
PROBLEMS

Money, Prices, Values and Purchasing Power from the XVIth to the XVIIIth Century

Istvan N. Kiss

Magyar Mezőgazdasági Múzeum, Budapest

It is generally believed amongst economic historians that the movement of prices and inflation or deflation of the value of currency are among the most important indicators for measuring the state of the economy. A series of widely differing causes and effects contribute to the formation of such indicators, and in no period of history can the development of prices be traced back to one single cause. It would be very difficult to determine or measure the real importance of any one of these internal, interacting effects, and as most of the literature on the subject shows, we can for the most part only draw on estimates and hypotheses in this field.

Representativeness of prices

The study by Braudel and Spooner, which appeared in 1967, offers an excellent critical international survey of the results of research on the history of prices.¹ There is no doubt as to the central importance of the general orientation and conclusions of this work. While stressing this, we would venture to express a few critical remarks. There is, for instance, a regrettable lack of concrete price series, which is not made good by the footnotes or diagrams that have been included. Although the chapter on the history of money provides a very good survey, no mention is made of the history of the florin, the money of account of the kingdom of Hungary. As is generally known, Hungary was the centre for the rearing and export of oxen in Europe between the XVIth and

¹ BRAUDEL, F.P. and SPOONER, F.: *Prices in Europe from 1450 to 1750*. In: *The Cambridge Economic History of Europe*. 1967. Vol. IV. p. 368-486.

XVIIIth centuries, and yet the price series for Hungarian oxen are not given in the study.

In our view the results of research on the history of prices (i.e. price series) must be reviewed in relation to their social and economic significance, because historical prices do not represent the volume of production and consumption in a given period, but cover only a fraction of the goods that were in fact produced and consumed; in other words they cover only a rather narrow sector of production and consumption. For example, Poland's exports of rye to Western Europe, which strongly influenced the movement of prices for rye in the XVIth and XVIIth centuries, only accounted for 5% of that country's production. In the same period, the 100,000 head of oxen exported from Hungary played an important part in the supply of meat to Central and Southern Europe but represented at most 3% of total beef production. In addition even the export of 200,000 head of cattle, which took place in exceptional conditions, accounted for only 5-6% of total beef production.

Martin Schwartzner, the great pioneer of economics and statistics in Hungary, described the country's situation in a work published at the beginning of the XIXth century in these words: "Mere political or historical chance cannot totally destroy the trade of a country like Hungary, which produces so many raw materials... and so long as Hungary's soil is not altered by some natural revolution and money-consuming luxury does not become widespread on Hungarian farms, Hungary cannot lose, even if her general trade structure completely excluded all home-produced factory goods!"² The Hungarian economist does idealize this state of backwardness to some extent, since only a few nobles could afford the luxury of foreign goods and self-sufficient farms provided no steady market in the countryside for industrial goods. However, his description basically holds good, for the majority of the productive population were still at the turn of the century living within a fairly closed frame-work of autarchy, in which market conditions and prices could play only an insignificant secondary role. There was, of course, even then a market for oxen, wine and cereals, but it amounted to only a relatively modest proportion of total consumption.

With some justification one might ask firstly whether it is possible to determine the general level of consumption of the area in question on the basis of known data for prices and wages, which relate to only a fraction of the population, and secondly whether this basis is sufficient for a statistical analysis and an accurate assessment of the standard of living. We would argue that the available sources for prices only hold good for the towns and areas from which they are drawn. We believe, therefore, that applying such price statistics on a wider scale in order, for example, to determine the trend of European social

² SCHWARTZNER, MARTIN: *Statistik des Königreichs Ungarn*. Vol. I-III. 1809-1811. Vol. I p. 436-445.

and political development, is exaggerated, hypothetical and unrealistic.³ It is an established fact that between the XVIth and XVIIIth centuries, at least in Eastern Europe, most production and consumption took the form of direct exchange and auto-consumption without the use of money. Furthermore, the sources are only partial and incomplete, even for those areas where prices may have played a greater part. The existing data on prices that are available for such international research are of little value on a wider scale, and this is something that must always be borne in mind.

Money of account and inflation.

One essential prerequisite for any analysis or explanation of price history is a thorough knowledge of the relevant currency and of the means of expressing its *value*. This is generally so complex that researchers can usually be familiar only with the monetary history of their own country. Between the XVIth and XVIIIth centuries coined money had a specific intrinsic value based on its fine weight. The various coins were changed at exchange rates that determined the intrinsic value of currency. In this case we should leave out of consideration fluctuations in rates of exchange which were due to exceptional and unexpected influences. But as the different coins varied in their silver and gold fine weight, it was difficult to determine their worth and exchange value in everyday life. To solve this problem the system of the money of account was introduced throughout Europe.

The money of account varied in nature according to country or even region, and formed a system of account by which it was possible to express given prices in different coins, carry out calculations based on standard values and conduct business on a uniform basis. As Braudel stated: "A study of monies of account involves not only prices and precious metals, but also the respective levels between the different national or regional economies into which Europe was divided".⁴

Each money of account retained its internal divisions, so that a *livre tournois* always equalled 20 *sols* or 240 *deniers* and a Hungarian florin 100 *denars*, independent of whether the fine weight of the money in question had increased or diminished in the meantime. Since the fine weight of coined money showed a tendency to fall, slow inflation of the money of account became typical throughout Europe.

³ Braudel and Spooner also argue that price series have little relevance to economic development: "prices are not just economic evidence". (See note 1). Their conclusions are however reached by a different route, as we have pointed to the unrepresentativeness of price series, to the autarchy of peasant economies and to direct non-market exchange.

⁴ BRAUDEL and SPOONER: *Prices...* p. 390 (See note 1).

The inflation of the money of account varied in intensity and tempo in each European country.⁵ Within one and a half centuries, but not quite in the same period of time, the inflation of four European monies of account developed as follows:

TABLE 1

THE SILVER EQUIVALENT OF CERTAIN MONIES OF ACCOUNT⁶

Type of coin	Year	Silver equivalent grammes	Silver equivalent index	Inflation rate of money of account
Cologne mark	1370	12.14	100	—
	1511	6.19	51	196%
Guilder	1499	19.80	100	—
	1645	9.72	49	203%
Livre tournois	1489	22.99	100	—
	1641	8.37	36	275%
Hungarian florin	1526	29.00	100	—
	1657	17.00	58	171%

From the turn of the XVth/XVIth centuries until the mid-XVIIth century, in the period of the price revolution, the Netherlands' money of account lost about half its fine weight, the French *livre tournois* almost 2/3 and the Hungarian florin 42%. The general inflationary trend is unmistakable, but the fall in silver equivalent had different proportions everywhere. Only a comparative study on the most recent research can offer us a complete overview.

It is generally well known that an abrupt fall in the face value of money is not due only to the decline in its silver fine weight. In this connection, Braudel refers to the calculations made by Luigi Einaudi,⁷ who traced 35.5% of the 627% inflation of the *livre tournois* between 1471 and 1598 to the fall in the value

⁵ See the comparative table in BRAUDEL and SPOONER: *Prices...*, Figure 4 p. 458 (See note 1). For the causes and development of inflation in France RICHET, DENIS: *Causes of Inflation in France in the XVIth Century*. Problems of Measurement and Interpretation, in «Journal of European Economic History» 1975, No 3, p. 707-715.

⁶ On the Cologne Mark - IRISGLER, F.: *Industrial Production, International Trade and Public Finances in Cologne*. «Journal of European Economic History» 1977, No. 2 p. 269-306. On the guilder - TIJMS, W.: *Prijzen van granen en peulvruchten*, Groningen 1977. *Historia Agriculturae* No 11, 16., p. 32. On the livre tournois - according to Dieudonné's tables, quoted in SCHRÖTTER, F.: *Wörterbuch der Münzkunde*. Berlin 1970, p. 357. On the Hungarian florin - HUSZAR, LAJOS: *Die Münzen der Könige des Hauses Habsburg*. "The coins of the Hapsburg Kings" (Hun.) Budapest 1975, p. 46

⁷ BRAUDEL and SPOONER: *Prices...* p. 442 (See note 1).

of the money of account, and 64.5% to other causes, such as the influx of silver from Spanish America. As the fine weight of the French *denier* fell in the period between 1493 and 1575 alone by 51% and that of the French *douzaine* by 45% at the same time, Einaudi's observation regarding the fall in the French money of account hardly seems exaggerated.⁸ But other factors that affected inflation are much more important for Western Europe than for the kingdom of Hungary. The proportion which Einaudi fixed at 64% would in the case of Hungary amount to 15-20% at the most, and it has so far been impossible to confirm that the influx of American silver had any effect at all in the kingdom of Hungary.

The Hungarian money of account always consisted of 100 *denars*. This leads us to ask how close was the connection between the decline in the silver fine weight of the *denar* and the fall in the value of the florin.

