

The influence of exports on grain production on Polish royal demesne farms in the second half of the sixteenth century

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Abstract

In this article the author explores a survey of royal lands produced in 1564 and 1565. This contains data from over 500 royal demesnes situated throughout the Kingdom of Poland, and provides detailed information about types of cereals grown, their yields and prices, animal husbandry, the system of land division, weights and measures, and the system of agricultural management. Here we examine regional differences in the arable economy of royal demesnes and consider how far their production was determined by the opportunities offered by local and international grain markets.

Interest in the Polish grain market of the early modern period dates from the turn of the nineteenth century.¹ It was, however, only after the Second World War that a succession of groundbreaking publications appeared, the results of a noticeable growth in the popularity of research into economic history and especially the economic role of demesne farms. One of the chief areas of interest was the place of the Polish grain market in the international grain trade and the role of Poland as the granary of Europe.² The works by Andrzej Wyczański and Stanisław Mielczarski inspired more detailed studies into the problem of the regionalization of grain production in Poland.³ A book of particular importance in the development of the subject is Mielczarski's *Rynek zbożowy na ziemiach polskich ...* (*Grain market in the Polish*

¹ W. Czermak, 'Handel zbożowy gdański w XVII w.', *Sprawozdania Akademii Umiejętności* 3 (5) (1898), pp. 8–9; A. Szelągowski, *Pieniądz i przewrót cen w XVI i XVII w. w Polsce* (1902); S. Kutrzeba, *Wisła w historii gospodarczej dawnej Rzeczypospolitej* (1920); R. Rybarski, *Handel i polityka handlowa Polski w XVI stuleciu* (1920).

² A. Żabko-Potopowicz, 'Handel zbożem w Polsce w XVI w.', *Ekonomista* 52 (1952), pp. 125–49; H. Samsonowicz, 'Handel zagraniczny Gdańska w drugiej połowie XV wieku (rejonizacja handlu na podstawie ksiąg cła palowego)', *Przegląd Historyczny* 47 (1956), pp. 283–352; H. W. Rusiński, *Znaczenie rynku zewnętrznego*

w dziejach gospodarki folwarczno-pańszczyźnianej, in *VIII Powszechny Zjazd Historyków Polskich*, session VI (1960); A. Wyczański, 'Próba oszacowania obrotu żytem w Polsce XVI w.', *Kwartalnik Historii Kultury Materialnej* 9 (1961), pp. 23–33; M. Bogucka, *Handel zagraniczny Gdańska w pierwszej połowie XVII wieku* (1970); A. Mączak, *Między Gdańskiem a Sundem. Studia nad handlem bałtyckim od połowy XVI do połowy XVII wieku* (1972); H. Obuchowska-Pysiowa, *Handel wiślany w pierwszej połowie XVII wieku* (1964); K. Chojnacka, *Handel na Warcie i Odrze w XVI i pierwszej połowie XVII wieku* (2007).

lands) of 1962 which, despite the criticism it has received,⁴ remains fundamental for its attempt to provide an overall view of the Polish grain market at the time of its greatest prosperity.

In his studies of the regionalization of grain production, Mielczarski focused on two factors: the prices of different grains and their mutual interdependence, and the geographical range of different grain measures. He undertook a detailed analysis of the relationship between the prices of rye and oats, seeing them as commodities whose supply and demand differed considerably. Oats were the cheapest and most readily grown grain, produced throughout the country. Their level of production reflected a constant demand on local markets. Used primarily as forage, oats were characterized by great price stability. They were hardly ever exported. Rye, by contrast, was a popular bread grain, sold on urban markets as well as exported. Its price in any particular market was influenced not only by the interplay between supply and demand, but also by factors such as the cost of transport. In addition, rye prices were much more vulnerable to changes in the overall economic situation. Historians studying grain prices in Cracow and Lvov noticed that the gap between the prices of oats and rye tended to widen as a result of a growing demand for rye, especially in regions where much of it was shipped to Gdansk.⁵ Mielczarski considered another factor influencing grain prices, namely the level of supply. He observed that because oats and rye were the most commonly grown cereals, they were ideal subjects for research because, in any analysis of their prices, differences in the quality of local soils did not have to be taken into account. Such an approach resulted in the establishment of an index of grain prices where the price of rye was indexed to the price of oats, taking oats to be 100. By taking this approach, Mielczarski avoided all the pitfalls of dealing with the complex, geographically diversified and far from completely understood system of old Polish dry measures.⁶ He used this index to determine the equilibrium price, i.e. the price at which demand and supply reached a state of balance.⁷ An important assumption on which the idea of equilibrium price is based is that the market, even if it evolves and fluctuates, has a long-term tendency towards equilibrium. It is an open question, however, whether it is possible in economic reality to reach a complete balance between supply and demand. Therefore, the equilibrium price may be used effectively as an economic indicator only in the analysis of free markets. Of course, grain markets in early modern Poland met this condition.

Mielczarski used the index of rye prices in his analysis of the regional diversification of

³ A. Wyczański, *Studia nad folwarkiem szlacheckim w Polsce w latach 1500–1580* (1960); S. Mielczarski, *Rynek zbożowy na ziemiach polskich w drugiej połowie XVI i pierwszej połowie XVII wieku. Próba rejonizacji* (1962); J. Małecki, *Studia nad rynkiem regionalnym Krakowa w XVI wieku* (1963); T. Chudoba, 'Warszawski rynek zbożowy w XVI wieku', *Rocznik Warszawski* 6 (1967), pp. 15–47; A. Olejarczuk, 'Towarowość produkcji zbożowej w XVI wieku. Próba rejonizacji', *Przegląd Historyczny* 64 (1973), pp. 729–40; J. Szpak, *Kierunki produkcji dworskiej w ekonomii malborskiej w XVI wieku* (1972); id., *Studia nad stosunkami rynkowymi w ekonomii malborskiej* (1962); id., *Rewolucja cen XVI wieku a funkcjonowanie gospodarki dworskiej w starost-*

wach Prus Królewskich (1982).

⁴ A. Mączak, 'O przydatności modeli ekonomicznych na przykładzie badań wiejskiej gospodarki feudalnej', *Kwartalnik Historyczny* 70 (1963), pp. 675–90; L. Żytkowicz, 'Gospodarstwo folwarczne na Żuławach Malborskich', *Przegląd Historyczny* 54 (1963), pp. 671–702.

