

Seasonal patterns in food markets in north-west Europe in the second quarter of the nineteenth century: the evidence of periodic markets in France, England, and Belgium, 1820 to 1850

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Abstract

This article explores seasonal patterns in grain markets in England, France and Belgium between the 1820s and 1840s. More particularly, the magnitude and regularity of seasonal cycles are investigated for the trade in wheat, rye, oats, and barley. It is found that the grain trade followed a seasonal cycle in all the areas investigated. Usually, the volume traded was largest in the months following the harvest and smaller during spring and summer. The magnitude of these cycles tended to be larger in the English and smaller in the French areas considered, while the regularity of seasonal patterns was often more pronounced in the Paris basin. We explain these patterns by evoking technical constraints (availability of labour, labour-saving technology, demand by the processing industry, demand for fodder, storage techniques, and the conditions for transport) as well as social and economic constraints (payment of rents, consumer preferences, and the degree of economic specialization).

In 1932, with the publication of his doctoral dissertation, Ernest Labrousse introduced the concept of *soudure* into French historiography. The *soudure* refers to the time of the harvest year when the supplies of the previous harvest were running low and the next was still in the fields. Especially when the previous harvest had been meagre, many consumers faced difficulties in making ends meet – literally bridging both harvests.¹ According to Labrousse, many small-scale agricultural producers sold much of their crop shortly after harvest, either because they needed the money or because they lacked the means to store the grain adequately. As a result, markets were flooded with grain and prices were depressed during these months. Conversely, towards the end of the harvest year, usually between May and July, prices soared, since many of the small-scale producers now had to buy extra supplies, to the benefit of the larger *fermiers*, speculators or others who had been able to keep stocks.²

Ever since Labrousse described this seasonal cycle, many French scholars have used the

¹ The term *soudure* is used in metallurgy, where it means ‘welding’.

² C. E. Labrousse, *Esquisse du mouvement des prix et des revenus en France au XVIII^e siècle* (1932), p. 160.

concept of the *soudure* to understand seasonal patterns in rural societies. However, few scholars have actually investigated what the *soudure* meant for trade volumes. The *soudure* argues for a rise in trade volumes during the months after the harvests, but it is unclear what its effect was later on, during the months before the new harvest. On the one hand, trade volumes could be expected to rise, since many people had to buy extra supplies during this time. On the other hand, trade volumes might also be expected to decline, since supplies were running out. Whether a cycle in trade volumes actually existed, and its shape and magnitude, remain unclear. In one of the rare studies considering trade volumes, Morineau found no notable seasonal cycles in the grain trade at the market of Charleville, a French town near the Belgian border.³ In addition, Béaur, looking at prices, recently showed that the potential gains from storing grain until the end of the harvest year were rarely rewarding, and that those who did so took a big risk.⁴

The aim of this article is to look at seasonal patterns in the grain trade in French, English and Belgian markets during the second quarter of the nineteenth century. Our first aim is to search for seasonal patterns: can such patterns be found, and if so, were trade volumes characterized by one peak (after harvest) or two peaks (the second one falling during the *soudure*)? What was their magnitude (the difference between highest and lowest seasons) and regularity (clockwork precision or not)? Our second aim is to explain these findings by looking at the broader 'social agrosystem' in which farming households operated.⁵

Therefore, this study places trade volumes registered at markets to the fore. Up to now, historians have mainly considered market prices instead of trade volumes to assess and reassess the degree of market integration and efficiency.⁶ However, we need to keep in mind that people did not eat and drink prices, but grain and potatoes, beer, wine or cider. Contemporaries were not only concerned about prices, but also about supplies, and the enormous amount of data collected by the governments in France, England and Belgium testifies to their concern. This huge collection of data has been virtually ignored by historians up to now. Exceptions are the work by Morineau mentioned before as well as that of Hubscher in France, studies by Fairlie, Adrian, and Vamplew in England, and Vandenbroeke, Vanderpijpen, and Goossens in Flanders.⁷ Yet these are rare cases. Furthermore, many of them were not primarily interested

³ Michel Morineau, 'A la halle de Charleville: fourniture et prix des grains, ou les mécanismes du marché (1647–1821)', in Michel Morineau (ed.), *Pour une histoire économique vraie* (1985), pp. 141–95.

⁴ Gérard Béaur, 'La "soudure" n'est plus ce qu'elle était. Contribution à l'étude du mouvement saisonnier du marché du blé et du marché de la terre d'après le cas de la région de Chartres au XVIII^e siècle', in Jean-François Chauvard and Isabelle Laboulais (eds), *Les fruits de la récolte* (2007), pp. 93–107.

⁵ The social agrosystem is an analytical concept developed by Erik Thoen to study regional differences between rural societies, indicating which factors determine their specific characteristics. See Erik Thoen, 'Social agro-systems as an economic concept to explain regional differences. An essay taking the former county

of Flanders as an example (middle ages–19th century)', in B. J. P. van Bavel and Peter Hoppenbrouwers (eds), *Landholding and landtransfer in the North Sea area (late middle ages – 19th century)* (CORN Series, 5, 2004), pp. 47–66.

⁶ Giovanni Federico, 'How much do we know about market integration in Europe?', *ECHR* 65 (2012), pp. 470–97; Mats Olsson and Patrick Svensson (eds), *Growth and stagnation in European historical agriculture* (Rural History in Europe, 6, 2011).

⁷ Ronald H. Hubscher, *L'Agriculture et la société rurale dans le Pas-de-Calais du milieu du XIX^e siècle à 1914* (1979–80); Susan Fairlie, 'The Corn Laws and British wheat production, 1829–76', *ECHR* 22 (1969), pp. 88–116; Lucy Adrian, 'The nineteenth-century Gazette corn returns from East Anglian markets', *J. Hist.*

in the trade volumes themselves, let alone seasonal patterns, but rather used them as proxies of output volumes or as a means to arrive at better price series.

The next section describes how we have conducted this research, by indicating the sources drawn upon, the cases analysed and the method used to identify and describe seasonal patterns. Afterwards, we present our results. The next step is to explain these results. First we consider the technical constraints imposed on agricultural producers, and second we consider the economic and social constraints they faced. Finally, we offer some concluding thoughts.

I

The sources used for this study are the official records of trade volumes at the public markets: the English Corn Returns and the French and Belgian *mercuriales*.⁸ The governments of these countries registered trade volumes so they might weigh the prices registered at the markets: the largest markets should have a greater influence on the official mean prices than the smaller markets. Still, the official mean prices were not always weighted by trade volumes. Another reason why trade volumes were recorded, at least in France and Belgium, was to monitor supplies, out of a concern for urban provisioning.

In all three countries, the market data are based on the observations from local officials, which were then collated by the central government. The English Corn Returns are based on the reports which grain factors from a large sample of periodic markets had to submit every week to the local Inspector, who forwarded the reports to the Receiver of the Corn Returns at the Treasury, after which they were published in the *London Gazette*. The grain factors' reports listed the total quantity of grain they had transacted by each price at which it was transacted. Similarly, in France and Belgium, the *mercuriales* were established in the municipalities where the main markets were held by a public official appointed by the local authorities. The data he gathered was forwarded to the departmental or provincial authorities and finally to the government in Paris or Brussels. These higher authorities often sent the *mercuriales* back for verification if they contained implausible or impossible values. It is likely that foreign cereals were not included in these data.⁹ Imported cereals were usually traded through channels other

Note 7 continued

Geography 3 (1977), pp. 217–36; Wray Vamplew, 'A grain of truth: the nineteenth-century corn averages', *AgHR* 28 (1980), pp. 1–17; Chris Vandenbroeke, 'Graanbevoorrading en graanaanvoer te Gent en Brussel tijdens de eerste helft van de 19de eeuw', *Handelingen der Maatschappij voor Geschiedenis en Oudheidkunde te Gent*, 26 (1972), pp. 93–115; id., 'Voedingstoestanden te Gent tijdens de eerste helft van de 19de eeuw', *Belgisch Tijdschrift voor Nieuwste Geschiedenis*, 4 (1973), pp. 109–69; Chris Vandenbroeke and W. Vanderpijpen, 'Landbouw en platteland in de Zuidelijke Nederlanden, 1770–1844', *Algemene geschiedenis der Nederlanden* 10 (1981), pp. 183–209; Martine Goossens, *The economic development of Belgian agriculture: a regional perspective, 1812–1846* (Studies in Social and Economic History, 24, 1993), pp. 158–9.

