

Transport Prices in the Long Sixteenth Century:  
A Contribution to pre-industrial Price History\*

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## I. Introduction: Transport Prices and Price History

Economic historians largely agree about the dominant part played by transport technology and organisation in the pre-industrial economy. Paradoxically, little research has been devoted to the systematic study of transport prices. It is not difficult to collect scattered price data on transport services, but, conversely, it proved extremely difficult to collect homogeneous, long run and reliable price series (HAMILTON 1947, DUBOIS 1980, MASSCHAELE 1993, VAN UYTVEN, 1997). Even when accounts do contain transport prices, it was especially harsh to meet the *ceteris paribus*-conditions necessary to reconstruct a homogeneous and representative price series. At the other hand economic historians tended to favour a “standard of living”-approach, and in so doing they were focussing on commodities sold on urban markets, hence including the transport price already.

It is the main purpose of this paper a) firstly to present new results on long term changes in pre-industrial transportation prices, b) to reflect upon their importance for price history, and economic history more in general. It is our intention to demonstrate that we need to take into account transport prices to explain diverging and converging price movements.

The focus will be on the famous “long sixteenth century”. The region studied is Brabant, a core area within the economy of the Southern Netherlands. During the sixteenth century, Brabant was a highly urbanised economy, largely dependent upon international commerce. Fortunately, thanks to, among others, works published by Herman Van der Wee (1963 & 1975), general prices and wages were already mapped and both key variables already were studied as economic development variables.

## II. Transport and Economic Development in the Long Sixteenth Century

During the last decades, pre-industrial transport history has enjoyed a vivid interest and in this process several studies have contributed to a re-assessment of, among others, the impact of road transport to economic development. Unsurprisingly, however, transport historians have principally concentrated on one of the most dynamic episodes in the field, the long eighteenth century. Even though the roots of the technological innovations in the transport sector (road improvements, horse feeding, etc.) already could be discovered from the second half of the seventeenth century onwards, a fierce dynamic undoubtedly was to be ascribed to eighteenth century-improvements (GERHOLD, 1993; BLONDÉ, 1999). For obvious reasons, transportation

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historians were eager to uncover the influences exerted by changing transportation technologies and organisation on the process of industrialisation (SZOSTAK, 1991).

The medieval period, however, witnessed equally important technological and organisational changes, such as the large-scale introduction of horses as draught animals (LANGDON, 1984). In general, however, sixteenth-century transportation technology and organisation were described as relatively primitive, especially compared to the presupposed modern transport facilities (contrast however MUSGRAVE, 1999, MASSCHAELE, 1993, HARRISSON, 1992). Horse-drawn road transport was presupposed to be expensive. Roads were usually described as extremely bad, hence impracticable during long periods of bad weather conditions. River navigation was, in relative terms, much cheaper: the ratio was about 1:4. But river transportation was slow, handicapped by numerous obstacles and also vulnerable to changing meteorological conditions.

This did not prevent, however, Brabant, and the Southern Netherlands, to grow heavily dependent upon the international commerce, thereby relying upon massive interregional and international commodity flows. For rich trades indeed transport costs didn't seem to weigh heavily upon the final price of the product (BRULEZ 1959, VAN DER WEE 1963, MUNRO 2001).

By the middle of the sixteenth century about 50% of the population in Brabant lived in an urban settlement with at least 5000 inhabitants (KLEP, 1988). Especially the growth of Antwerp, the commercial metropolis, was impressive. On the eve of the iconoclastical outbursts of 1566 approximately 100,000 inhabitants were said to have lived in the city. This urban population not only produced luxury commodities for the international markets; it also needed to be heated, fed and sheltered. In other words: cities needed to be provisioned. Unfortunately, the transportation of every day life, so-called "poor commodities" such as fuel, food, building and other raw materials, has attracted less attention so far (see for example GALLOWAY, KEENE, MURPHY, 1996). Without doubt, here transport prices represented a larger share in total transaction costs and, consequently, also of the final prices of products offered for sale on urban markets. Furthermore, the total volume of the goods and people transported on the local and regional level, undoubtedly by far exceeded the volume of luxury goods. In many respects feeding and, even more, fuelling the pre-modern city was a bottleneck to pre-industrial town development and economic development in general (VAN DER WOUDE, DE VRIES & HAYAMI, 1990).