TABLE 2

THE DECLINE IN FINE WEIGHT AND INFLATION
OF THE HUNGARIAN FLORIN

Year	Fine weight of denars, in g. silver	Index of fine weight	exchange rate of taler in den.	Index of exchange rate of taler
1540	29.0	100	93	100
1657	17.0	58	152 *	163 *
			180 **	193 **

* In Western Hungary

** In Eastern Hungary

The inflation of the money of account, as reflected in the exchange rate of the *taler*, was lower (163%) in the west of the country and considerably higher (193%) in the east than can be explained by the fall in the silver fine weight. In explaining this one must, however, bear in mind that in the XVIIth century the relative value of silver to gold fell back markedly. The ratio of silver to gold was 10.98 in 1540, and had fallen to 14.51 in 1657, so that silver lost 32.14% of its earlier purchasing power. Consequently 17 g. of silver fine weight in 1657 only represented a purchasing power of 11.6 g. silver in XVIth century. Bearing this in mind we can establish that the decline in the silver fine weight caused a 171% inflation, which rises to 250% inflation if the loss of value of silver on the market is taken into account. To sum up: the loss in value of the silver fine weight caused 250% inflation in purchasing power, which was much higher

⁸ SPOONER, FRANK C.: *L'économie mondiale et les frappes monétaires en France, 1493-1680*. Paris 1956. p. 336-337. For the introduction of foreign precious metals see MORINEAU, MICHEL: *Or brésilien et gazettes hollandaises*. *Revue d'Histoire Moderne et Contemporaine* 1978. No. 1. p. 3-60

than the rise in the exchange rate of the *taler* i.e. +163% for Western Hungary and +193% for Eastern Hungary.

What form did this inflationary tendency take on the market, and how was it reflected in the movement of prices of various goods? Prices for oxen generally rose more rapidly than could be justified through the decline in the fine weight of the money of account. In Hungary, the price of a cow was 2.12 florins in the mid-XVth century, and in the 1650s 7 florins, a rise of 330%. In Nuremberg in the same period the price for oxen rose from 12.25 to 48 guilders, a rise of 315%. In Vienna, also in the same period, the price of oxen climbed from 7.5 to 24.76 florins, becoming 303% dearer.⁹ The inflation of the money of account was in all three examples both steeper and more marked than would have resulted from the decline of the silver fine weight. On the basis of the instances mentioned above it could be argued that the inflation of the money of account was indeed brought about in the first place by the decline in the fine weight, but that a smaller and more modest proportion of the inflation (20-25%) can only be explained by other influences and effects.

The Hungarian florin as money of account.

In his study of French coinage F. Spooner draws our attention to the fact that "instead of studying money on the basis of prices, we should in fact study prices on the basis of money".¹⁰ Given the uneven and complex nature of monetary history we would be inclined to accept Spooner's view. In the data series for the different monies of account that have been compiled by European economic historians, the Hungarian florin is virtually absent.¹¹ Only certain more recent publications, together with our own research, make it possible for us to offer a survey of the development and role of the florin.

When the Hapsburgs acquired the kingdom of Hungary in 1526, the Hungarian florin was already established as the money of account. The Rhenish florin, (*florenus Rhenensis*), equivalent to 60 *kreutzers*, which was the money of account of the hereditary and South German lands, at first had a lower purchasing power than the Hungarian florin, but with the fall in the fine weight of the Hungarian *denar* the difference was slowly eliminated and by 1580 the Rhenish (or German) and Hungarian florin were already equal in terms of purchasing power.

⁹ The relevant data are in Tables 7, 9 and 10 in the second half of the essay.

¹⁰ SPOONER: *L'économie...*, p. 289 (See note 8).

¹¹ "The monetary development of Hungary is known only through a few very rare texts, particularly from the Middle Ages". DESPAUX, ALBERT: *Les dévaluations monétaires dans l'histoire*. Paris 1936. p. 450. The source material, including 1367 figures for the exchange rate, is given by HORVÁTH, T.A.: *Veränderungen der Talerkurse in Ungarn von 1542 bis 1700*. "Changes in the exchange rate of the taler in Hungary between 1542 and 1700" (Hun.) Numizmatikai Közlöny (Budapest) 1963/64 p. 25-50.

As is well known, the Hapsburg monarchy — especially through the Hungarian kingdom — owned its own mines for precious metals, and so was in a position to ensure an uninterrupted supply of good silver coin. The silver *taler*, with 25 g. of fine weight on average, entirely dominated the markets of Central and Eastern Europe, and soon the Levant as well. The Hungarian authorities fixed the exchange rate of the *taler* in money of account, like other European countries. As well as this rate, which was adjusted from time to time depending on changes in values, there were also in the country several unofficial rates for the *taler*, which frequently changed. The following table is a summary which shows these average values and includes the figures for official as well as unofficial rates. The material in Table 3 was published in 1964 and this has enabled us to prepare new aggregates of exchange data. These data series are shown in Table 4.

TABLE 3

THE EXCHANGE RATE FOR THE *TALER* IN 10-YEAR PERIODS ¹² -
WEIGHTED AVERAGES IN *DENARS*

Years	Western Hungary		Mountain area		Plain		Eastern Hungary ¹³	
	No. of data	<i>denars</i>	No. of data	<i>denars</i>	No. of data	<i>denars</i>	No. of data	<i>denars</i>
1541/50	7	93	—	—	—	—	3	90
1551/60	17	93,7	1	100	—	—	4	100
1561/70	13	97,2	3	100	2	144	4	98,3
1571/80	22	97,6	1	93	—	—	2	100
1581/90	15	99,1	1	100	—	—	5	103,8
1591/1600	14	107,5	—	—	—	—	7	101,4
1601/10	17	107	2	115	—	—	12	107,1
1611/19	27	122,4	1	130	2	125	14	125
1620/23	19	306	6	210,8	1	400	19	288,6
1624/30	82	135	9	152,2	2	150	68	164,3
1631/40	87	152,2	9	165	10	155,5	109	174,7
1641/50	80	149,9	—	—	—	—	66	177
1651/60	81	153,5	4	182,5	1	160	67	179,3
1661/70	49	151,4	1	150	1	200	65	185,6
1671/80	24	157,7	3	160	1	273	61	188,2
1681/90	26	154,3	1	150	8	199,6	54	196,2
1691/1700	21	169,8	3	180	2	177	25	191,2

¹² We were responsible for the regional analysis of the data.

¹³ Compulsory exchange rate of the Turkish authorities in Ofen (Buda).

TABLE 4

FURTHER DATA FOR THE EXCHANGE RATE OF THE TALER
IN DENARS IN THE KINGDOM OF HUNGARY, 1545-1711¹⁴

Years	Western Hungary	Mountain area	Plain	Eastern Hungary
1541/50	93-95 ^f	95 ^g	—	93 ^h
1551/60	97 ^f	93.5 ^g	—	93 ^h
1561/70	100 ^f	—	—	—
1571/80	123 ^a -100 ^f	—	—	—
1581/90	100 ^f	—	—	—
1591/1600	100 ^f	105 ^g	105 ^g	105 ^h
1601/10	112-120 ^f	110-112 ^g	—	108-120 ^h
1611/19	125-140 ^f	126 ^g	—	125 ^b -150 ^h
1620/23	250 ^f	405 ^g	—	—
1624/30	150 ^f	140-200 ^g	124 ^g	200 ^h
1631/40	150 ^f	150 ^g	160 ^g	180 ^h
1641/50	150 ^f , ^a	180 ^g	158.6 ^g	180 ^h
1651/60	150 ^f	180 ^g	158.6 ^g	180 ^h
1661/68	150 ^f	180 ^g	176 ^g	180 ^h
1669/80	165 ^f	198 ^g	240 ^g	200 ^h
1681/90	165-175 ^f	210 ^g	—	200 ^h
1691/1700	150 ^c , 175 ^f	210 ^g	—	180 ^c , 210 ^h
1701/07	175 ^d , 175 ^f	240 ^g	—	210 ^d , 240 ^h
1708/11	200 ^f	240 ^g	—	240 ^h

At first sight the data on the exchange rates in these two tables seem to vary substantially since the figures in Table 4 seem consistently higher than those in Table 3.

- ¹⁴ a - KIETAIBL, H.: *Aus den Waisenbüchern des Marktes Purbach am Neusiedler See, 1550-1650*. Burgenländische Heimatblätter 1974. No 3/4. p. 126, 178
- b - Letter of the Upper Ungarian KAMMER: *Magyar Gazdaságtörténeti Szemle* (Budapest) 1900 p. 190.
- c - Archive of the Károlyi family, OL (State Archive in Budapest) P 396, Act a Publica 17/b.
- d - According to the receipts of the KAMMER of the Hungarian government. TAKÁCS, J. *Die allgemeine Steuerpflicht in der Zeit von II Rakoczi Ferenc*. "General taxation in the time of II R.F.". (Hun.) 1941 p. 63
- e - For the years 1622-30 4 data were provided, 20 for 1631-40, 15 for 1641-50^c 7 for 1651-60, 5 for 1661-70 and 8 for 1671-81. BUZA, J.: *Der Kurs des Goldflorins und Talers*. "The exchange rate of the gold florin and taler" (Hun.) *Történelmi Szemle* (Budapest) 1977. No. 1. p. 77-78.
- f - The data for the towns of Nagyszombat and Pressburg, KAZIMIR, ST.; *Vývoj realnej hodnoty drobných strieborných minci na Slovensku v rokoch 1526-1711*. Numismatický Sborník (Prague) 1964 p. 171-216
- g - The data for the town of Besztercebánya (See note 12f).
- h - The data for the towns of Lőcse and Bartfa (See note 12f)

TABLE 5

COMPARISON OF THE TWO EXCHANGE RATES
OF THE TALER IN DENARS (Tables 3 and 4)

Years	Western Hungary		Mountain area		Plain		Eastern Hungary	
	Tab. 3	Tab. 4	Tab. 3	Tab. 4	Tab. 3	Tab. 4	Tab. 3	Tab. 4
1541/50	93	93	—	95	—	—	90	93
1551/60	93	97	100	93	—	—	100	97
1561/70	97	100	100	—	144	—	98	—
1571/80	98	115	93	—	—	—	100	—
1581/90	99	100	100	—	—	—	104	—
1591/1600	107	100	—	105	—	105	101	105
1601/10	107	120	115	112	—	—	107	115
1611/19	122	130	130	126	125	—	125	140
1620/23	306	250	211	405	400	—	289	—
1624/30	135	150	152	200	150	124	164	200
1631/40	152	150	165	150	155	160	175	180
1641/50	150	150	—	180	—	159	177	180
1651/60	153	150	182	180	160	159	179	180
1661/70	151	150	150	180	200	176	186	180
1671/80	157	165	160	198	273	240	188	200
1681/90	154	175	150	210	200	—	196	200
1691/1700	169	175	180	210	177	—	191	200
1701/11	—	200	—	240	—	—	—	240

As the data in *Tables 3 and 4* refer to the same regions, the much higher values in *Table 4* may mean that the figures drawn up later included fewer official estimates and more unofficial data for rates of exchange, which were therefore *ipso facto* higher than the official figures.