⁸ The sources used for this study are listed in the Appendix. About these sources: Liam Brunt and Edmund Cannon, 'The truth, the whole truth, and nothing but the truth: the English Corn Returns as a data source in economic history, 1770–1914' (Norwegian School of Economics, Department of Economics, Paper SAM 9, 2013); Wouter Ronsijn and Laurent Herment, 'The nineteenth-century mercuriiale: monitoring and managing market prices and supplies in France and Belgium, 1789–1914' (forthcoming).

⁹ This was the case with the English and (at least at the end of the nineteenth century) the Belgian data. For France, the *circulaire ministérielle* on the *mercuriales générales* of 1 Apr. 1817 did not mention imported cereals, though they were excluded for the *mercuriales spéciales* recorded for the regulation of import and export tariffs.

than the public markets, which means that the records in all three countries only include grain produced domestically.

An important drawback of these sources is that they probably did not include domestic grain sold outside the public markets or grain sold by sample. In England, the grain factors were expected to include transactions by sample in their reports, but they may have neglected to do this. The English trade volumes only add up to about 25 per cent of the gross domestic output. In France, the data did not usually include trade outside markets. Still, the *mercuriale* of Étampes, one of the main markets in the Paris basin, separately indicated sales by sample, but given the implausible nature of these data (the numbers provided sometimes remained the same for several months), these have been excluded from the analysis. Finally, in Belgium, practices differed from one market to the next, but in Flanders, the trade in grain outside the markets considered here was not very extensive. For all three countries, we can assume that seasonal patterns in the grain trade outside the public markets are similar to those in the markets.

These data were analysed for four coastal counties (Norfolk, Suffolk, Kent, and Devon) and three inland counties (Berkshire, Cambridgeshire, and Surrey) in England, three departments in the Paris basin (Oise, Seine-et-Oise, and Eure-et-Loir) and three coastal departments in France (Pas-de-Calais, Calvados, and Morbihan), and three Flemish markets (Sint-Niklaas, Oudenaarde, and Kortrijk) in Belgium. These areas both have important similarities and differences (see Table 1 for the composition of trade volumes). The French departments in the Paris basin mainly sold wheat to supply the capital, as well as large volumes of oats.¹⁰ Similarly in England, arable farming was to a large extent oriented towards the production of wheat for London, except in Norfolk and Suffolk where barley was important as well. Trade volumes tended to be more diversified in the French coastal departments as well as in Flanders, especially in the market of Sint-Niklaas. In general, the importance of wheat relative to other grains grew considerably during the period under study.

Other factors may have played a role in determining seasonal patterns. The delivery of grain by sea, water or road may have affected the seasonality of trade. The size structure of holdings also differed between these regions. At one extreme is England, where large holdings predominated: around the middle of the nineteenth century, about three quarters of the land was in holdings of over 40 hectares, and about a third was in holdings of over 120 hectares. The *grande culture* also predominated in the Paris basin, although the importance of smallholdings was increasing in this region. Holdings in the west of France were smaller. At the other extreme is inland Flanders, where almost all holdings were small by English standards: holdings of more than 20 hectares were few, and included less than a quarter of the land near Oudenaarde and less than five per cent of the land in parts of the region near Sint-Niklaas.¹¹

¹⁰ They also supplied the main towns in the Paris region, including Versailles, Pontoise, Étampes, Rambouillet and Beauvais, though most of the grain sold in the markets was destined for the capital itself.

¹¹ G. E. Mingay, 'The size of farms in the eighteenth century', *EcHR* 14 (1962), pp. 469–88; David Grigg, 'Farm size in England and Wales, from early Victorian times to the present', *AgHR* 35 (1987), pp. 179–89; Leigh Shaw-Taylor, 'The rise of agrarian capitalism

and the decline of family farming in England', *EcHR* 65 (2012), pp. 26–60; Laurent Herment, *Les fruits du partage. Petits paysans du Bassin Parisien au XIX^e siècle* (2012); Jean-Claude Farcy, 'Le monde rural face au changement technique: le cas de la Beauce au XIX^e siècle', *Histoire, économie et société (HES)* 2 (1983), pp. 161–84; Annie Antoine, 'Systèmes agraires de la France de l'Ouest : une rationalité méconnue?', *HES* 18 (1999), pp. 107–32; Erik Thoen and Eric Vanhaute,

TABLE 1. Composition of the grain trade by region, 1829, 1839, 1849

		Year	Wheat (hectolitre) ^a	Trade volume relative to wheat (in %):			
				Rye and maslin ^b	Buckwheat ^c	Barley	Oats
Flanders	East Flanders (Sint-Niklaas)	1829	27,640	105	70	56	68
		1839	36,290	78	30	38	34
		1849	35,550	76	43	35	34
	East Flanders (Oudenaarde)	1829	7,764	47	0	0	15
		1839	10,470	36	0	0	26
		1849	10,442	31	0	0	16
	West Flanders (Kortrijk)	^d 1829	3,562	46	0	0	44
		1839	8,940	39	0	0	23
		1849	8,066	36	0	0	7
England	Kent	1829	170,021	0	0	50	32
		1839	192,527	0	0	46	15
		1849	203,792	0	0	32	6
	Norfolk	1829	776,383	1	0	140	6
		1839	813,552	1	0	177	5
		1849	1,018,494	0	0	103	2
	Suffolk	1829	520,770	1	0	117	9
		1839	774,714	1	0	122	7
		1849	923,407	1	0	81	4
	Devon	1829	63,446	0	0	98	24
		1839	59,601	0	0	70	48
		1849	64,399	0	0	55	28
	Cambridgeshire	1829	246,311	1	0	19	107
		1839	462,525	0	0	30	66
		1849	720,062	0	0	20	22
	Berkshire	1829	96,422	0	0	39	20
		1839	92,412	0	0	46	17
		1849	132,824	0	0	24	3
	Surrey	1829	31,718	0	0	31	6
		1839	61,438	1	0	36	13
		1849	55,748	0	0	6	2
Paris Basin	Seine-et-Marne	1829	437,538	17	0	6	43
		1839	452,283	12	0	6	64
		1849	400,067	10	0	4	58
	Seine-et-Oise	1829	358,768	55	0	13	111
		1839	397,399	50	0	12	119
		1849	304,614	52	0	15	114

Eure-et-Loir	1829	478,646	26	0	13	48
	1839	744,635	26	0	11	32
	1849	595,291	33	0	9	38
Oise	1829	69,745	110	0	23	121
	1839	133,641	94	0	18	112
	1849	172,915	71	0	13	61
Northern France Pas-de-Calais	1829	200,467	66	0	68	90
	1839	224,358	73	0	77	97
	1849	294,401	63	0	72	88

Notes:

^a English data converted from imperial bushel at 36.35 litres per imperial bushel.

^b Rye and maslin for the French *départements* and Oudenaarde; only rye elsewhere.

^c For England, there are no data on the sale of buckwheat. We assume it was not sold at the markets.

^d Missing data for January extrapolated by multiplying trade volumes by 12/11.

Source: the English Corn Returns and French and Belgian *mercures* as described in the Appendix.

Seasonal patterns in trade volumes will be examined for the second quarter of the nineteenth century. During this period, agriculture made progress in the three areas and the size of urban populations grew, especially in Belgium and England but also in the Paris Basin and the extreme north of France. Accordingly, more grain needed to be sold, and the rhythms of transactions and the methods of storage could have been affected.¹² In these years, agricultural price levels differed between the three countries. Everywhere, the 1820s were characterized by depressed prices after the high levels of the Napoleonic period. However, English prices stayed fairly high compared to those in France and especially Belgium, where they sank to very low levels. Subsequently, prices remained stable at a comparatively high level in England (whether or not the effect of the Corn Laws, abolished in 1846) and at a lower level in France, whereas they gradually rose in Belgium. By the late 1840s, prices in all three countries had converged and reached peak levels during the dearth crisis of 1847.¹³ Changes in price levels could also

Note 11 continued

‘The “Flemish Husbandry” at the edge: the farming system on small holdings in the middle of the 19th century’, in Erik Thoen and B. J. P. van Bavel (eds), *Land productivity and agro-systems in the North Sea Area. Middle Ages–20th century. Elements for comparison* (CORN series, 2, 1999), pp. 271–96; Erik Thoen, ‘A “commercial survival economy” in evolution. The Flemish countryside and the transition to capitalism (Middle Ages–19th century)’, in Peter Hoppenbrouwers and Jan Luiten van Zanden (eds), *Peasants into farmers? The transformation of rural economy and society in the Low Countries (middle ages–19th century) in light of the Brenner debate* (CORN series, 4, 2001), pp. 102–57; Wouter Ronsijn, ‘Mediated and unmediated market dependence in the Flemish countryside in the

nineteenth century: two paths of rural development’, *Continuity and Change* 28 (2013), pp. 89–120.