### **III. Transport price history: developing a methodology in no men's land?**

So far, heuristic as well as methodological problems prevented economic historians from reconstructing reliable transport prices series. Among the few historians trying to reconstruct a persuasive and qualitative time series of transportation prices from the pre-industrial period, James Masschaele must be considered a pioneer and his conclusions were quite remarkable and challenging indeed. According to Masschaele, land carriage in late medieval England was not as expensive as was often thought before. Secondly, and this came as a surprise, relative transport prices were even higher during the eighteenth century, in spite of the infrastructural and technological improvements such as the famous turnpikes, achieved in that period. We will return to this important conclusion later.

At first sight in the Southern Netherlands too, sources seem not to abandon for a history of transportation service prices. We were however very fortunate in possessing an impressive

series of accounts of ducal domains. In these sources, among others, especially transports of *millstones* to ducal mills were carefully recorded and deserve our attention. It is this information that will be used here to try to assess a) structural mechanisms in pre-industrial transport price formation and b) long term price developments.

Millstones can be considered as *examples* of commodities with an unfavourable value-weight-proportion, though millstones were valuable items. The millstone is a relatively exceptional commodity, indeed. The series of transport prices of millstones is an exceptionally homogeneous one, however. (1) Millstones were standardised items, keeping broadly the same weight (more than 1000 kg), measure and quality overtime. Moreover, in the ducal mills, only the largest formats of millstones were grinding, and due to the technical equipment of these mills in the long sixteenth century, there was no incentive to change the size. (2) Though customary services prescribed a load of two millstones, in reality no more than one millstone was carried by a wagon at a time, hence no economies of scale could affect the transport costs recorded. (3) Moreover, the depreciation of the stones could be followed up closely, the replacement of a stone could carefully be scheduled, hence it was possible to avoid the need to carry a stone under bad climatic circumstances. Conversely, in the exceptional cases in which a millstone needed to be urgently replaced, transportation prices sometimes rose significantly and the specific circumstances responsible for the exceptional price rise were accounted for in detail in the documents scrutinized. (4) As the purchase of a new millstone represented a heavy capital investment, both purchase and transportation were accounted for in detail and the transportation was, in normal circumstances, confined to professional carriers. This is important, since land carriage often was a second source of income for people normally engaged in agriculture offering transport services at low (but variable) opportunity cost (BRAUDEL 1966 & 1979, RINGROSE, 1970). (5) Both, place of origin (varying from the wharf in Antwerp, the quay in Brussels, the wharf in Liège) and destination (the mill) were carefully described in the sources.

A major disadvantage of the time series we were able to reconstruct, is the rather limited number of observations. In contrast to other series with price and wage data, the transport price series presented in the following paragraphs is far from serial and complete. Moreover, in most cases, data related to one year are based on one observation (one purchase) only. We will show, however, that this does not seem to affect the representativity of the general trends uncovered. Moreover, a comparison of price developments related to different mills and trajectories underscored the validity of the broad general trends in this research.

#### **IV. The proof of the pudding: transport prices**

A first look at the graphs urges us to make some preliminary remarks and observations<sup>1</sup>.

1. Data for sixteenth century land carriage are more numerous than data for the fifteenth, due to the fact that during the fifteenth century, sometimes customary services were invoked for the transport of millstones.

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<sup>1</sup> What is not shown in these graphs, for reasons of homogeneity, is the switchover to alternative transport services during periods of war or other troubles. Indeed, in these periods of war and distress, sometimes no professional carriers were hired, but, instead, refuge was taken to less expensive alternatives. During the fifteenth century, this implied the use of customary obligations. In the second half of the sixteenth century, local inhabitants were asked to transport, hereby safeguarded by a large number of soldiers.

2. During the fifteenth century prices of land transportation heavily fluctuated. During the sixteenth century a more stable price structure seems to have emerged.
3. River navigation prices, unfortunately, are rather limited in number.
4. Yet, river navigation tariffs reveal a remarkable variation at the end of the fifteenth century, but share a convergence and upward stepwise movement during the sixteenth century.

Both, land transport and river navigation prices moved in rising line. Relative transport prices (compared to the price of oats) slightly declined.

