. Limberger 2009, p.17.

hinterlands. In rural Flanders, Brabant and Hainaut, most aldermen registers are only fragmentarily preserved from the mid-sixteenth century on. Hence, a year-to-year view of the land market would only be possible from the start of the seventeenth century onwards. Manorial accounts, on the contrary, do not possess the drawbacks mentioned above. Most of them are preserved from the early fifteenth century onwards. In addition, since one had to pay a conveyance tax (generally 5% of the transaction price) either when selling real estate or when rents were issued on property, and those receipts were transcribed in the manorial accounts, this particular income entry gives an instant overview of the market activity in a particular year. As a result, using manorial accounts of the domain of Overzenne gives us the possibility of investigating both the rural land and credit markets on a year-to-year basis for a longer period. The receipts of the conveyance tax (pond - or coopgeldt) mentioned above provide us with insight into the market for 'cijnsgronden' in three parishes (Ternat, St-Katherina-Lombeek and Wambeek) and allow us to track the yearly mutations in landownership between families. While the Duke collected 5% of the value of the transaction in other Brabantine domaines (for example 'Het Land van Mechelen' or the manors of Tervuren en Vilvoorde), this wasn't the case in the domain of Overzenne. Here, the receipts of the 'coopgeldt' were split evenly between the Duke and the local lord. Thus, the revenues recorded in the manorial accounts only accounted for 2,5% of the total price.[9] The main drawback however is that not every land transaction in a particular locality is recorded, since the conveyance tax was only levied on 'cijnsgronden'. Consequently, the transmission of freehold land and fiefs escapes the scope of this source. Then again, this should not pose too much of a problem since the possession of freehold land by peasants was relatively limited in the Southern Low Countries.[10] About 4000 transactions were recorded in Overzenne between the early fifteenth and the first half of the sixteenth century. This is quite noteworthy given that on average the four parishes together comprised only 260 households. Thus on average about 20 percent of the households were active, either as buyer or seller, on the land or credit market in a particular year. When only the taxable households are considered (on average about 155 households), this percentage rises to 35 percent. These percentages should of course be adjusted downwards for two reasons. First, since in any given year one household could buy, sell or mortgage multiple plots of land, the participation of households is slightly overestimated. Second, the 4000 transactions are not evenly spread over time. During the first half of the fifteenth century, the number of registered transactions was relatively low (about 10 per year on average). From the end of the fifteenth century, on the contrary, the average number of transactions rises considerably (30 to 40 per year). This means that household participation in the early fifteenth century was probably lower than the above-mentioned estimate and vice versa for the first half of the sixteenth century. Besides being large in number, the records also offer very detailed information about both the transaction itself (e.g. surface area, soil type, owners of neighbouring plots) and the contracting parties. This includes the name and surname of the buyer and the seller as well as their respective blood relatives.

9 State Archives Brussels (SAB), Chamber of Accounts, Manorial Accounts of Overzenne, 4733-4742.

10 The feudal court of Brabant could be used to investigate the transfer of fiefs.

Half a century historiographical research in a nutshell

In 2006, for the Corn publication 'Rural history in the North Sea area, a summary of recent research', Erik Thoen and Peter Hoppenbrouwers made a 'status questonis' of Rural Historiography in Belgium and the Netherlands respectively.[11] Besides the fact that they both observed a strong path dependency as to research themes from Belgian and Dutch agricultural historians, Thoen and Hoppenbrouwers separately concluded that much research remained to be done concerning the commercialisation and commodification of the rural countryside in the Low Countries during the middle ages and the early modern period. In the Southern Low Countries in particular, the lack of literature is occasioned by an absence of usable sources as Thoen stated: *'the fact that our knowledge of economic development of rural society is fairly poor is partly due to a lack of statistical data about that [land] market'*.[12] Still, rural economic historiography has seen some important evolutions during the past five decades. The first rural historians in the Low Countries, such as Slicher von Bath and Paul Lindemans mainly set out to discuss long term evolutions in agricultural technique, without connecting their findings to the broader socio-economic context.[13] The lack of for example economic data concerning prices of staple goods and wages was counterbalanced by the work of Charles Verlinden and Jan Craeybeckx during the sixties and seventies. In their magnum opus, *Dokumenten voor de geschiedenis van prijzen en lonen in Vlaanderen en Brabant*, they collected, in collaboration with other researchers, an extensive number of datasets concerning wages, industrial goods and foodstuffs.[14] As in other countries, this sparked a renewed interest in rural history from the seventies and eighties onwards. As a consequence, the main topic of research within rural history was how 'growth' in agricultural productivity and by extension the premodern economy was realised. Scholars in Great Britain were without a doubt a frontrunner in this matter. As Bruce Campbell and Mark Overton pointed out this was caused by the fact that research on the origins of agrarian capitalism was one of the long-running debates in British historiography [15] As a result, the commodification of the countryside was already a well-established research subject in Great-Britain by the late seventies. Since development of land and capital markets played such an important role in the dawn of agricultural capitalism, it shouldn't come as a surprise that landholding and the land market has received broad interest by British scholars in the past few decades.[16] As noted earlier the Low Countries were somewhat lagging behind on the aforementioned research theme, notwithstanding the seminal works by Erik Thoen en Tim Soens.[17] Since 2006 however, a number of works have been published concerning the

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11 E. Thoen 2006, pp. 177-193 and P. Hoppenbrouwers 2006, pp.249-283.

12 E. Thoen 2006, p. 194

13 In Belgium, rural history only gained a foothold during the 1950s, mainly because nineteenth and early twentieth century historiography was largely focussed on urban history. Two reference works on agriculture are H. Slicher van Bath 1960 and. P. Lindemans 1994.

14 C. Verlinden en J. Craeybeckx 1959-1973.

15 B. Campbell and M. Overton 2006, pp. 34-73.

16 For example: R.M.Smith 1984, R.C. Allen 1988, R.W. Hoyle 1990, J. Whittle 2000.

17 E. Thoen 2004 and T. Soens 2009.

commercialisation and commodification of the countryside in the Low Countries.[18] Still, notwithstanding some existing studies about limited periods and areas, the rural land market in the Southern Netherlands still remains uncharted territory.[19]

The distribution of rural land between the different groups of society (e.g., nobility, clergy, religious institutions, burghers, rural population) is well studied for both England and continental Europe[20] However, the way in which this redistribution was influenced through the structure and institutional arrangements of the land market is much less studied, in particular for the Southern Low Countries.

In recent historiography, land ownership and the transmission of property through a rural land market has been investigated from several angles. This distinction is in part arbitrary as arguments and conclusions are frequently interconnected across historiographical debates. Still, two viewpoints can more or less be distilled, namely a bottom-up and a top-down perspective. In the first case, the possession of property and ownership of land throughout one's life-cycle, ties in with the debate surrounding the role of the household as an economic agent and instigator of economic growth. In the second case, the structural changes in property holding and the lowering of transaction costs throughout the fifteenth and sixteenth century have been used to explain the development of agrarian capitalism. In the next few pages, the historiography concerning these aspects of the land market will be analysed in more detail.

Remarkably enough, the transformation that society underwent during the transition from the late middle ages into the early modern time has long gone unnoticed by both historians and economists alike. Adam Smith and Karl Marx for instance, both acknowledged that society in eighteenth and nineteenth century England differed fundamentally from earlier times, respectively juxtaposing an agricultural society with a commercial society, and feudalism with capitalism. Still in both their analyses of long-term economic growth, the rural society in the early modern time was considered to be relatively stable. Smith focuses mainly on the growth of (international) markets, towns and labour division during the eighteenth century as the key to economic growth. Marx's capitalistic class relations were based on the employment of wage labourers by employers. In this form of production, the surplus extraction was reached through the level of wages. In he preceding era, roughly between the fall of the Roman Empire and the dawn of the industrial revolution, feudalism ruled. In this form of production, the relationship between the tenant and the lord is expressed through the level of rent the tenant has to pay. Since the peasant effectively owned his means of production the lord must have exerted non-economic pressure to obtain the rent payments, which in turn happened through the institution of serfdom. Whittle painstakingly showed that Marx's analysis of early modern society was problematic. As she pointed out: *'In it's complete form, the feudal mode of production ends in the early fifteenth century [in the southern Low Countries even earlier, around the first half of the*

18 Examples of recent work concerning the commodification and commercialisation of the countryside are: R. VERMOESEN 2011, W. RONSIJN 2011 and B.VAN BAVEL 2010.

19 See for instance: E. SCHOLLIERS and F. DAELEMANS 1981, F.G. SCHEELINGS 1982, F. DAELMANS 1986, E. THOEN 1987, P.VANDEWALLE 1994 B. VAN MAELZAEKE 2002, M. LIMBERGER 2009, F. DE WEVER 1978.

20 For example VAN BAVEL 1999 and 2010, LIMBERGER 2008, HOPPENBROUWERS 1992, SOENS 2009. For a concise summary see VAN BAVEL and HOYLE 2010.

fourteenth century, sic] with the dissolution of serfdom, yet the fully developed capitalist system does not appear until the late eighteenth or nineteenth century.'[21] It was not until the early eighties that a marxist approach towards the evolutions within society between the middle ages and the nineteenth century was formulated. At its core, Robert Brenner's explanatory model was a reaction against the neo-Malthusian interpretation proposed by Michael Postan and Emmanuel Le Roy Ladurie. This neo-Malthusian model starts from the assumption that rural society is in effect a homeostatic ecosystem, which was self correcting and as Le Roy Ladurie stated *'provides for major interrelations between population, production, land rent, industrial and agricultural prices, landownership and so forth*'.[22] Brenner however, highlighted that the neo-malthusian model made abstraction of class structure, and therefore couldn't explain regional differences in ground rents, profits and wages. As a consequence, he proposed a Marxist approach to explain economic growth, whereby the shift in social property distribution created new dependency relationships between on the one side smallholders and cottars on the other side the rural elite.[23] Whereas in the feudal mode of production the nobility exerted power through oppressive means, this shifted towards non-coercive means like for example rent-seeking behaviour from the fifteenth century onwards. The influence of this neo-marxist interpretation on mainstream history might have been relatively limited, but within economic history of the early modern period it's affect was significant. Not at least because it created an interest in the creation of early modern factor markets and the explicit and implicit laws and institutions that governed it. Whereas Brenner's ideas of inequality, surplus extraction and rent seeking behaviour might have been less on the forefront of new research, his work did create a debate on in early modern factor markets and the set of explicit and implicit rules, law and institutions that formed 'the rules of the game' and led to the development of Agrarian Capitalism. From this perspective, Brenner's work shares some key building blocks with Douglas North's and Robert Thomas' theory of economic growth and institutional change. Their 'New Institutionalism' laid the foundations for a third interpretational model of economic growth, which is in effect a hybrid combination between Smith and Marx since they set out to explain economic history from economic theory, focussing on the role institutions played in governing the economic life. One such institution they focussed on was feudalism and the manorial system.[24] Although not without its critics, New Institutionalism proves the be fruitfully implemented by historians in the past few decades.[25]

Within contemporary historiography, the transformation of property-holding structures within society is pushed forward as to playing a central role in the transition to agrarian capitalism. From this point of view, it has been argued that between the fourteenth and sixteenth centuries, the ownership structures of the European countryside underwent significant

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21 J. Whittle 2000.

22 E. Le Roy Ladurie 1978, pp.55-59.

23 R. Brenner 1976, pp. 30-70.

24 D. North 1981.

25 T. De Moor (2009), J. Zuijderduin (2009), O. Gelderblom (2009), T. De Moor, J. Zuijderuin, J.L. Van Zanden. (2011). Although several scholars have managed to show that the prevalence of institutions in time was not necessarily because they were successful at lowering transaction costs. In her recent work 'Institutions and European Trade' Sheila Oglivie is particularly skeptical on merchant guilds in this respect. S. Oglivie (2011).

changes. This distribution of land within the society was characterised by a) a strong accumulation of landownership by some social groups (noblemen, institutions, burghers and '*capitalist*' farmers) and b) an increasing segment of the rural population (cotters, *manouvriers*) who were confronted with dwindling farm sizes. Many of them owned little or no arable land whatsoever. This forced peasants to develop alternative income yielding strategies, which varied widely across regions, largely depending on the economic context and population density. In regions with low population densities, where extensive pastoralism dominated (for example North Devon or Hainaut) working as a servant on farms was the primary way of gaining a living.[26] The low population densities made labour scarce and combined with the nature of their economic enterprise (the need for a constant workforce from March/April to October to guard the cattle) forced farmers to hire servants with one-year contracts.[27] The high transaction cost for finding a new labourer and negotiating a contract several times a year was apparently outweighed by the lower total cost of hiring a servant for a whole year. A similar *modus operandi* existed in coastal Flanders during the fifteenth though seventeenth century. In this small approximately 10 kilometres wide strip along the coast, a very capital intensive form of agriculture came into existence during the transition from the late middle ages into the early modern time. For this evolution to occur, several elements had to be in play; an active land market (to be able to enlarge holdings to an optimal scale), access to sufficient amounts of capital and a well organised commodities market to sell surpluses. However, as Soens has sufficiently shown, these three elements only provided the fertile ground on which a combination of large-scale arable and pastoral farming became prevalent.[28] The catalyst appeared to be high fixed cost (due to water management) of farming in the polders, which as a result favoured increasing farm sizes. [29] In the eighteenth century however, increasing population density (in part as a consequence of economic migration from inland Flanders) caused a rising supply of labour, thus lowering transaction costs for short-term work contracts. As a result day labouring became the norm in some parts of coastal Flanders throughout the eighteenth century.[30] In inland Flanders and south Brabant on the contrary, small farms with labour-intensive arable farming which realised exceptionally high outputs per hectare were the norm.[31] Still, yields were insufficient to sustain the family and alternative income strategies were developed. These could range from growing industrial crops such as flax, developing proto-industrial activities such as weaving or working as a farmhand on nearby farms.[32] Similar economic patterns can be discerned in other regions with comparable socio-economic contexts.[33]

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26 G. Sivéry 1980, pp.475-571.