As the tables clearly show, the *taler* represented varying silver fine weights according to its exchange rates in money of account in the west or east of the country. A price of 10 florins in Western Hungary around 1550 was equivalent to a fine weight of 234 g., while in Eastern Hungary it was equivalent to 250 g. of silver. This variation in exchange rates was firmly established throughout the country, with a few fluctuations. The 10 florin price mentioned above represented about 243 g. in the West in about 1630, and in the East about 279 g. of silver fine weight. Some decades later, during the Turkish wars of the 1660s, the same florin price was equivalent in Western and Eastern Hungary to 242 g. and 297 g. respectively of fine weight. We cannot fully explain this phenomenon, but one must emphasize that it was connected with the influx of Polish small coin into Hungary. Each year several hundred thousand *talers* were struck from Hungarian silver, and used by the Hapsburgs for political purposes, while the production of smaller silver coin always remained well behind demand. Although

the Hungarian parliament (*Landtag*) strongly criticized the Vienna government's coinage policy, the shortage of small coin became a permanent feature in the country. The needs of money circulation were satisfied by a massive influx of Polish small coin. These Polish *polture* and *groschen* had a lower fine weight than the equivalent Hungarian coins and an exchange rate that was unfavourable to the Hungarian coins meant that the good Hungarian coin could be bought up and exported. Although this was strictly forbidden, it provided a flourishing business for certain Hungarians and foreigners throughout the XVIth and XVIIth centuries. In the Eastern zones of Hungary, state taxes were converted into Polish small coin as early as 1550. The royal *Kammer* in Eastern Hungary made many complaints about the situation and announced in a letter to the *Hofkammer* that in Poland lighter small coin to the value of 100,000 florins were minted every year and found their way into the Hungarian market.¹⁵

The different regional exchange rates of the money of account were so firmly established that in 1671 the Hungarian *Hofkammer* introduced an official rule that a *taler* should be equivalent to 1.5/1.6 florins in the West of the country and 1.8/2.0 in the East. This official double rate remained in force until about 1720 and even with the increase in the value of the *taler* in both East and West the differential in the exchange rate remained intact. When the coinage system was officially reorganized in the XVIIIth century the higher, Eastern rate for the *taler* was introduced everywhere, so that the value of a *taler* became equivalent to 120 *kreutzer*, or 240 *denars*, i.e. 2.4 florins.¹⁶

These different rates of exchange typified the Hungarian money of account throughout the XVIIth and part of the XVIIIth century. This meant that anyone could make a 20% profit merely by transporting a sum of money to a city 200 or 300 kilometres away and changing it there. One can imagine what opportunities this opened up for speculation and fraud. The double exchange rate was also indicated in the official accounts: "*Rheneses floreni 1000, Kr. 13 facit Hungaricos florenos 1200, denarii 26*".¹⁷ This entry is from 1711 and plainly shows that the money of account that was called "*florenus Rhenensis*" in Western Hungary¹⁸ was known as "*florenus Hungaricus*" in the East, and had a value of 100 and 120 *denars* respectively.

What effects did the Hungarian money of account with its varying rates of exchange have on prices? If we do not know from which exchange rate area prices originated, we could make an error of 25-30% in our conversions into *talers* or *ducats*. The prices in *talers* are reliable, but those given in money

¹⁵ HARKO, GYULA: *Die Geschichte des Geldes in Ungarn 1526-1608*. "The history of money in Hungary between 1526 and 1608" (Hun.) Kolozsvár 1912. pp. 97-99.

¹⁶ HORVATH, T.A.: *Veränderungen...*, pp. 25-26, 47 (See note 12)

¹⁷ Domäne Nagykaroly, OL (Budapest) Karolyi Archive P. 397 Rationes 82 fasc.

¹⁸ That part of the kingdom of Hungary that was not occupied by Turks, and excluding historical neighbouring states and Transylvania.

of account (and most are of this type) are difficult to calculate. The tables of exchange rates (*Tables 3, 4 and 5*), which we were able to draw up, provide material and a guide for further research, but up to 20 years ago no one in Hungary made any distinction between the two prices for florins in the XVIth and XVIIth centuries, although, as the tables show, this is of fundamental importance.

The economic significance of the coinage.

After examining the function, movement, inflation and function of the money of account we must also look at the coin, the minted money, as the sums stipulated in money of account were ultimately calculated in these coins. The process of minting coin was highly complicated and peculiar to each region and province, hence the difficulties of conversion. Rather than describe the problems here in detail, let us examine how the volume and value of the coinage was related to the general level of economic development.

There is no doubt that the volume of money coined each year will influence economic life. But if we ask whether the volume and value of the annual coinage also represents the level of development of a country, the answer is neither straightforward nor unequivocal. A comparison of the geographical and demographic data of the French and Hungarian kingdoms in the XVIth to XVIIIth centuries indicates that there were great differences.

POPULATION AND TERRITORY IN FRANCE AND HUNGARY
(XVIth-XVIIIth centuries)

	France	Hungary
1550-1650	450,000 km ² 17.5 million inhabitants	110,000 km ² 1.0 million inhabitants
1680-1695	500,000 km ² 18.0 million inhabitants	190,000 km ² 2.0 million inhabitants
circa 1748	550,000 km ² 19.0 million inhabitants	215,000 km ² 3.5 million inhabitants

In this period France had the highest population in Europe, and a strong economy. She had successfully waged a series of wars and expanded her territory sevenfold during the XVIIth and XVIIIth centuries. But about half of the territory of the kingdom of Hungary was occupied by the Turks for 150 years, and in the XVIIIth century it absorbed great waves of foreign emigrants and, as is generally known, it was also economically backward in relation to Western Europe.

If we compare the quantity of precious metal circulating as coin in France and Hungary at given periods, we obtain the following picture:

TABLE 6

THE WEIGHT OF PRECIOUS METAL IN FRENCH
AND HUNGARIAN COINAGE, in quintals¹⁹

Year	France		Kingdom of Hungary	
	gold	silver	gold	silver
1534	5.186	5.26	2.286	38.80
1553	0.741	114.90	1.568	35.17
1565	11.125	106.41	2.456	56.61
1680/1695	45.418	794.65	4.083	160.98

At the four dates in question 10.39 quintals of gold and 291.56 quintals of silver were coined in Hungary, while for France the figures were 62.46 and 1021.22 quintals of silver. If we look at population and territory, it is evident that although France was $4\frac{1}{2}$ times the size of Hungary and had a population as much as 18 times greater, France held only a modest lead in terms of issues of coin. In France about 6 times more gold coins were struck than in Hungary, but only $3\frac{1}{2}$ times as many silver coins.

If we convert gold to silver on the basis of the relevant exchange rate, then we obtain the following values: in these years the French mints issued a total of 1948.4 quintals of silver against Hungary's quota of 431.1 quintals. France, the leading economic and military power in Europe, with $4\frac{1}{2}$ times the territory and 18 times the population of Hungary, issued only $4\frac{1}{2}$ times as much coin as the Hungarian kingdom, which had an area of 110,000 sq.km. and a population of one million in the XVIth century.

If we convert the total annual weight of silver minted into *talers* (on the

¹⁹ We refer to France on the basis of data in SPOONER, F.: *L'économie... passim* (See note n. 8) and GUÉRY, ALAIN: *Les finances de la monarchie française sous l'Ancien Régime*. Annales 1978. No 2. p. 216-239. Also "Valeur de livre tournois en franc germinal" based on Dieudonné's tables, quoted in SCRÖTTER, F.: *Wörterbuch der Münzkunde*. Berlin 1970. p. 357 and SPOONER, F.: *L'économie... Graphique* 10-11, p. 110. For Hungary data are in HARKO, GYULA: "The history..." *passim* (See note 13), PECH, ANTAL: "The history of mining in lower Hungary" (Hun.) Vol I 1884, vol. II 1887 p. 139 and vol. III 1967 p. 589-593. HUSZAR, LAJOS: "Minting of coin in K.; 1748-1768" (Hun.) *Numizmatikai Közlöny* (Budapest) 1957-1958, p. 32-43. For the statistical data on Austrian-Hungarian coinage see BECHER, SIEGFRIED: *Das österreichische Münzwesen vom Jahre 1523 bis 1838*. Vols. I-II. pp. 246, 241 and 513.

basis that 1 *taler* = 25 g. of silver fine weight) and then divide the *taler* value by the population figure, we see the following distribution for each 1,000 head of population:

ANNUAL COIN ISSUE PER 1,000 HEAD OF POPULATION

Year	France	Hungary
1534	14.9 <i>talers</i>	264.9 <i>talers</i>
1553	27.4 *	212.6 *
1565	52.6 *	341.8 *
1612	12.6 *	221.9 *
1680	337.8 *	452.4 * (in 1695)
1748	?	159.0 *

In the kingdom of Hungary the annual coin issue in relation to population was 18 times greater in the XVIth and XVIIth centuries than in France. At the turn of the XVII/XVIIIth centuries this difference had diminished, but the quantity was still $1\frac{1}{2}$ times greater in Hungary than in France. Does this mean that there was a similar difference in the economic position of the two countries, to Hungary's advantage? This cannot, of course, have been the case. It is scarcely necessary to point out that in the XVIth and XVIIth centuries France's economic development and her volume of trade were of a much higher level than Hungary's. How can we realistically explain the high level of annual coin issue and the volume of newly minted money in each year in the kingdom of Hungary?