In order to try to explain these price rises, it is important to return to the cost structure of pre-industrial transport. Calculations, based on eighteenth-century transport firms and services, have shown that in average more than 50% of the expenses of professional transport firms were absorbed by the fodder costs of the horses (BARKER & GERHOLD, 1995). Other costs, such as the depreciation of the horse as a capital investment, and the maintenance of the equipment etc. were less important. Tolls are generally considered as the second largest post of expense. But, because the transportation in service of the duke was exempt of all (ducal) tolls, the share of fodder expenses in the transportation series presented, probably was even larger. Hence, we suspect fodder costs and agricultural prices more in general, to have had a decisive impact on pre-industrial road transport prices.

Anyhow, prices of oats (as the most important horse-fodder) and transport prices show the same trend. Professional carriers were indeed capable of adapting their prices to changing costs in the long sixteenth century. There is, apart from the cost structure, another reason which should be considered to account for the price analogy between transport prices and trends of agricultural prices. The transport price, without doubt, also represented the opportunity cost of farmers possessing of sufficient means to own horses. It is not impossible that in providing transport services they were giving up profitable agricultural work ... This probably explains why transport prices did better match to the general price trends (as is shown by a comparison with eleven year moving averages) than to the day-to-day agricultural prices. Hence in the pre-industrial economy they exerted a modest counter-cyclical influence on the market prices of the products carried.

Paradoxically, river navigation prices did follow the same trends, though river navigation in principle was to a lesser extent (if at all) dependent on horse power. The stepwise trend through river navigation prices is clearly caused by the regulatory environment in which guilds negotiated new tariffs. Though river navigation was, in absolute terms, relatively cheap, it did follow the trends of sixteenth-century road transport prices!

It is not yet clear to us, what mechanisms dominated this parallelism. In contrast to what absolute tariff levels suggest, however, no such clear lines of division existed between the expensive road transport and the cheap river navigation. This can partially be ascribed to the advantages of road transport (such as the time gain) reducing the absolute cost gap between both modes of transportation. As a result road and river were not only complementary, but also partially competitive. It looks as if bargemen were able to raise tariffs only after professional land carriers had done so before. In addition, without any doubt, the sixteenth-century transport market of Brabant was in top form: several maritime, river and land transport trajectories converged on the metropolis Antwerp and, consequently, demand for transport services was high. It cannot be excluded that the permanent high demand for transport services during the sixteenth century resulted in relatively high wage levels in the

sector as well. Indeed, late sixteenth-century price rises, finally, for both land as well river transport coincide with strong wage rises and in so doing, were compensating for the general price inflation of this unfortunate era.

### **V. Does it matter? Building, fuelling and feeding the cities**

Whether directly (via the rising costs of keeping horses), or indirectly (via the general inflation of the long sixteenth century) regional transport prices charged by professional carriers were greatly influenced by the evolution of agrarian prices.

How did this affect the economy, and how does this finding affect our understanding of pre-industrial price history? For luxury items, the historiographical evidence is overwhelming: transport costs made up a low percentage of the final price of the commodities sold on markets. This research is however very suggestive for commodities with a (relatively) unfavourable ratio of weight and value.

This can amply be demonstrated by the influence exerted by price rises on the price of the millstone itself. Indeed, the prices of the millstones investigated were to an increasing degree influenced by rising prices of transportation in Brabant, though the price of the stone at, say, the Antwerp Wharf was without doubt already highly influenced by the cost of transportation from the place of origin to this wharf. Yet, the relative transport cost of millstones from Antwerp to Turnhout, for instance, grew from about 8% of the final price in 1420 to about 20% in 1570. From Liège to Jodoigne, where less costly millstones were used, the total relative increase was a little bit more modest. Here transport accounted for about 15% of the total cost of a stone in 1414-1434, while in the middle of the seventeenth century transport costs weighted for 23% on the final prices<sup>2</sup>.

The influence of rising transportation costs also applies to several items and commodities that can be considered as being vital to pre-industrial town development.