⁵ J. Pelc, *Ceny w Krakowie w latach 1369–1600* (1935), pp. 61–2; S. Hoszowski, *Ceny we Lwowie w XVI i XVII wieku* (1928), p. 75.

⁶ K. Skupieński, 'Struktury systemowe polskich miar zbożowych w XVI wiek', *Przegląd Historyczny* 69 (1978), pp. 623–46.

⁷ Mielczarski, *Rynek zbożowy*, p. 39.

grain markets. He determined the equilibrium price at 191 on the basis of the mean of prices in Gdansk between 1500 and 1655. He proposed the following standards for comparison between demand and supply: where the index is ≤ 169 , supply exceeds demand; where it falls between 170 and 199, supply is slightly greater than demand; where it falls between 200 and 229, there is a balance between supply and demand. An index of between 230 and 259 indicates that demand is slightly greater than supply and a figure of ≥ 260 shows that demand exceeds supply.⁸ Assuming that there is a relationship between the equilibrium price of individual grains and a balance between their supply and demand, it may be understood that each time the index increases, it reflects a growth in demand over supply on a given market. By the same token, when it goes down, it reflects a growth in supply over demand.

Mielczarski also tried to assess grain production in Poland by determining the percentage share of bread grains (rye and wheat) and non-bread (barley and oats). The basis for his assessment was the amount of grain left on the demesne after the deduction of seed corn. He assumed this surplus to be a commodity set aside for sale. He divided the demesnes he analysed into three categories: (i) those with a small supply of bread grains (no more than 45 per cent of total surplus by volume), (ii) farms with a medium supply of bread grains (46–55 per cent) and, finally, (iii) those with a large supply of bread grains (more than 56 per cent).⁹

This article aims to expand Mielczarski's earlier studies by offering a detailed analysis of the production of, and market for, wheat and barley. Mielczarski treated bread grains, wheat and rye, jointly, while data concerning barley was used only to test the price indexes of the other crops. Meanwhile, both wheat and barley played a vital role in the domestic market because, apart from being processed into flour and groats, they were also key ingredients in the production of beer.

The data employed in the study comes from a survey of royal demesnes made in 1564–65.¹⁰ This provides detailed information about the quantity of grain produced and its prices for 523 farms scattered throughout Poland. The documents were compiled by a number of special commissions established by parliament to assess the value of royal estates. The commissions consisted of members of both houses and representatives of the monarch. They travelled the length and breadth of the country recording the extent, composition and value of royal estates.¹¹ Unlike the source material adopted by Mielczarski, the survey provides more

⁸ Ibid., p. 45.

⁹ Ibid., p. 60.

¹⁰ The database was created from the following publications: for Little Poland, J. Małecki (ed.), *Lustracja województwa krakowskiego, 1564* pts 1 and 2 (1962–64), A. Wyczański (ed.), *Lustracja województwa lubelskiego, 1565* (1959) and ed. W. Ochmański (ed.), *Lustracja województwa sandomierskiego, 1564–65* (1963); For Greater Poland, A. Tomczak, C. Ohryzko-Włodarska and J. Włodarczyk (eds), *Lustracja województw wielkopolskich i kujawskich, 1564–1565*, pt 1 (1963) and A. Tomczak, *Lustracja do województw wielkopolskich i kujawskich, 1564–65*, pt 2 (1963); For Masovia, I. Gieysztorowa and A. Żaboklicka (eds), *Lus-*

tracja województwa mazowieckiego 1565, pts 1 and 2 (1967–8); A. Sucheni-Grabowska and S. M. Szacherska (eds), *Lustracje województwa płockiego, 1565–1789* (1965); Z. Kędzierska (ed.), *Lustracje województwa rawskiego, 1564 i 1570* (1959); For Royal Prussia, S. Hoszowski (ed.), *Lustracja województwa pomorskiego, 1565* (1961) and S. Hoszowski, *Lustracja województw malborskiego i chełmińskiego, 1565* (1961); finally, for the Ruthenian lands, K. Chłapowski and H. Żytkowicz (eds), *Lustracja województw ruskiego, podolskiego i brzeskiego*, pts 1 and 2 (1992–2001).

¹¹ I. Rychlikowa, 'Lustracja 1564–65 jako podstawa szacunków dochodów z gospodarki polowej', *Kwartalnik Historii Kultury Materialnej* 22 (1974), p. 678.

chronologically coherent data. Mielczarski's analysis of Little Poland was based on data from 1565 for Lubelskie voivodship¹² and from 1569 for Krakowskie and Sandomierskie voivodships. Likewise, his data for Masovia comes from different periods in different voivodships: 1564 for Płockie voivodship, 1564 and 1569 for Mazowieckie voivodship and 1570 for Rawskie voivodship. All his data for Greater Poland comes from 1569, whereas that for Red Ruthenia is derived from surveys of 1565.¹³

For the purposes of this study, data concerning the kind, quantity and prices of grain sold by each of the 523 farms has been compiled. The figures have been used to calculate price indexes and average sales of particular grains for individual voivodships. The equilibrium price of wheat and barley calculated for the purposes of this study is not based on grain prices in Gdansk, as was the case in Mielczarski's analysis, but on the prices in Cracow. The decision to use Cracow rather than Gdansk was prompted by the fact that the Cracow grain market is the only one to provide a relatively complete set of data for wheat and barley prices in the years under study. The use of Cracow brings an additional advantage. Gdansk was a very important centre for the rye trade (which was the main export grain in Poland) and its prices were determined by the strength of the export demand. For this very reason, however, the Gdansk grain market can hardly be treated as representative of the rest of the country.¹⁴ Cracow, although admittedly in the zone of the Vistula river, was more representative of Poland as a whole because grain production for local markets was as important as production for export. In this study, we are not interested in determining the territorial range of individual local markets. Instead, our focus is on establishing the characteristic features of grain markets in particular regions that were, at the same time, units of state administration.