¹² J. V. Beckett and Michael Turner, ‘Agricultural productivity in England, 1700–1914’, in Mats Olsson and Patrick Svensson (eds), *Growth and stagnation in European historical agriculture* (Rural History in Europe, 6, 2011), pp. 57–81; Herment, *Les fruits du partage*; Goossens, *Economic development of Belgian agriculture*.

¹³ Peter M. Solar, ‘The crisis of the late 1840s. What can be learned from prices?’, in Cormac Ó Gráda et al. (eds), *When the potato failed. Causes and effects of the ‘last’ European subsistence crisis, 1845–1850* (CORN series, 9, 2007), pp. 79–94.

have affected the volume of transactions or the propensity to engage in speculation. During the whole period, local agricultural producers faced little competition from abroad. It was not until the second half of the century that western Europe was flooded with eastern European and American grain.¹⁴

Two approaches are followed to identify seasonal patterns: firstly we look at the patterns during the calendar years 1829, 1839, and 1849, and secondly we test for autocorrelation during three subperiods, the 1820s, 1830s, and 1840s. Time series, such as monthly data on trade volumes, are tested for autocorrelation by establishing the successive coefficients of correlation (R) between a series, and that same series with a time lag. For example, without a time lag ($i + 0$), the coefficient of correlation will be 1, since a series is obviously perfectly correlated with itself. With a time lag of one step ($i + 1$), the coefficient of correlation is usually considerably lower, whereas it might become high again after a longer time lag ($i + n$). If we are working with monthly data, and we obtain a high R -value with a time lag of 12 steps (i.e. 12 months), we have identified an annual cycle in the data. However, these R -values only indicate the presence of a cycle, but do not indicate the magnitude of that cycle, nor the time of the year when trade volumes were low or high. To that end, the test for autocorrelation has little meaning if it is not considered together with the first approach, the actual patterns observed during the year.

A few more comments are necessary on the method for detecting seasonal patterns. The data used for both approaches are monthly aggregates of weekly observations. They were de-trended using a simple method: rather than the raw data, we expressed the amount of grain sold each month as a percentage of the total amount traded during the calendar year. This was necessary since the method of autocorrelation may fail to reveal a cycle if there is a trend in the data, i.e. if there is a rise or decline in the trade volumes in the long run. For certain markets during certain years the data are absent, which imposes some inconsistency upon the analysis. We have no data for most of the inland English counties or for France before 1828, while the other English data contain a long gap in the course of 1826, so this year was excluded from the analysis. The sample of markets included in the Corn Returns was expanded in 1828 and 1842, but only those markets for which data are available throughout the period were included in our analysis. Similarly, after 1838, the data of the Oise department apply to a larger number of markets than before that year, but for France we could not exclude these other markets from the analysis. These gaps and inconsistencies were circumvented by adjusting the period considered for the areas concerned. The analyses could not be made for all kinds of cereals, since these were not sold at all markets. Finally, in the course of 1827, the unit in which the English data were expressed changed from the Winchester (35.24 litres) to the Imperial bushel (36.35 litres). We ignored any effect this small difference of 3 per cent might have had.

¹⁴ Paul Sharp and Jacob Weisdorf, 'Globalization revisited: Market integration and the wheat trade between North America and Britain from the eighteenth century', *Explorations in Economic Hist.*, 50 (2013), pp. 88–98; Richard Perren, 'Structural change and market growth in the food industry: Flour milling in Britain, Europe, and America, 1850–1914', *EcHR* 43 (1990), pp. 420–37; Roger Price, *The modernization of rural France: Communications networks and agricultural market structures in nineteenth-century France* (1983), pp. 63–70; K. Verachttert, 'De Antwerpse graanhandel 1850–1914', in G. Blauwens *et al.* (eds), *De dynamiek van een haven: Liber amicorum aangeboden bij het emeritaat van Prof. Fernand Ridder Suykens* (1993).

TABLE 2. Average trade volumes by season, 1820s–1840s: ratio between peak and bottom periods

	Monthly data				Seasonal data			
	Wheat	Rye	Oats	Barley	Wheat	Rye	Oats	Barley
England coastal	2.1	14.8	3.0	24.5	1.5	4.0	2.6	16.1
England inland	2.7	124.2	3.9	121.5	2.1	6.6	3.6	61.6
France coastal	1.3	–	–	–	1.2	–	–	–
France Paris basin	1.7	1.6	1.3	1.7	1.4	1.3	1.2	1.3
Flanders	2.1	1.5	2.1	4.4	1.7	1.3	1.5	2.2

Note: Displays the ratio between the months and seasons with the lowest and highest average trade volumes for 1829, 1839 and 1849. The respective months and seasons may differ by region.

Source: the English Corn Returns and French and Belgian mercuriales as described in the Appendix.

II

A selection from our results is shown in Table 2 and in Figures 1 to 3. Figure 1 displays the monthly trade volumes of wheat, rye, oats and barley during the calendar year 1839 for four selected regions as a percentage of the total annual trade volume. Likewise, Figure 2 displays seasonal trade volumes as a percentage of the annual trade volume, here as the average for the different regions considered based on observations for the calendar years 1829, 1839 and 1849. Figures 1 and 2 allow us to assess the magnitude of seasonal cycles: they reveal the difference between months and seasons with the highest and lowest trade volumes. The ratio between peak and bottom periods is indicated in Table 2. In contrast, Figure 3, showing the successive R-values of the test for autocorrelation in our monthly data, reveals the regularity of seasonal cycles for four selected regions in the 1830s. If the coefficient of correlation after a time lag of 12, and again after a time lag of 24 steps, is high ($R \geq 0.5$), then the monthly data contain a regular, annual cycle. For all four cereals investigated – wheat, rye, oats, barley – a recurring cycle could be found. However, there were important differences in the magnitude, regularity, and timing of the cycle, depending on the type of cereals, the region and the period considered.

Most wheat was sold after the harvest in autumn, particularly during October. In Flanders, the wheat cycle started somewhat earlier, whereas in the Paris basin it extended into winter. The magnitude of the cycle, i.e. the proportion between the busiest and quietest season, was largest in the English inland counties. There, twice as much wheat (more than a third of the annual trade volume) was sold in autumn as in winter. The magnitude of the cycle was lowest in the French coastal areas and in the Paris basin. The regularity of the cycle at the monthly level was lowest in the English coastal areas, even though a clear seasonal cycle existed there. In the English coastal counties, autocorrelation does not reveal a cycle using monthly data, though it does using quarterly data.¹⁵ In the other regions considered, in contrast, there was a regular cycle. Especially in the Seine-et-Oise department in the Paris

¹⁵ Autocorrelation using quarterly data is not presented here.

