

Market Integration in the North and Baltic Seas, 1500-1800

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I. Introduction

Since Adam Smith, the attribution to foreign trade of the ability to affect the productive powers of an economy has remained a very powerful concept in both economics and economic history. At the heart of this interpretation is the observation that improvements in productivity are generated by the expansion of trade through the spreading of fixed costs and an increasing international division of labour.

More recently, this so-called Smithian growth process has fallen under the rubric of market integration, the conversion of discrete and autonomous markets into an interdependent and unified whole. This concept of market integration is particularly relevant to the early modern era in Europe, in that the role of technological innovation in the growth process was severely circumscribed, leaving the expansion and intensification of trade as the only route to sustained productivity and output growth.

An earlier generation of researchers of early modern Europe, indeed, found signs of burgeoning market integration, albeit without necessarily adducing to it any profound influence on economic

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activity.¹ However, more recently, there have been some calls for reevaluation of both the degree and evolution of market integration in early modern Europe. In this view, the apparent movement towards more highly integrated markets was simply that-apparent; data drawn from almost the entirety of Europe seem to bear no signs of inherent market integration, in that significant price differentials appear to persist throughout the early modern age.²

It may be argued, however, that such an approach incorporates a certain error of anachronism by reading back into history a view of a pan-European economic system. In disregarding the existence of 'operative economic regional boundaries'³ as well as the fact that 'the existence of different price levels is not inconsistent with a highly developed market'⁴, such studies have glossed over possible instances of market integration (cum Smithian growth) and have replaced in their stead an overly static vision of greater Europe.

One of the issues which this paper will attempt to explore is the degree to which one may speak of market integration in the early modern period within such an operative economic region, namely the North and Baltic Seas area. Furthermore, attempts will be made, in turn, to examine the determinants of the course of market integration itself.

¹ Cf. W. Abel, *Agrarkrisen und Agrarkonjunktur*, (Berlin 1935) pp. 106-114; W. Achilles, 'Getreidepreise und Getreidehandelsbeziehungen Europäischer Räume in 16. und 17. Jahrhundert,' *Zeitschrift für Agrargeschichte und Agrarsoziologie*, 7 (1959), pp. 32-55; F.P. Braudel and F. Spooner, 'Prices in Europe from 1450 to 1750,' in eds. Rich and Wilson, *The Cambridge Economic History of Europe, Vol. IV*, (Cambridge 1967) pp. 395-438; and finally, C. Reuter, *Ostseehandel und Landwirtschaft im Sechzehnten und Siebzehnten Jahrhundert*, (Berlin 1912) pp. 1-34.

² R.C. Allen, 'The Great Divergence: Wages and Prices in Europe from the Middle Ages to the First World War,' *Explorations in Economic History*, 38 (2001), pp. 411-447.; R.C. Allen and R.W. Unger, 'The Depth and Breadth of the Market for Polish Grain, 1500-1800,' in eds. Lemmink and van Koningsbrugge, *Baltic Affairs: Relations between the Netherlands and North-Eastern Europe, 1500-1800*, (Nijmegen 1990) pp. 8, 11-2, 15-6; R.W. Unger, 'Integration of Baltic and Low Countries Grain Markets, 1400-1800,' in ed. J.M. van Winter, *The Interactions of Amsterdam and Antwerp with the Baltic Region, 1400-1800*, (Leiden 1983) pp. 7-10.

For a similar and much earlier statement of this view, see W. Röpke, *International Economic Disintegration*, (London 1942) pp. 21-2.

³ S. Pollard, *Peaceful Conquest*, (Oxford 1981), pp. 114.

⁴ C.W.J. Granger and C.M. Elliott, 'A Fresh Look at Wheat Prices and Markets in the Eighteenth Century,' *Economic History Review*, 20 (1967), p. 258.