Another point is that unlike Mielczarski's study, the present one considers prices from a much shorter period, i.e. 80 instead of 150 years. This is because complete records of Cracow grain prices are available only for the years 1521–1600 and, consequently, the equilibrium price for particular grains was determined only for those years (Table 1). This is taken to be the mean of prices over the 80 years indexed against oats (where oats equals 100).¹⁵

These figures may be compared with prices recorded in primary sources. The surveys of 1564–65 provide information about the prices of grain sold from the demesnes, but not of grain from mills or peasant rents. These were current prices, recorded by members of the commissions on the basis of oral evidence or checked by them directly at the market ('wedle pospolitego targu'). Data is drawn from the last quarter of the year when the grain supply was greatest, so the prices recorded are at their lowest during the year.¹⁶ On the basis of this data it is possible to calculate price indexes of particular grains in different regions of Poland for this single year (Table 2).

It is noticeable that the most balanced of all rye markets was that of Gdansk, which is hardly surprising given this city's dominant role as a centre of international trade and because of the character of rye, commonly grown throughout the country and a major Polish export

¹² Voivodship is the largest unit of local administration.

¹³ Mielczarski, *Rynek zbożowy*, pp. 198–204.

¹⁴ This was noted by Mielczarski himself, who wrote: 'An average calculated from Gdansk prices is not reliable because it applies to a city which is a large export

centre, while the scale is to be applied to local centres situated in the vicinity of the place of production'.

¹⁵ Pelc, *Ceny w Krakowie*, Tables 3–7.

¹⁶ Mielczarski, *Rynek zbożowy*, pp. 30–2.

TABLE 1. Equilibrium price of grain prices on the Cracow market (1521–1600) (oats = 100).

Years	Index		
	Rye	Wheat	Barley
1521–1600	221	330	175

Source: Adapted from J. Pelc, *Ceny w Krakowie w latach 1369–1600* (1935), tables 3–7.

TABLE 2. Price on regional grain markets, 1564–65 (oats = 100).

Region	Index		
	Rye	Wheat	Barley
Royal Prussia	217	300	150
Greater Poland	186	379	163
Little Poland	242	322	203
Masovia	200	371	183
Red Ruthenia	227	325	152

Sources: J. Małecki (ed.), *Lustracja województwa krakowskiego, 1564* pts 1 and 2 (1962–64); A. Wyczański (ed.), *Lustracja województwa lubelskiego, 1565* (1959); W. Ochmański (ed.), *Lustracja województwa sandomierskiego, 1564–65* (1963); A. Tomczak, C. Ohryzko-Włodarska and J. Włodarczyk (eds), *Lustracja województw wielkopolskich i kujawskich, 1564–1565*, pt 1 (1963); A. Tomczak, *Lustracja województw wielkopolskich i kujawskich, 1564–65*, pt 2 (1963); I. Gieysztorowa and A. Żaboklicka (eds), *Lustracja województwa mazowieckiego 1565*, pts 1 and 2 (1967–8); A. Sucheni-Grabowska and S. M. Szacherska (eds), *Lustracje województwa płockiego, 1565–1789* (1965); Z. Kędzierska (ed.), *Lustracje województwa rawskiego, 1564 i 1570* (1959); S. Hoszowski (ed.), *Lustracja województwa pomorskiego, 1565* (1961); S. Hoszowski, *Lustracja województw malborskiego i chełmińskiego, 1565* (1961); K. Chłapowski and H. Żytkowicz (eds), *Lustracja województw ruskiego, podolskiego i brzeskiego, pts 1 and 2* (1992–2001).

commodity (Table 2). Greater Poland, Kuiavia and Masovia, which were the chief suppliers of rye for export, were characterized by an excess of supply over demand, while in Little Poland demand exceeded supply. A relatively balanced situation characterized rye markets in Red Ruthenia where the impact of Gdansk grain trade was negligible. Mielczarski's conclusions about the rye trade based on his analysis of the Gdansk market do not differ greatly from our conclusions based on the examination of rye market in Cracow.

The situation in the wheat and barley market was quite different. The Gdansk market was characterized by an excess of supply over demand for all grains. The supply of barley in Greater Poland and of wheat in Little Poland also exceeded demand. Masovia was characterized by a deficit of both barley and wheat, whereas in Red Ruthenia, whilst the wheat market was relatively balanced, the supply of barley was greater than the demand for it.

An examination of the situation in all the regional grain markets in Poland in the second half of the sixteenth century reveals that in spite of some differences between them, and despite varying indexes of price relations between particular grains, none of the regional markets experienced any gross disproportion between supply and demand (Table 2). Even the most pronounced differences between the equilibrium price of wheat (330) and price indexes in Royal

TABLE 3. Grain price indexes in 1565.

<i>Voivodship</i>	<i>Number of demesnes</i>	<i>Grain</i>		
		<i>Rye</i>	<i>Wheat</i>	<i>Barley</i>
(a) Royal Prussia				
Pomorskie	15	217	300	150
(b) Masovia				
Mazowieckie	68	200	373	187
Rawskie	22	200	376	175
Płockie	6	200	320	154
Total	96	200	371	183
(c) Greater Poland				
Brzeskie Kujawskie and Inowrocławskie	12	200	250	133
Łęczyckie	17	182	360	159
Sieradzkie	31	210	416	175
Kaliskie	19	172	369	164
Poznańskie	15	146	358	169
Total	94	186	379	163
(d) Little Poland				
Krakowskie	76	246	324	204
Sandomierskie	74	240	320	203
Lubelskie	14	240	320	206
Total	164	242	322	203
(e) Red Ruthenia				
Bełskie	24	249	300	154
Ruskie	79	221	332	152
Podolskie	2	200	333	133
Total	105	227	325	152

Source: As for Table 2.

Prussia (300) or Greater Poland (379) were indicative of only a minor excess of either supply or demand. Similarly, the barley market, characterized by higher demand in Little Poland (203) and higher supply in Royal Prussia (150), did not experience any drastic supply-demand imbalance. Changes in the equilibrium price of both grains did not exceed 30 per cent. Even smaller fluctuations are visible in the market for rye characterized by higher supply on the demesnes in Greater Poland (186) and higher demand in Little Poland (242). Here, the changes in the equilibrium price did not exceed 25 per cent. This means that the market for rye, which was the major Polish export commodity and as such was most vulnerable to changes in external economic conditions, was actually more stable than the market in wheat or barley, which were

TABLE 4. Pattern of grain surplus on royal demesnes, 1564–65.