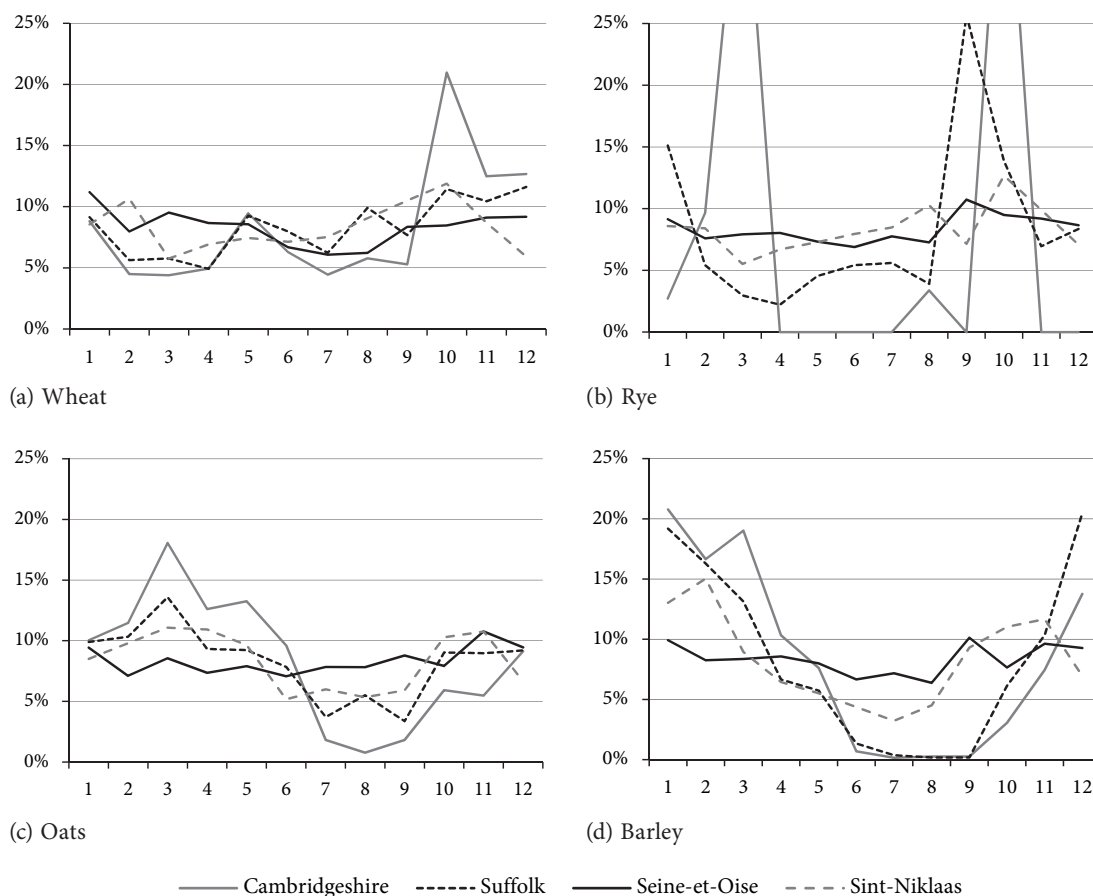


FIGURE 1. Trade volumes by month, selected regions, 1839 (calendar years beginning January).

Note: Rye data for Cambridgeshire exceed 25 per cent during certain months. For consistency, the Y-axis was not adjusted. Only insignificant amounts of rye were sold at the English markets considered here.

Source: the English Corn Returns and French and Belgian mercuriales as described in the Appendix.

basin, the wheat trade conformed to a seasonal pattern with almost clockwork precision, as revealed by autocorrelation.

The rye trade followed a seasonal pattern in Flanders, where like wheat most of it was sold in autumn. Still, the differences in trade volumes between the seasons were rather small, while the regularity of the cycle is not always clearly detected by autocorrelation using monthly data. Elsewhere, seasonal patterns were more pronounced, especially in England, but given the very small volumes of rye traded, compared to wheat, this is hardly significant.

Most oats and barley, in contrast to wheat and rye, were usually sold somewhat later, during winter and spring. Trade volumes of barley went up during the last months of the year and reached peak levels during January or February, whereas most oats were sold during March and April. However, in the Paris basin most oats were sold, like wheat, in autumn, whereas in

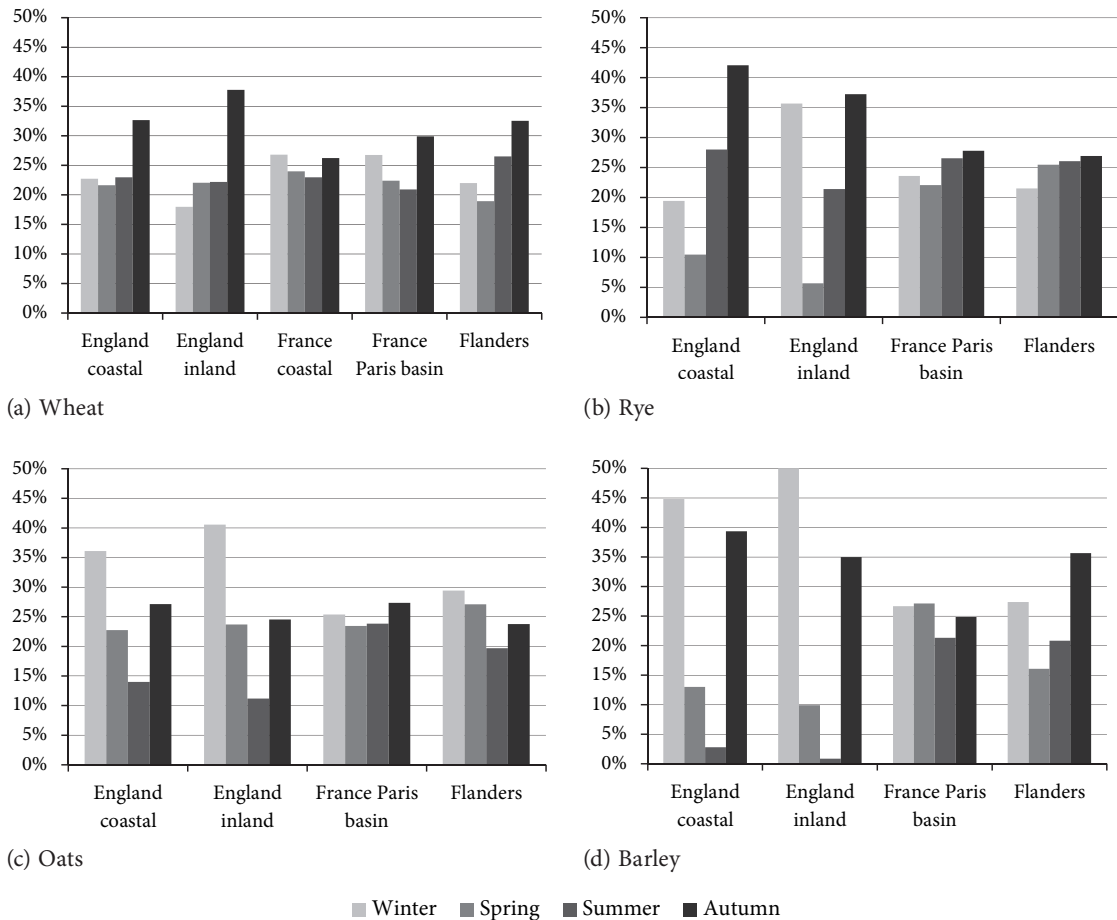


FIGURE 2. Average trade volumes by season, 1820s–1840s

Note: Unweighted average of data per region/market of 1829, 1839, 1849. Winter: January–March; Spring: April–June; Summer: July–September; Autumn: October–December.

Source: the English Corn Returns and French and Belgian *mercures* as described in the Appendix.

Flanders the barley trade was usually also largest in autumn (most barley sold in the market of Sint-Niklaas was winter barley).¹⁶ For both oats and barley, the magnitude of the cycle was largest in England and smallest in the Paris basin, especially for barley. In England, about two thirds of all barley was sold in the four months from December to March, whereas almost none was sold during the summer months. The regularity of the cycles for oats and barley was very high, except for oats during the earliest period considered.

Exceptional circumstances could interfere with the usual seasonal patterns. The incidents and political disturbances of 1830 in France may explain why autocorrelation is less convincing in

¹⁶ The year 1839 was an unusual year for the barley trade in the market of Sint-Niklaas, in that an almost equal proportion of winter and summer barley were sold that year. Otherwise, the amount of winter barley sold in Sint-Niklaas was usually between two to six times the volume of summer barley.