27 H.S.A. Fox 1995, pp. 125-154.

28 T. Soens 2009, pp. 83-105.

29 T. Soens 2009, pp. 257-279.

30 W. Vandepijpen 1983, pp. 406-408 and C. Vandenbroecke 1977, pp.151-163.

31 M.J. Tits-Dieuaide 1975, pp.93-96.

32 E. Thoen 2004, pp.37-39.

33 H.S.A Fox 1995, pp. 126-139.

The evolution sketched above resulted in the transition to agrarian capitalism and economic growth in three ways. First, as show in the previous examples, labour, together with land and capital became commodified. Second, in regions were labour was scarce such as North Devon, coastal Flanders or Hainaut, economic conditions favoured large-scale capital intensive farming, which provided the growing cities with the necessary foodstuffs. Third, in densely populated regions a morcellization occurred. As a result alternative income strategies were developed, in itself forming the grassroots of the industrial revolution. As a result, the evolution to a market-oriented form of agriculture transformed society as a whole. This transformation occurred on two distinct levels. As illustrated above, at the macro-level it caused a monetization and commodification of society. As I will show later on in this chapter, at the micro level the changes in their everyday lives immersed the minds and mores with a (proto)capitalistic mentality. Although the same general tendencies existed across Europe, the process described above showed vast regional differences in speed as well as in effect. In this respect, consider the case of the medieval and early modern County of Flanders. Within this relatively confined area, the property structure and average farm size varied greatly between coastal and inland Flanders. In the former, land was largely owned by ecclesiastical houses and burghers, whereas in the latter the none-noble rural population held more than 50 percent of the land around the second half of the sixteenth century.[34] As briefly touched upon earlier, this resulted in diverging economic activity, with large scale market oriented farming being the norm in coastal Flanders, whereas subsistence farming augmented with proto-industrial activities prevailed in inland Flanders.[35]

34 B. van Bavel, P. van Cruyningen and E. Thoen 2010, p.192.

35 E. Thoen, 2004, pp. 32-45.

The interregional perspective - Brabant and Flanders

First, I will describe the macro-economic framework of the land market in the Southern Netherlands. How did variables like population density, property distribution or distance to towns affect the price for land? The findings of this chapter will serve as the contextualisation of our case study which will be conducted later on. In the second chapter, I discuss the long term price movement of land in the domain of Overzenne. Previous economic and historiographic research has given considerable amount of attention on the loosening of institutional constraints as a prerequisite for sustained economic growth. Within the current historiography, the implicit understanding is that more favourable institutional arrangements stimulated market efficiency, which led to a higher market participation and in turn higher economic growth in certain (urbanised) parts of North Western Europe during the sixteenth century.

Constructing hypotheses and presenting the formal model

The main objective of this paragraph is to construct a formal model which can help explaining the huge price differences between different regions, and formulate our different hypothesises. As can be seen on map 1, prices in the cheapest regions, for instance in the North-east of present day Flanders, vary around 10 to 50 Brabantine Groats per hectare. In the North-west of Flanders on the other hand, they could easily be 10 times as high.

These price differences are not mere historical *faits-divers*. Their social and economic consequences both in the short and long term and at the micro- and macroeconomic level shouldn't be underestimated. For example, when confronted with an economic environment of high land prices, enlarging the farm might prove to be difficult, and cause farmers to lease additional plots instead of buying them. At a more macroeconomic level, high land prices in a cash-poor economy would entice the development and spread of credit instruments, which proved to be beneficial for long run economic growth.[36] When confronted with relatively low land prices on the other hand, one could expect the further development of credit instruments to be hampered, since demand for credit would be relatively limited. One cannot exclude that in such a scenario of low land prices, the commodification and integration of the rural economy went at a slower pace compared to the rest of the region. Therefore, persistent low land prices over time, could have detrimental consequences on the economic activity in the long run.

Taking all this into consideration, several hypotheses can be put forward. These will be tested on the formal model and the regression analyses which will follow. First, the model should clearly show a positive correlation between land prices and soil quality. The better the soil, the better the yield and thus the future cash-flows.

Second, population density and average land prices ought to be positively correlated as well. Demand for land should have been higher in more densely populated regions and thus reflected in land prices. Furthermore on average, plots should have been smaller and cultivated

36 P. Schofield and T. Lambrecht, 2009, pp. 1-17.

in a more labour intensive way, resulting in higher yields and consequently higher land prices. Third, nearby cities would likewise have to show a positive effect on land prices. Cities provided not only a market for surplus production, but also legal institutions such as aldermen courts and access to sufficient capital.[37] In the parishes immediately surrounding the towns, farmers oriented their crops toward the urban demand, with products with the highest added value being produced closest to the city. In the case of fourteenth century Brussels for example in nearby St-Jans-Molenbeek, farmers would reorient their farms from grains to the more profitable legume.[38] A similar shift is noticeable in sixteenth century Wambeek, with higher numbers of gardens and hop yards sold.[39] Affluent townsmen with spare cash, ranging from well-off craftsmen over lawyers to merchants, were frequently keen landholders. Their landholding portfolios could vary from small plots of land just outside the city walls they cultivated personally, to larger plots of land or whole farms, with a clear rent-seeking perspective.[40]

'Urban manure' was furthermore the only available fertiliser besides animal dung and as a consequence very popular in agriculture.[41] For this particular hypothesis it will be interesting to see how far inland cities influenced land prices and if a difference can be observed between large urban centres and minor towns. The closer the town, the lower transportation costs to the market, and we suspect this to have a very significant effect on land prices. Since well kept highways between the major cities were only constructed in the late seventeenth and eighteenth century, transporting agricultural produce over large distances with oxens and carts was time-consuming and expensive. Navigable waterways were in many cases probably a more cost-effective alternative to transport agricultural produce over large distances. Consequently our fourth hypothesis is that navigable waterways should affect land prices positively. Moreover waterways should have a positive correlation with land prices, since wetter soils (meadows and arable land for instance) were generally more fertile and consequently more expensive. Since some regions were more positioned towards intensive commercial agriculture (coastal Flanders), we expect a positive interaction effect between soil quality and the presence of navigable waterways within the parish. A final hypothesis concerns the difference in economic activity between Flanders and Brabant. Given that economic activity between Brabant and Flanders differed vastly in the sixteenth century, one could expect a similar difference in land prices between the two regions, (when controlling for the other variables). However in inland Flanders, high net yields were obtained (compared to Brabant in any case), due to the specific

37 J. Zuijderduijn, T. de Moor and J.L. van Zanden 2011, pp. 5-16.

38 P. Charruadas 2006, pp.21-24.

39 SAB Chamber of Accounts, Manorial Accounts of Overzenne, 4373-4742.

40 M. Limberger 2008, pp. 23-60.

41 A. Verhulst 1956, pp. 213-219.

social agrosystem which combined high labour intensity with frequent manuring on small plots of land to obtain high net-yields per acre.[42]

Constructing the dataset

As noted in the first two chapters, research into land markets and the price-evolution of land in early modern continental North Western Europe is still in it's infancy. From historiography, we know that for instance the development of judicial institutions, the availability of credit and demand for agricultural produce spurred on by urban growth accelerated the commodification of the countryside.[43] As useful as those insights might be, for now they have only been used to explain individual cases both in time and in space. However, what is missing from the current economic and rural historiography is a more elevated view of the land-market. How do land prices compare between different regions, within a single year? Can we explain interregional price differences through an institutional framework, or were ecological and economic parameters the main drivers? Further along this paragraph the most important variables which cause price differences in agricultural land will be analysed through a OLS regression analysis. For now however, it might be useful to approach this problem briefly from a theoretical perspective. Three elements can be distinguished as to having an influence on the price of land. First, the value of future cash flows. This is in part dependent on the future price movement of agricultural output and for another part dependent on the productivity of the land. Second, population pressure both in the parish itself and the surrounding area plays a role as well. The direct effect is that the increased demand for land is causing prices to rise, given a constant supply. The indirect effect is that a high population density drives up demand for foodstuffs and consequently increases the value of the future cash flow. A third variable which might cause price differences between regions are legislative and judicial institutions. However, as noted earlier, apart from the preponderance of communal structures in the Campine area, both judicial and legislative norms and institutions were relatively homogenous in sixteenth century Brabant and Flanders, due to the high degree of urbanisation and the relatively powerful territorial lords.[44]

To analyse these differences a cross-sectional dataset was constructed, whereby the foundations were formed by the accounts of Alva's 100th penny tax.[45] In the following pages, the collected variables will be discussed briefly. Land values per geographical location were obtained through dividing the total tax revenues per parish by the approximate acreage of each parish and afterwards multiplied by a hundred. This resulted in an average price per hectare for each location, a fiscal land value as it were. As can be seen on the map 2 data for both Hainaut, Luxembourg, Namur and the Prince-Bishopric of Liège are particularly limited due to the

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42 At the end of the fifteenth century, Tits-Dieuaide found that in the region around Brussels, net crop yields were about 16,64 hl/ha for rye. For the same period, Thoen registered crop yields of 15,59 hl/ha for the region around Audenarde. However, the data for Brussels stems from the demesnes of ecclesiastical institutions which were amongst the highest grossing plots of land, and should therefore be adjusted downwards. The data for Audenarde on the contrary is from probate inventories and give a more accurate picture of the average grain yields in the region. E. THOEN and G. DEJONGH 1999, pp.35-45.

43 P. SCHOFIELD 2004, pp. 785-795 and B. VAN BAVEL 2010, pp 181-192.

44 P. GODDING 1987, pp. 232-240 and M. HOWELL 2010, pp. 49 ev.

45 Source: P. STABEL and F. VERMEYLEN, 1997

unavailability of source material. However, for Brabant and Flanders, a relatively complete set of data was obtained. Since data on the South of the Spanish Netherlands is so infrequent, it was decided to exclude them from our analysis. The remaining dataset therefore considers only the county of Flanders and the duchy of Brabant, which for by approximation the borders of present day Flanders. Our dataset containes information on 1114 parishes, 265 of them pertained to either Hainaut, Namur or Luxembourg and were therefore excluded form our final analysis. The remaining parishes were then linked to their nineteenth century counterparts, in order to be able to use the data from the HISTAT-project. In all, we were able to link 784 parishes (for approximately 70 hamlets no match was found). Since Flanders counted around 1091 villages in the middle of the nineteenth century, roughly 71 per cent of the villages in Flanders are represented in our dataset.

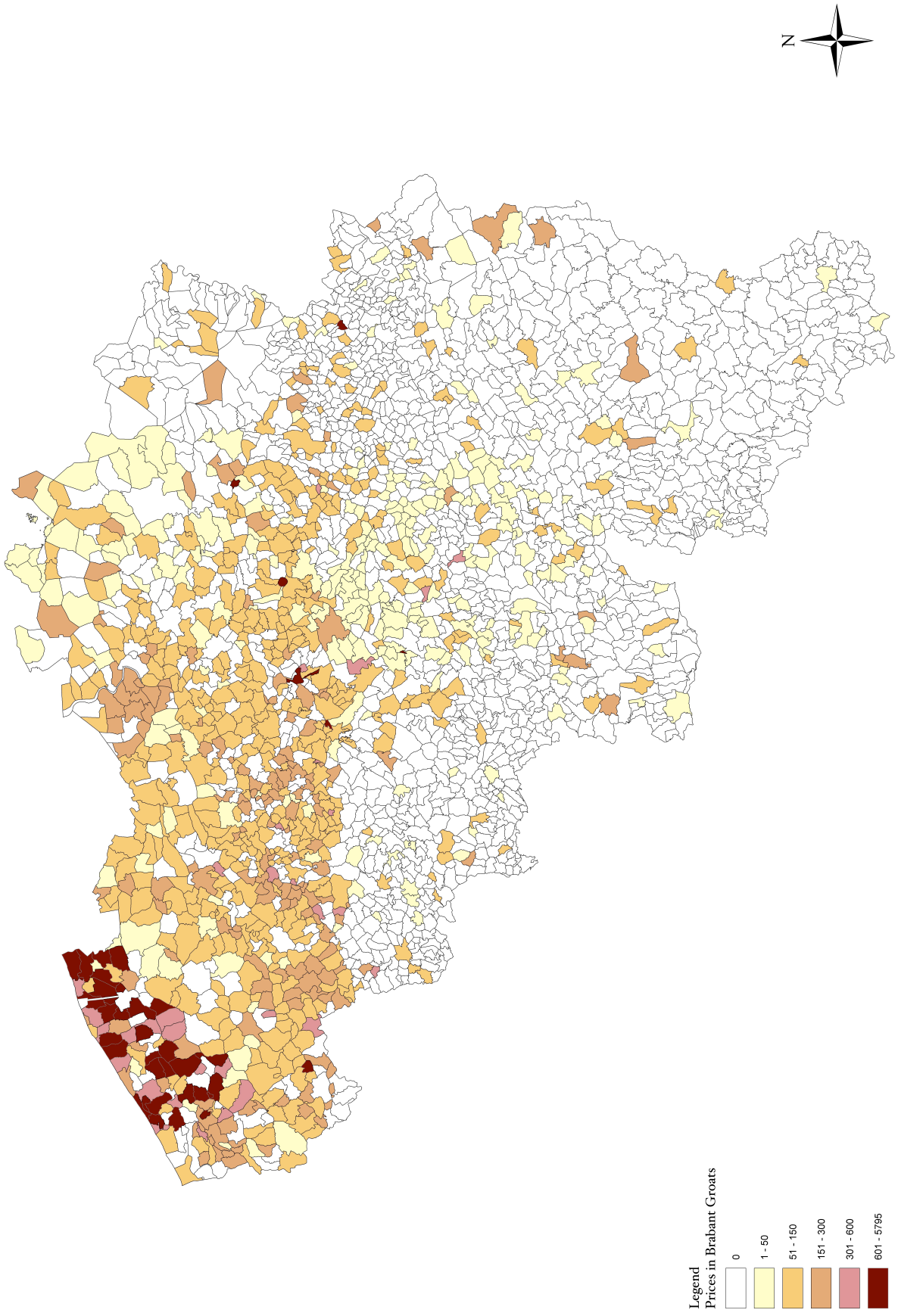
Population figures per parish were constructed using several sources. In general, the number of hearths per parish were registered in the accounts of the 100th penny tax. For rural areas these figures were multiplied by five to obtain total population, as for more urbanised areas the total number of hearths were multiplied by four (since the average household was smaller in towns).[46] For Brabant the robustness of these calculations were controlled by comparing the obtained numbers with census data from the middle of the sixteenth century.[47] As for the cities, the population figures were compared with the estimates given by Jan de Vries in his seminal work: 'European urbanisation 1500-1800'.[48]