Region	Number of demesnes	Grain (%)			
		Rye	Wheat	Oats	Barley
Royal Prussia	47	39.0	9.8	26.1	25.1
Greater Poland	93	48.8	5.3	36.5	9.3
Masovia	104	55.0	4.1	34.0	6.9
Little Poland	164	36.5	10.1	44.7	8.6
Red Ruthenia	115	37.4	10.0	41.6	11.0
Total	523	43.5	7.7	38.4	10.3

Source: As for Table 2.

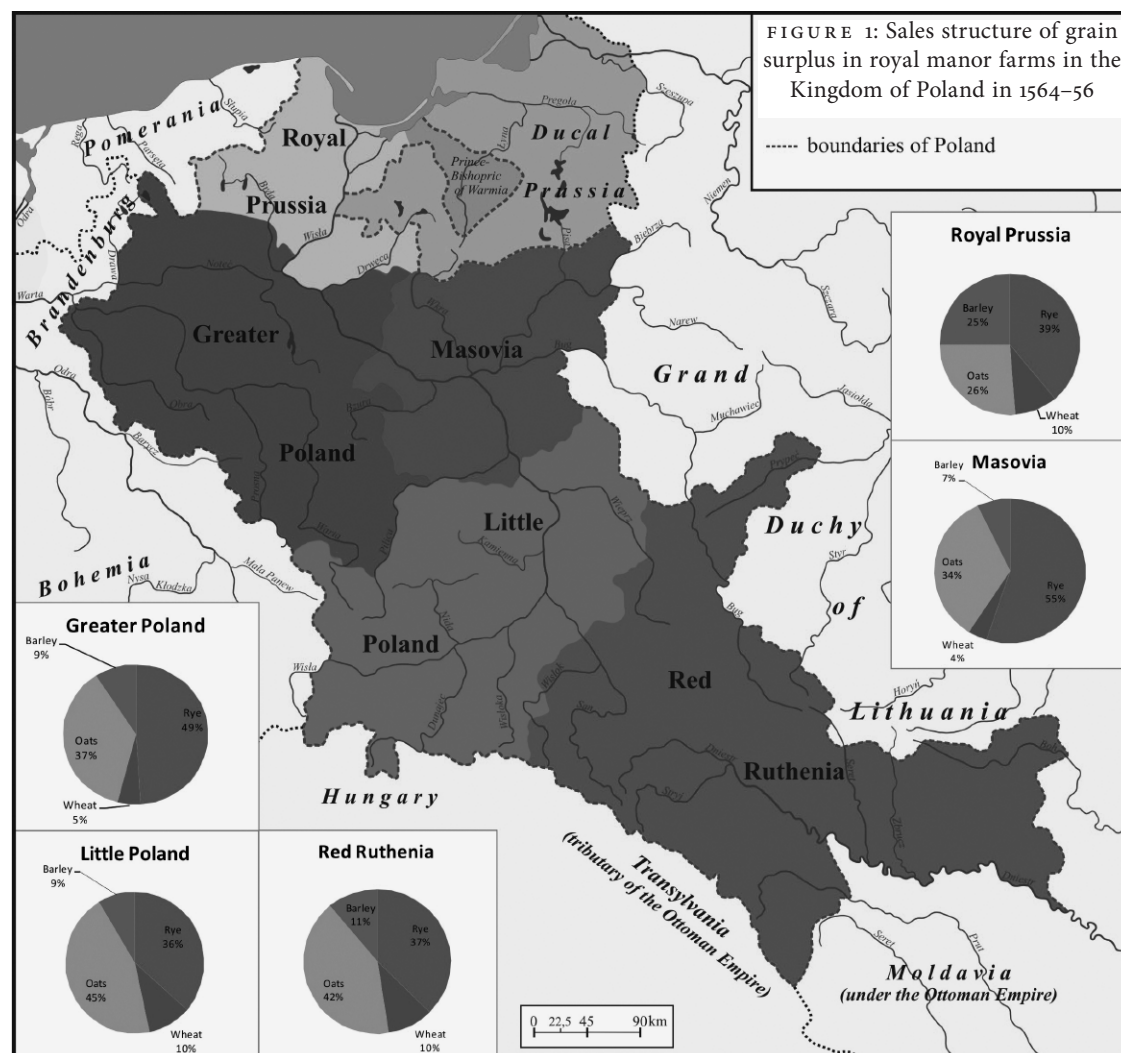


TABLE 5. Pattern of grain surplus on royal demesnes, 1565.

<i>Voivodship</i>	<i>Number of demesnes</i>	<i>Grain</i>			
		<i>Rye</i>	<i>Wheat</i>	<i>Oats</i>	<i>Barley</i>
(a) Royal Prussia					
Pomorskie	28	36.5	4.9	31.9	23.7
Malborskie	11	31.3	29.5	12.2	26.9
Chełmińskie	8	47.7	0	24.7	27.6
(b) Masovia					
Mazowieckie	74	56.1	4.6	31.3	8.0
Rawskie	23	54.7	3.0	38.6	3.7
Płockie	7	44.0	1.8	47.9	6.4
(c) Greater Poland					
Brzeskie Kujawskie and Inowrocławskie	13	46.8	1.7	31.2	20.3
Łęczyckie	16	47.6	2.0	40.0	10.4
Sieradzkie	30	43.5	8.1	38.6	9.8
Kaliskie	19	54.1	4.2	38.2	3.8
Poznańskie	15	55.8	8.1	31.3	4.8
(d) Little Poland					
Krakowskie	76	28.4	13.7	48.9	9.0
Sandomierskie	74	41.3	8.1	41.8	8.9
Lubelskie	14	55.5	1.4	37.4	5.6
(e) Red Ruthenia					
Bełskie	14	48.8	6.9	33.4	11.0
Ruskie	94	35.8	10.4	42.5	11.5
Podolskie	7	27.3	15.9	35.5	21.3

Source: As for Table 2.

grains mainly produced for domestic consumption. Detailed data for the price indices of grains, where oats equals 100, by local jurisdictions or voivodships, is presented in Table 3.