II. Defining market integration

As the name would imply, market integration may simply be viewed as the opening and development of trade between heretofore autonomous markets and their integration into a single operative entity. Among the many definitions explored by Jovanovic, one finds that common to all are the precepts that 'trade is the quintessence of [market] integration and the division of labour its underlying principle'.⁵ Thus, the concept carries with it important implications for structural change in that the integration of an economy entails 'tailoring the economic fabric of each economy to the requirements of an [interregional, intranational or] international division of labour'.⁶

The concept of market integration in its simplest form is distilled into the so-called law of one price. That is, as inter-market trade commences, any observed differentials in the prices of commodities and services will tend to lessen and eventually disappear, given the absence of any abnormal shocks to the system and the existence of individuals capable and willing to engage in arbitrage. However, the law makes one further very strong assumption, in that the costs of transportation, or more generally, transactions costs are neglected. Therefore, only in a 'wonderland of no dimensions' – that is, devoid of time and space – would we expect that a single price would be obtaining.⁷

Yet the inclusion of transactions costs in the analysis of market integration does not radically alter the situation. Instead of complete equalisation, one now expects a convergence of prices up to the point where the price found in the relatively 'dear' market equals the price found in the relatively 'cheap' market plus the costs of transactions (or $P_1 = P_2 + t$).

The simplicity of the theory of market integration, however, belies

⁵ M.N. Jovanovic, *International Economic Integration: Limits and Prospects*, 2nd edn, (London 1998) p. 9.

⁶ F. Machlup, *A History of Thought on Economic Integration*, (London 1977) p.18.

⁷ W. Isard, 'The General Theory of Location and Space-Economy,' in *Location Analysis and General Theory*, (London 1990) p. 28.

the complexity of its empirical manifestation. This has led one authority on the subject to despair that ‘the difficulty or impossibility of measuring economic integration, or even of suggesting methods of doing it, is embarrassing’.⁸ Nevertheless, even given this lack of accepted standards in the measurement of integration, it is believed that assigning an operational definition to market integration inspired by its basic theory and grounding all testing on these criteria may go a long way in averting these problems of measurement.

Specifically, this paper will propose three means for assessing different facets of market integration: the dispersion of prices around their mean value, the synchronicity of prices at a given point in time, and the evolution of joint dependence through time. As such, we will adopt the terms of temporal, geographical, and structural integration – terms used elsewhere, albeit in a very different context⁹ – to describe these respective facets.

III. The data

The data employed in the current study exclusively pertain to the course of basic grain prices, namely rye and wheat, throughout the three hundred years under scrutiny. The motivation for the choice of basic grains is easily located in Braudel and Spooner’s typification of grains as ‘grown almost everywhere, recorded almost everywhere’.¹⁰ So, above all considerations, there is the inescapable fact that they constitute two of the most represented commodities throughout the ages. Additionally, for the region and time period considered, the predominance of wheat and rye culture not only in production and consumption, but also, in commerce was heartily felt; Slicher van Bath summarised the situation well with the observation

⁸ F. Machlup, ‘Conceptual and Causal Relationships in the Theory of Economic Integration in the 20th Century,’ in eds. Ohlin *et al*, *The International Allocation of Economic Activity*, (London 1977) p. 199.

⁹ K.N. Chaudhuri, ‘World Silver Flows and Monetary Factors as a Force of International Economic Integration 1658-1758,’ in eds. Fischer *et al*, *The Emergence of a World Economy, 1500-1914, Part I*, (Stuttgart 1986) p. 65.

¹⁰ F.P. Braudel and F. Spooner, ‘Prices in Europe from 1450 to 1750,’ p. 392.

that 'cereal prices acted as the thermometer of the general economic situation'.¹¹

As to the construction of the relevant series, the data was, first, compiled from a number of sources which are detailed on a city-by-city basis in Appendix I. Following the tradition set by the price historians, the collection of data was keyed towards determining the values of 'middling' quality grains in an effort to control for quality differences over time and space; but admittedly, this is at best a stopgap measure for holding quality constant. At most, what can be hoped for is that any noise generated by quality changes will be consistently represented in the individual datum since in the main we are interested in patterns of change and not necessarily precise values of price levels.

Likewise, the very nature of international comparisons of prices makes the recourse to a standard unit absolutely necessary and here the ubiquitous problem of noise crops up again. Conversions of weight and volume are relatively easy to deal with. However, the matter of a standard unit of value is especially vexing, both in terms of conversion and of the danger of falling prey to Beveridge's criticism that 'to describe silver and gold equivalents as prices is to ignore the nature of money and to confuse barter with exchange by the use of money'.¹² Abiding by this insight to develop a means to overcome the problem of international convertibility, essentially, leaves only one option: obtaining the average spot exchange rates of every currency in every period – as yet an impossibility.