46 This methodology is (relatively) undisputed amongst socio-economic historians. For more information see: E. THOEN 1988. pp.112-114 and p.1119.

47 J. CUVELIER 1912

48 J. DE VRIES 1984, pp.293-294.

Map 2: Land prices in Brabant and Flanders circa 1560.[49]



49 Own calculations using P. STABEL and F. VERMEYLEN, 1997

Since the acquisition of land became standardised in the Southern Low Countries (and especially in Flanders and Brabant) form the 14th century onwards, diverging legislative arrangements in terms of buying and selling land did not occur. However, in the less fertile Campine area east of Antwerp, commons still had a firm grip on land usage. Next to that, due to the institutional arrangements of commons, the alienation of land proved to be more difficult.[50] To test wether the diverging institutional arrangement in the Campine area effected land prices, a dummy was inserted in our dataset, whereby 'one' corresponded to the existence and dominance of strict communal structures. Of course, commons still existed in regions other than the Campine area, but rural historiography assumes that they were of only minor importance in both coastal and inland Flanders and the South-west of Brabant, therefore the dummy was coded zero in those regions.[51]

Through using the HISSTAT database, several other variables (soil quality, water and distances) were added.[52] First, four types of soil textures were added: clay-loam for the polder area, dry sandy soil for the Campine area and finally a mixture of sandy loam and wet sandy soil for Inland Flanders and South-west Brabant.[53] Second, wether or not a navigable waterway flowed through a parish was coded in the dataset through a dummy-variable. Not only natural waterways were taken into account. The channels that existed before 1570 were added to the dataset as well. One such example is the Moervaart, flowing through the parishes Daknam, Eksaarde Sinaai, Evergem, Mendonk, Moerbeke and Wachtebeke, all situated in the North-west of the present day province of Eastern-Flanders. This channel was originally commissioned by the abbey of Baudelo in Sinaai in the High Middle Ages, and further developed in the fifteenth century to facilitate the production and transportation of peat.[54]A third variable that was added to our dataset was distances from each parish to every other parish in the dataset. These variables were used to calculate average population densities in concentric circles of 10, 25 and 50 kilometres around each parish. The same data were used to construct dummy variables wether a parish was situated on either 5, 10, 15, 20 or +20 kilometres of an urban centre.

Finally, data on social property distribution was collected through secondary literature.[55] The extensive literature on the subject shows us that at the end of the thirteenth century, due to mismanagement of their domains combined with rising inflation the influence of the local lords declined in both Flanders and Brabant. Their political and economic role even further eroded since: '*the power of the manorial lords was counterbalanced by strong territorial lords. Where the territorial lord was able to ally with an emerging urban bourgeoisie (as was the case in Flanders and*

50 E. van Onacker 2011.

51 E. Thoen 2004, p.48.

52 HISSTAT database project. Department of History, Ghent University, under the supervision of Eric Vanhaute and Sven Vrielinck. <http://www.hisstat.be/> Consulted on 4/4/2012.

53 For this aggregate level of analysis, we opted for a relatively rough subdivision of soil textures, comparable with the subdivision that Vanhaute. A more specific subdivision would be possible and even advisable for a micro-level analysis. E. Vanhaute 2004, p.68

54 D. Verelst 1977, pp.37-40 and H. Vervinckt 1965, pp.73-74

55 B. van Bavel B., P. van Cruyningen and E. Thoen, 2010, pp 175-176

Brabant [sic]) this evolution (increasing peasant land ownership [sic]) took place even faster.'[56] Along the coast and the northern part of Flanders freehold land dominated even in the high Middle Ages.[57] Consequently, during the fourteenth and early fifteenth century, in both Flanders and Brabant a high percentage of the land was owned by peasants exclusively (be it in freehold or as *cijnsgronden)*. However, during the fifteenth and sixteenth century a reverse evolution took place, for which several reasons can be put forward. In coastal Flanders, high fixed costs for dikes maintenance proved an incentive for economies of scale and as a result clustering of land in the hands of a few.[58] In inland Flanders, a combination of population growth, together with specific inheritance customs caused a morcelisation of holdings.[59] Around the middle of the sixteenth century, the social distribution of landownership was as follows.

Tabel 1: Property distribution in the county of Flanders and the duchy of Brabant (in %).[60]

Region	Nobility	Ecclesiastical institutions	Burghers	Rural population
Coastal Flanders	11	9	20	60
Polders	19	20	12	49
West-Flanders	22	9	11	58
East-Flanders	11	9	20	60
Brabant	14	38	25	15
Polders around Antwerp	42	8	/	50

One might ponder why the concept of 'social agrosystems' were not taken into account in our dataset, for instance through dummy-coding specific parishes in one way or the other. In the definition of Erik Thoen social agrosystems are: *'systems of rural production based on the region-specific social relations involved in the economic reproduction of a given geographical area'*.[61] The key elements he proposes for characterising regional social agrosystems are the following: Soil and environment, average holding size, institutional framework, and agricultural technology. Of secondary importance are labour relations and income strategies, links with other agrosystems and social property relations.[62] I chose not to implement the concept of the social agrosystems directly into the constructed dataset for several reasons. From a theoretical and methodological viewpoint, a priori recoding areas as being part of one or another social agrosystem (a concept which is in itself only theoretical construct made up of several elements) would be antagonistic to the goal of our analysis which is to unravel which variables influence

56 B. VAN BAVEL, et al., 2010, p 172

57 B. VAN BAVEL, et al 2010, p 171

58 T. SOENS 2009, pp. 83-86 and 88-89.

59 E. THOEN 2004, pp. 43-45.

60 B. VAN BAVEL, et al 2010, pp 172-173. There: H. VAN DEN ABBEELE 1985, L. DE KEZEL, 1988, T. SOENS 2009, P. VANDEWALLE 1986 and M. LIMBERGER, 2008:

61 E. THOEN 2004, p. 47

62 E. THOEN 2004, p. 48

land prices the most. When several social-agrosystems would be used as variables, a regression-analysis would show us that land prices were higher in one region compared to our standard value, but we wouldn't know which of the aforementioned factors which together make up a social agrosystem was the major determinant.

Theoretical problems aside, the practical use of social agrosystems as a variable poses problems as well. Whereas the former county of Flanders is well researched, our knowledge on the (different) social agrosystems in the duchy of Brabant is virtually non-existing. Of course, we are well aware that agriculture in the Campine area differed from that in the rest of Brabant, however until today no comprehensive study on the different social agrosystems in Brabant exist. Furthermore, even within the well researched case of coastal Flanders with an agrosystem of large scale commercial husbandry, recent research shows that striking differences within the same region can occur, and thus undermining the idea of a single social agrosystem for the the whole of coastal Flanders.[63] Thus, deciding whether a parish is part of one social agrosystem or another depends in part of the value judgement of the researcher and is prone to methodological criticism. For these reasons, I decided not to encapsulate the concept of social agrosystems into one variable. However, several key elements that characterise social-agrosystems (as far as sufficient data were available) were entered into the dataset as independent variables. A complete summary of the different variables used in the dataset can be found in table 2.

Table 2: Collected variables[64]

Variable name	Variable	Source	How operationalised
Price_per_hect (dependent variable)	Price per hectare	1	Continuous variable, calculated natural log.
Parish_id	Name of parish	1	Nominal variable
Soil	Soil texture of parish	2	Three dummy variables
Pop	Total population	1	Continuous variable
Surface	Total surface area of parish	1	Continuous variable
Density	Population density of parish	1 and 2	Continuous variable
Prop_Nob	Holdings owned by nobility?	3	Nominal variable
Prop_Ecl	Holdings owned by ecclesiastical institutions?	3	Nominal variable

63 S. De Langhe 2011.

64 Sources: 1: P. Stabel en F. Vermeylen 1997.
2:HISSTAT 'Databank voor Historische Lokale statistiek' / 'Database for local historical statistics', Department of History, Ghent University, under the supervision of E. Vanhaute and S. Vrielinck.
3: B. van Bavel B., et al., 2010, p 172
4: J. de Vries, 1984, pp.293-294.

Variable name	Variable	Source	How operationalised
Prop_Bur	Holdings owned by burghers?	3	Nominal variable
Prop_Rural	Holdings owned by rural population?	3	Nominal variable
Commons_dum	Commons or not?	3	Dummy variable
st5_10_small and st5_10_large	Closest town less than 10 km?	2 and 4	Two dummy variables
st15_small and st15_large	Closest town between 10 and 15 km?	2 and 4	Two dummy variables
st20_small and st20_large	Closest town more than 15 kilometres?	2 and 4	Two dummy variables
Vl_Br	Flanders or Brabant	1 and 2	Dummy variable
Close_town	Closest town?	Own calculations	Categorical variable (based on population figures of 3)
Wat_D	Navigable waterway?	2	Dummy variable

Testing the model and interpreting research results.

To assess the effects of the different variables and test our various hypotheses, a simple multivariate ordinary least squares regression was used. Alternative regression models would be for example an ordered probit model or a quantile regression. Both take into account that the dependent variable might be affected differently depending on its relative size. Since the ordered probit model uses categorical variables as dependents, we would have to categorise the dependent variable (Price_per_hect) ourselves. From a methodological point of view, breaking up a continuous variable in different intervals might be done arbitrarily and cause biased results. A proper solution to this problem would be to spliit the data into different categories using the q25, q50 and q75 quantiles. A quantile regression model similarly uses quantiles to split the continuous dependent variable into several quantiles (normally q50, but in most statistical programmes other quantiles might be indicated by the user). Since preliminary research revealed few meaningful differences between the different quantiles, I've opted not to overburden our analysis by using one of the aforementioned statistical techniques. Consequently, a clear and easy to comprehend OLS-regression model will be used. The final model is presented in table 3.

Table 3: Land prices in Brabant and Flanders - regression results

Independent Variable	Coef.	Std. Err.	t	P>t	[90% Conf.	Interval]	Std. Coef.	Exp. Sign
PolderDummy	0,894	0,107	8,390	0,000	0,718	10,691	0,299	+
SandyLoamDummy	0,100	0,071	1,400	0,163	-0,018	0,217	0,055	+
CampineDummy	-0,274	0,127	-2,160	0,031	-0,482	-0,065	-0,090	-
Pop_density	0,00016	0,00006	2,820	0,005	0,00007	0,00026	0,104	+
VL_BRA	-1,467	0,327	-4,480	0,000	-0,201	-0,928	-0,807	-/+
Wat_D	0,137	0,078	1,770	0,078	0,009	0,266	0,070	+
VL_BRA*Pop_density	0,224	0,073	3,050	0,002	0,103	0,345	0,539	+
St5_10_Small	0,208	0,080	2,590	0,100	0,076	0,340	0,136	+
St5_10_Large	0,143	0,122	1,180	0,240	-0,057	0,343	0,061	+
St15_Small&Large	-0,156	0,079	-1,970	0,049	-0,287	-0,026	-0,085	-
VL_br*St5_10Small	-0,110	0,121	-0,910	0,361	-0,309	0,088	-0,049	-/+
VL_br*St5_10Large	0,126	0,188	0,670	0,501	-0,183	0,435	0,036	-/+
_cons	4,679	0,077	60,780	0,000	4,553	4,806		

As can be seen in the table, the variables concerning the property distribution were left out of the final model since preliminary analysis was inconclusive as to the effect of the independent variable on the dependent variable. For example, the variables concerning social property distribution rejected from the final model. Preliminary analysis showed that average land prices did not differ when the proportion of property owned by a social group varied. This was done by preforming a Kruskal-Wallis test, (comparable to an anova test but without the need for the populations to be normally distributed). Four times a significant p-value was returned. Thus rejecting the null-hypothesis and implying that means across groups are equal. Secondly a Mann-Whitney test was preformed to pairwise check which samples differed. The findings of this analysis, for all for social groups, pointed towards the region of coastal Flanders as to having significant differences in average land prices compared to the other groups. However, when we would have operationalised these findings in a variable, we would in effect put multicollinearity in our model, since coastal Flanders corresponded with the polder region (itself a variable in the model).[65]

The model succeeds in explaining around 30 percent of the variance of the dependent variable (adjusted R^2 of 0,3027, F(12,720)), which can be considered a success since only a limited number of variables were used. The model furthermore seems to corroborate most of our

65 For details on the preformed statistical tests, see appendix 1

hypotheses. Soil quality obviously played an important role. In this model the sandy Flemish soil was taken as the reference category. The more fertile soil type in the coastal area proved to be significantly more expensive, and vice versa for the Campine area. Interestingly enough, at the aggregate level prices did not differ between the soils of the sandy type and the sandy-loam type soils. As will be shown later on, differences between the two soil types were significant at the local level.[66] Furthermore, as expected population pressure proved to have a positive effect on land prices. A higher population not only meant that more people were chasing a finite amount of land, and drove up prices as a result. It also meant increasing agricultural yields since the maximum average labour input hectare rose.