An explanation of the situation of each grain in regional markets as presented in Table 2 may be sought in the pattern of grain produced for sale and in the influence of exports on regional markets (Table 4 and Figure 1). Rye and oats were grown throughout the country and on some demesnes they constituted almost all the grain available for sale. Rye was slightly more popular than wheat as it was sold by 520 of the 523 demesnes (99.4 per cent), whereas oats were sold by 504 demesnes (96.3 per cent). Wheat and barley required better soil than rye and oats and therefore could not be grown everywhere on an equally large scale. Nonetheless, wheat for sale was produced by 397 of the 523 demesnes examined in this study (75.9 per cent) and most (484,

or 92.5 per cent) sold barley. The percentage share of wheat produced for the market ranged from mere 0.5 per cent of all grains to 75 per cent while the share of barley ranged from 0.5 per cent to 100 per cent.

The importance of particular grains in the pattern of production for the market varied considerably from region to region (Table 4 and Figure 1). For instance, rye predominated in Masovia and Greater Poland, both of which were the major suppliers to the grain trade by shipment down the Vistula and the Oder rivers. Barley production, mainly for the brewing of beer, was more extensive in Royal Prussia than elsewhere because of the better quality of soil and bigger local market. Differences in the importance of particular grains between Little Poland and Red Ruthenia were minimal and both regions displayed similar market tendencies even though the former was much more involved in the waterborne trade down the Vistula. In Table 5 the same data is presented by voivodship.

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Data from 1565 indicates that of the 45,000 *lasts* of Polish grain exported that year, 92 per cent was rye and the remaining 8 per cent was wheat.¹⁷ About two thirds of all grain leaving Gdansk came from regions other than Royal Prussia, and especially from Masovia. Detailed information is available for 1568 from the surviving records of the tollhouse in Włocławek. The source reveals that around 25,000 *lasts* of grain were floated down the Vistula to Gdansk and it allows the identification of the place of origin of about 15,000 *lasts* (Table 6).

About a third of the grain sold on the Gdansk market came from Royal Prussia. Unfortunately, although the inspectors surveyed 47 farms in this region, the data collected by them is incomplete and it is possible to determine price indexes on the basis of information from only 15 farms, drawn from only one of the Royal Prussian voivodships (Table 3 (a)).

The indexes of rye, wheat and barley prices in Pomorskie voivodship reveal that the supply of all grains exceeded demand. Closest to the equilibrium price was the price index of rye (217), while the situation for wheat (300) and barley (150) was much less balanced. A characteristic of Royal Prussian grain production is a large share of barley in the grain brought to sale (a quarter of total sales, see Table 5a)). This market is also distinctive because of the amount of wheat produced, which in Malborskie voivodship reached 30 per cent of the total although, at the same time, demesnes in Chełmińskie voivodship did not sell wheat at all. The concentration on wheat and barley was at the expense of rye and oats, which, in Malborskie voivodship, constituted only about 40 per cent of the total grain finding its way to the market.

The majority of grain transported down the Vistula to Gdansk came from Masovia. This was of fundamental importance to the structure of grain production in the region. In all three voivodships of the Masovia region, the share of rye in overall grain production was larger than the national average (Table 5b). Rye in Masovia constituted 55 per cent of total grain produced by the demesnes for the market. At the same time, the region experienced a shortfall in the supply of wheat and barley. That the index of rye prices fluctuates around 200 (the equilibrium price was 221) is indicative of a relatively integrated market for rye throughout the whole

¹⁷ Mączak, *Między Gdańskiem a Sunde*, p. 71.

TABLE 6. The waterborn grain trade in the Vistula basin in 1568.

Region	Percentage share in the grain shipped down the Vistula
Greater Poland	7.0
Masovia	54.3
Little Poland	17.0
Red Ruthenia	10.0
Grand Duchy of Lithuania	11.7
Total	100.0

Source: Adapted from: S. Gierszewski, *Wisła w dziejach Polski*, (1982), pp. 64–5.

region. The index of wheat prices for individual farms, by contrast, oscillated between 300 and 560, whilst that of barley ranged between 150 and 240 (Table 3 (b)).

Wheat in Masovia was grown on 79 demesnes (74 per cent of the whole), but only on four of them did its share of overall grain production exceed 15 per cent. On all the other demesnes, the share of wheat was smaller and in some cases very small indeed. It appears that Masovian demesnes were stimulated neither by the opportunity provided by the Gdansk market nor by domestic demand to develop the production of this grain. Another characteristic feature of this region was that the shortage of wheat was not balanced by any increased production of barley (Table 5 (b)).

The situation was more complex in Greater Poland where there were pronounced differences in the pattern of grain production for sale between particular voivodships (Table 5 (c)). Brzeskie Kujawskie and Inowrocławskie voivodships (Kuiavia), both lying within the catchment of the Vistula trade, were characterized by an average share of rye in their output but little production of wheat, whose shortage was to some extent compensated for by a remarkably increased supply of barley (more than 20 per cent). The price indexes are indicative of a relatively integrated grain market, with an increased supply of all grains (Table 3 (c)). The situation was similar on demesnes in Łęczyckie voivodship where growing wheat was equally unpopular, but, unlike in the two voivodships mentioned previously, barley was not substituted for wheat. Price indexes show a slightly increased demand for wheat and an excess supply of all other grains. Data from Sieradzkie voivodship are closest to the national average, but at the same time its grain market was definitely much less integrated than elsewhere in Greater Poland. The rye price index for individual farms (Table 3 (c)) fluctuated between 160 and 250, for wheat the range was from 330 to 500, and, for barley, from 150 to 200. In Poznańskie and Kaliskie voivodships, rye formed as much as 56 per cent of grain supply. In Poznańskie voivodship, the share of wheat in the structure of the grain supply was close to the national average, whereas in Kaliskie voivodship it was definitely lower. In both voivodships the share of barley was also much below the national average. Price indexes (120–200) show a largely increased supply of rye on local and regional markets, which may be explained by the unstable conditions for

¹⁸ Chojnacka, *Handel na Warcie*, p. 197.

the shipment of grain down the Warta River that arose from frequent changes in the rate of tolls, temporary bans on grain imports to Brandenburg and the New March, and also from the burdensome staple rights (right of pre-emption) exercised by Frankfurt an der Oder and that city's economic rivalry with Szczecin.¹⁸ The wheat price index (300–400) is indicative of a somewhat greater demand for this grain, but it is worth adding at this point that a third of all demesne farms in these voivodships did not grow wheat at all. On the other hand, although almost all demesnes produced barley for sale, its price index – fluctuating between 133 and 200 – reveals that the demand for and supply of barley varied considerably within this area.