This can only be explained by a whole series of mutually sustaining causes. Firstly, most of the gold, and much of the silver production in Europe, came from the Hungarian mines,²⁰ despite the fact that at that time the population was barely 25% that of France. In France, periods of war always led to increases in the issue of coinage and the levels of taxation and loans. In Hungary, however, because the country became a permanent battle-ground between 1526 and 1699, one can only distinguish between intermittent warfare and the more major movements of international armies. There were no real periods of peace

²⁰ The production of Hungarian precious metal mines fluctuated in the XVIth and XVIIth centuries, and during the XVIIIth century contemporaries confirm the critical state of production. Yet even in the XVIIIth century the mining town of Selmecbanya (Schemnitz) the centre of the mining area, produced a considerable quantity of silver. Between 1620 and 1649 a total of 104.95 tons of silver were delivered to the mint in Kőrmöcbanya (Kremnitz), representing an annual rate of 3.498 tons of silver. This quantity was sufficient for a coinage of 140,000 *talers* per year. PECH, A.: *Geschichte...*, vol. I, p. 484 (see note 16)

in the true sense of the word. The new money that was minted every year was only partly absorbed by the national economy and was mainly devoted to the military needs of the Hapsburg empire. So the high level of coinage issue in Hungary had little significance as far as economic development was concerned, and should be seen rather as a result of these specific factors.

Monetary values purchasing power.

Prices have generally come down to us in terms of money of account and there are only very few series of prices in which the commodity values were recorded in *talers* or other silver coin. Owing to the problems involved in money of account — the regional differences, varying rates of exchange, different rates of inflation etc. — researchers have generally used the silver equivalent (i.e. the value of prices in terms of grammes of silver) in fact adopting the same system that was used in the XVIth century to convert prices into *talers*. Silver as a commodity had a market price of its own and was subject to great fluctuations. This factor must be borne in mind when analysing real prices, and the nominal price movement must be related to silver or gold equivalents. Consequently, one would expect individual prices, or series of prices, that appear in the sources to be uninformative and unsuitable for comparison with other prices. The equivalent in silver and gold values becomes a prerequisite for any comparison of prices.²¹

The three dimensional method of determining prices — using money of account, silver equivalent and gold equivalent — also involves allowing for differing ratios. Spooner's view of the price movement in France was that: "In the XVIth century the greatest pressure came from the rise in the price of the *livre tournois*, then secondly from that of silver prices, while gold prices rose more lethargically".²² My own research suggests that in a three-tier analysis of prices it is the fluctuations of silver prices that should be borne in mind rather than gold equivalent; in other words, the index figure expressing the market price ratio of silver to gold.²³ If we express the gold/silver ratio as a nominal

²¹ Without making any claims for the comprehensiveness of these works: - source material for the history of prices and wages in Austria, PRIBRAM, ALFRED FRANCIS; GEYER, RUDOLF; KORAN, FRANCIS. Vienna 1938. ZANETTI, DANTE: *Problemi alimentari di una economia preindustriale. Cereali a Pavia dal 1398 al 1700*. Turin 1964 pp. 99, 107. SPRENGER, BERND: *Preisindize unter Berücksichtigung verschiedener Münzsorten, also Bezugsgrößen für das 16 und 17 Jh., dargestellt anhand von Getreidepreisen in Frankfurt/Main*. Scripta Mercaturae 1977. No 1. p. 57-72. TIJMS: *Prijzen...* (see note 6) BRAUDEL and SPOONER: *Prices... passim and figures p. 459-464* (see note 1) IRSIGLER, FRANZ: *Getreideumsatz, Getreide- und Brotpreise in Köln 1368-1797*. LXVII, p. 1055.

²² SPOONER: *L'économie...*, p. 297 (see note 8)

²³ "Silber-Gold Äquivalente in Zehnjahres-Mittel". PRIBRAM: *Materialien...* p. 84 (see note 18)

index which reflects fluctuating silver values (i.e. its purchasing power) then when we adjust silver prices by means of this index we will arrive at the real purchasing power of silver prices at any given moment.²⁴

It is well known that in the early Middle Ages (Xth-XVth centuries) the gold/silver ratio remained fairly stable at 1:10. After the XVth century silver values²⁵ began to fluctuate for various reasons. Starting from the 1:10 ratio each fall in the value of silver, as when the ratio dropped to 1:12, caused the immediate decline in the purchasing power of all prices in silver coin. On the other hand, when silver became more valuable, for example when the ratio rose to 1:8, the purchasing power of the same silver coin on the market immediately increased.²⁶ So when studying any specific item (prices, wages, taxes, credits etc.), one must first establish the degree of inflation of the money of account and then examine the movement of purchasing power of the silver price, which always followed a shift in the gold/silver ratio on the precious metal market.

With this in mind, the index for the average price of oxen sold in Vienna between 1540 and 1790, for example is, as follows: (the index number represents the ratio for the decade 1531-1540).

Period	Price in florins	Price in g. of silver	Purchasing power of silver
1531-1540	100	100	100
1781-1790	745	365	63.8

²⁴ Bernd Sprenger has recently made an interesting attempt to establish the change in purchasing power of the German money of account, the guilder. He made use of price comparisons and did not examine the intrinsic value of currency. SPRENGER, BERND: *Über die Kaufkraft alter deutscher Münzen*. Money Trend, the international magazine on coins with a coin catalogue. 1977. No. 3/4

²⁵ In France a ratio of 1: 12 was generally considered to be "healthy" for gold and silver between the XVth and XVIIth centuries. Only in 1641 did the *Cour des Monnaies* acknowledge that the gold/silver ration was not fixed, but changing. A 1; 14.49 ratio of gold to silver was then already in effect in France. SPOONER: *L'économie...*, p. 86-89 (see note 8).

²⁶ When in the mid XIXth century world production of gold quickly began to increase and the price of gold began to sink, the purchasing power of silver immediately rose. MARTIN, DAVID A.: *The Impact of Mid-Nineteenth Century Gold Depreciation upon Western Monetary Standards*. «Journal of European Economic History» 1977. No. 3, p. 648.

The 750% rise in the price of money of account is reduced to an increase of only 350% in silver equivalent (price of grams of silver). But if we also take into consideration the change in the value of silver, that is, fluctuations in its purchasing power, then the average price of an ox rose from a base price in 1540 (100) to only 233 over two and a half centuries! This figure represents the purchasing power of the price, without the inflation of the money of account or the shift in the silver equivalent. Consequently this real and technically inflation-free price can be taken to represent the real rise in the price of oxen on the market which occurred over 250 years. To what extent this inflated price was affected by contemporary market conditions is a problem that remains to be solved.

To demonstrate this method *Tables 7, 9, 10* show the three ways of expressing prices in parallel columns. The prices in money of account, the silver equivalent and the purchasing power of the silver gram are given both in original values and as indices. The third series, which gives the probable purchasing power of the silver price on the market also enables us to compare and measure the real, hence inflation-free increase in the value of a commodity on various markets. To demonstrate this method we have used the price series for fattened oxen in Central Europe between XVIth and XVIIth centuries.

The reasons for this choice will be immediately apparent. First, there are comprehensive and continuous series of data to draw on for Northern and Southern Germany, and Vienna. From the early XVIth century all three regions became the main markets for the export of Hungarian oxen, so we can follow the way prices changed as the herds of cattle were moved from the breeding grounds and driven south from Denmark and west from Hungary and Poland, and thence to the consumer. By applying the three-tier price system (prices in money of account, silver equivalent and purchasing power) we can obtain real price data, which can then be compared and analysed. This allows us to measure the rate of growth of inflation, the price in silver equivalent and the real changes in purchasing power. For nearly 300 years we can study the changes in prices in the Central European cattle trading areas by looking at different price values both individually and in comparison with each other. In describing the sources for these prices, we hope both to demonstrate and prove the appropriateness and accuracy of the system we recommend.

Beef prices in Nuremberg.