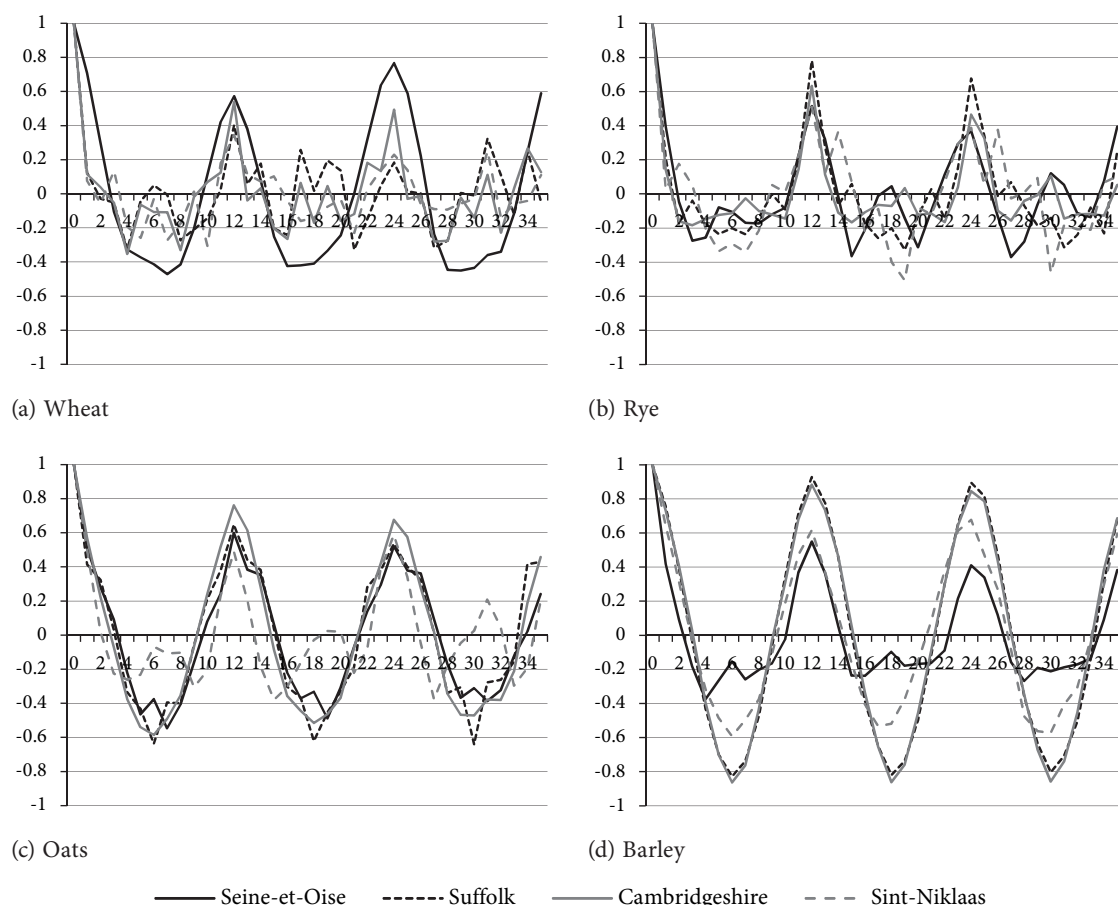


FIGURE 3. Autocorrelation, selected regions, 1830s

Note: X-axis shows the time-lag introduced in the series to calculate the corresponding coefficient of correlation; Y-axis shows the coefficient of correlation (R-values). R-values approximating to +1 and -1 indicate high correlations.

Source: based on the English Corn Returns and French and Belgian mercuriales as described in the Appendix.

revealing a cycle in Oise for the earliest period considered (based on the period 1828–32) than for the other periods.¹⁷ Also, the dearth of 1846–7 seems to have affected the regularity of the wheat trade in the English inland counties.

To summarize, wheat and rye were mostly sold after the harvest, especially in October, while barley followed from December to March, and oats from March to May. Trade was generally quietest during the spring and especially the summer months. In England, the magnitude of these cycles was larger, especially for barley and oats. In contrast, it was smaller in France, while Flanders occupied an intermediate position. The regularity of these cycles was highest

¹⁷ Nicolas Bourguinat, *Les grains du désordre. L'État face aux violences frumentaires dans la première moitié du 19e siècle* (Civilisations et Sociétés, 107, 2002), pp. 161–5.

for barley and oats, but more irregular for wheat and rye. Regularity was most clearly observed in the Paris basin, in the Seine-et-Oise department. If there was a *soudure*-effect, then it took the form of a decline in trade volumes at the end of the harvest year, and not a second peak in trade. Still, these monthly fluctuations were fairly modest, certainly for bread grains in France. Farmers therefore did not sell their entire crop of cereals immediately after they had harvested it, even though much of the trade was still concentrated in the autumn and winter months.

III

To explain the seasonal patterns in the grain trade, we must place grain production within the broader social agrosystem of the regions considered. There is no room here to consider all the key elements of social agrosystems, but we will focus on the technical aspects related to harvesting, preparing and selling grain. This includes agricultural technology, but also the physical environment, in particular the conditions for transport.

Agronomic publications of the nineteenth century reveal a multitude of reasons why producers did not dispose of their grain immediately after the harvest, and hence why they did not sell everything at once.¹⁸ During the harvest months, countrymen and women devoted virtually all of their energy to collecting the harvest. All this work left them with little time to prepare the grain from the previous year for sale and to take it to the market. This is part of the reason why supplies at that time of the year tended to be lower. In fact, during August, the grain markets in Oudenaarde started one hour earlier than usual, to allow the farming population to supply it and then return home for a full day on the harvest.¹⁹

In the North Sea area around the middle of the nineteenth century, grain was usually harvested shortly before it reached complete maturity, somewhere from July to September, depending on the weather, region, and crop. When the farmer believed the time for the harvest had come, the grain was cut, and the culms with the ears hanging from them were left to dry and ripen in the field. Drying took more time for summer grains, due to the weeds which often

¹⁸ Arthur Young, *The Farmer's calendar containing the business necessary to be performed on various kinds of farms during every month of the year* (1804); John Chalmers Morton, *Arthur Young's Farmer's Calendar describing the business necessary to be performed on various kinds of farms during every month in the year* (1862); Martin Doyle, *A cyclopaedia of practical husbandry and rural affairs in general* (1839); Alexandre Bixio (ed.), *Maison rustique du XIXe siècle* (1844), pp. 285–344; P. J. Sencie, *Den pagters, landsmans en boeren handboek en almanach, of noodzaakelyk onderwys voor den landbouw, verdeelt in XII hoofdstukken, volgens de XII maanden des jaers* (2 vols, 1785); *Landbouwers almanak voor België: 1850* (1849); Th. F. Uilken, *De landbouw in zijne graangewassen beschouwd* (1864), pp. 161–235; J. W. H. Cordes, 'De inoogsting en zuivering der voornaamste granen, met betrekking tot den Nederlandschen landbouw', *Vriend van den landman*.

Tijdschrift ter bevordering van landhuishoudelijke kennis in Nederland, 19 (1855), pp. 321–46, 385–413. On grain harvesting and storage, see also François Sigaut, 'A method for identifying grain storage techniques and its application for European agricultural history', *Tools & Tillage* 6 (1988), pp. 3–32; id., 'Storage and threshing in preindustrial Europe: additional notes', *Tools & Tillage* 6 (1989), pp. 119–24; Pierre Brunet, 'Les granges de Normandie. Essai d'architecture et d'économie rurale', *Hors-série des Annales de Normandie. Recueil d'études offert en hommage au doyen Michel de Boüard*, 1 (1982), pp. 115–28; Annelien Verhelst, 'Vlaamse dialectbenamingen voor graan- en hooistapels: een dialectgeografische studie' (unpublished master's thesis, Ghent University, 2011).

¹⁹ City archives Oudenaarde, Ancient archive, 463/1521: Decision 23 Floréal XI (Art. 15); *Gazette van Audenaerde*, 13 Aug. 1854, p. 2, cols. 1–2.

grew in between them more abundantly than between the winter grains, and which risked to make it mouldy if not perfectly dry. Often the grain was bound into sheaves, which could be piled together in stooks. Shortly afterwards, when the grain was completely dry, it was ready to be stored for a longer period of time, in barns or in stacks. Which of the latter two methods predominated is difficult to make out; both seem to have been common.

Most contemporaries at the time agreed that grain was better preserved when left in the open air in stacks than when it was stored in barns. In barns, particularly those that were poorly ventilated, the grain ran the risk of getting damp and musky, or of suffering damage from rodents. Still, Sencie, the author of an agricultural calendar for Flanders in the 1780s, believed barns were the best way to store grain, but still reckoned that barns could not do without cats, whose job it was to catch rats and mice.²⁰ Yet those cats might also give the grain a bad smell. That was not the case when the grain was stored in stacks in the open air. These stacks were composed of piled up sheaves, usually 4 or 5 metres in diameter and 5 or 6 metres high. Yet such stacks were no mere heaps of sheaves, but involved a complicated design, in which the grain could even be preserved for several years. If stacks were well-built, they offered a fairly good protection against rain and permitted the grain to continue drying. According to the *Maison rustique*, grain merchants could recognize grain that had been stored in stacks, and sometimes paid higher prices for it.²¹ However, stacks had the disadvantage that once one had been opened, the entire stack had to be disassembled. In addition, they were also liable to damage from strong winds.