In any case, keeping a mindful ear to the fulminations of Beveridge and citing the standards of the International Scientific Committee on Price History,¹³ conversion to the Dutch *rijksdaalder*, a unit of account fixed at 25.98 grams of silver, as an 'internationally stable' currency was deemed

¹¹ B.H. Slicher van Bath, *Agrarian History of Western Europe*, (London 1963) p. 98.

It is dutifully noted that the use of grains as a proxy for the prevailing economic climate, indeed, raises some methodological concerns, the chief being the danger of an overvaluation of the level of market integration; barring a more encompassing examination of commodity prices, grain prices remain attractive both in terms of their precedence in previous research and their theoretical applicability to the study of market integration – see A. Marshall, *Principles of Economics*, 6th edn, (London 1920) pp. 270-3.

¹² W. Beveridge, *Prices and Wages in England, Vol. I*, (London 1939) p. XLVIII.

¹³ A. Cole and R. Crandall, 'The International Scientific Committee on Price History,' *Journal of Economic History*, 24 (1964), pp. 381-8.

to be the preferred route.¹⁴ The reasons being the availability of data on exchange rates into the *rijksdaalder*, the exchange rates' remarkable stability throughout the period in question, and the fact that the *rijksdaalder* played an exceedingly great role in the financial and commercial transaction of our period and region of study - it being noted in the seventeenth century that 'they go current and are very much esteemed'.¹⁵

Another issue was the determination of which cities to include in the analysis, which was predicated by two factors: the appropriateness of the locality in regards to its importance in the international grain market and the availability of sufficient and reliable data for the period at hand. Essentially, this represented a strong constraint only in regards to the Danzig market. In order to simultaneously calculate continuous measures of market integration and avoid promiscuous interpolation of the price data, it was found necessary to construct a Danzig series based on data taken from numerous Polish cities.¹⁶ This is certainly not the handicap one might suppose as soon as it is realised that from early on the Polish urban markets had begun to articulate a 'national price,' or at the least, a 'very great uniformity of prices' based on 'a determinate regional dependence'.¹⁷

Finally, all prices were logarithmically transformed in order to dampen

¹⁴ A. Attman, *Dutch Enterprise in the World Bullion Trade, 1550-1800*, (Uppsala 1983), p. 8; and S. Quinn, 'Gold, Silver, and the Glorious Revolution: Arbitrage between Bills of Exchange and Bullion,' *Economic History Review*, 39 (1996), pp. 475.

¹⁵ Quoted in C. Wilson, *Anglo-Dutch Commerce and Finance in the 18th Century*, (Cambridge, 1941), p. 8; additionally, see A. Attman, *The Russian and Polish Markets in International Trade, 1500-1650*, (Gothenborg 1973) p. 159; H. Klomp maker, *Handel in De Gouden Eeuw*, (Bussum 1966), pp. 29-30; and J. Schneider and O. Schwarzer, 'International Rates of Exchange: Structures and Trends of Payments Mechanism in Europe, 17th to 19th Century,' in *The Emergence of a World Economy 1500-1914, Part I*, ed. Fischer *et al*, (Stuttgart 1986), pp.152, 154-5.

¹⁶ The method for "patching" the Danzig series was one whereby observations on the natural logs of observed prices through time were stacked series upon series and regressed on dummy variables assigned for each series and each year; the series for Danzig was then derived from the value of the place dummies for Danzig and those estimated for the time dummies, or $P_i = \exp(aB_i)$. This procedure has the obvious advantage over taking the simple average of the series in that its requirements on the data are not as great (i.e. it does not require perfectly continuous series or a resort to interpolation) and it also makes use of a correspondingly greater information set (i.e. it makes use of observations in isolation, rather than throwing them out).