C.L. Sachs provides data from which we can obtain a series of specific prices for sales of oxen on the Nuremberg cattle market. For the XVIth century we have 22 price series for 12 years, and for the XVIIth century there are 10 for 9 years. Using the method described above these prices are given in the following table:

TABLE 7

PRICES FOR OXEN ON THE NUREMBERG MARKET, 1530-1660²⁷

Year	Money of account		Silver equivalent		Purchasing power of silver price	
	guilders	index	silver g.	index	silver g.	index
1530	13.0	100	328.1	100	328.1	100
1533	15.25	117	359.9	109	363.1	110
1558	21.0	161	494.8	150	488.1	148
1559	18.0	138	423.8	129	418.0	127
1570	18.47	142	388.6	118	370.7	113
1575	20.0	153	420.8	128	431.8	131
1577	22.3	171	469.3	143	481.5	146
1594	23.0	177	449.0	136	453.8	138
1595	22.5	173	439.2	133	444.0	135
1597	24.16	185	471.8	143	476.9	145
1598	27.5	211	536.9	163	542.7	165
1599	29.5	227	575.9	175	582.1	177
1600	31.5	242	574.2	175	580.4	177
1601	29.0	223	528.7	161	517.5	157
1614	26.0	200	470.0	143	414.8	126
1621	34.5	265	587.8	179	462.6	141
1631	42.0	323	687.9	209	505.4	154
1633	40.0	307	655.2	199	481.3	146
1641	45.0	346	737.1	224	512.9	156
1650	48.0	369	786.2	239	547.1	166
1660	45.5	350	705.9	215	487.4	148

²⁷ SACHS, C.L.: *Metzgewerbe und Fleischversorgung der Reichsstadt Nürnberg*. Mitteilungen des Vereins für Geschichte der Stadt Nürnberg, Jg. 24, 1922, p. 1-260. The data in the 2nd and 3rd columns are adjusted.

- a. The conversion of the price in money of account into silver equivalent. We have applied the exchange rates for the taler given by Pribram and Becher using the following method: The price of an ox was 22.5 guilders in 1595. This equals (22.5×60) 1350 kreutzer. The kreutzer rate of the taler was equal, by the official valuation, to 71 kreutzers, according to the real exchange rate 75-80 kreutzers, giving an average prices of 77.5 Kr. Consequently $1350 \text{ kr.} : 77.5 \text{ kr.} = 17.4$ talers. The silver equivalent is therefore $17.4 \times 25.22 \text{ g} = 439 \text{ g. silver}$.
- b. Calculation of value of purchasing power. In 1614 the average price of an ox was 26 guilders, which equalled 470 g. silver. As in 1530, the base year, the ratio of gold/silver was 1:11.08, and in 1614 already 1:12.38, we are faced with an 11.73% decrease in silver value. Consequently, we must deduct 11.73% from the silver equivalent 470 g. in order to determine the real purchasing power on the market. The silver

The prices in money of account rose increasingly sharply throughout the period, and during the Thirty Years' War they shot up. In the second column are the prices in silver grams. Their movement seems to be roughly parallel to that of money of account, but of course there is a disparity between them that grows increasingly pronounced due to the inflation of the money of account. The third column, which represents the fluctuations of the real purchasing power of the silver price, gives a quite remarkable picture, as the relevant data show very evenly distributed fluctuations, unlike those in the first and second columns.

On the graph (Fig. 1) the three different curves with the same point of departure in 1530 are super-imposed. As we see, the prices in money of account indices, silver equivalents and purchasing power between 1530 and 1558 are still roughly parallel. But after 1570 the money price rises markedly, while the other two curves continue to follow an almost identical path until 1600. After 1614 the curves of both money of account and the silver price show a steep increase. But the very even movement of the third curve (of the purchasing power) shows clearly that the inflationary increases in the money of account and in silver prices caused no essential changes in the value relationships, at least as far as Nuremberg was concerned.

If this is expressed in specific figures we obtain the following picture: the average price of an ox weighing 4.5 *half-quintals*, that is, 2.3 quintals in the XVIth and XVIIth centuries on the Nuremberg cattle market was as follows. (The figure of 2.3 quintals represents the carcass weight of the animal).

TABLE 8

AVERAGE PRICES OF NUREMBERG OXEN
IN THE XVIth-XVIIth CENTURIES

Price	XVIth cent.	XVIIth cent.	increase in %
in guilders - (money of account)	21.2	37.9	+ 77.9
in silver g. - (silver equivalent)	446.5	637.0	+ 42.6
in silver g. - (purchasing power)	453.8	510.4	+ 12.3

equivalent of 470 g. represented a purchasing power of only 414 g. silver on the market compared with the base year (1530) also because of the fall in the value of silver. In other words, the sum of 470 g. in 1614 had no greater purchasing power than that of 414 g. in 1530.

Fig. 1 - Prices for oxen (of 2.3 quintals in weight) on the Nuremberg market, 1530-1660

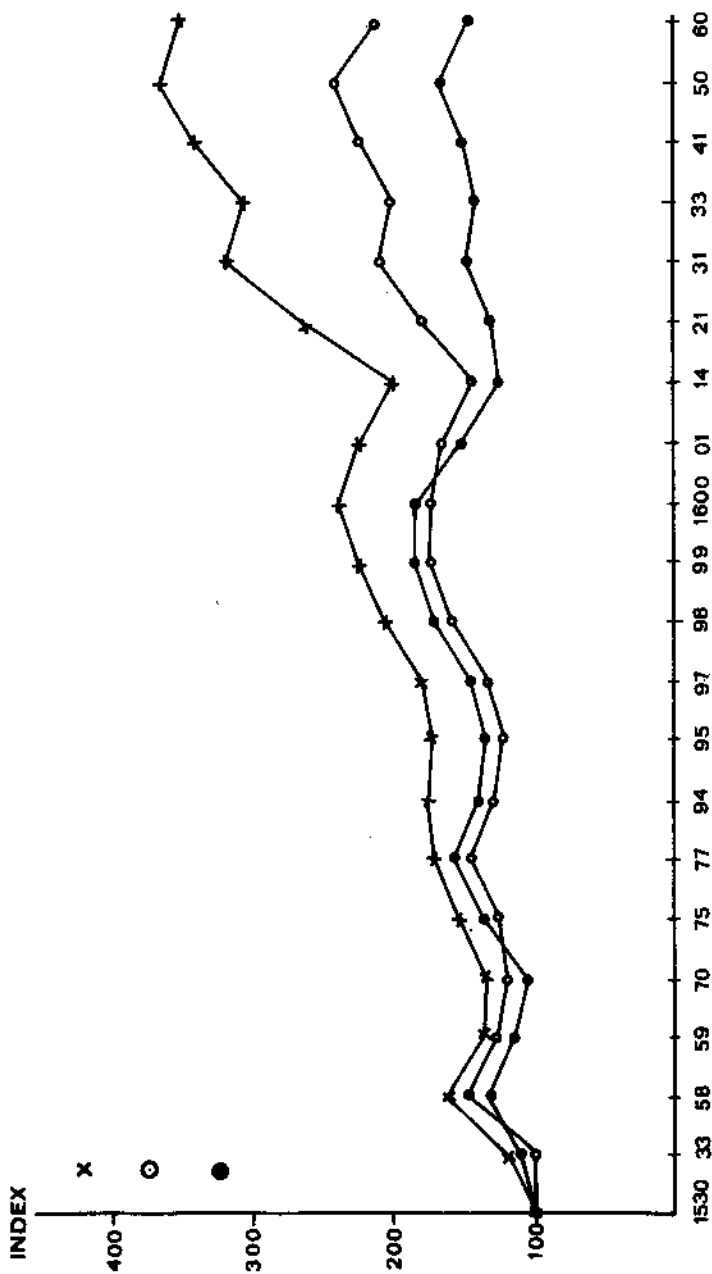
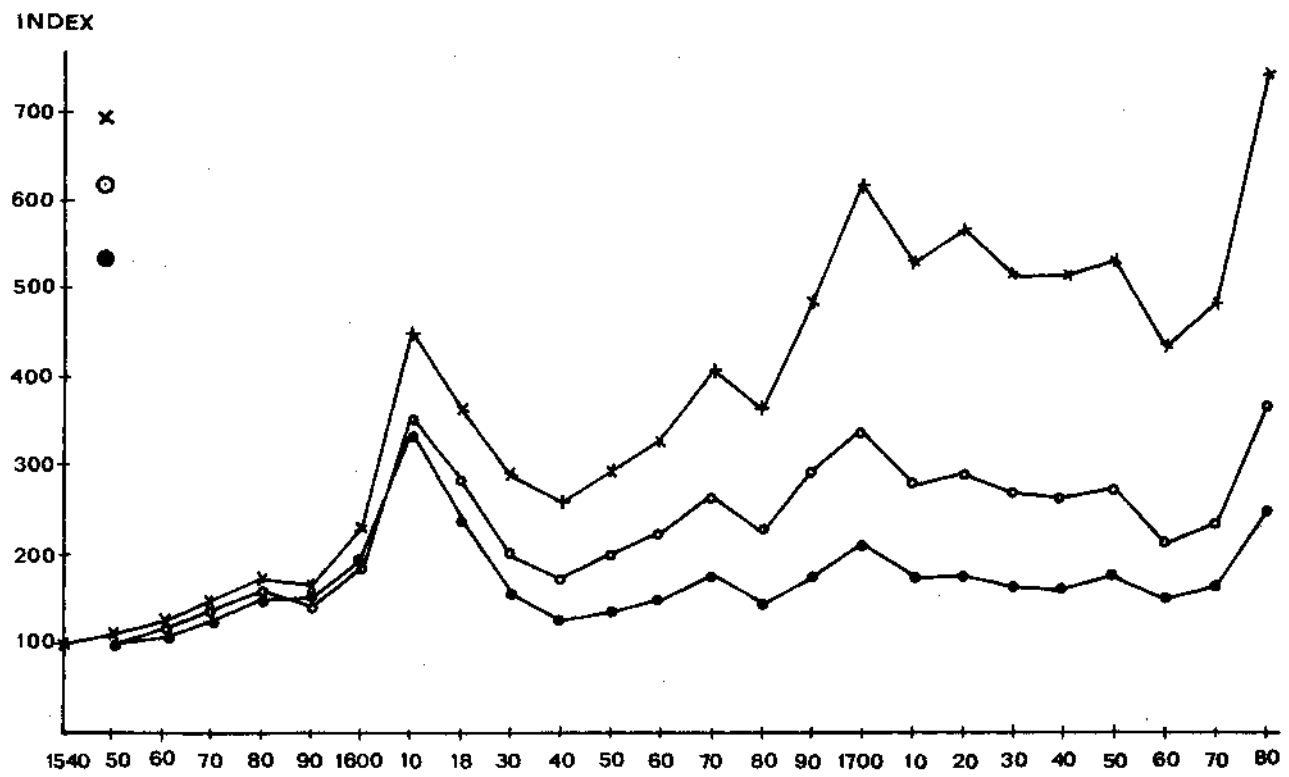