With the sheaves of grain stored in barns or in stacks, which was customarily accomplished by the end of September, there was no urgency in getting it threshed.²² Other tasks, such as preparing the land where the winter crops were to be sown, were more pressing. In contrast, threshing, especially when it was done by hand using the flail, was postponed until the end of autumn, taking place mainly from November to March.²³ By the middle of the nineteenth century, much of the threshing was already done by machines in England, whereas in France and Belgium, manual threshing was still the rule. There, perhaps only the very largest of holdings had threshing machines, powered either by steam or by animals.²⁴ Threshing grain by hand was one of the most labour-consuming operations in arable farming. In Flanders for example, threshing took up more than half of all the labour required to harvest grain.²⁵

²⁰ Sencie, *Den pagters, landsmans en boeren handboek*, II, p. 8.

²¹ Bixio (ed.), *Maison rustique du XIXe siècle*, p. 314.

²² Sigaut, 'Storage and threshing', p. 120.

²³ E. J. T. Collins, 'The rationality of "surplus" agricultural labour: mechanization in English agriculture in the nineteenth century', *AgHR* 35 (1987), pp. 36–46; Sigaut, 'Method for identifying grain storage techniques', p. 22.

²⁴ E. J. T. Collins, 'Harvest technology and labour supply in Britain, 1790–1870', *EcHR*, 22 (1969), pp. 453–73; id., 'Rationality of "surplus" agricultural labour', p. 40; Morton, *Arthur Young's Farmer's Calendar*, p. 42; *Landbouwers almanak voor België: 1850*, pp. 12, 51–2;

Emile de Laveleye, *Essai sur l'économie rurale de la Belgique* (1862), pp. 83, 218, 54, 73; Farcy, 'Le monde rural face au changement technique', p. 167; Michel Demonet, *Tableau de l'agriculture française au milieu du XIXe siècle: l'enquête de 1852* (1990), pp. 79–80; Bixio (ed.) *Maison rustique du XIXe siècle*, p. 319.

²⁵ Eric Vanhaute, 'Agrarian labour and food production in a peripheral region. Agricultural dynamics in the Antwerp Campine in the "long nineteenth century"', *Histoire et Mesure*, 12 (1997), pp. 143–64; Martine Goossens and Guy Dejongh, *Agriculture in Figures. Belgian Agricultural and Cadastral Statistics of the period 1801–1825. Publication of Source Material* (Belgisch Centrum voor Landelijke Geschiedenis,

During this winter slack season when there was little other farm work and wages were therefore lower, threshing was carried out in the barns on days when there was no other work with which to occupy the labourers, or when rain prevented them from working outside. Moreover, threshing, especially of wheat, benefitted from the winter cold, since the grains came away from the ears more easily. Besides, the author of a Flemish farmers' calendar for 1850 added that 'there is nothing better to keep yourself warm than the flail'.²⁶ Also, by this time of year, the grain had already 'sweated', which helped to store it as threshed grain. Storing threshed grain required it to be dryer than when storing it in the ear.²⁷ In conditions of humid weather, threshed grain could spoil easily, and it had to be kept in granaries where it could dry quickly. For that reason, most cereals were probably only threshed shortly before they were consumed or sold.

Apart from the availability of labour, the timing of threshing was also guided by the demand for its output, which consisted not only of cereals, but also of straw. Consumption of bread grains was probably fairly constant over the year, yet there were still (modest) price fluctuations from week to week. Farmers were recommended to schedule their threshing 'according to the market', i.e. the prevailing price, next to household needs and the availability of labour.²⁸ Uilkens, a Dutch agronomist, advised against storing grain for longer than one harvest, but did recommend waiting for the best moment within the harvest year. Yet when exactly that moment came, he was unable to tell: it could come immediately after the harvest, or it could be two, four or eight months afterwards.²⁹

However, without threshing machines it was difficult to respond quickly to short-term market fluctuations. Agronomists in continental Europe lamented the absence of threshing machines, without which it was often impossible to benefit in time from high prices.³⁰ In the updated version of 1862 of Arthur Young's calendar, 'the greater quickness of the [threshing] process; and the ability thus at once to supply the market without materially interfering with the ordinary labour of the farm' were mentioned among the main benefits of the threshing machine, by which, according to the same publication, 'the great bulk of corn in this country [was] now threshed'.³¹

In contrast to bread grains, demand for barley fluctuated sharply in the course of the year, because the processes of malting, brewing, and distilling mainly took place between October and May. After the harvest, barley first needed to 'rest' for a while before it germinated.³² The cooler months were most suitable for the germination process, and malting rarely continued into the warmer summer months. For the production of beer as well, warmth might interfere

Note 25 continued

116, 1997), pp. 135–43. For England, see Gregory Clark, 'Yields per acre in English agriculture, 1250–1860: Evidence from labour inputs', *ECHR* 44 (1991), pp. 445–60.

²⁶ *Landbouwers almanak voor België: 1850*, p. 12.

²⁷ Sigaut, 'Method for identifying grain storage techniques', p. 7.

²⁸ Sencie, *Den pagters, landsmans en boeren handboek*, II, pp. 45–6; Cordes, *De inoogsting en zuivering der voornaamste granen*, p. 385.

²⁹ Uilkens, *De landbouw in zijne graangewassen beschouwd*, pp. 230–5.

³⁰ Cordes, 'De inoogsting en zuivering der voornaamste granen', p. 402; Bixio (ed.) *Maison rustique du XIXe siècle*, p. 331; *Landbouwers almanak voor België: 1850*, pp. 51–2.

³¹ Morton, *Arthur Young's Farmer's Calendar*, pp. 32, 44.

³² Cordes, 'De inoogsting en zuivering der voornaamste granen', p. 336.

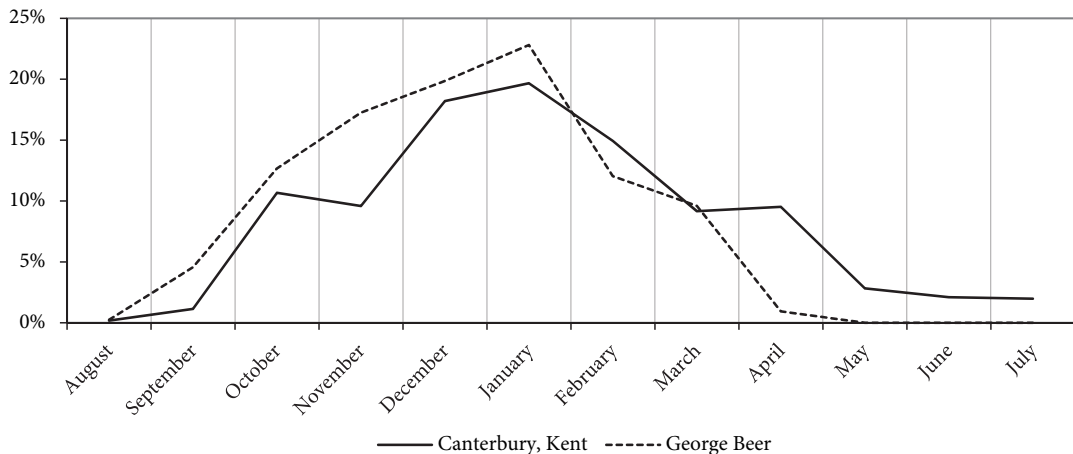


FIGURE 4. Volume of Barley sold in the market of Canterbury and the quantity of barley bought by the George Beer brewery, 1840–41

Note: the percentage is the monthly percentage of the total of the crop passing through the market/bought by Beer. *Source:* based on: the English Corn Returns (see Appendix) and George Beer account book, Kent Archives, U3555/2/GBR/Bf/24.

with fermentation. The malting, brewing, and distilling seasons, like the months for threshing, were a source of employment when there was little other farm work.³³ This also fits with the pronounced seasonal pattern in the sale of barley: this pattern was dominated by the purchases of the processing industry. If we compare the sale of barley at the market of Canterbury in Kent between August 1840 and July 1841 with the purchases of the George Beer brewery, located in Canterbury, during the same period, we find a high degree of overlap between the two (see Figure 4).