¹⁷ W. Kula, *An Economic Theory of the Feudal System: Towards a Model of the Polish Economy, 1500-1800*, (London 1976), pp. 130-1, 163; H. Madurowicz-Urbanska, *Ceny Zboza w Zachodniej Malopolsce w Drugiej Polowie XVIII Wieku*, (Warsaw 1960).

any noise generated from matters of product heterogeneity and/or fundamental errors in physical and monetary conversions.

IV. Testing for market integration

IV.A Temporal integration. Following the formulation of temporal integration as the dispersion of prices around their mean value, we find that the application of coefficients of variation (standard deviation divided by mean) to be the most suitable. In simplest terms, what is expected from increasing market integration is a decrease in the value of the coefficients of variation over time, for if we expect prices to be normally distributed, a decline in the value of the coefficient of variation implies that the distribution of prices became more concentrated around the mean. In this case, the coefficient of variation was calculated for individual years across time and across various trading centres. Additionally, the construction of a benchmark to aid in the determination of the relative degree of integration was thought appropriate; the choice of the wheat trade among Berlin, Chicago, and London in the period from 1875 to 1900 was predicated upon the era's relative lack of trade barriers and, hence, high degree of integration, both of which were underwritten by an organisational and institutional apparatus which is thought to have been, in the main, available to the economies in question.¹⁸

Figures one through three document the course of the coefficients of variation (CV) through time. In figure one, we find the coefficients of variation for rye with the longest continuous series (1500-1800) being that for Amsterdam, Brussels, Köln, and Danzig. At successive dates (1684,

¹⁸ D.C. North, 'Ocean Freight Rates and Economic Development, 1750-1913,' *Journal of Economic History*, 18 (1958), pp. 537-55; and D.C. North, 'Sources of Productivity Change in Ocean Shipping, 1600-1850,' *Journal of Political Economy*, 76 (1968), pp. 953-70. Even though North's original thesis regarding the primacy of organisational factors has recently been called into question, this should present no problem to the use of the benchmark in that the inadvertent incorporation of unavailable technological factors should only *raise* its expected value – see C.K. Harley, 'Ocean Freight Rates and Productivity, 1740-1913: The Primacy of Mechanical Innovation Reaffirmed,' *Journal of Economic History*, 48 (1988), pp. 851-76.

1710, and 1732), the data permitted a broadening of the cities under examination to include Copenhagen, London, and Stockholm, respectively. In figure two, we find the coefficients of variations for wheat with the longest continuous series (1500-1800) now being that for Amsterdam, Brussels, Köln, London, and Danzig. Again, additions to the database allowed for the inclusion of Copenhagen, Bremen, Hamburg, and Stockholm at later dates (1684, 1700, and 1736).

It must first be noted that the broad concurrence of the individual series within the figures for both rye and wheat suggests that the coefficients of variation derived from the longest continuous series may be taken as representative of the region as a whole. Second, as the number of cities in the two series for rye and wheat differs, the series are not strictly comparable; however, as depicted in figure three, the correspondence between the two is high. In both cases, we see a dramatic diminution in the coefficients until the period of 1620/40 at which time there is an increase until 1640/70 (eroding around half of the ground made previously) which is, in turn, followed by a gentle downturn into 1800. Perhaps, the most startling observation arising from figure three is the fact that at its global minimum the wheat series attains a value for the coefficient of variation which is less than that attained for the benchmark. The picture that arises from this analysis is that, although market integration did, undoubtedly, suffer from periods of hesitation and even regression which should not be overlooked, the period of 1500 to 1800 was largely one of increasing market integration and that for the period of 1500 to c.1650, this process, as represented by the coefficients of variation, was strongly in effect.

IV.B Geographical integration. In contrast to that of temporal integration, the measurement of geographical integration requires a bit more finesse than simple coefficients of variation, in that we are essentially searching for evidence of sympathetic movements in prices in the region. Fortunately, Weir has already developed such a statistic for the extent of price synchronisation across many markets which can ‘with some loss of statistical precision be interpreted as the average correlation coefficient across regions.’