Fig. 2 - Prices for Hungarian oxen on the Vienna market in 10-year aggregates, 1530-1780



In the XVIIth century, prices in money of account had risen by almost 78% compared with the XVIth century, and even the price in silver grams shows a rise of 42.6%. But if the real purchasing power of the silver price is used, we arrive at a price rise of only 12%. One has, therefore, to be very careful when analysing price series. In the example given, the 78% rise in prices in fact conceals a rise of only 12% in terms of the true relative commodity value. And the extent to which this real price influenced the living standard of the population using the market, also depends on the wage situation²⁸ in the same period. In order to identify the various factors influencing prices on the Nuremberg cattle market, therefore, we would have to carry out a comprehensive economic and social analysis of the relevant sources.

Beef prices in Vienna

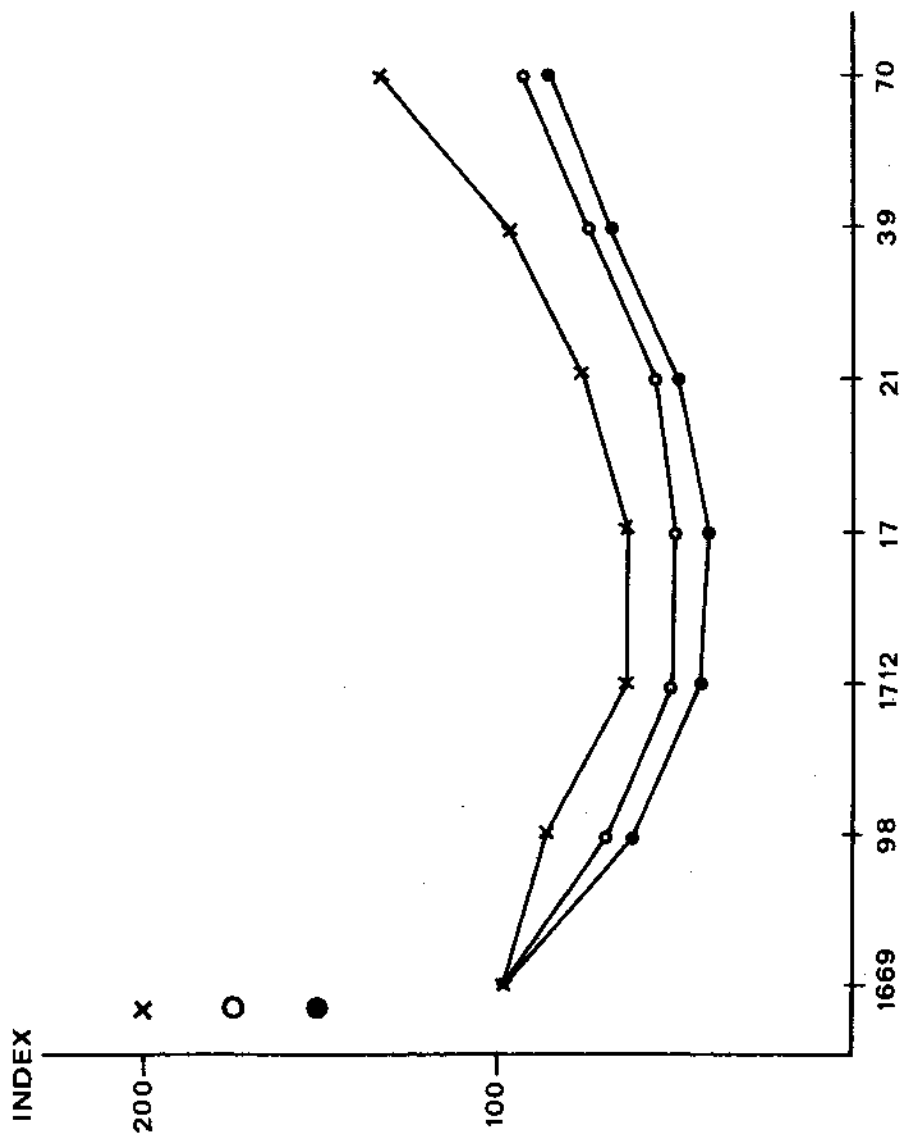
Beef prices on the Vienna market can be found in Pribram's classical study. The data in the first and second columns are taken from Pribram's book, but those in the third column, representing the value of purchasing power, have been adjusted. Attention is drawn to the first and final series in the table; compared with 1530-40, the price in money of account in 1780 had increased by nearly 750%, but in silver equivalent by only 350%. When we take the fall in purchasing power of the silver price into account as well, the real increase in price was only about 250%.

The graphs represent the movement of the indices for money of account, silver equivalent and purchasing power of silver. Up to 1600, the three curves follow a roughly parallel path, (Fig. 2), but in the XVIIth century the distances between the individual curves grow increasingly. After 1700 the values in florins are 7-8 times higher than in the initial period from 1530-40. The silver equivalent is on average three times higher in the XVIIIth than in the XVIth century. If we leave out the jump in prices around 1610, we would have a surprisingly even curve for the evolution of the purchasing power of silver. Compared with the base price (1530/40), the increase in the XVIth century amounts to only 50%, and this is largely retained in the XVIIth century and only increases slightly in the XVIIIth. The figures for 1540 are 179 g. of silver, for 1700 407 g. 1770 303 g. From the mid-XVIth century to the 1770s the real rise in price amounted — leaving aside the leap in prices in 1610 mentioned above — to only about 175%, which was not even double that of the initial value!

In order to discover the factors which determined prices over this period

²⁸ In order to take wages into consideration we must know their real value. "One must follow the trend, not of the nominal salary in *livre tournois*, but of the *real salary*, free of inflation and calculated in terms of purchasing power of food — wheat for, example".
LE ROY LADURIE, E.: *Malthus ou Marx*. Annales E.S.C., 1978. No. 1 p. 117

Fig. 3 - Prices of oxen on the Hungarian domestic market, 1669-1770



TAB. 9

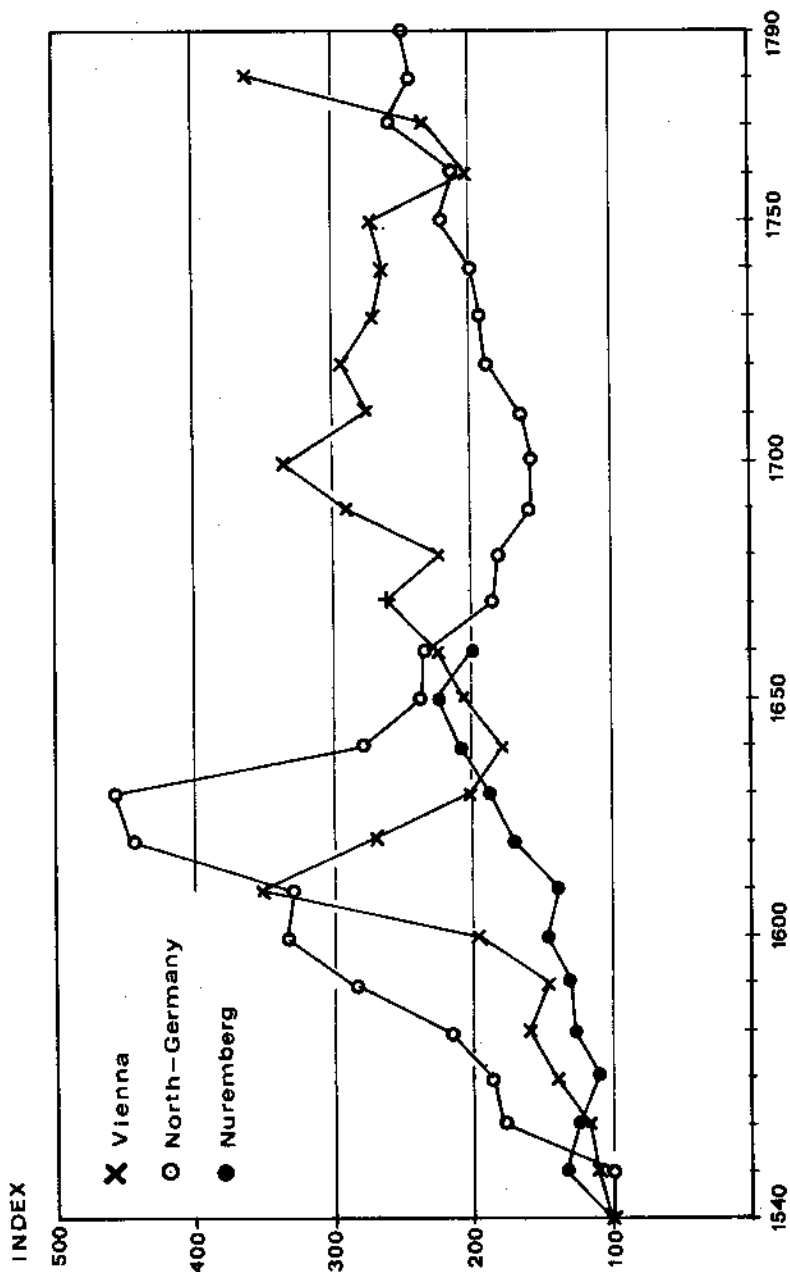
PRICES FOR HUNGARIAN OXEN ON THE VIENNA MARKET
IN 10 YEAR AGGREGATES, 1530-1730²⁹