Interestingly enough, the effect of towns remained limited. The proximity of small towns yielded a positive effect at the 90 per cent level, whereas the closeness to large towns provided no significant effect whatsoever. Moreover, absence of towns within a 15 kilometres radius proved to have a detrimental effect on land prices. So contrary to what we expected, it wasn't the proximity to large towns which positively affected land prices, but rather the opposite. These results once more show the relatively high level of urbanisation in Brabant and Flanders around the middle of the sixteenth century, and it's effect on the rural economy at large. As can be seen in the model, it were not necessarily the largest towns (Antwerp, Brussels, Ghent, Bruges and Louvain) which had an affect on land prices, but rather the proximity to smaller secondary towns which formed a relatively close knitted network.[67]

Furthermore, as expected, access to navigable waterways had a positive effect as well, albeit only at the 90% level. Finally the difference between Flanders and Brabant (coded as 0 for Flanders and 1 for Brabant) contradicts the assumption that the supposedly better economic growth in Brabant during the sixteenth century drove up land prices. On the other hand, the current model might be skewed in that respect since the highest land values were mostly found in Flanders and the lowest in the Campine area in North Brabant. Therefore, I estimated a new model, disregarding both the polders and the Campine area. However, as can be seen in table 4, the new estimates did not differ much from the one presented in table 3.

Table 4: Land prices in inland Flanders and Brabant - regression results.

Independent Variable	Coef.	Std. Err.	t	P>t	[90% Conf.	Interval]	Std. Coef.
SandyLoamDummy	0,091	0,067	1,360	0,174	-0,019	0,201	0,056
Pop_density	0,000099	0,00006	1,740	0,082	0,000	0,000	0,082
VL_BRA	-0,201	0,353	-5,700	0,000	-2,594	-1,430	-1,295
Wat_D	0,12349	0,06980	1,770	0,077	0,00850	0,23849	0,074
VL_BRA*Pop_density	0,344	0,008	4,400	0,000	0,215	0,473	0,998
St5_10_Small	0,022	0,104	0,220	0,829	-0,149	0,194	0,018

66 Infra chapter 6.

67 Towns categorised as smaller towns: Aalst, Ypres, Courtray, Ostend, Lier, Leuven, Malines and Tournai. Large towns were Ghent, Antwerp, Brussels and Bruges. This distinction was made using J. DE VRIES, 1984, pp.293-294.

Independent Variable	Coef.	Std. Err.	t	P>t	[90% Conf.	Interval]	Std. Coef.
St5_10_Large	0,014	0,134	0,110	0,916	-0,207	0,236	0,001
St15_Small&Large	-0,243	0,087	-2,790	0,005	-0,386	-0,099	-0,157
VL_br*St5_10Small	-0,064	0,119	-0,540	0,589	-0,261	0,013	-0,035
VL_br*St5_10Large	0,074	0,181	0,410	0,682	-0,224	0,373	0,026
_cons	0,487	0,103	47,080	0,000	4,700	5,041	

Comparing land prices between Brabant and inland Flanders, the model shows that even when only taking into account the sandy and sandy-loam area of Brabant and Flanders, population density, the county and interaction variable of the two still are significant at the 90 percent level. Since the price for land in Brabant and Flanders can be written as (1) and (2) respectively, the price for land in Brabant will be higher when the population density per square kilometre exceeds 6,11.[68]

(1) $$P_{brabant} = 0{,}000099 * Population\_density - 2{,}08 + 0{,}344 * Population\_density + (remaining\ coefficients)$$

(2) $$P_{flanders} = 0{,}000099 * Population\_density + (remaining\ coefficients)$$

In reality population densities were always higher then 6,11 inhabitants per km², therefore the price for land in Brabant would always be higher then in Flanders, keeping all other variables constant.[69] On a whole, the average population density in Flanders was higher than in Brabant (181 versus 168 people per km²).[70] Yet the upward population pressure exerted on land prices was fundamentally different in Brabant than in Flanders. This evolution is not unexpected. Population pressure would lead to either new land being cultivated or a higher labour input for the existing stock of land.[71] However, it is well known that no large scale reclamations took place in Flanders and Brabant during this period, except for the polder area. As a result higher population pressure would lead to a higher labour input, which was subject to consecutively increasing and decreasing returns to scale. Since the positive effect of population pressure on land prices in Brabant was larger than in Flanders, this would seem to indicate that for an equal increase in population, the returns to scale in Brabant were higher then in Flanders.

To conclude, this chapter sketches the outline of the market for land in sixteenth century Flanders and Brabant where price differentiation was at least in part driven by economic factors. In this respect, transportation costs, future net yields and population density can be

68 In this case, we treated all independent variables except 'Pop_density', 'VL_BRA' and 'VL_BRA*Pop_density' constant.

69 Furthermore a similar interaction variable between the 'VL_BRA' and the soil quality variable 'SandyLoamDummy', showed no significant results (p>0,05) which implies that land with the same inherent soil qualities wasn't priced any differently in Brabant than in Flanders. This suggests that future return net returns for the same soil quality were about the same in Brabant or Flanders. As can be seen in table 4, the same goes for the proximity to towns.

70 Own calculations using P. Stabel and F. Vermeylen 1997.

71 A third possibility would be migration, which was not taken into account in this analysis.

identified as the prime drivers. However, some questions still remain. How did prices evolve to the levels of the mid-sixteenth century? Did the same economic logic of population density and expected future net yields drive land prices at the regional and local level? These questions are addressed in the next chapter.

The regional perspective - Overzenne

Whereas the previous analysis gave a macroeconomic overview of the determinants of land prices in early modern Flanders and Brabant, the main objective of this chapter is twofold; first, to assess whether early modern factor markets were as efficient as suggested by recent literature, and second constructing a hedonic price index of land.[72] To study the land market from a regional perspective, the conveyance tax found in the manorial accounts of the ducal manor of Overzenne will be used. As mentioned before, approximately 3131 transactions were recorded in the period 1404-1553.[73] This seemingly abrupt periodisation stems from a frequent problem in economic historical research, the availability of sources. There are no manorial accounts for Overzenne preserved from before 1404, and after 1550 the bookkeeping of the manorial accounts in Brabant deteriorated due to the renewed geopolitical struggles.[74]
This chapter is structured as follows. First, some general observations on the land market will be given. Second, several hypotheses will be formulated to test both the validity of the cross-sectional model and the assumption that early modern factor markets followed economic rationale. Third, an econometric model will be constructed to test our hypotheses. Finally, a price index will be constructed to get a clear understanding on price movements and the living standard of peasants in South Brabant during the transition from the middle ages into the early modern time.

Market activity

In the next few paragraphs, I will show that the land market in Overzenne changed dramatically over a period of 150 years. Graph 1 gives a summary of the average number of sale transactions per year that were registered in our three parishes. As to be expected, the first half of both the fifteenth and sixteenth century were periods with an increasing number of transactions, given the economic growth. The second half of the fifteenth century on the other hand, was marked by a decline in the average number of land sales. This comes as no surprise since the second half of the fifteenth century is generally described as a period of economic and social crisis in Brabant.[75] Research on the rural credit market in the rural hinterland of Antwerp saw similar fluctuations in the number of credit transactions.[76]

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72 B. Van Bavel, 2010, pp.161-234.

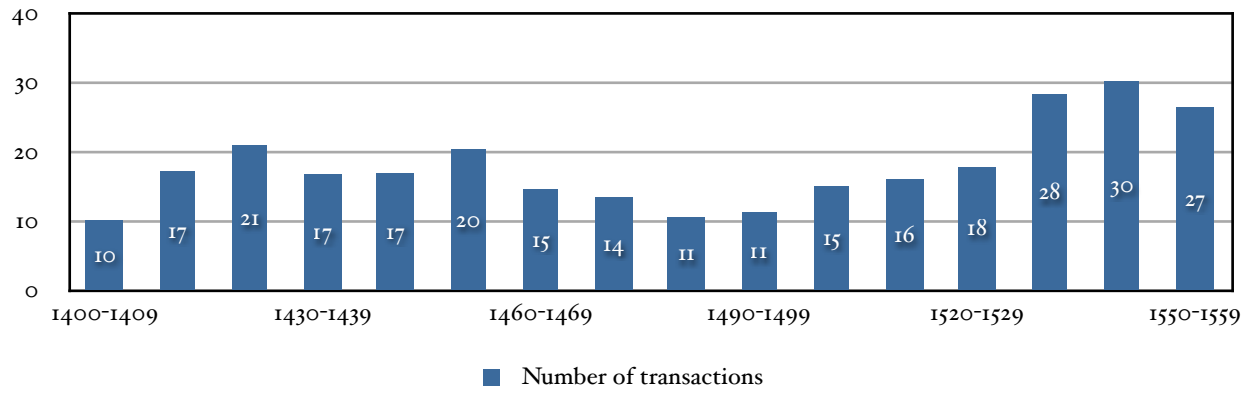
73 SAB Chamber of Accounts, Manorial Accounts of Overzenne, 4373-4742.

74 L. Van Meerbeeck 1989.

75 R.Van Uytven 1975, pp 1097-1149, J. Cuvelier 1912, H. Van Der Wee 1963; M.J. Tits-Dieuaide 1975, pp 315-318; F Daelmans 1986, pp. 173-175.

76 M.Limberger 2009, pp. 66-68

Graph 1: Average number of sale transactions per year[77]



Although the first half of both the fifteenth and sixteenth century are generally described as being periods of economic growth, the average number of transactions per year were very different. In the early fifteenth century, on average 16 land sales per year were recorded in the three villages. A hundred years later, between 1523 and 1553, during a period of economic growth, around 25 land sales per year were recorded (a growth of 56,25 per cent), within the same community. Keep in mind that over the same period, population only rose with 8%. Next to an apparent higher participation of the rural community, we also notice a diversification of the types of holding that were transferred on the market. (Graph 2) In both periods, land followed by farmsteads were by far the predominant type of holdings to change hands. However, when comparing both periods the declining importance of both types of property is noticeable. The total number of plots of land and farmsteads sold rose in absolute numbers, but relatively speaking it declined quite sharply.[78] Other types of land such as gardens, heath, woodland, orchard and even hop-gardens grew in importance. The rise in the number of transactions would imply that the number of square metres used for these purposes has increased. As a result, the diversification of land use (i.e land that was being used for other purposes than arable farming) increased. This evolution is in part the result of the growing demand for foodstuffs from Brussels. The cultivation of hop for example was capital intensive and highly specialised. The mere fact that no transactions of hop-gardens occurred during the whole of the fifteenth century, but several of them were bought and sold in the first half of the sixteenth century when at the same time the population of Brussels recovered from a demographic low-point, is probably no coincidence.[79] Moreover, it is a clear indication of the growing economic importance of Brussels for its hinterland. However, we do not expect that the growth of Brussels during the sixteenth century affects the land prices in Overzenne directly, since our cross-sectional model showed that once a parish was situated more than 10 kilometres from a town, the positive effect of the city's proximity disappeared.[80]

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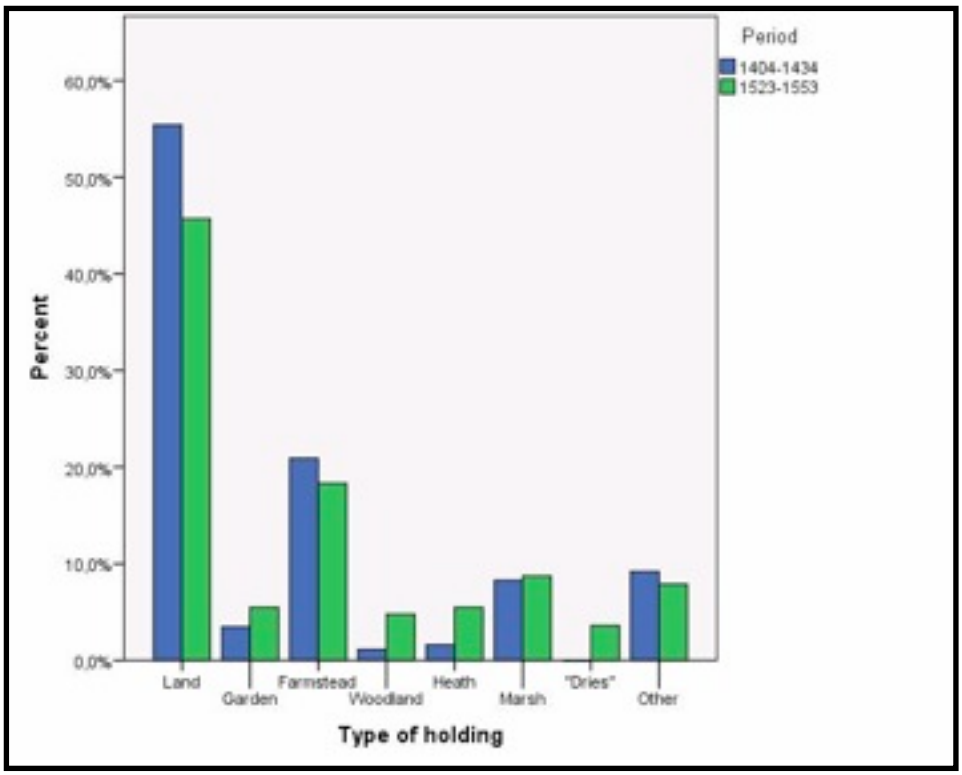
77 SAB, Chamber of Accounts, Manorial Accounts of Overzenne, 4733-4742.