The grain market in Little Poland was much more uniform and integrated. It is even possible to talk about it as a regional market although each voivodship was, of course, to some extent unique in the structure of its grain supply (Table 5 (c)). Krakowskie voivodship was characterized by a relatively large share of wheat in the total amount of grain produced for sale (14 per cent), which gave a price index of 324, showing a slight excess of the supply of this grain over demand (Table 3 (c)). The percentage share of barley in the production for the market was close to the national average, giving it a price index of 204, indicative of excessive demand. Other voivodships in Little Poland followed the same pattern of wheat and barley price indexes (wheat, 320; barley, 203–206) although the percentage share of each in the grain available for sale was much lower than in Krakowskie voivodship. The most interesting aspect is the market for rye. The price index of this grain throughout the region was 240 although there were considerable differences between particular voivodships. In Krakowskie voivodship, for example, rye constituted 30 per cent of all grain sold, whereas in Lubelskie voivodship it was over 55 per cent. It appears that rye and wheat in Krakowskie voivodship were produced for the domestic, local market and met the demand in the area, while from Sandomierskie and Lubelskie voivodships a considerable portion of both grains was transported to Gdansk. At the same time, it is surprising that the tiny quantity of wheat produced by the royal demesnes in Lubelskie voivodship still exceeded the demand for this grain (as can be seen from its price index).

Data from Red Ruthenian voivodships (Table 5 (e)) reveals considerable diversification in the supply structure and interesting tendencies in the price indexes. For instance, even though the grain market in Bełskie voivodship was dominated by rye, the price index of this grain (249) suggests that the demand for rye in the area was still higher than its supply (Table 3 (e)). The percentage share of wheat in the grain market was lower than the national average, but the price index of wheat (300) suggests an excessive supply and so does that of barley (154). A smaller share of rye and a larger share of wheat in the output of demesnes in Ruskie voivodship resulted in the price indexes of these two grains being close to their equilibrium prices (221, 332). In the case of barley (152), supply exceeded demand. Barley constituted as much as 20 per cent of the total amount of grain sold on the market by demesnes in Podolskie voivodship and its price index there (133) indicates that supply exceeded demand considerably. A similar tendency was visible in the rye market (200) although the share of this grain in the supply structure was exceptionally low (27.3 per cent). The wheat price index (333) suggests a balance between supply and demand even though the quantity of available wheat in the area was almost twice as high as the national average.

II

The mix of grain produced by the royal demesnes presented here may be compared with the pattern of grain put on the market by other great landowners. For example, in 1565–66, the estate of the Bishop of Włocławek in Kuiavia, which contained about 30 demesnes, sold its surplus of grain in the following proportion: rye 70.3 per cent, wheat 6.8 per cent, oats 11.3 per cent and barley 11.3 per cent.¹⁹ Data from the sale of surplus grain by the Archbishops of Gniezno is not available, but the proportion of grain left for sowing in 13 demesnes belonging to the Archbishops in mid-century was as follows: rye 62.0 per cent, wheat 5.7 per cent, oats 27.0 per cent and barley 5.3 per cent.²⁰ In both cases, the rye was sold directly to Gdansk. Some rare data from just nine demesnes belonging to the gentry in Greater and Little Poland for the years 1550–80 (studied by A. Wyczański), shows a somewhat different structure of grain left for sowing: rye 39.9 per cent, wheat 6.8 per cent, oats 42.8 per cent and barley 7.7 per cent.²¹ About 80 per cent of the total grain floated down the Vistula to Gdansk from regions outside Royal Prussia came from great estates.

In the analysis of the supply of different grains in various regions of Poland, it is worth considering what factors influenced the decision to grow and sell a particular kind of grain. It appears that the export trade was a factor of the paramount importance in the shaping of local and regional grain markets. It is discernible in the interest that some of the commissioners surveying the royal demesnes showed in the circumstances of grain sales, especially in Masovia. In Rawskie voivodship 14 out of 23 demesnes surveyed in 1564–65 (61 per cent) shipped their rye to Gdansk by river. The same was done by 42 of 74 (57 per cent) of the demesnes surveyed in Mazowieckie voivodship. It may be concluded that in the region that was the largest supplier of grain for export from Gdansk, some two thirds of the demesnes participated in the shipping of grain down the Vistula. Our data is certainly not complete because the commissioners did not reach all the demesnes in the region. Besides, the fact that the survey does not mention that a particular demesne sold grain to Gdansk does not necessarily mean that it did not. A comparison of the saleable surplus of farms whose export of grain to Gdansk is mentioned by the survey with those where it is not does not reveal any striking differences between the two (Table 7). This may mean that export was indeed an important factor influencing the choice of cereals grown in Masovia. Moreover, it appears that even if some of the grain was sold locally rather than sent to Gdansk, it was still the export demand for rye that determined the scale of its production in particular regions.²² Grain production in Masovia was dominated by rye (55 per cent of total sale). A similar proportion may be found also in Greater Poland (Poznańskie and Kaliskie voivodships) and in Little Poland (Lubelskie voivodship). Rye price indexes in these parts of Poland indicate that the quantity supplied was much larger than the quantity demanded. An excess of supply also characterized those voivodships where the production of

¹⁹ L. Żytkowicz, *Studia nad gospodarstwem wiejskim w dobrach kościelnych XVI w.* (2 vols, 1962), table 58.

²⁰ J. Topolski, *Gospodarstwo w dobrach arcybiskupstwa gnieźnieńskiego od XVI do XVIII wieku* (1958), p. 165.

²¹ Wyczański, *Studia nad folwarkiem*, p. 146.

²² Warsaw merchants, for example, would purchase grain in Mazowieckie voivodship, on demesnes located far away from the Vistula and the Bug, and then floated it to Gdansk. Chudoba, *Warszawski rynek*, p. 37.