1. Fuel for instance represented an important share in the average urban family budget during the pre-industrial period. As shown in the graph, prices for charcoal as well as firewood, were growing in the same upward trend, though there is a remarkable difference. The general convergence of fuelling prices and agricultural prices was not left unnoticed (VAN DER WEE 1963). Of course a common cause (rising population and increasing demand) or strictly monetary factors could account for this convergence. Our research suggests another causal linkage, though it will be hard, if not impossible, to quantify its impact on a statistical basis. Indeed transport costs heavily weighed upon the final price of firewood, peat or charcoal on the urban markets. Fuel, not surprisingly, was often measured by its transportation unity and sixteenth-century fuel price rises were increasingly affected by the rising costs of shipping or driving these sources of energy to town!
2. Other commodities with an unfavourable value-weight proportion were frequently used in the building sector: lime, bricks, slates, beams, etc. Relative transport costs of building materials largely depended on local supply and regional variations in provisioning possibilities. Hence, it is extremely dangerous to generalise. Yet, transport costs in the ducal domain accounts scrutinised represented 15 to 25% of the final market price in Antwerp, and this holds true for goods originating from the Campine area (Kempen), only 20 to 30 km east of the metropolis. Without doubt, a large part of the building market was

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<sup>2</sup> In both examples, the quality of the millstones within the series, didn't change.

affected indirectly also by rising transportation costs (and indirectly probably by rising agricultural prices). So far, sixteenth-century rent levels in Flemish and Brabantine towns principally have been interpreted by elements related to the economic performance of the cities studied. Antwerp rent levels, for instance, were vigorously growing, while rent levels in Bruges followed far behind and at a slower pace. From the findings stemming of our research, it seems logical that rent levels were affected by the rising prices of *new building*, a price rise which was also caused by rising transportation costs.

3. Conversely, however, feeding the sixteenth-century city was, *ceteris paribus*, becoming relatively cheaper. Rising agricultural prices, and this comes as no surprise, were always narrowing the friction of distance between town and countryside. The methodology used by Masschaele, to compare early modern and medieval prices is, as the author himself noticed, not completely satisfactory. Transport prices, when expressed as an equivalent of wheat or other agricultural products, can be highly misleading. The comparison undertaken by Masschaele includes, for instance, a period (first half 14th century) with high levels of agricultural prices (and fodder costs) with a period (mid-eighteenth century) when agricultural prices were still relatively low.

Rising agricultural prices directly, but also indirectly through the rising costs of provisioning the city, affected urban purchasing power in the sixteenth century. They added up to the diseconomies of agglomeration (LIMBERGER 2001), but these diseconomies were offset by several productivity gains in the urban economy of the Southern Netherlands.

For the price history these conclusions are extremely important since, however modestly in some cases, pre-industrial transports always tend to influence final market prices, and this holds true especially for bulk trades.

## **VI. Epilogue: Brabant and beyond**

The organisers of this session challenged us to reflect upon the consequences of our research for global price history. Without any doubt, a fundamental mechanism in pre-industrial transport price formation was uncovered. But the causal connection we uncovered could, in the sixteenth-century Brabantine context, operate under favourable circumstances: a constant and huge need for transport services indeed caused a massive and relatively transparent market for transport services to emerge. In the ducal domain of Jodoigne for instance the price of transportation was determined by market forces (*par marché*). The volatile fifteenth-century prices need to warn us against a deterministic approach: even the fifteenth-century transportation market of the Burgundian Netherlands did perhaps not function under ideal market circumstances. Is it possible, then, to geographically broaden the conclusions forwarded before, and valid for the duchy of Brabant?

Further research will be needed to answer this question. Braudel for example paints a fresco of the transportation possibilities in the Mediterranean Basin during the sixteenth century, that by no means was comparable to the modern Brabantine technology and infrastructure: mules and carts were still very common in the mediterranean world (BRAUDEL 1966). Unlike the Mediterranean area, where Braudel suggested a decline in transport costs, thanks to technological progress, sixteenth-century Brabant did not gain in this field. Organisational progress may have affected the transcontinental overland trade via Brabant. But for regional transport the Brabant findings seem to correspond to a model of an *'histoire immobile'*, in which a productivity ceiling was attained. Indeed, no fundamental decrease in the correlation

between fodder costs and transportation prices could be noticed, suggesting a lack of productivity gains through technological, infrastructural or organisational progress.

A comparison with the Mediterranean Basin is quite hazardous, since it is not clear to what extent fodder prices equally heavily influenced the final transport price (though prices there need to share basic similarities, of course). In more agrarian and less urbanised societies it was common use to pasture draught animals and mules on common fields (RINGROSE 1970).

In addition, it is not yet completely clear to us how the professional transport market was related in different countries to the seasonal side-employments of farmers and peasants, absorbing hidden unemployment by providing transport services at low marginal (and opportunity) costs. Yet, as a result of the mechanisms described above, as soon as these transport services surpassed a threshold volume, farmers were, indeed, no longer inclined to act as transporters unless they were paid according to the standards employed among 'professional' carriers (RINGROSE 1970).