78 Infra graph 2

79 All holding types representing less than 2 per cent of all transactions are summed up in the column 'Other'. For example, since hop-gardens only amounted to 0,9 percent of all transactions, they were grouped with mills, orchards and ponds in the final category.

80 Supra chapter 5.

Graph 2: Holding types in sales transactions [81]



The marked rise in the number of sold gardens, could be explained in two ways. Research by Charruadas showed that villages in the immediate vicinity of Brussels (St-Jan-Molenbeek) saw a surge in the cultivation of pulses and other vegetables on large gardens surrounding the farmsteads, during the 14th century.[82] The rising number (both in absolute and relative terms) of sold gardens could consequently be interpreted as a result of the growth of the population of Brussels. Demand for vegetables increased, therefore peasants were more eager to get hold of those tracts of land on which they could cultivate them. Since demand for gardens went up, the price rose and more peasants were inclined to sell. Although this line of thought might seem plausible from an economic point of view, it begs the question why peasants would be inclined to sell land which by definition (they were the lots adjacent to their farmstead) were an integral part of their farm. Selling those plots of land would literally imply giving up the last straw. From this perspective, the rising number of sold gardens, could act as an indicator for the increasing impoverishment of certain groups within the rural society.

The receipts of the conveyance tax not only gave information about the type of land that was sold, but in many cases also specified the acreage of the sold plot. Already at the start of the fifteenth century average plot sizes in the Overzenne region were very small (0,8 hectares on average). As can be seen in table 5, average plot size diminished between periods 1 and 2. This is especially true for land, woodland and heath, since average plot size decreased approximately

81 SAB, Chamber of Accounts, Manorial Accounts of Overzenne, 4733-4734 and 4739-4742 .

82 P. Charruadas 2004. pp.97-115.

by half. Not only did the average plot size diminish, the spread between the largest and smallest plots decreased as well. Comparing the average plot size of sold gardens would lead us to believe this type of land followed the same tendency. The small number of transaction in the earlier period implies that mean and median aren't significant, as far as garden, woodland and heath are concerned. However, in most cases minimum and maximum are lower in the latter period compared to the earlier period, which would lead to the conclusion that average plot sizes did decline.

Table 5: Average plot size per type of land in hectares [83]

Type of land	Period	Mean	Median	N	Range	Minimum	Maximum
Land	**1404-1434**	0,80257	0,62880	210	4,951	0,079	5,030
	1523-1553	0,50691	0,31440	216	3,122	0,022	3,144
Garden	**1404-1434**	0,90437	0,11950	3	2,436	0,079	2,515
	1523-1553	0,25432	0,12420	14	1,229	0,028	1,258
Woodland	**1404-1434**	2,43645	1,72910	4	5,030	0,629	5,659
	1523-1553	1,10956	1,25750	17	2,122	0,079	2,201
Heath	**1404-1434**	0,83087	0,62880	7	1,729	0,157	1,886
	1523-1553	0,49044	0,31440	24	1,100	0,157	1,258

So far, evidence not only suggest that the average plot size in Overzenne was comparable to inland Flanders at the start of the fifteenth century. But that it was even further solidified through parcellation of holdings throughout the fifteenth and early sixteenth century. However, in inland Flanders this parcellation was the result of a rising population in combination with egalitarian inheritance strategies.[84] This explanatory model cannot explain the morcellisation in our test case, because while similar inheritance practices were common in Brabant, overall population density in Overzenne remained relatively stable throughout the fifteenth and sixteenth century.[85]

Two elements concerning the land market in Overzenne attract attention. First, the number of market transactions mirrors the general macroeconomic climate. Both in the first half of the fifteenth and sixteenth century are characterised by a high number of transactions whereas the economic downturn following the political unrest in the second half of the fifteenth century resulted in fewer land sales. Second, the average transferred property size declined sharply over the aforementioned period, which hints at an ongoing morcelisation throughout the research

83 Note: Only those types of land where the average acreage between both periods were significantly different (Mann-Whitney test (using exact estimations) p-value 0,1) are shown in this table. SAB, Chamber of Accounts, Manorial Accounts of Overzenne, 4733-4734 and 4739-4742 . For a complete overview see appendix

84 E. Thoen, 2004, pp. 47-57.

85 Between 1404-1434 and 1524-1553 increased only from 46 people per square kilometre to 50 per square kilometre. Source: J. Cuvelier 1912 pp.452-453.

period. The question still remains if the land market itself was working efficiently and how prices compare across time. For example, does a land price index follow the same pattern as the average number of sales transactions per year, or is a different logic at work?

Specifying the model

Since inherent qualities of different plots of land could vary widely, calculating average prices per hectare, in order to construct a price index across time would be not make a lot of sense. A statistical solution is hedonic price analysis. This technique, created by Andrew Court, has it's origins in Detroit's automotive industry in the 1930's. During the twenties and thirties, car prices rose steeply. Contrary to the general accepted view that this was due to oligopolistic behaviour, Court showed through hedonic price analysis that it was due to newly offered options that cars became more expensive.[86] Since it inception, hedonic regression has increasingly become the standard for deriving real estate prices.[87] In recent decades, the statistical technique has even been used to estimate the effects of pollution on housing prices.[88] It's use on historical datasets has been relatively limited to a study of David Ryden and Russel Menard on the colonial land market of South Carolina.[89] For agricultural land as a whole however research using hedonic regressions is abundant, with findings all pointing to expected future cash-flows as being the prime mover in prices for agricultural land.[90]

As in the previous chapter, several variables were collected. As noted in chapter 2, about half of the transactions were recorded with details on property size, transaction price, location (parish) and soil quality.[91] Consequently, a differentiation could be made between several types of land. For their study on late-eighteenth century South Carolina, Ryden and Menard had to settle for just one dummy (improved or not) due to archival problems.[92] Both the population of the domain of Overzenne and Brussels (approximately 15 kilometres eastwards of Overzenne) were added as well. Furthermore, time-dummies were inserted to be able to create a general price index of land. Finally, temperature data was inserted in the dataset, to take into account the changing climate during the fifteenth and sixteenth century.[93] This variable was calculated by taking the eight-years rolling average of the deviation of summer temperature from the average summer temperature over the period 1300-1830.[94] Of most continuous variables the natural log was calculated and used, to ensure that normality assumptions of both the dependent and independent variables were met.

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86 E. Berndt 1991.

87 D. Gatzlaff and D. Ling 1994, E. Cassel and R. Mendelsohn 1985, and S. Kask and S. Maani 1992.

88 H. Michael, K. Boyle and R. Bouchard, 2000 and Y. Kanemoto, 1988.

89 D. Ryden and R. Menard 2005

90 F. Xu, R. Mittelhammer and P. Barkley, 1993 and R. Ready and C. Abdalla, 2005

91 In total, we collected 3131 transactions, but only 1238 of them were used in our regression model due to missing data concerning property size.

92 D. Ryden and R. Menard 2005, pp. 614-615.

93 M. Kelly and C. Ò Grada 2010.

94 Since previous grain yields severed as a guidance to the estimation of future net yields, we have opted to use a rolling average to calculate our temperature variable.

Table 6: Collected variables[95]

Variable name	Variable	Source	How operationalised
Tra_pric	Transaction price	1	Continuous variable, calculated natural log.
Paris_id	Name of parish	1	Three dummy variables, (Wambeek, Lombeek and 'Not available', Ternat was considered standard)
Surface_m^2	Surface in square metres	1	Three dummy variables
Price_m^2	Price per square metre	1	Continuous variable, calculated natural log.
Pop	Total population in Overzenne	2	Continuous variable, calculated natural log.
Pop_brux	Total population in Brussels	2	Continuous variable, calculated natural log.
Land_num	Number of plots sold per decennium (10 year moving average)	1	Continuous variable, calculated natural log.
Rent_num	Number of rents sold per decennium (10 year moving average)	1	Continuous variable, calculated natural log.
Land_turn	Turnover land market (10 year moving average)	1	Continuous variable, calculated natural log.
Lnturnover	Turnover credit market (10 year moving average)	1	Continuous variable, calculated natural log.
Heath	Heath	1	Dummy variable
Woodland	Woodlands	1	Dummy variable
Garden	Gardens near farmstead	1	Dummy variable
A_Land	Arable land	1	Dummy variable
W_A_Land	Wet arable land	1	Dummy variable
Dries	'Dries'	1	Dummy variable
Kouter	'Kouter'	1	Dummy variable
B_Land	Land with building	1	Dummy variable

95 (1) SAB, Chamber of Accounts, Manorial Accounts of Overzenne, 4733-4742.
(2) J. CUVELIER, Les dénombrements de foyers en Brabant XIVe-XVIe siècle, Bruxelles, Kiessling et Imbreghts, 1912. pp. 452-453
(3) Data are gathered by J. BUISMAN and described by A.F.V. van ENGELEN, J. BUISMAN and F. IJNSEN. See: <http://www.knmi.nl/klimatologie/daggegevens/antieke_wrn/index.html>

Variable name	Variable	Source	How operationalised
C_Land	Improved land (for which large amounts of capital were needed)	1	Dummy variable
M_land	Land in use during high middle ages	1	Dummy variable
D(Decennium)	Time dummy per decennium	1	Dummy variable
Summer_temp	Summer temperature	3	Continuos variable, (measurement-average temperature 1300-1850)

Whereas Ryden and Menard used the natural log of the selling price of an individual land sale as the dependent variable, I used the natural log of the price per square metre as the dependent variable. For interpretational purposes the only difference this makes is that their estimated coefficients had to be either ≧0 and ≦1 to be inelastic and ≥1 to be elastic. On my model on the contrary, the coefficient has to be either negative to be inelastic or positive to be elastic.

$$\ln((Price\,m^2)_{(i,t)}) = a + \sum_{k=1}^{K} \beta_k X_{(k,i,t)} + \sum_{t=1420}^{1550} \gamma_t D_{(t)} + \varepsilon$$

As can be seen in the formula above, I expressed the natural log of the average price per square metre of a plot of land as a function of a series of qualities of that plot (a summation of several X_i's) and the decennium in which the sale took place (D_t). Since we have few observations for the 1520s (only in the years 1519 and 1520), one dummy for the period 1511-1530 will be used. Both beta's and gamma's are the unknown coefficients which will be estimated in the model. Furthermore, a and ε are respectively the constant and the error term. The final estimates this aforementioned model calculates, will yield the net weight that each independent variable contributes to the land price. Since I calculated the natural log of each continuous variable, these estimates will express the elasticity between the dependent and independent continuous variable. The same regression will also provide our hedonic price index (a price index which disregards changing properties of land). This will be done by multiplying the natural antilog of each estimated gamma-coefficient by 100, standard practice when constructing hedonic price indexes.[96]

From a methodological point of view, a major problem is caused by the price evolutions of the sixteenth century. Whereas prices were relatively stable during the fifteenth century, prices for all agricultural commodities rose during the sixteenth century. At first at a relatively modest pace, but from 1530-1540 onwards, prices rose dramatically. Until today, economic historians remain divided on the exact origins and depth of this early modern price revolution. As to the origins, most scholars tend to point at the sixteenth en seventeenth century bullion imports from the Spanish America's.[97] However, as Fisher aptly pointed out in 'The great wave', this

96 The reference category will by 100 since gamma equals 0 and (e^0)*100=1. D. RYDEN and R. MENARD 2005, p. 616.

97 E. J. HAMILTON 1977, F. VELDE and W. WEIR 2000, pp.1-5. For a good overview of historiograhy concering the sixteenth century price revolution see: J. Munro, 2003, pp.

price (r)evolution started after the late fifteenth century recovery, whereas the first silver fleets arrived around the middle of the sixteenth century.[98]

Historical debates aside, the fact remains that in order to understand how prices evolved in real terms, some deflator in our model is necessary. As an economic historian, several options are available to us. First, we could us a single commodity to calculate price movements throughout the fifteenth and sixteenth century. This raises a twofold problem. For one, using a single price series as the basis for our deflator, will all ways receive ample scrutiny.[99] Second, food prices, and those of grain in particular, were highly volatile due to the constant danger for of persistence crises. During famines, agricultural prices could easily increase two-or threefold. It was not until the nineteenth century that the occurrence of this type of 'pre-modern' crises, due to the underproduction of the agricultural sector, systematically declined in North-western Europe. This was mainly due to the large scale cultivation of potatoes, combined with agroindustrial techniques from the late-nineteenth century onwards.[100] Consequently, our index could become increasingly skewed when such a price series would be used as a deflator. Therefore, we opted to construct a basket of produce, combing agricultural and industrial prices with wages. Equal weights were given to each produce. To level out price shocks due to persistence crises, index values were calculated on a 10-yearly basis.[101]

Table 7: Deflator, using rye, wheat barley flax and masons labourers wages. (1400-1550)[102]

Decennium	Index	Decennium (continued)	Index (continued)
1401-1410	1,00	1481-1490	1,71
1411-1420	1,05	1491-1500	1,56
1421-1430	1,15	1501-1510	1,73
1431-1440	1,38	1511-1520	1,90
1441-1450	1,34	1521-1530	2,17
1451-1460	1,43	1531-1540	2,27
1461-1470	1,27	1541-1550	2,64

98 R. FISHER 1996, pp. 65-78. Similarly, a breakpoint analysis of (for example) wheat prices in Antwerp shows no distinctive break in the middle of the sixteenth century, but rather in the first decennium of the sixteenth century.