TABLE 7. Pattern of grain produced in two categories of Masovian demesnes, 1564–65.

Category of demesnes	Number of demesnes	Grain			
		Rye	Wheat	Oats	Barley
Demesnes mentioned by the surveyors to be sending goods to Gdansk	56	56.7	4.1	33.1	6.1
Demesnes with no mention of goods being transported to Gdansk	41	54.4	4.5	32.9	8.2

Source: I. Gieysztorowa and A. Żaboklicka (eds), *Lustracja województwa mazowieckiego 1565*, pts 1 and 2 (1967–8); A. Sucheni-Grabowska and S. M. Szacherska (eds), *Lustracje województwa płockiego, 1565–1789* (1965); Z. Kędzierska (ed.), *Lustracje województwa rawskiego, 1564 i 1570* (1959).

rye was smaller (45 per cent of total sale, which was still higher than the national average), such as Chełmińskie, Brzeskie, Kujawskie and Inowrocławskie, Łęczyckie, and Bełskie.

Rye production developed at the cost of other cereals, wheat and barley in particular. Demand for these two grains varied from region to region and this is discernible in the diversity of price indexes. Supply of wheat did not meet demand in Poznańskie, Kaliskie, Łęczyckie, Mazowieckie, Rawskie, and Bełskie voivodships. In Brzeskie, Kujawskie and Inowrocławskie voivodships, the very limited supply of wheat from demesnes (about 1.5 per cent of production) was compensated for by barley which constituted as much as 20 per cent of the grain marketed. The relative disinterest on the part of demesnes in growing wheat resulted partly from their focus on producing rye for export but also the poor quality of the soil, which made the production of wheat impossible in some regions of Poland.²³ The commissioners were often curious why some royal demesnes grew rye, oats and barley, but not wheat. Throughout their reports there are comments such as: 'They do not sow any other grain here because hardly any crops well', 'This farm yields a very poor crop because its soil is sandy'; 'The soil is barren here, very sandy'; 'They do not grow wheat here because it does not crop well'.²⁴ In the areas where the soil was rich and fertile, wheat was grown in large quantities. For instance, on five royal demesnes in Żuławy Malborskie (an area of very fertile fenland) wheat formed as much as 50 per cent of all the grain put on the market. (In the whole Malborskie voivodship it was 30 per cent.) Good soil and the proximity of Gdansk, which was itself the major consumer of wheat and also the point from which it was shipped abroad, encouraged many demesnes to devote more effort to the growing of this cereal. But rich soils were also found in Red Ruthenia, where wheat crops in Ruskie voivodship made only 10 per cent of total grain production, and about 16 per cent in Podolskie voivodship. Elsewhere, poor soil was a reason for a preference for rye production, but it was not only wheat that was given up. One of the reports says that 'neither millet, flax nor hemp is grown on the demesne, as we are told, but peasants do grow them'.²⁵ Royal demesnes in Starostwo²⁶ Warszawskie 'do not sow wheat, barley or tartary buckwheat

²³ The quality of soil on farms where wheat and barley was grown was of much greater importance than in the case of rye and oats.

²⁴ *Lustracja województwa mazowieckiego*, pt 1,

pp. 101, 36; pt 2, 101.

²⁵ *Lustracja województwa mazowieckiego*, pt 2, p. 198.

²⁶ Starostwo is a complex of royal estates.

TABLE 8. Yield ratio on demesnes on the basis of surveys of 1564–65.

<i>Region</i>	<i>Rye</i>	<i>Wheat</i>	<i>Oats</i>	<i>Barley</i>
Royal Prussia	4.4	7.6	4.7	4.1
Greater Poland	3.1	3.6	3.1	5.1
Masovia	5.8	6.6	5.0	8.0
Little Poland	4.9	5.1	5.1	6.4

Source: Adapted from A. Wawrzyńczyk, *Studia nad wydajnością produkcji rolnej dóbr królewskich w drugiej połowie XVI wieku* (1974); A. Czapiuk, 'O plonach zbóż w Polsce i w Wielkim Księstwie Litewskim w XVI i XVII wieku', in C. Kukło (ed.) *Między polityką a kulturą* (1999), pp. 233–47.

these years, as we are told, though they used to sow all kinds of grain, only under the present *starosta* [manager]²⁷ they do not ... *Starosta* always floats his rye to Gdansk'.²⁸ However, it was not only the quality of soil that was responsible for the limited position of wheat in the overall structure of grain supply. Access to a market where the grain could be easily put up for sale was even more important, which becomes clear when we look at the high yield ratio of wheat. Wheat was sown on over 75 per cent of demesnes and its yield was no worse than that of rye (Table 8), and yet wheat production for the market did not equal the production of rye because rye could be easily exported and wheat could not.

The only area between Royal Prussia and Red Ruthenia where the share of wheat in the total grain put on the market exceeded 10 per cent was Krakowskie voivodship. Here, the demesnes did not actively ship produce to Gdansk, which discouraged greater rye production. On the other hand, however, the quality of soil was lower there than in Żuławy (part of Royal Prussia) or Red Ruthenia. It appears, therefore, that the factor determining the position of wheat was the demand for it in the capital city. With a price index at 324, very close to the equilibrium price (330), and forming 13.7 per cent of the crops produced, supply slightly exceeded demand. It may be suggested that the small supply of wheat for bread and brewing was caused, in many parts of the country, by a combination of poor soil quality and the demesnes being geared towards the production of rye for export, but also by a relatively low level of domestic demand for the better quality grains resulting from people's poor living standards and limited resources.

A similar combination of factors influenced the supply of barley although this grain was more commonly grown than wheat (on 92.5 per cent of royal demesnes) and its share in the overall output was larger. From time to time the survey of royal manors contain notes that barley 'is not sown because it does not crop well'.²⁹ Barley was not exported from Poland, so its share of overall production of over 20 per cent in all Royal Prussian voivodships and also in Brzeskie Kujawskie and Inowrocławskie is indicative of a substantial demand from the brewing industry based, in particular, in north Poland. The fact that barley made 20 per cent of total grain sales in Podolskie voivodship (Red Ruthenia) may be explained by the character

²⁷ The *starosta* was a manager in charge of a complex of royal estates.