Threshing not only produced the grain, but also straw, used as fodder or litter for the animals. Besides, the brewing and distilling industries also produced animal fodder as a by-product. The need for fodder was greatest precisely during those months when threshing, brewing and distilling took place, which were the months when the animals were taken from their pasture to be housed indoors.³⁴ To feed cattle, straw from freshly threshed grain was preferable; older straw might become stale and disliked by the animals. For that reason, Arthur Young recommended farmers to proportion their number of threshers to the number of lean cattle they held: ideally, the threshing should produce exactly the amount of straw needed for the animals. Threshing should start from the moment the cattle were brought in for the winter, and continue regularly, to produce a regular supply of straw. In addition, Young recommended threshing grain with the worst straw first, and to gradually turn to the better kinds later, to prevent the animals from losing their appetite for it. This meant that wheat had to be threshed

³³ Christine Clark, *The British Malting Industry Since 1830* (1998), p. 4; Peter Mathias, 'Agriculture and the brewing and distilling industries in the eighteenth

century', *EcHR* 5 (1952), pp. 249–57.

³⁴ *Ibid.*

first, as this cereal had the worst straw, followed by oats, then by barley, to finish with barley and oats which had a lot of clover mown with them.³⁵ While this schedule partly follows that of the grain markets, there were also alternatives, such as mixing older chaff with pulped root, or giving the cattle both poor and good quality straw, chopped and mixed together so that the animals could not distinguish between the two kinds.³⁶

While most of the grain was consumed in one way or another, either by humans or animals, part of it was also required to be sown, for the next year's crop. Not all grain was suitable for sowing: grain for sowing needed to be harvested at full maturity, and farmers were recommended to select the best ears from which to take seeds.³⁷ According to one French author, farmers' only concern during September and October was sowing for the next harvest. He claimed that during those months, the only threshing that took place was to obtain seed corn. Moreover, farmers customarily did not use their own grain for sowing, but that of other areas, and as a result, he claimed the grain traffic was most extensive in those months.³⁸ If grain for sowing is included in our market data, the trade in seeds could also account for the seasonal patterns visible in grain markets. By far most grain sold in the markets was probably meant for consumption, though eighteenth-century records for Sint-Niklaas occasionally mention seed grain as well. The sale of minor amounts of seed grain might be part of the explanation why more wheat, rye and, in Flanders, winter barley were sold during autumn, whereas more oats and summer barley were sold during winter and spring.

Once the grain was threshed, winnowed and bagged, ready for the market, it depended on the availability of the means of transport whether it would actually be brought to its destination. According to Young's updated *Calendar*, the main task for the horses during winter was carrying grain to the market.³⁹ However, the poor state of roads might render market access more difficult, especially in times of thaw or heavy rain. Sencie, in his Flemish calendar of 1785, claimed that the roads were so good in August, so that a transport that otherwise required three carts, could now be achieved with only two. Still, further in his calendar he wrote that October was the best month for transportation, since the state of the roads were still fairly good, and not yet spoiled by heavy rains.⁴⁰ The possibility of transporting grain both by water and by road may explain why seasonal patterns were more irregular in the English coastal counties than in the inland counties.

IV

Apart from mere technical constraints, agricultural producers also faced economic and social constraints. These include social property relations, the size of holdings and labour relations, but also the 'cultural' environment such as consumer preferences.

³⁵ Young, *Farmer's Calendar*, pp. 24–25, 512, 24.

³⁶ Morton, *Arthur Young's Farmer's Calendar*, pp. 42, 44, 615; *Landbouwers almanak voor België: 1850*, p. 14.

³⁷ Cordes, 'De inoogsting en zuivering der voor-naamste granen', p. 323; *Landbouwers almanak voor België: 1850*, pp. 60–1.

³⁸ *Feuille d'Annonces [Oudenaarde]*, 23 Nov. 1817, p. 3, cols 1–2, p. 4, cols. 1–2; see also *L'utilité commerciale, industrielle, agricole*, Sept. 1864, pp. 7–8.

³⁹ Morton, *Arthur Young's Farmer's Calendar*, p. 615.

⁴⁰ Sencie, *Den pagters, landsmans en boeren hand-boek*, II, pp. 19–20, 38.

Often, agricultural producers relied on the revenues from selling their crops to pay for leases, taxes and wages. In the 1862 revision of Arthur Young's *Calendar*, it is mentioned that part of these expenses 'will not need to be paid until after harvest time, when means may be provided for the purchase of livestock, and for the payment of rent, by the sale of grain'.⁴¹ Likewise, the Flemish farmers' calendar of 1850 advised people to verify their financial situation in November, since leases in Flanders often started on Christmas day.⁴² Indeed, Flemish lease contracts might expire between Saint-Bavo (1 October) and Candlemas (2 February) or even mid-March, but most of them expired between Saint Andrew's day (30 November) and Christmas day (25 December).⁴³ In France, leases were due on Martinmas (11 November) and wages on St John's day (24 June). Therefore, a considerable part of a farmer's outgoings were due in the months following the harvest, and this is another explanation for the rise in trade volumes in autumn.

Agricultural producers therefore needed to sell part of their output after harvest in order to satisfy immediate expenses, but may still have been able to choose which of their crops to sell, depending on the variety of their production and regional demand patterns. If the composition of their output as well as demand for farm products was diversified, producers could have been able to give priority to a certain crop in one year, and to another crop the next year, depending on market conditions during the months after the harvest. In other words, in a diversified agricultural economy, varying market conditions from year to year will lead to irregularity in seasonal patterns for specific crops. In contrast, in a highly specialized agricultural economy, producers will have no option but to sell the same crop or set of crops, irrespective of the market conditions during the months after the harvest, creating a highly regular seasonal pattern for that crop.

The Paris basin had such a highly specialized agricultural economy. The large farmers in the Paris basin drew by far most of their incomes from the sale of wheat and oats, and from their sheep. They produced other goods as well, including hemp. They had gardens and supplied towns with poultry and eggs, but these were only of minor importance. They had cattle too, but more for manure than for sale. In general, the diversity of their production was very limited. Rye, barley or buckwheat, cereals which were important in other regions, were almost totally absent on the large farms in the Paris basin. Maslin, a mixture usually consisting for two-thirds of wheat and one-third of rye, was the only major cereal next to wheat and oats. The smaller farmers in this region grew certain other crops, such as onions, beans, peas as well as vines, but the larger farmers were highly specialized in the production of wheat and oats.

In the Paris Basin the highly regular seasonal pattern for wheat can be explained by the fact that farmers had no choice about what to sell because of their very high degree of specialization. In turn, this was the result of the fact that urban consumers in this region refused to eat any bread other than wheat bread. Farming households in England and Flanders were more diversified and could, if they found it to be more profitable, realise their barley, buckwheat, flax, or coleseed first, postponing the sale of their wheat. Likewise, the production of barley,

⁴¹ Morton, *Arthur Young's Farmer's Calendar*, p. 620.

⁴² *Landbouwers almanak voor België*: 1850, p. 71.

⁴³ L. Delaruye and C.-H. Van Boekel, *Het pachtersregt en de land- en hofbouwpryzer: handboek*

voor het kennen en bewerken van alle landbouw- en hoveniers-schattingen, met toegepaste voorbeelden en uitgebreide berekende pryzen voor alle getyden des jaers (1855), pp. 55, 79.

oats, buckwheat, potatoes but also other items such as colza in the Calvados, as well as poppy seed (*oeillette*) in the Pas-de-Calais, permitted farmers to choose which crops to sell first.⁴⁴ In the Paris basin, in contrast, the producers were, in a sense, ‘imprisoned’ by the dominance of wheat production (*l’impératif frumentaire*). For them, oats were the only alternative product, but its value was low and the quantities of oats available for sale were rather limited, since they were also required to feed the horses used on-farm, as in England and Flanders.

This brings us to the question of consumer preferences and the marketability of foodstuffs. The rural population was often less picky than the urban population. Urban consumers mostly preferred wheat, and increasingly so in the eighteenth and nineteenth centuries. Agricultural producers usually reserved their wheat for the market, and ate their other cereals. In France, agricultural producers ate more maslin in the Paris basin, buckwheat, rye and oats in the west and maize in the south-west. In Flanders, country people ate more rye, potatoes, and (in parts of Flanders) buckwheat, than the urban population, while in England people ate more barley and oats.⁴⁵ We can assume that producers preferred to keep the cereals they ate themselves longer than those they did not eat. For example, they could quickly sell cereals (i.e. wheat) they did not eat themselves, and use their storage space for the cereals which they consumed.