99 When opting for wheat prices, one could argue that only a minority of society ate wheat and that the price index thus doesn't reflect the real standard of living, or that only a minority of plots were sown with wheat so that price movements of wheat didn't reflect changes in the real income of farmers.

100 Nunn and Qian's evidence suggests that potato's contributed to urbanisation and a decline in malnutrition in cities. (N. NUNN and N. QUIAN 2011, pp. 638-644.) However, as the cases of mid-nineteenth century Flanders and Ireland showed, severe persistence crises could still occur, with vast socio-economic consequences. Recent works concerning nineteenth century famines include: (R. PAPING, E. VANHAUTE and C. Ò GRADA (2007) and W. RONSIJN (2011).

101 I'm well aware that using a basket of goods to calculate long term price evolutions is open to scrutiny as well. For instance, the commodity basket of middling peasants or nobility could differ substantially. (See: E. SCHOLLIERS 1981) Ideally, the underlying inflationary trend would be estimated using several price series in combination with a space-state model. However, this was not achievable given the time-frame.

102 For this deflator, several price series were used, with equal weights: rye, wheat, barley, flax and carpenters wages. Source: H. VAN DER WEE, The Growth of the Antwerp Market and the European Economy, The Hague: Nijhoff. 1963. Data digitally available through: <http://www.iisg.nl/hpw/data.php#belgium>.

Decennium	Index	Decennium (continued)	Index (continued)
1471-1480	1,58	1551-1553	2,78

Formulating hypotheses

Taking into account the conclusions from the previous chapter, several hypotheses can be made, which will test the validity of our preliminary research results from chapter 6.
In the first chapter we saw that from a macroeconomic perspective land prices were highly correlated with the expected future cash-flows. Land with a high net-yield or on which demanding crops could be sown or cattle could be grazed, were in general more expensive. As a consequence, we expect a positive relationship between soil fertility and the price per square metre in Overzenne. Second, we concluded tentatively that large towns like Antwerp, Brussels or Ghent had only a minor influence on the surrounding countryside with regard to land prices. When parishes were more than 10 kilometres separated from large towns, the positive correlation between the two variables disappeared completely. Moreover, we noticed that population density had a significant positive effect on land prices as well. Since population figures remained fairly constant over time in Overzenne, we expect this to have an insignificant effect on land prices. A final hypothesis concerns the climate. Morgan Kelly and Cormac Ò Gráda illustrated that cereal yields declined substantially during the Little Ice Age. They showed that a one degree Celsius fall in summer temperatures reduced yields of wheat in several British manors by 5 per cent. Similarly, a rise in summer rainfall reduced grain yields by 10 per cent.[103] As a consequence, we expect the temperature variable to have a negative correlation with land prices. While crop yields for the Southern Low Countries are available for this period, no such variable was inserted as a variable in our model. This because the available data either concerns different regions (the countryside of Bruges and Audenarde was vastly different than that of Brussels) or too few datapoints are available.[104] An alternative would be to construct a dummy variable which simply indicates declining or rising net yields. However, net yield evolved differently between several regions, and even within one region (Audenarde) net yields of rye and wheat had diverging evolutions.[105] Consequently no variable concerning net yields of crops were inserted as a variable in our model.
As for the long term evolution of land prices, we assume that the resulting price index will be either fairly stationary or slightly declining, depending on the significance of the temperature variable. In the previous chapter, we distilled five elements which effected land prices: inherent soil fertility, future net yields, population pressure, closeness (less than 10 kilometres) to towns with a population of over 15.000 inhabitants and accessibility to navigable waterways. Two of

103 M. Kelly and C. Ò Grada 2010, pp. 18-20.

104 For data concerning Bruges see: J. Mertens 1970, p.153 , for the brussels countryside see: M.J. Tits-Dieuaide 1975, pp. 315-318. The research of Tits-Dieuaide concerns the in-fields of ecclesiastical institutions which were highly fertilized and well kept (with high labour input) and therefore probably don't reflect yield of 'average' land. Furthermore, she only gives data for the second half of the fifteenth century. For a more general overview see: E. Thoen & G. Dejongh 1999, pp.30-65.

105 In the region of Audenarde, net yields of rye rose with 10 per cent between the second half of the fifteenth century and the first half of the sixteenth century. Wheat net yields however, declined with 11 per cent. Since we have no indication on the distribution of grain cultivation in South Brabant, it would be difficult to estimate general productivity yields.

those are contextual factors (closeness to towns and soil fertility) which aren't subject to change over time. As mentioned earlier in the contextualisation of the case of Overzenne, population pressure and accessibility to navigable waterways did not change dramatically during the fifteenth and sixteenth century.[106] As a result, the only factor that could explain a trend in our deflated price index are increased future net yields of the land. However, since yield improving strategies were either already in use (for example crop rotation systems were in use from the High Middle Ages onwards) and others were not available yet (use of fodder crops, large scale fertilisation or mechanisation of the agricultural process was not implemented until the respectively the seventeenth and eighteenth century) a trend in land prices is not to be expected.[107] A structural break however, due to a changing political and social climate, new institutional arrangements or new economic techniques is plausible, since previous research has shown a development of credit instruments on the countryside from the late fifteenth century onwards.[108]

An efficient land market?

The hypotheses from the previous paragraph will be tested by preforming an hedonic regression on our dataset of approximately 1200 land sales. Several time dummies were inserted in order control for inter-temporal changes in the quality of the sold plots. Subsequently several variables were inserted to be able to identify which environmental and intrinsic factors influenced land prices. The regression estimates can be found in tables 8 and 9, respectively with and without deflated prices. The final model succeeds well in explaining a significant portion of deflated prices per square metre, with an adjusted R^2 of 0,266 F (27, 1198)[109]. Furthermore we see that most of the variables we thought to have an influence on land prices show significant p-values. As can be seen in tables 8 and 9, the total acreage of a plot of land is negatively correlated with the deflated prices per m^2. When plots become larger, the land prices don't rise proportionally. This is not surprising, since landowners in inland Flanders and Brabant were mostly smallholders, with insufficient access to credit. As a result small plots of land were more in demand, and vice versa for larger plots, which explains the negative relationship between the two variables. As the negative coefficient and beta of the variable '*trend Surface_m-2*' shows, this negative correlation became even stronger in time. This implies an ongoing morecellization and pauperisation within the domain of Overzenne during the fifteenth and sixteenth century.

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106 Between 1400 and 1550, population figures changed only the slightest from 1265 to 1370 inhabitants. As for navigable waterways no rivers were flowing through the parishes of Ternat, Wambeek or Lombeek. However, the domain of Overzenne was perched between the Senne East and the Dender in the West.

107 On agricultural productivity in the early modern period see: E. THOEN & G. DEJONGH 1999, p35-38.

108 M. LIMBERGER 2009, pp. 63-74. and E. THOEN and T. SOENS 2009, pp. 28-35.

109 The model without deflated land prices resulted in an adjusted R2 of 0,3628 F (27 , 1198)

Table 8: regression 1 - dependent variable Ln (deflated price m²) [110]

Independent variable	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]	Std. Coef.
du1420	-0,349	0,280	-1,250	0,212	-0,898	0,199	-0,116
du1430	-0,043	0,316	-0,140	0,891	-0,663	0,576	-0,011
du1440	0,019	0,166	1,120	0,264	-0,140	0,510	0,049
du1450	-0,292	0,039	-0,750	0,450	-0,105	0,468	-0,087
du1460	-0,109	0,393	-0,280	0,782	-0,088	0,662	-0,036
du1470	-0,219	0,494	-0,440	0,658	-0,119	0,751	-0,055
du1480	-0,374	0,361	-1,040	0,300	-0,108	0,334	-0,098
du1490	0,341	0,274	1,240	0,213	-0,197	0,880	0,067
du1500	-0,006	0,418	-1,330	0,183	-0,138	0,026	-0,129
du1510	-0,268	0,468	-0,570	0,566	-0,119	0,065	-0,075
du1520-1530	0,167	0,438	0,380	0,704	-0,693	0,103	0,052
du1540	0,106	0,528	0,200	0,841	-0,929	0,114	0,037
du1550	0,235	0,569	0,410	0,679	-0,881	0,135	0,102
dummylombeek	-0,181	0,006	-2,990	0,003	-0,030	-0,062	-0,086
dummynietbeschikbaar	-0,091	0,061	-1,490	0,136	-0,210	0,029	-0,004
dummywambeek	-0,030	0,059	-0,510	0,610	-0,145	0,085	-0,015
B_land	-0,334	0,261	-1,280	0,201	-0,085	0,178	-0,090
Woodland	0,102	0,112	0,910	0,361	-0,117	0,322	0,023
Heath	-0,040	0,099	-4,070	0,000	-0,596	-0,208	-0,103
Garden	-0,157	0,150	-1,050	0,295	-0,452	0,014	-0,027
W_A_land	0,307	0,068	4,500	0,000	0,173	0,044	0,114
A_land	0,036	0,150	2,380	0,017	0,063	0,652	0,060
C_land	0,562	0,246	2,290	0,022	0,080	0,104	0,160
M_land	0,251	0,103	2,430	0,015	0,048	0,454	0,062
trend Surface_m^2*	-0,013	0,005	-2,670	0,008	-0,023	-0,003	-0,386
Surface_m^2*	-0,303	0,048	-6,260	0,000	-0,398	-0,208	-0,308
lnturnover	0,328	0,170	1,930	0,054	-0,006	0,661	0,287
_cons	-0,177	0,183	-0,100	0,923	-0,376	0,341	

Furthermore, evidence suggests that land which yielded higher returns (either higher net yields or more valuable produce) was valued higher, and vice versa for less profitable land. Wet arable land, arable land and improved land (with a orchard or hop yard) were all valued higher per square metre than 'standard' land. Conversely, types of land that had limited uses in agriculture, like heath, were relatively cheaper. Prices for woodland, gardens and builded land don't seem to be significantly different from average land.[111] Part of this statistical insignificance however, may be due to the limited amount of transferred plots of these types (49, 28 and 70 respectively).

Some plots of land were under intensive cultivation from the high middle ages onwards. These infields consisted of the central part of the early medieval demesnes. They were highly

110 Own calculations using: SAB, Chamber of Accounts, Manorial Accounts of Overzenne, 4733-4742.
Durbin-Watson test for autocorrelation: 1,196.

111 Part of this statistical insignificance however, may be due to the limited amount of transferred plots of gardens woodland and builded land where an indication of total acreage was given. For example most of the times a farmhouse (*hofstede* or *hofke*) were sold without an indication of the plot size. Likewise for gardens (only 28 observations). Normally, gardens would fetch a higher price per m2 than *run of the mill* plots, because they were relatively small, well fertilised and situated next to the farmhouse.

fertilised and were constantly sown (no fallow period).[112] As a result, when plots of land were described as being part of a 'kouter', due to the early etymological origin of this word, we can safely assume that these plots were either better fertilised than the normal land or that their soil consistency was intrinsically better.[113] Both in tables 8 and 9, the variable '*M_land'* (land in use from the middle ages onwards) is positively correlated with land prices. On a more general level, some differences can even be noticed between the three parishes of Ternat, Wambeek and Lombeek. As shown in the general contextualisation, both Ternat and Wambeek had relatively fertile soils (wet loamy soils) whereas the soil quality in Lombeek was on average less fertile (a combination of sandy dunes and dry sandy loam). Again we find that the results correspond with our hypothesis. Where '*dummynietbeschikbaar'* and *'dummywambeek*' show no significant correlation with land prices, *'dummylombeek'* has a significant negative effect on land prices. Again our analysis shows that the better the soil quality, the higher the prices. In this case, plots in Lombeek get a negative penalty because of the on average lesser soil quality in the aforementioned parish, when compared to Ternat and Wambeek.