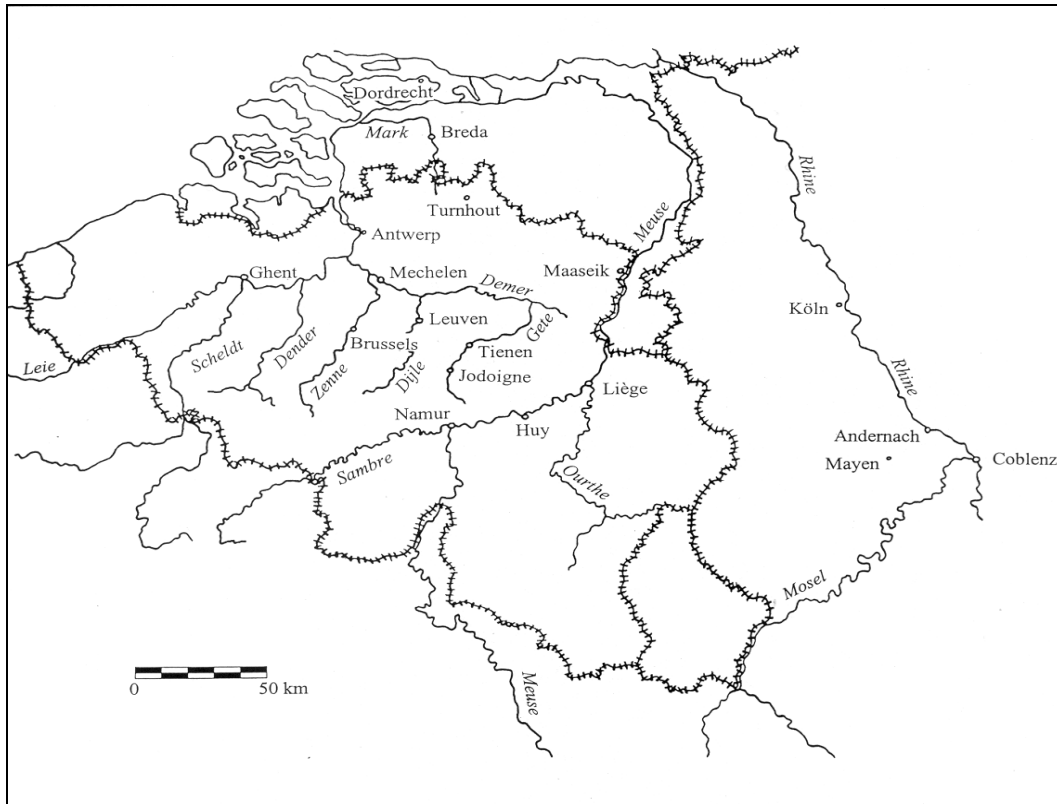
For these and other reasons it is of the utmost importance to assemble new series of transport prices for different countries and to study other segments of the transport markets.

Our contribution necessarily (?) is of a highly qualitative nature. We are (a few commodities excepted) not yet able to statistically determine the impact of rising transport prices on the general prices. One conclusion however stands out. It is impossible to discuss the price rises of the sixteenth century without taking into account rising transportation prices, both over land as well as by river. Indeed, rising transport tariffs were also affecting the prices of commodities and primary materials outside the agricultural sector, hence decisively contributing to a general price rise.