Period	1. Money of account		2. Silver equivalent		3. Purchasing power of silver equivalent	
	florins	index	silver g.	index	silver g.	index
1530-40	7.50	100	179	100	179	100
40-50	8.31	110	184	103	184	102
50-60	9.61	128	213	119	208	116
60-70	11.20	149	255	142	240	134
70-80	13.37	178	282	157	286	159
80-90	12.63	168	261	145	266	148
90-1600	17.36	231	345	192	346	193
1600-10	34.04	453	637	355	617	344
10-18	27.68	369	499	278	435	243
25-30	21.61	288	363	202	281	157
30-40	19.34	257	323	180	234	130
40-50	22.28	297	369	206	252	140
50-60	24.76	330	406	226	273	152
60-70	30.44	405	480	268	333	186
70-80	26.88	358	405	226	262	146
80-90	36.57	487	529	295	324	181
90-1700	48.50	646	612	341	407	227
1700-10	39.98	525	504	281	312	174
10-20	42.47	566	535	298	331	185
20-30	38.65	515	487	272	305	170
30-40	38.28	510	483	269	298	166
40-50	39.78	530	496	277	313	174
50-60	32.73	436	383	214	272	152
60-70	36.32	484	425	237	303	169
70-80	55.93	745	654	365	446	249

of nearly 250 years, during which the inflation rate for oxen prices remained very steady, it would be necessary to re-examine the entire series for the economic and social history of the Hapsburg monarchy. In our view, this would make it possible to identify not only the real determinants of prices for oxen, but also the reciprocal influences operating between production, markets, consumption, export profits and government policy.

²⁹ For the 1st and 2nd columns PRIBRAM: *Materialien...*, p. 84 and 580-81. (See note 21) The data in the 3rd column have been adjusted by the author.

Fig. 4 - Prices for oxen on the markets of Nuremberg, North-Germany and Vienna, 1540-1790



Beef prices on the Hungarian domestic market.

As far as oxen prices on the domestic market are concerned, there is very scant information for the XVIIth century, but although we only have price series for cows these were in any case of prime importance for domestic consumption. We can also use hitherto unpublished material for oxen prices for the period after 1720, which also permit a survey of the market on a regional basis. By this time all official declarations on prices were already making a clear distinction between the average ox for export (of standard quality) and the special category (of special export quality). The prices in the following table include the weighted average values of over 20,000 head of cattle.

TABLE 10
PRICES FOR HUNGARIAN OXEN
ON THE DOMESTIC MARKET, 1669-1770 ³⁰

Year	Money of account		Silver equivalent		Purchasing power of silver price	
	florins	index	silver g.	index	silver g.	index
1669	40.0	100	650.6	100	650.6	100
1698	35.1	88	472.1	72	448.0	68
1712	27.0	66	340.4	52	321.3	49
1717	26.6	66	335.4	51	316.6	48
1721	29.8	74	375.7	57	356.9	54
1739	39.4	98	496.8	76	468.9	72
1770	52.5	131	613.7	94	608.1	93

The unusually high price level of 1669 was exceptional. The war with Turkey, which had only been concluded in 1664, had devastated the regions of Eastern Hungary which were devoted exclusively to the rearing of beef and the re-establishment of production was also hindered by the uncertainty of the political situation.

The sources clearly indicate that these oxen prices refer to the special export quality. The silver equivalent of the price was 25% higher than the price in Vienna in the same period. Hungarian oxen did not even during the famine

³⁰ N. KISS, ISTVAN: *Die Bedeutung der ungarischen Viehzucht für Ungarn und Mitteleuropa, 16-18 Jahrhundert*, in: *Internationaler Ochsenhandel der frühen Neuzeit 1350-1750*. Proceedings of the 7th International Economic History Congress, Edinburgh, 1978. Ed. E. WESTERMANN. 1979. Klett-Cotta.

of 1770-2, regain the peak value of 650 g. silver (which they reached in 1669), on the domestic market. In the XVIIIth century, the price of oxen followed a downward trend — in 1720 and 1740 the market price amounted to only 57% and 76% respectively of the silver price of 1669. In the period of the famine (1770-2) the silver price (613 g.) came close to the exceptionally high level of 1669 (650 g.) but did not exceed it. The price in 1770 was 6% lower than in 1669, but already we can see the sharp upswing in beef prices which is also evident from Pribram's data series. In Vienna, the average price of Hungarian oxen rose from 425 g. (1760/70) to 654 g. (1770-80). As much as 85-90% of Hungarian oxen exports in the XVIIIth century were directed towards the Hapsburg hereditary lands, and approximately a third of the exports supplied the imperial city of Vienna.³¹ If we compare the price movements on the Hungarian domestic market with the Vienna beef market, the following picture emerges:

OXEN PRICES IN EASTERN HUNGARY. INDEX: 1669 = 100

	1669	1720	1740	1770
Price in florins	40.0	29.4	39.4	52.5
index	100	74	98	131
Price in silver g.	650	357	496	613
index	100	57	76	94
Purchasing power of silver	650	356	468	608
index	100	54	72	93

OXEN PRICES ON THE VIENNA MARKET. INDEX: 1660-70 = 100 *

	1670	1720	1740	1770
Prices in florins	30.4	38.6	38.3	55.9
index	100	127	125	183
Price in silver g.	480	487	483	654
index	100	101	100	136
Purchasing power of silver	480	462	456	648
index	100	96	95	135

* The price for the year 1540 forms the basis of the Vienna series of beef prices. To compare Vienna prices with those on the Hungarian domestic market between 1669 and 1770 the base must be set at 1660/70 in Vienna also. In comparison with 1540 (the base year) by 1720 there was a difference of over 30% between the silver equivalent and the purchasing power of the price for oxen. But if we take 1670 as base year, then there is a difference of only 5% between the two values in 1720.

³¹ N. KISS, ISTVAN: *Die Krise der Fleischversorgung von Wien 1770-1773. Staatsraison, Handelsgewinn, Kapitalakkumulation*. In: *Beiträge zur Handels- und Verkehrsgeschichte* Ed. ROTH, P. W. Graz. 1978. p. 95-121. (Grazer Forschung zur Wirtschafts- und Sozialgeschichte, Band 3).

On the Vienna market the price movement was much more even — the silver equivalent of the price remained almost unchanged from 1670 to 1740. Only in 1770, during the famine in Central Europe, did prices rise sharply, and a slaughtered ox cost about a third more than in the first half of the century. The traditional price differences between the markets of Hungary and Vienna were re-established around 1770; a fattened ox, costing 613 g. silver in Hungary fetched a price of 624 g. in Vienna. During this period silver declined very little in value; from 1750 to 1770 the gold/silver ratio remained unchanged and between 1770 and 1780 its purchasing power decreased by only 2.2%.

One might conclude that the situation seems a little contradictory, for the price of oxen fell in Hungary in the XVIIIth century, while the price level remained unchanged in Vienna. This can, however, be explained, because in the 1740s the silver price was higher in Hungary than in Vienna, and because the Hungarian prices referred to the best export quality and the Vienna price to only standard quality. In Hungary they refer to fattened oxen of a live weight of more than 6.5 quintals. But as we have already mentioned, the old, traditional price difference between the Hungarian and Vienna markets was re-established during the famine years between 1770 and 1772. The price data which would clarify the way in which the pattern developed are not at present available for either Hungary or Austria.

A Comparison of the trend in beef prices over the century.

When we compare the trend in beef prices over the century on the markets of Nuremberg, North Germany and Vienna we are more struck by the variations than by the similarities. The following is a comparison of ox prices in four periods in terms of money of account, silver equivalent and purchasing power:

OX PRICES IN MONEY OF ACCOUNT.³² INDEX: 1540 = 100

	1540	1600	1630	1660
Nuremberg	13.0	31.5	42.0	45.5
index	100	242	323	350
N. Germany	7.7	25.8	35.7	18.5
index	100	335	463	240
Vienna	7.5	17.3	21.6	24.7
index	100	231	288	329

³² In Nuremberg and Vienna the guilder was the money of account, and in Northern Germany the Reichstaler. For the data for Nuremberg and Vienna see notes 27 and 29, and for those for Northern Germany see: WIESE, H and BÖLTS, J *Rinderhandel und Rinderhaltung im nordwesteuropäischen Küstengebiet vom 15. bis zum 19. Jh.* Stuttgart 1966. p. 85, 100.