Table 9: Regression 2 - dependent variable Ln (price m²) [114]

Independent variable	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]	Std. Coef.
Surface_m^2	-0,306	0,049	-6,310	0,000	-0,401	-0,211	-0,296
du1420	-0,525	0,321	-1,640	0,102	-1,154	0,104	-0,162
du1430	-0,176	0,369	-0,480	0,633	-0,901	0,549	-0,043
du1420	-0,349	0,279	-1,250	0,212	-0,897	0,199	-0,108
du1430	0,040	0,316	0,130	0,900	-0,580	0,659	0,010
du1440	0,496	0,165	3,000	0,003	0,172	0,821	0,122
du1450	-0,072	0,387	-0,190	0,852	-0,832	0,687	-0,002
du1460	0,173	0,392	0,440	0,659	-0,596	0,943	0,005
du1470	-0,076	0,494	-0,150	0,877	-0,105	0,893	-0,018
du1480	0,022	0,361	0,060	0,951	-0,685	0,730	0,005
du1490	0,849	0,274	3,100	0,002	0,311	0,139	0,155
du1500	-0,182	0,417	-0,440	0,662	-0,100	0,636	-0,040
du1510	0,194	0,468	0,420	0,678	-0,723	0,111	0,051
du1520-1530	0,862	0,438	1,970	0,049	0,000	0,172	0,252
du1540	0,835	0,527	1,580	0,113	-0,199	0,187	0,275
du1550	1,107	0,568	1,950	0,052	-0,008	0,222	0,450
dummylombeek	-0,180	0,006	-2,990	0,003	-0,298	-0,062	-0,080
dummynietbeschikbaar	-0,091	0,061	-1,490	0,136	-0,210	0,029	-0,040
dummywambeek	-0,031	0,059	-0,530	0,598	-0,146	0,084	-0,014
B_land	-0,330	0,261	-1,260	0,206	-0,841	0,182	-0,082
Woodland	0,104	0,112	0,930	0,352	-0,115	0,323	0,022
Heath	-0,401	0,099	-4,060	0,000	-0,595	-0,207	-0,096
Garden	-0,157	0,150	-1,040	0,297	-0,451	0,138	-0,003
W_A_land	0,307	0,068	4,490	0,000	0,173	0,441	0,106
A_land	0,358	0,150	2,390	0,017	0,064	0,652	0,006
C_land	0,559	0,246	2,270	0,023	0,077	0,104	0,149
M_land	0,252	0,103	2,440	0,015	0,049	0,455	0,058
trend Surface_m^2	-0,013	0,005	-2,640	0,008	-0,002	-0,003	-0,355

112 E. THOEN and G. DEJONGH, 1999, p.37.

113 The underlying assumption is that land which was under cultivation since the middle ages was of higher quality since Ricardo's the law of diminishing returns states that the most productive plots will be cultivated first.

114 Own calculations using: SAB, Chamber of Accounts, Manorial Accounts of Overzenne, 4733-4742.

Independent variable	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]	Std. Coef.
Surface_m^2	-0,304	0,048	-6,290	0,000	-0,040	-0,209	-0,289
lnturnover	0,361	0,170	2,120	0,034	0,028	0,694	0,295
_cons	-0,521	0,183	-0,290	0,775	-0,410	0,306	

Several variables were withheld in our final model since their effects on land prices were insignificant. The population of Brussels and the domain of Overzenne for example, had little or no influence on the land market. For the case of Brussels, this is not unsurprising since our cross-sectional model showed that large towns had only an limited effect on the countryside immediately surrounding the town. Land prices in parishes more than 10 kilometres from the city centre had no significant influence of the town. Since Ternat, Wambeek and Lombeek were more than 10 kilometres away from Brussels a significant effect was not to be expected.
Therefore these results only reinforce the test results of our previous chapter. As for the population of Overzenne, we already noted that the population change in Overzenne remained limited. Consequently, it's insignificant effect on land prices was to be expected. This doesn't mean population density didn't matter. Comparing Overzenne with Herzele provides an indication as to what effect population density had on land prices. Herzele, situated 20 kilometres west of Overzenne, with a comparable soil consistency had a population density of about 75 around 1560, typical for the social-property system of inland Flanders.[115] Being 50 per cent more densely populated, apparently made a huge difference with land prices being on average 20 to 30 per cent higher in Herzele. Climate changes (calculated through the deviation of the summer temperature from the norm between 1300 and 1850), although clearly affecting net grain yields, showed no effect on land prices between 1404 and 1553. The insignificance of the climate variable can be due to several reasons. For one, it could be that the time-frame used was too short. Another (and in our understanding a more plausible) reason could be that declining net yield due to climate change could be counterbalanced by more working on smaller plots and increasing labour intensity.
Finally, credit availability ('*lnturnover*') is measured through the natural log of the deflated decennial turnover of the credit market in Overzenne. The results are remarkable. In both models, the turnover on the credit market and prices achieved on the land market seem to be highly correlated. It would be wrong however to conclude that a lively credit market drove rising land prices. Regression analysis shows correlation between several variables and not causality. In this particular case, it wouldn't be unimaginable that rising land prices helped fuelling credit availability. So far, we can only conclude that land price and credit availability were strongly correlated. Further microeconomic analysis is necessary to give a conclusive answer as to the causal relationship between the two variables.

Long term price evolutions, (1404-1553)

Our hedonic regression had a twofold objective. First, it was used for analysing the determinants of price differences between plots of land on a regional level, and thereby falsifying the results of our cross-sectional analysis. In this paragraph, we will use the same

115 J. De Brouwer 1968, pp. 225-232 and E. Scholliers and F. Daelemans 1981, p.175.

dataset with approximately 1200 land sales and the same regression to construct a price index of land, both deflated and not deflated, throughout the fifteenth and first half of the sixteenth century. Some general elements of the price series will be highlighted in this chapter, but a more in-depth analysis of the social and economic consequences will be preformed in the following chapters. The index itself is constructed by calculating the natural antilog of the coefficients of the time-dummies and multiplying this number by a hundred.[116] For the reference period the beta-coefficient is zero and consequently has an index value of 100.

Both indexes are visualised in graph 3, together with the average deflated price per hectare. Please note that this last index was not obtained through our hedonic regression but by averaging the deflated price per hectare per each transaction for each decennium. Consequently, this graph does not take into account the changing average property size, shifts in the soil quality or type of land sold, and so forth. Comparing both solid lines with the dashed line, clarifies the methodological benefits of using a hedonic price index as opposed to averaging values of a product with inherently different characteristics. When controlling for intrinsic differences in the quality of land, real land prices are lower in the first half of the fifteenth century, whereas they were slightly higher in the first half of the sixteenth century.

Besides two peaks in the 1430s and 1480s respectively, land prices remained relatively stable in nominal terms during the first half of the fifteenth century. From the 1490s, a clear upward trend can be distinguished. This upward movement corresponds with the more general price rise during the long sixteenth century, as mentioned earlier. In accordance to the findings of Fischer and John Munro nominal prices moved up from the late fifteenth century onwards, well before Spanish silver from the America's could have created monetary inflation, but corresponding nicely with the increased silver production in South Germany, much of which was diverted by merchant bankers to the Antwerp market. [117]

In real terms, land prices fluctuated between roughly 60 and 120 per cent of the value of 1404-1410 during our research period. Yet two distinct periods can distilled. In the fifteenth century, land prices were mostly between 70 and 90 per cent of the value of the 1400s, with clear peaks around the the 1400s, 1430s and 1480s. After such a high, prices reverted quickly to their pre-peak level. As a consequence I conclude that those prices rises were due to short lived shocks. The timing of these shocks is remarkable. Both in 1431-1440 and 1481-1490, wars were fought in the Burgundian Netherlands.[118] During those episodes, the decennial change in inflation spurred higher (see table 7). Remarkably enough, the price rise of land in nominal terms was higher than the inflationary upsurge, which resulted in a price hike in real terms. As a consequence, the high prices in both 1430s and 1480s were the result of an increased future cash flow due to high grain prices, together with a safe haven effect, which pushes up the prices of 'safe' commodities during crisis periods. At the same time, the turnover on the land market (measured through the number traded plots) decreased as one would expect during war-periods.

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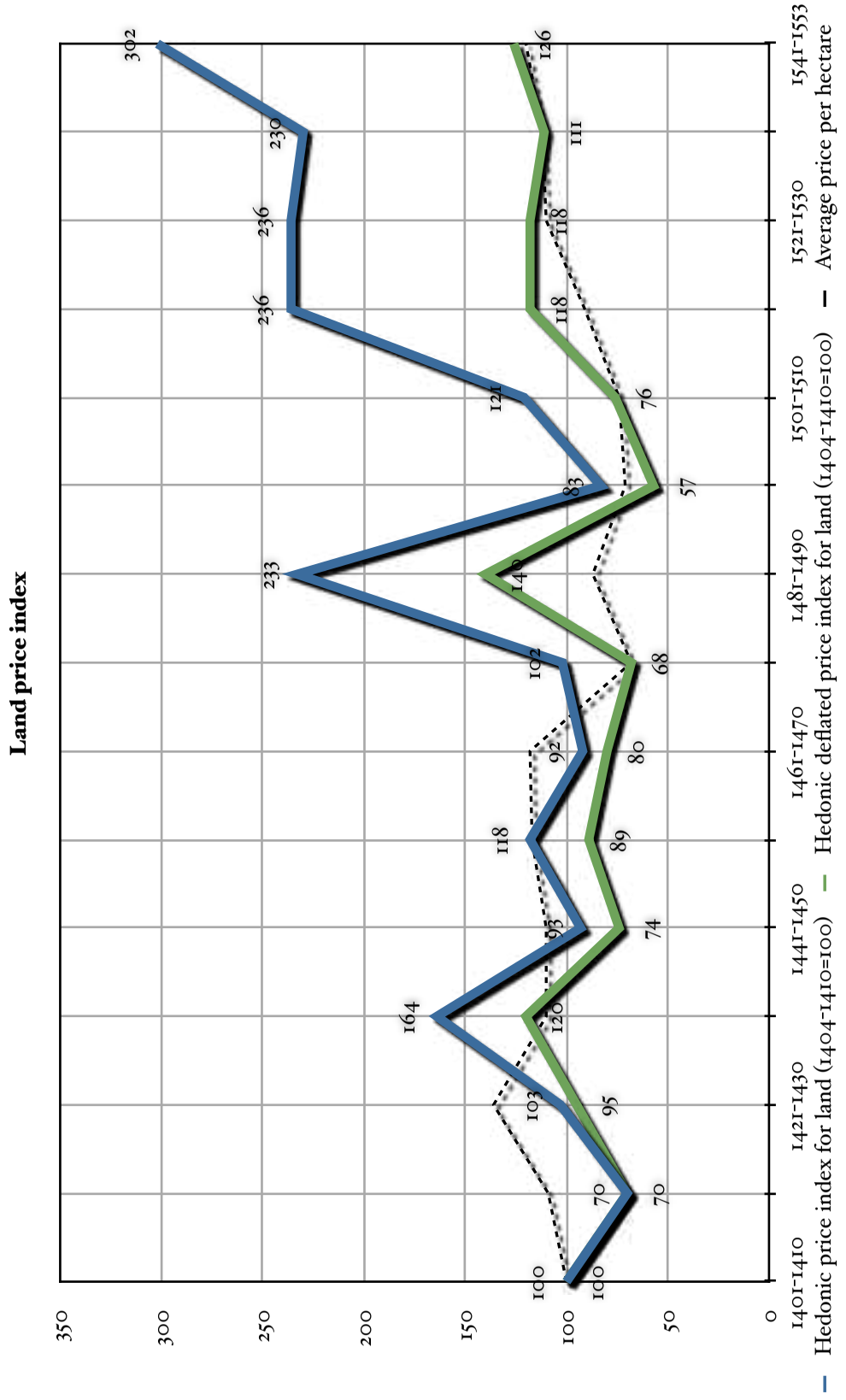
116 A likewise approach was used in D. RYDEN and R. MENARD 2005, pp.602-622.

117W. BARRETT 1990, pp. 224 - 254 and J. MUNRO 2003, pp. 4-8.

118 W. BLOCKMANS 2007, pp. 66-70. During the 1430-1440, the Burgundian Netherlands were involved in the final stretch of the Hundred years war. Half a century later, the Southern Low Countries were plagued by internal conflict, with Ghent, Bruges and Brussels opposing the new Habsburg ruler Maximilian of Austria.

Graph 3: Hedonic land price index, South Brabant 1404-1553.[119]



119 Own calculations using: SAB, Chamber of Accounts, Manorial Accounts of Overzenne, 4733-4742.

The combination of these elements; a declining turnover, an increased demand and a rising future net value resulted in few sold properties at high prices, both in nominal and real terms. When the externalities disappeared, the supply increased and future returns normalised and the index returned to its 'normal' value. This changed remarkably from the sixteenth century onwards. Gradually, prices were lifted to a higher level of around 120 per cent. After this price hike in the early part of the sixteenth century, prices were relatively stable once again, albeit at a higher level than during the fifteenth century. Unlike in the fifteenth century, this structural break in our index was clearly due to a persistent external shock, a structural change in the economic or institutional context which served as the backdrop of the land market. Further research on this evolution is clearly necessary, which will be done in the next chapter.