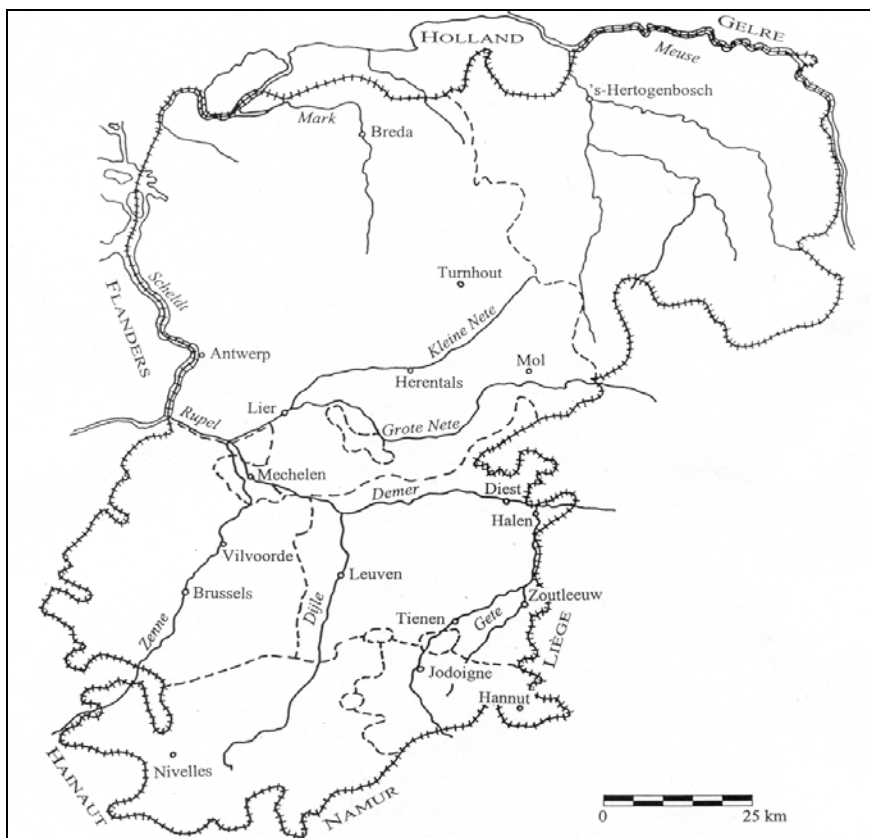
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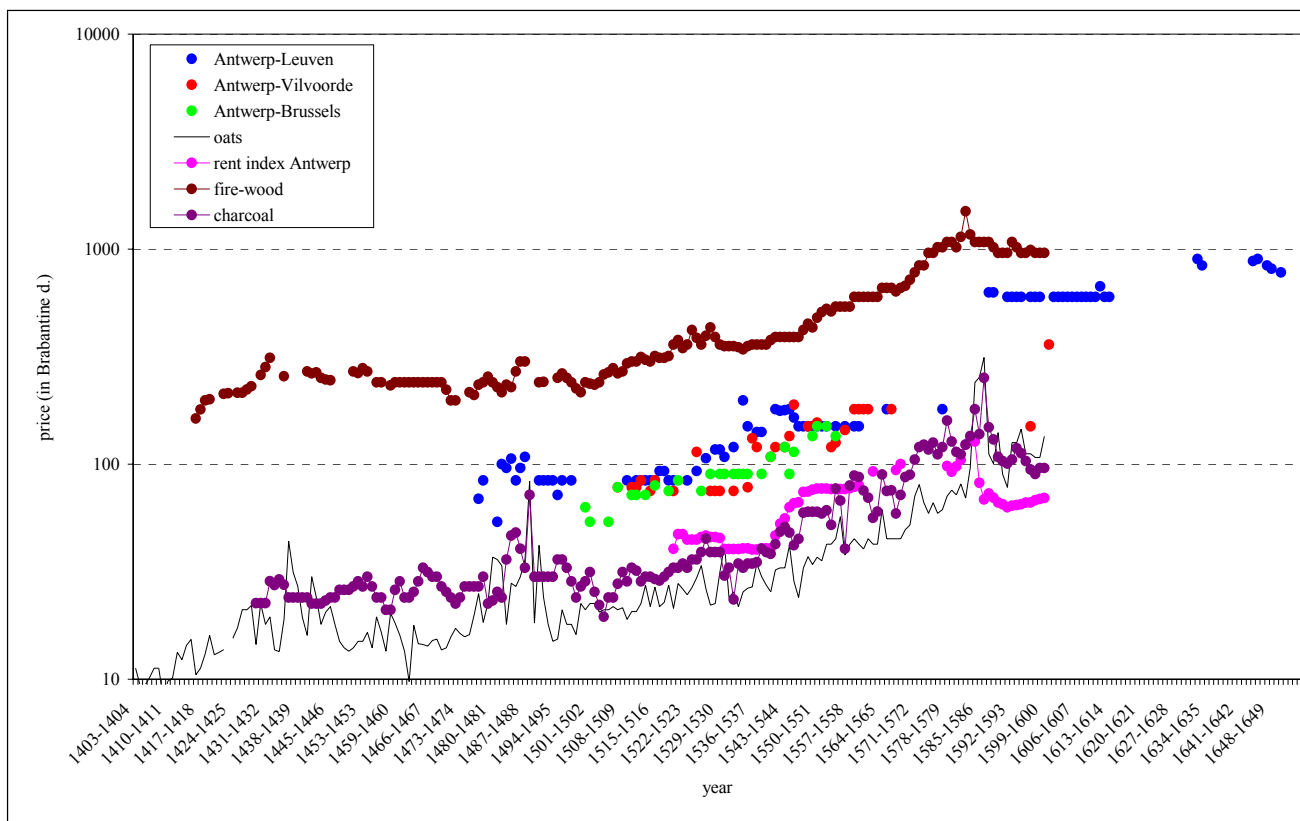
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