As Weir writes, ‘the measure described here exploits the fact that the variance of a variable constructed as the mean of several component variables, holding constant the number of components and their variances, will be larger the higher are the correlations among the components’ while ‘the year-to-year variance of the [regional] market will increase...with greater correlation across markets.’ Controlling for the effect of variances in the components, ‘we can form the ratio of the observed variance of the composite [regional] average to the variance expected in the absence of any correlation across regions’ as $\text{Var}(\text{regional})/(\text{Var}(x)/n)$, where n equals the number of component markets. As would also be expected, this ratio will range from one (no correlation) to n (absolute correlation). Weir continues, ‘to rescale the measure from zero to one, subtract one from the ratio and divide by $(n-1)$...[finally]...estimate $\text{Var}(x)$ by the average of the local variances.’¹⁹ We find the statistic, therefore, to take the form:

$$R = \frac{\frac{\text{Var}(\text{regional})}{\sum_i \text{Var}(i)/n^2} - 1}{(n - 1)}$$

Yet again, the construction of a benchmark based on the Berlin-Chicago-London wheat trade was carried out; and as before, we find figures four through six documenting the course of the R-statistics for rye and wheat (calculated on the basis of a centred, moving twenty-five year interval) throughout the period from 1500 to 1800. Taken individually, figures four and five are both suggestive of the fact that the longest continuous series may be again taken as highly representative of the entire region.

This being the case, we can sketch out the broad outlines of the path of price synchronisation as follows: relative stability with general improvement for the period from 1500 to c. 1650 followed by a

¹⁹ D. Weir, ‘Markets and Mortality in France, 1600-1789,’ in eds. Walter and Schofield, *Famine, Disease and the Social Order in Early Modern Society*, (Cambridge 1989), pp. 206-9.

pronounced drop until c. 1670 which, in turn, was followed by an appreciable rise throughout the last the eighteenth century. This course is in large measure in agreement with the previous analysis of the coefficients of variation, especially in their concurrence on the existence of an appreciable shock to the process of market integration in the period c. 1640 to 1670. Most importantly, the figures on the R-statistics also further the cause of interpreting the entire period as one of greater market integration as evidenced by their favourable performance vis-à-vis the benchmark statistic.

Finally, it also must be recognised that these figures represent, if anything, the lower bound for geographical integration. This is so because, as stated before, the underlying logic of the use of the R-statistic is based on the assumption that $P_1 = P_2 + t$ and that t remains constant. However, the validity of this last statement, regarding the constancy of t in all situations, is, of course, highly debatable. To the extent that variation in one price series is perfectly correlated with variation in the transactions costs variable, t , we would expect the correlation between (or among) price series to fall to zero; for instance, the outbreak of war in an area could be expected to raise local prices (P_1) as well as costs of transaction and transport (t), and if the accompanying rise in t is great enough, no change in P_2 may occur. Thus, in the context of increased shocks – in extent and/or intensity – to the system and, hence, increased price variance, the value of the R-statistics could fall without the implication of any change in market efficiency or the extent of market integration. This observation when taken into consideration along with the previous analysis is highly suggestive; thus, once again, the interpretation of the early modern period as one of little or no international market integration is called into serious question.

IV.C Structural integration. The emphasis on joint dependence in our loose definition of structural integration allows us to take a step back and identify the broader evolutionary patterns of market integration. As such, it is proposed that an additional test be undertaken: one employing our price data within the structure of a

formal model of market integration based on the assumption of commodity price convergence.²⁰

In a seminal study, Ravallion searches for a dynamic representation of market integration in order to supplant the imprecision and inferential dangers of static measures. Specifically, the task Ravallion sets out for himself is to develop a methodology which ‘can distinguish between the concepts of instantaneous market integration and the less restrictive idea of integration as a long-run target of the short-run dynamic adjustment process,’ for ‘in many settings it will be implausible that trade adjusts instantaneously to spatial price differentials, and so one would be reluctant to accept short-run market integration as an equilibrium concept.’ Obviously, this latter condition should be seen as especially true for early modern European history, in that the means of transfer, both in terms of goods and information, were exceedingly slow by present standards. However, ‘given enough time, the short-run adjustments might exhibit a pattern which converges to such an equilibrium;’ furthermore, in the case that ‘short-run integration is rejected, then it would be nice to know if there is any long-run tendency toward market integration’.²¹