OX PRICES IN SILVER G. INDEX: 1540 = 100

	1540	1600	1630	1660
Nuremberg	328	574	687	705
index	100	175	209	215
N. Germany	200	672	927	481
index	100	336	463	240
Vienna	179	345	363	406
index	100	192	202	226

OX PRICES IN PURCHASING POWER OF SILVER (IN SILVER G.)
INDEX: 1540 = 100

	1540	1600	1630	1660
Nuremberg	328	580	505	487
index	100	177	154	148
N. Germany	200	673	719	323
index	100	336	359	162
Vienna	179	346	282	273
index	100	193	157	152

In the base year there were considerable price differences; the price (in silver) in Nuremberg was about 85%, and Northern Germany about 12% higher than that in Vienna. This variation seems to have been permanent, for at the end of the period under examination, around 1660, the Nuremberg price (in silver equivalent) was 73% higher, and the North German price 18% higher, than that in Vienna.

In Nuremberg prices tended to move steadily upwards, especially in the first half of the XVIIth century and began to fall back only about 1660. The price level between 1540 and 1650, which rose in an almost uninterrupted fashion, cannot be explained by any specific cause. Even during the Thirty Years' War, when the war was the central factor in determining prices, one cannot trace the price movements that varied between regions to one exclusive reason or one particular factor.

By computerizing 270,000 individual data for the Northern and Central German provinces, Wiese established that in 1540 the average price was about 200 g. silver. Later, between 1620 and 1630, the German price increased by 400%, and rose to 927 g. silver. In the XVIIth century beef prices fell slowly,

and at their lowest level (1680/90) were only a third of the level of 1630. Consequently, almost throughout the XVIIIth century the prices rose slowly, reaching their highest point in 1750 (532 g. silver). It was only in 1790 that prices rose abruptly, and during the Napoleonic Wars beef prices exceeded the level of 800 g. silver.

In Vienna beef prices reached their peak around 1610, representing a 250% increase in terms of silver equivalent compared with the price for 1540. Before 1780 there was no similar peak in Vienna price data. The jump in price in Vienna 1610 had no effect on the Nuremberg market, despite the fact that Hungarian oxen were exported via Vienna to the South German city. After 1610, the beef price decreased over the century, and at its lowest level (1640) the purchasing power of the silver equivalent was scarcely higher than in 1540. Later the price level of 1690-1770 stabilized, and only rose again under the pressure of the famine around 1770. Between 1540 and 1660 the price rise can be observed in all three curves; in money of account the increase was 150-250%, in silver equivalent only 115-140% and in the purchasing power of silver barely 48-62%: without inflation, a price increase of about 50% occurred between 1540 and 1660. This does not, then, provide any explicit proof of a price revolution. The ox, one of the most important commodities in Eastern and Central European trade was subject to only a modest price increase in the period in question.

Around 1660 the three price curves briefly meet on the same level, but this should not be seen as a strong indication of a parallel movement in prices. Firstly, this was a short-term phenomenon and, as the tables show, immediately after 1660 the movement of oxen prices varied greatly until the end of the XVIIIth century. Secondly, it must be remembered that the 50% increase in the value of the ox mentioned above embraced widely varying price levels. In 1660 an ox in Nuremberg had a value (in terms of purchasing power) of 487 g. silver, in North Germany of 323 g. and in Vienna of 273 g. We believe that the *diversity in prices*, both nominal and real, constitutes a much more important index for the economic historian than the occasional short-term parallel development, or slight convergences, of such price curves, which reflect situations in distant regions and differing values.

The prices that had been gradually sinking in Vienna and slowly increasing in North Germany again reached the same level around 1760, if only for a short time. The level at which they crossed was about double that of the base year (1540). Immediately after meeting the two price curves take completely opposite directions; in Vienna the price rose very fast and in 1780, even before the Napoleonic Wars, it almost reached the famous peak of about 1600. At the time the purchasing power of the silver price in Vienna was 476 g., but only 338 g. in Northern Germany. The rise in German ox prices was much more modest; in 1790 the price level of 1760 — which was double that of the base year of 1540 — had been exceeded by 50%. Some years later, under the pressure of the Napoleonic Wars, the German price for oxen rose abruptly.

To sum up our observations so far, it could be said that the movements in prices on the main beef markets of Central Europe varied greatly, both in overall tendency and in their irregular "leaps". From 1530 to 1790 there are no traces of that parallel, or uniform development of prices in Europe that has often been claimed.

Conclusion.

In considering the price analysis attempted above, which shows how the movement of prices was marked by divergent, rather than parallel development, we would like to make a few remarks on price inflation. We have already studied some aspects of the relationship between gold and money (money of account, silver equivalent, purchasing power) and pointed out that inflation of the money of account, in other words loss in value, and not only loss in intrinsic value, of the *livre tournois*, the guilder and the florin, was an important factor in price rises. The silver equivalent and especially the value of purchasing power provide indices for the researcher that make it possible to assess the degree of monetary inflation contributing to price increases. By using relative purchasing power, the inflation rate of both the money of account and the fluctuation in silver value can be deducted from the price, so that what remains represents the real value of the market price. If this extrapolated element of the price is compared with the value in the base year, it then becomes possible to establish the true and real increase in value of the commodity in question.

The three data series for oxen prices at our disposal give the following picture in terms of value of purchasing power:

OXEN PRICES IN TERMS OF THE PURCHASING POWER OF SILVER, FROM XVI-XVIIIth CENTURY

Year	Nuremberg	N. Germany	Vienna
1540	328 g.	200 g.	179 g.
1660	487 g. + 48.4%	323 g. + 61.5%	273 g. + 52.5%
1670	— —	308 g. + 50.4%	272 g. + 51.9%

These dates were selected because they give a cross-section of periods of relative calm in the otherwise turbulent history of price movements in the markets of Nuremberg, Northern Germany and Vienna. The picture of economic development which emerges from the data for the three periods could be defined as the average trend in price movements. Consequently a real price in-

crease in terms of only 48-61% between 1540 and 1660 can be observed on all three markets. A century later, around 1760, there had been a rise of only 51-52% in the average price in Vienna and Northern Germany, again compared with the base year (1540).

In an average period of 100 years the real rise in ox prices seems to have been fairly modest. During this period of almost 300 years there are, of course, some sharp leaps and falls in the price data, but even so we can establish that there had been a price increase of only 50% (on a rough average) in the price or value of the ox since 1540.

On the social and economic causes of the price movements we would hesitate to draw hasty conclusions. It would be easy to build new hypotheses and explanations on the basis of events such as the Thirty Years' War, the Turkish wars waged by the Hapsburgs between the XVIIth and XVIIIth centuries, or the famine in Central Europe between 1770 and 1772. They would, however, provide us with an answer that would be neither adequate nor scientific. An adequate explanation of the causes of the price movements can only be achieved by research on local sources in the different countries involved. Any comparative international history of prices must take as its starting point the all too infrequent local studies of this type.³³

There are of course other problems which still need to be resolved in connection with the real rise in the value of oxen.³⁴ For example: How great were the real rises in value for other goods? How can wage and consumption levels be reconstructed? What was the influence of the waves of emigration in Eastern Central Europe in this respect? Last of all, we must also ask the unavoidable question: how far can the rise in value, in this case of oxen, which were at that

³³ Apart from the works already quoted we would like, without making any claims for comprehensiveness, to mention several other representative studies: POPEREN, JEAN: *L'étude historique de la comptabilité de l'agriculture: l'exemple de l'Indre-et-Loire*. Revue Historique (Paris) 1967. No. 238. p. 303-332; FRÊCHE, GEORGES: *Étude statistique sur le commerce céréalière de la France méridionale au XVIII^e siècle*. Revue d'Histoire Economique et Sociale 1971. No. 1. 5-43., No. 2, p. 180-224 HARRISON, C. J.: *Grain price analysis and harvest qualities, 1465-1634*. Agricultural History Review 1971. No. 2. p. 135-155.; DAVICO, ROSALBA: *Le Piémont agricole au XVIII^e siècle*. Études Rurales (Paris) 1972. No. 46. p. 76-102; SIGAUT, FRANÇOIS: *Les profits de l'éleveur et du cultivateur dans le Hainaut à la fin du Moyen Age*. Annales E.S.C. 1976 No. 3. p. 604-630; DERVILLE, ALAIN: *Le marché lillois du blé à l'époque bourguignonne*. Revue du Nord 1977. No. 232. p. 45-62.

³⁴ Braudel and Spooner are unanimous in denying the usefulness of individual price series. BRAUDEL and SPOONER: *Prices...*, p. 442-456 (See note 1). HUBERT FREIBURG is just as critical: "it is extremely difficult and fundamentally unreliable to deduce from changes and wages that there were nominal and real changes in income and thence in the agricultural situation". *Die Agrarkonjunktur und Agrarstruktur in vorindustrieller Zeit*. Vierteljahrsschrift für Sozialund Wirtschaftsgeschichte 1977. No. 3 p. 308.

time one of the most sought-after commodities, be related to the growth rates in population, social product and national wealth in the same period? We are, of course, aware of the difficulties posed by the sources, but from our own experience we are convinced that recent research and recent work on data series that have already been published now provide us with material that can be quantified. In this way these problems could be clarified, at least partly. This would give new and more accurate insights and provide series of indices which would offer both economists and historians a sound basis for analysing and assessing both the productive potential and the relations of production in the countries involved.