Another factor which needs to be considered is the size of farms and the kind of labour used on those farms: family members, farm servants or casual labourers. Regions dominated by large farms using temporary day labourers for threshing might have preferred to thresh a large part of their harvest immediately after it was taken from the fields, making available large supplies for the markets in the months following the harvest. However, if farms used farm servants employed all year round for threshing, or if farms were smaller and mainly used family labour, they could have threshed their harvest at a slower pace, relegating the activity to moments when they were not occupied with more urgent work. In that case, market supplies will be more evenly spread out over the year. Connected to this issue is the diversity of economic activities in the region. Other economic activities besides agricultural work, such as cottage industries, reduced seasonal unemployment and made it possible to sustain a larger labour force, performing agricultural work during summer and other work during winter.⁴⁶ The present state of research does not allow us to make any claims on how this might explain the regional differences in seasonal patterns in the grain trade, but it is a question worth examining in the future.

⁴⁴ Gabriel Désert, *Les Paysans du Calvados 1815–1895: Une société rurale au XIXe siècle* (2007), pp. 331–34, 843.

⁴⁵ Doyle, *A cyclopaedia of practical husbandry*, pp. 29, 32, 75, 320–21, 411; Mark Overton and Bruce M. S. Campbell, ‘Statistics of production and productivity in English agriculture, 1086–1871’, in Thoen and van Bavel (eds), *Land productivity and agro-systems*, pp. 189–208; Stephen J. Miller, ‘The economy of France in the eighteenth and nineteenth centuries: Market opportunity and labour productivity in Langue-doc’, *Rural Hist.*, 20 (2009), pp. 1–30; Johan Poukens,

“‘Tout-à-la-fois cultivateurs et commerçans”: small-holders and the Industrious Revolution in eighteenth-century Brabant’, *AgHR* 60 (2012), pp. 153–72.

⁴⁶ Franklin F. Mendels, ‘Seasons and regions in agriculture and industry during the process of industrialization’, in Sidney Pollard (ed.), *Region and industrialization. Studies on the role of the region in the economic history of the last two centuries* (1980), pp. 177–95; Nigel Goose, ‘Farm service, seasonal unemployment and casual labour in mid nineteenth-century England’, *AgHR* 54 (2006), pp. 274–303.

Finally it is necessary to ask, for those regions where the magnitude of seasonal variation was large, who took on the cost of the storage if the farmers did not? An extensive food processing industry, capable of storing large amounts of cereals, seems to be the necessary corollary of a pronounced seasonal cycle in grain markets. Yet around the middle of the nineteenth century, the milling industry in England would still have been dominated by small-scale enterprises, whereas the Paris basin milling industry seems to have been dominated by some very powerful enterprises from an early date. How this industry affected the wheat and flour markets remains a question, and again, this issue merits further research.⁴⁷

V

Everywhere, the grain trade followed a seasonal cycle. Usually, trade was busiest in the months following the harvest. Trade volumes of wheat, rye, and (in Flanders) winter barley were largest in the autumn months, whereas oats and summer barley followed a few months later. Trade was quieter during spring and summer. The *soudure*-months were therefore characterized by a decline in trade volumes, not by a rise. On the one hand, the magnitude of these cycles tended to be larger in the English and smaller in the French areas considered. On the other hand, the regularity of seasonal patterns was often more pronounced in the Paris basin.

Explaining these seasonal patterns and their differences by region is more difficult than describing them. Seasonal patterns in the grain trade, the magnitude and regularity of those patterns need to be explained by locating grain production within a broader regional social agro-system. Everywhere, grain production was an integral part of a complex production system, interacting with and influenced by the regional economic and social environment, consumer preferences, the position of other agricultural products, and by technical and technological features. Therefore, seasonal patterns in the grain trade are the result of a complex set of interrelated factors, making it impossible to pinpoint any specific item as being responsible for a high or low magnitude of seasonal cycles, or the absence or presence of highly regular cycles.

While we found patterns in trade volumes that fit within the concept of the *soudure*, the explanation for these patterns provided by Labrousse is unlikely to conform to historical reality. It is unlikely that the large volumes of grain sold in the months following the harvest, for instance to supply Paris, mainly came from the smaller farmers. On the contrary, the large *fermiers* of the Paris basin probably dominated the grain trade throughout the agricultural year.

Agricultural producers faced many technical constraints which prevented them from marketing their entire harvest at once. One of the main constraints was the enormous amount of labour required for threshing and winnowing grain, unless labour-saving technology such as threshing machines were available. Seasonal patterns in the grain trade will therefore depend on seasonal patterns in the availability of labour, but also in the demand for animal

⁴⁷ Steven Laurence Kaplan, *Provisioning Paris: Merchants and millers in the grain and flour trade during the eighteenth century* (1984); Perren, 'Structural Change'; Jean Meuvret, *Le problème des subsistances à l'époque Louis XIV*, II, *La production des céréales et la société rurale* (1987) and III, *Le commerce des grains et la conjoncture* (1988).

fodder (threshing also produces straw), the demand from the processing industry (brewing and malting took place mainly in the colder months), and the conditions for transport (roads were in a worse state during winter).

However, seasonal patterns in the grain trade cannot only be reduced to mere technical matters. Regional economic and social characteristics also exercised their influence. Among these are consumer preferences, which determined the degree and nature of agricultural specialization. English arable farming was focused on both wheat and barley, while Flemish arable farming included different kinds of cereals as well industrial crops such as flax and coleseed. The farmers of the Paris basin, however, were primarily oriented towards the production of wheat to provide for the needs of the capital city. Agricultural producers with a diversified output could choose among different crops to market according to the situation of the time, while the options for highly specialized producers, like those in the Paris basin, were more limited. The latter will lead to a higher regularity in seasonal patterns.

Finally, also the issue of storage needs to be taken into account. Unthreshed grain could be stored at rather moderate costs, since it was possible to store it in the open air in stacks, but preserving threshed grain required granaries. Agricultural producers had to take many factors into account to assess the cost of storage, but probably they chose to sell their threshed grain quickly due to this cost and the associated risk of spoiling the grain. This begs the question of who stored the threshed grain, which brings us to consider the size and characteristics of the food processing industry. At this stage, the question remains puzzling. This article is only one step on a long road to reconsidering the functioning of staple food markets in the nineteenth century. It should be carried forwards by further research to improve our understanding of this crucial economic matter.

Appendix: overview of sources and data used for test of autocorrelation

	1820s	1830s	1840s
England: coastal counties	Suffolk	1823–25, 27–28 Wheat, Rye, Oats, Barley	1835–40 Wheat, Rye, Oats, Barley
	Norfolk	1823–25, 27–28 Wheat, Rye, Oats, Barley	1835–40 Wheat, Rye, Oats, Barley
	Devon	1823–25, 27–28 Wheat, Oats, Barley	1835–40 Wheat, Oats, Barley
	Kent	1823–25, 27–28 Wheat, Oats, Barley	1835–40 Wheat, Oats, Barley
England: inland counties	Cambridgeshire	1823–25, 27–28 Wheat, Rye, Oats, Barley	1835–40 Wheat, Rye, Oats, Barley
	Berkshire	1829–33 Wheat, Rye, Oats, Barley	1835–40 Wheat, Oats, Barley
	Surrey	1829–33 Wheat, Rye, Oats, Barley	1835–40 Wheat, Oats, Barley
	Oise	1828–32 Wheat, Rye, Oats, Barley	1832–37 Wheat, Rye, Oats, Barley
France: Paris basin	Seine-et-Oise	–	1835–40 Wheat, Rye, Oats, Barley
	Sint-Niklaas	1823–25, 27–28 Wheat, Rye, Oats, Barley	1835–40 Wheat, Rye, Oats, Barley
	Oudenaarde	1823–25, 27–28 Wheat, Rye, Oats	1835–40 Wheat, Rye, Oats
	Kortrijk	1823–25, 27–28 Wheat, Rye, Oats	–

Sources:

England: The Corn Returns Online (<http://www.cornreturnsonline.org/>).

Belgium: *Mercuriales*, gathered by Isabelle Devos, 'Prijzen van Granen en andere Landbouwprodukten in de Kasselrij Kortrijk (16de - 19de eeuw)' (unpublished licentiate thesis, Ghent University, 1990); Wouter Ronsijn, 'De donderdagmarkt van Oudenaarde, 1750–1900: een reconstructie van anderhalve eeuw prijzen en handelsvolume', *Handelingen van de Geschied- en Oudheidkundige Kring van Oudenaarde*, 49 (2012), pp. 3–45; Wouter Ronsijn, 'De donderdagmarkt van Sint-Niklaas, 1720–1900. Een reconstructie van meer dan anderhalve eeuw prijzen en handelsvolume', *Annalen van de Koninklijke Oudheidkundige Kring van het Land van Waas*, 115 (2012), pp. 111–56.

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