Conclusion

Land prices differed greatly in the former county of Flanders and the duchy of Brabant. We found that four elements were of importance in explaining the observed price differences. Soil quality explains a large portion of the observed variance in land prices. The access to navigable waterways proved to have a positive effect on land prices as well. Interestingly enough, it was not the proximity to towns and cities which had a positive effect on land prices, but rather the opposite. The absence of towns within a reasonable radius proved to have a detrimental effect on land prices. This reaffirms the exceptional population density in Flanders and Brabant in the sixteenth century. Comparing those two regions yielded some interesting results. While population pressure on the aggregate level was higher in Flanders then in Brabant, an increase in population proved to have a larger (positive) effect in Brabant than in Flanders. This indicates that for an equal increase in population, the returns to scale in Brabant were higher then in Flanders.

At the regional level, we can conclude that the land market at the regional model clearly followed some economic rationale. Future net yields of a certain plot significantly influences price per square metre of that plot. For example, we saw that land was cheaper in the less fertile region of the domain of Overzenne. The same applies to heath, wasteland with limited agricultural possibilities other than grazing, which was cheaper than our reference category of 'normal' land. On the other hand, land which was under intensive cultivation (high labour input and frequent manuring) from the Middle Ages onwards, fetched a higher price. The same goes for land which was improved through the input of capital or those plots who were more fertile by nature such as arable land.

The econometric model showed some interesting relationships of a structural nature as well. We saw for instance that the relation between plot size and price per square metre was inelastic. As the interaction variable (trend Surface_m^2) showed, the preference for smaller plots grew even stronger through time. This is telling for the consumer preferences towards smaller plots, and its evolution throughout the researched period. Although the term 'consumer preference' might be somewhat misleading. Peasants might have preferred to buy larger plots, but were unable to due to a whole range of institutional, social and economic constraints. Consequently further research is necessary to trance the changes in the economic, institutional and social context of the land market in South Brabant.

Finally, after analysis of the price indexes, a similar picture of a land markets driven by economic rationale emerges. Throughout the fifteenth and sixteenth century prices remained relatively flat. Still, decreased supply in combination with higher future returns (due to rising grain prices) caused the price index to spike. As soon both supply and grain prices normalised, the price index returned to it's pre-peak levels. The dawn of the sixteenth century however, brought along the end of this relative price stability. Prices rose both in nominal and real terms for an extended period, from 1491 to 1520. Hereafter, prices remained stable once again, but at a remarkably higher level then in the fifteenth century.

From a microeconomic perspective, the effects of this evolution are far-reaching. Recall Jan Winterbeke from the introduction. When he started his farm at the dawn of the sixteenth century, prices were in real terms about the average of the past century. However, when he

passed away in the spring of 1538, real prices were 42 percent in higher.[120] His remaining family decided to cash in on their newfound wealth and sold their heritage. The flip-side of this price evolution implies that a farmer willing to expand his farm from the 1520s onwards, was facing much steeper entry fees. Simply put, if Jan Winterbeke would have started his farm 30 years later, he would have needed to put much more 'skin in the game' to achieve the same farm size.
On the one hand, the macroeconomic analysis has given us some great insights in the structural working of the land market, at the national and regional level. On the other hand, the question still remains which implications this had at the level of the farm. As a result a microeconomic analysis might yield some interesting research results.Furthermore, comparisons between different regions might be beneficial, in order to grasp the effect of diverging economic, social and institutional arrangements (for example population density, social property distribution, market or family oriented farming etc...).

120 Own calculations using: SAB, Chamber of Accounts, Manorial Accounts of Overzenne, 4733-4742.

Appendix

Appendix 1-a : Kruskal -Wallis test.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
lnprijsperha	750	4,622115	,8514773	,5129	8,3061
Grondbezit Instellingen	750	19,82	13,249	8	38

Ranks

	Grondbezit Instellingen	N	Mean Rank
lnprijsperha	8	4	240,25
	9	414	237,27
	11	2	279,50
	20	81	321,00
	Total	501	

Test Statistics[a,b]

	lnprijsperha
Chi-Square	22,760
df	3
Asymp. Sig.	,000

a. Kruskal Wallis Test

b. Grouping Variable: Grondbezit Instellingen

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
lnprijsperha	750	4,622115	,8514773	,5129	8,3061
Grondbezit Ruraal	750	44,67	21,609	15	70

Ranks

	Grondbezit Ruraal	N	Mean Rank
lnprijsperha	15	249	146,13
	25	2	208,00
	49	81	235,67
	50	4	181,00
	Total	336	

Test Statistics[a,b]

	lnprijsperha
Chi-Square	52,325
df	3
Asymp. Sig.	,000

a. Kruskal Wallis Test

b. Grouping Variable: Grondbezit Ruraal

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
lnprijsperha	750	4,622115	,8514773	,5129	8,3061
Grondbezit Burgers	750	18,56	6,225	0	50

Ranks

	Grondbezit Burgers	N	Mean Rank
lnprijsperha	0	4	391,25
	10	88	207,37
	11	86	491,67
	12	81	511,88
	20	240	429,48
	25	249	297,57
	50	2	447,50
	Total	750	

Test Statistics[a,b]

	lnprijsperha
Chi-Square	157,183
df	6
Asymp. Sig.	,000

a. Kruskal Wallis Test

b. Grouping Variable: Grondbezit Burgers

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
lnprijsperha	750	4,622115	,8514773	,5129	8,3061
Grondbezit Adel	750	14,29	4,254	11	42

Ranks

	Grondbezit Adel	N	Mean Rank
lnprijsperha	11	328	369,89
	14	251	298,76
	19	81	511,88
	22	86	491,67
	42	4	391,25
	Total	750	

Test Statistics[a,b]

	lnprijsperha
Chi-Square	88,554
df	4
Asymp. Sig.	,000

a. Kruskal Wallis Test

b. Grouping Variable: Grondbezit Adel

Apendix 1-b: Mann Withney U-test - Ecclesiastical institutions[121]

Ranks

	Grondbezit Instellingen	N	Mean Rank	Sum of Ranks
lnprijsperha	8	4	212,75	851,00
	9	414	209,47	86720,00
	Total	418		

Test Statistics[a]

	lnprijsperha
Mann-Whitney U	815,000
Wilcoxon W	86720,000
Z	-,054
Asymp. Sig. (2-tailed)	,957

a. Grouping Variable: Grondbezit Instellingen

Ranks

	Grondbezit Instellingen	N	Mean Rank	Sum of Ranks
lnprijsperha	9	414	208,34	86254,00
	11	2	241,00	482,00
	Total	416		

Test Statistics[a]

	lnprijsperha
Mann-Whitney U	349,000
Wilcoxon W	86254,000
Z	-,383
Asymp. Sig. (2-tailed)	,702

a. Grouping Variable: Grondbezit Instellingen

Ranks

	Grondbezit Instellingen	N	Mean Rank	Sum of Ranks
lnprijsperha	11	2	37,00	74,00
	20	81	42,12	3412,00
	Total	83		

Test Statistics[a]

	lnprijsperha
Mann-Whitney U	71,000
Wilcoxon W	74,000
Z	-,297
Asymp. Sig. (2-tailed)	,766
Exact Sig. [2*(1-tailed Sig.)]	,783[b]

a. Grouping Variable: Grondbezit Instellingen
b. Not corrected for ties.

121 This test showed that the only significant difference in mean's existed between the region of coastal Flanders and the other observations. Mann Whitney test for the other social groups showed similar results.

Ranks

	Grondbezit Instellingen	N	Mean Rank	Sum of Ranks
lnprijsperha	20	81	231,88	18782,00
	38	249	143,91	35833,00
	Total	330		

Test Statistics[a]

	lnprijsperha
Mann-Whitney U	4708,000
Wilcoxon W	35833,000
Z	-7,208
Asymp. Sig. (2-tailed)	,000

a. Grouping Variable: Grondbezit Instellingen

Ranks

	Grondbezit Instellingen	N	Mean Rank	Sum of Ranks
lnprijsperha	8	4	153,50	614,00
	38	249	126,57	31517,00
	Total	253		

Test Statistics[a]

	lnprijsperha
Mann-Whitney U	392,000
Wilcoxon W	31517,000
Z	-,730
Asymp. Sig. (2-tailed)	,465

a. Grouping Variable: Grondbezit Instellingen

Appendix 2: Table: plot size evolution

Type of land	Period	Mean	Median	N	Type of land	Period	Mean	Median	N
"Kouter"	**1420-1429**	0,865	0,865	2	**Heath**	**1410-1419**	0,534	0,314	5
	1440-1449	0,262	0,314	3		**1420-1429**	0,820	0,629	7
	1450-1459	1,209	0,629	13		**1430-1439**	0,472	0,314	3
	1460-1469	0,472	0,472	1		**1440-1449**	0,419	0,393	9
	1470-1479	0,498	0,393	3		**1450-1459**	1,461	0,707	12
	1480-1489	0,201	0,201	1		**1460-1469**	0,025	0,025	1
	1490-1499	1,965	1,965	2		**1470-1479**	0,727	0,707	8
	1500-1509	0,908	0,511	10		**1480-1489**	0,550	0,550	4
	1510-1519	0,157	0,157	1		**1490-1499**	0,812	0,707	6
	1520-1529	3,353	0,629	3		**1500-1509**	0,672	0,629	9
	1530-1539	0,393	0,393	4		**1520-1529**	0,734	0,629	9
	1540-1549	1,115	1,258	11		**1530-1539**	0,587	0,314	17
	Total	1,064	0,590	54		**1540-1549**	0,750	0,472	29
Garden	**1410-1419**	1,297	1,297	2		**1550-1559**	0,540	0,432	8
	1420-1429	0,120	0,120	1		**Total**	0,730	0,472	127
	1430-1439	0,156	0,079	3	**Land**	**1400-1409**	1,381	0,786	39
	1440-1449	0,330	0,330	1		**1410-1419**	0,901	0,629	95
	1480-1489	4,716	4,716	1		**1420-1429**	0,732	0,550	70
	1490-1499	0,314	0,314	1		**1430-1439**	0,587	0,440	35
	1530-1539	0,531	0,393	4		**1440-1449**	0,693	0,314	60
	1540-1549	0,399	0,157	11		**1450-1459**	0,628	0,511	56
	1550-1559	0,038	0,038	1		**1460-1469**	0,911	0,629	47
	Total	0,604	0,157	25		**1470-1479**	1,279	0,629	47
Hay Land	**1400-1409**	1,886	1,886	1		**1480-1489**	0,498	0,432	12
	1410-1419	0,277	0,277	1		**1490-1499**	0,802	0,629	39
	1430-1439	2,201	1,100	5		**1500-1509**	0,767	0,550	43
	1440-1449	0,751	0,943	5		**1510-1519**	0,393	0,393	2
	1450-1459	0,544	0,472	8		**1520-1529**	0,829	0,393	51
	1460-1469	0,629	0,629	2		**1530-1539**	0,602	0,330	88
	1470-1479	0,576	0,629	3		**1540-1549**	0,704	0,346	71
	1490-1499	2,122	2,122	2		**1550-1559**	0,633	0,314	37

Type of land	Period	Mean	Median	N
	1500-1509	0,354	0,354	2
	1530-1539	1,572	1,572	1
	1540-1549	0,472	0,472	2
	Total	0,991	0,629	32
Woodland	**1410-1419**	5,659	5,659	1
	1420-1429	1,729	1,729	2
	1430-1439	0,629	0,629	1
	1440-1449	0,629	0,629	5
	1450-1459	0,747	0,629	4
	1460-1469	0,079	0,079	1
	1470-1479	0,603	0,314	3
	1480-1489	4,401	4,401	1
	1490-1499	1,310	0,943	3
	1500-1509	1,192	0,943	6
	1520-1529	0,786	0,786	2
	1530-1539	1,314	1,572	7
	1540-1549	1,300	1,258	13
	1550-1559	0,786	0,786	1
	Total	1,234	0,943	50
Orchard	**1450-1459**	0,629	0,629	1
	1520-1529	0,629	0,629	1
	1540-1549	0,550	0,550	1
	1550-1559	0,393	0,393	2
	Total	0,519	0,629	5

Type of land	Period	Mean	Median	N
	Total	0,796	0,472	792
Marsh	**1400-1409**	0,786	0,472	6
	1410-1419	0,786	0,629	9
	1420-1429	0,561	0,472	7
	1430-1439	0,293	0,157	3
	1440-1449	0,291	0,314	10
	1450-1459	0,566	0,484	11
	1460-1469	0,629	0,629	2
	1470-1479	0,472	0,472	4
	1490-1499	0,880	0,629	5
	1500-1509	0,472	0,472	2
	1510-1519	0,472	0,472	2
	1520-1529	0,873	0,629	9
	1530-1539	0,815	0,314	11
	1540-1549	0,884	0,629	13
	1550-1559	1,258	1,258	7
	Total	0,716	0,484	101
Pasture	**1450-1459**	0,157	0,157	1
	1460-1469	0,629	0,629	1
	1470-1479	1,572	0,550	4
	1490-1499	0,629	0,629	1
	1500-1509	0,681	0,629	3
	1520-1529	0,393	0,393	2
	1530-1539	0,576	0,629	3
	1540-1549	0,747	0,786	4
	1550-1559	0,838	0,629	3
	Total	0,807	0,629	22

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