²⁸ *Lustracja województwa mazowieckiego*, pt 1, p. 41.

²⁹ *ibid.*, pt 1, p. 153.

of the soil there, which created favourable conditions for greater wheat crops as well. The level of 10 per cent of total sale was exceeded by barley also in Łęczyckie, Ruskie, and Bełskie voivodships. In neither of these areas did rye drive out barley. Nevertheless, rye supplied to the market did not exceed 50 per cent either. In voivodships where the share of rye in the market was higher (Mazowieckie, Rawskie, Lubelskie, Kaliskie, and Poznańskie), barley was sold in a much smaller quantity and did not form more than 6 per cent of the grain offered for sale by demesnes.

III

There has – rightly – been little dispute in Polish historiography about the importance of European demand for Polish grain in the development of a demesne economy based on coerced labour. This relationship was first noticed by the great pre-war Polish economic historians, Stanisław Kutrzeba and Jan Rutkowski.³⁰ Western European historians have for decades built their own theories about economic and social development around this insight, including the leading theory of Immanuel Wallerstein and its concepts of core and periphery and a world-economy.³¹ Others have explored the relationship between foreign demand, the introduction of forced labour and the transformation of the Polish peasants' social and legal status.³² But the theoretical models of economic development have sometimes seemed to lack support from primary sources. Meanwhile, a more detailed examination of the records has revealed that only 5 per cent of all bread grain produced in Poland was exported, which has resulted in a greater emphasis being placed on the domestic market.³³

In the sixteenth century, Poland entered a period of development and relative prosperity. In 1370, the estimated number of people inhabiting Poland was about two million, which gives a population density of 8.3 people per square kilometre.³⁴ By about 1580, the likely density of population in the three most important regions of the country (Greater Poland, Little Poland and Masovia) had increased to about 21.3 people per square kilometre.³⁵ It may be estimated that the entire territory of the Polish crown in the second half of the sixteenth century was inhabited by 3.65 million people, which implies that over 200 years the number of consumers in the domestic market had increased by more than 80 per cent. Almost one million of them lived in towns,³⁶ whose number increased from 688 at the end of the Middle Ages to 861 a hundred years later.³⁷ Although it was a characteristic feature of Central European towns that their inhabitants were involved not only in craftsmanship and trade, but also produced some of

³⁰ S. Kutrzeba, *Wzrost w historii gospodarczej dawnej Polski Rzeczypospolitej Polskiej*, (1920); J. Rutkowski, *Historia gospodarcza Polski* (2 vols, 1946), I, p. 128.

³¹ I. Wallerstein, *The modern world-system*, I, *Capitalist agriculture and the origins of the European world-economy in the sixteenth century* (1974).

³² W. Kula, 'Agrarian class structure and economic development in pre-industrial Europe', *Past and Present* 70 (1976), pp. 30–75; W. Kula, *Teoria ustroju feudalnego: próba modelu* (1962).

³³ *Historia Polski w liczbach*, (2 vols, 2006), p. 39; J. Topolski, *Przełom gospodarczy w Polsce XVI wieku i jego następstwa* (2000), p. 56.

³⁴ *Historia Polski w liczbach*, I, p. 51.

³⁵ I. Gieysztorowa, 'Ludność', in *Encyklopedia Gospodarcza Polski do 1945 roku* (2 vols, 1981), I, p. 431.

³⁶ *Historia Polski w liczbach*, I, p. 59.

³⁷ M. Bogucka, H. Samsonowicz, *Dzieje miast i mieszczaństwa w Polsce przedrozbiorowej* (1986), pp. 119, 332.

their own food,³⁸ the urban demand for grain still increased. The development of the domestic market is also discernible in the number of licences granted for fairs. In the first decade of the sixteenth century more privileges were issued than in the entire fifteenth century and this tendency continued in subsequent years.³⁹ In the sixteenth century the number of village fairs also increased and 'together with the development of grain market, trading villages were established along rivers'.⁴⁰

The significance of exports for the growth and evolution of the domestic market should not, however, be ignored. It is worth remembering that only 20 per cent of total grain production was put on the market. The rest was either consumed by its producers (60 per cent) or set aside as seed corn (20 per cent). Given this, it transpires that the 5 per cent of total grain supply being sold abroad made as much income as the 25 per cent sold through the domestic market. Therefore, foreign demand for Polish grain inevitably shaped the supply, prices and structure of grain production.

Jerzy Topolski divided Polish demesne farms into two categories according to their production focus. He called the first category 'expansionist' and the second 'autonomous'.⁴¹ The first were demesnes belonging to large landowners, specializing in production for export and thus narrowing the range of their crop production. The second category were demesnes run by gentry, who sold their more diversified farm produce in local markets. Although the number of autonomous demesnes was greater, grain prices, also on local markets, were indirectly dictated by the owners of expansionist demesne farms, which can be seen in the significant degree of unification and integration of the rye market. Royal demesnes scattered around various regions of Poland could also be assigned to these two categories. Some of them, especially in Royal Prussia, Masovia and Greater Poland, and those situated along the Vistula or its navigable tributaries, were focused on producing grain for export and this determined their production strategies. All expansionist demesnes, royal ones included, were focused on growing rye and shipping it to Gdansk. This preference had inevitable consequences for the market situation of wheat and barley. Given that 70–75 per cent of total grain production in Poland came from peasant farms, it is obvious that also this group too, and not only the owners of autonomous demesnes, felt the consequences of the export grain trade on the Polish economy.

³⁸ H. Samsonowicz, 'Małe miasto w środkowej Europie późnego średniowiecza (próba modelu)', *Roczniki Dziejów Społecznych i Gospodarczych* 50 (1989), pp. 35–6.

³⁹ *Historia Polski w liczbach*, II, p. 132; H. Samsonowicz, 'Przemiany osi drożnych w Polsce późnego średniowiecza', *Przegląd Historyczny* 64 (1973), p. 708.

⁴⁰ J. Maroszek, *Targowiska wiejskie w Koronie Polskiej w drugiej połowie XVII i w XVIII wieku* (1990), pp. 39–40.

⁴¹ J. Topolski, *Polska w czasach nowożytnych. Od środkowoeuropejskiej potęgi do utraty niepodległości (1501–1795)* (1994), p. 27.