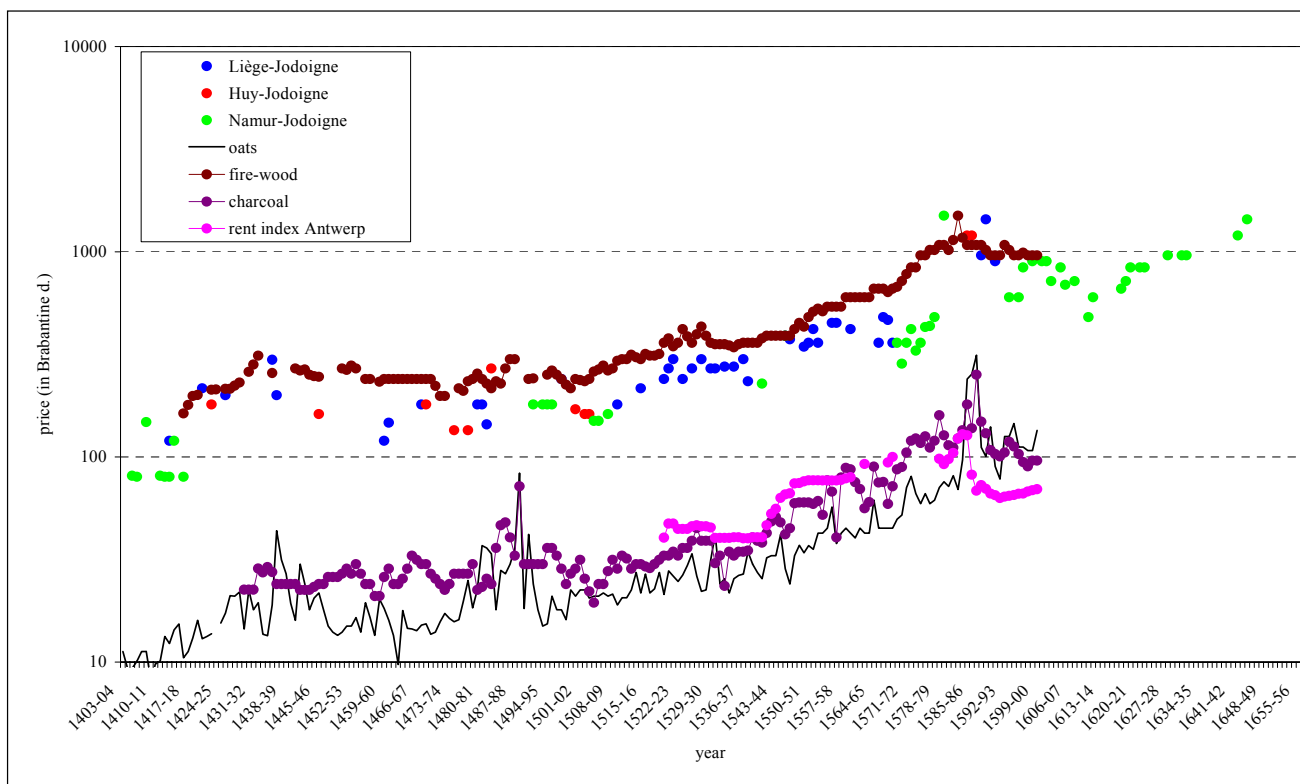
**Map 1: The Southern Netherlands and the Rhineland**



**Map 2: The Duchy of Brabant**



**Graph 1: River transport prices**



**Graph 2: Land carriage prices**