The model which Ravallion proposes explicitly assumes certain characteristics about spatial market structure. First, it is assumed that there exist a number of localised markets and a single central market. Second, it is assumed that while trade does take place among the localised markets, it is trade with the central market which dominates local price formation. Additionally, so as not to prejudice the outcome, Ravallion proposes incorporating alternative hypotheses regarding market integration in such a way as to allow for their nesting within a

²⁰ In an earlier version of this paper, the implications of Zipf’s law were also tested to further the case for structural integration. The results of this exercise showed the clear evolution of a more articulated rank-size distribution for the cities of the northern seas throughout the period and can be taken as indirect proof of greater market integration. For the sake of clarity of argument and space, this analysis has been omitted here. The interested reader may consult D.S. Jacks, *Market Integration in the North and Baltic Seas, 1500-1800*. London School of Economics, Working Papers in Economic History, no. 55/00, (April 2000).

²¹ M. Ravallion, ‘Testing Market Integration,’ *American Journal of Agricultural Economics*, 68 (1986), pp. 102-9.

more general model. The resulting structural form of the model is represented by:

$$(1) P_{1,t} = \sum_{j=1}^n \alpha_{1,j} P_{1,t-j} + \sum_{k=2}^N \sum_{j=0}^n \beta_{k,1,j} P_{k,t-j} + \gamma_1 X_{1,t} + e_{1,t} \text{ for the central market and}$$

$$(2) P_{i,t} = \sum_{j=1}^n \alpha_{i,j} P_{i,t-j} + \sum_{j=0}^n \beta_{i,1,j} P_{1,t-j} + \gamma_i X_{i,t} + e_{i,t} \text{ for the localised markets,}$$

where P_{1t} is the price in the central market in time t , P_{1t-j} is the price in the central market in time $t-j$, $P_{k,t-j}$ (or $P_{i,t-j}$ in (2)) is the price in localised market k (or i) in time $t-j$, X_t is a vector of other influences on the central market, P_{it} is the price in localised market i in time t , and X_i is a vector of other influences on localised market i . In this way, prices in the central market are determined by past values in the central market and all localised markets and current values in the localised markets while prices in the localised markets are determined by past values in the central and respective localised markets and current values in the central market.

As such, a few points are worth mentioning. First, since our concern lies with the transmission mechanisms evident in the greater economy and not with the structure of price formation within the central market, we can safely disregard the first equation for now. Second, the appropriate hypotheses to be entertained are those of short-run market integration (whereby $\beta_{i0}=1$ and a price increase in the central market will be immediately passed on in the localised market) and long-run market integration (whereby $\sum \alpha_{ij} + \sum \beta_{ij} = 1$ and the short-run process of price adjustment described by the model is consistent with an equilibrium in which a unit increase in the central price is passed on fully in localised prices).

In aligning this model with received historical wisdom, we may begin with the observation that throughout this period, certain cities in our study (notably Amsterdam and London) played a crucial role as commercial entrepôts and that incumbent upon these roles was a corresponding part in price formation across the region.²²

²² V. Barbour, *Capitalism in Amsterdam in the 17th Century*, (Baltimore 1950), p. 20; and C. Cipolla, *Before the Industrial Revolution: European Society and Economy, 1000-1700*, 2nd ed., (London 1981), p. 268.

From the end of the fourteenth century, Dutch/Flemish towns transmitted powerful signals to the markets of England, Denmark, Sweden, Germany, Poland, and the Baltic states alike.²³ This process culminated in the late seventeenth/early eighteenth centuries, for which time, Henri Sée could write, ‘Amsterdam est toujours le grand marché...les prix de cette place...s’imposent aux autres places de commerce [Amsterdam is always the great market...the prices of this market...are essential to other centres of commerce]’.²⁴

However, the theme of the eventual ascendancy of London over Amsterdam has long been a popular one in the economic history of early modern Europe with most pundits dating the transfer sometime in the second half of the seventeenth century;²⁵ yet there has been as yet little quantitative evidence for this. Tests on the vector autoregression of the five time series of wheat – based on the Granger representation theorem²⁶ – were carried out which show clear statistical corroboration for the thesis of Amsterdam’s hegemony up until 1650 followed by a period wherein neither Amsterdam nor London can be assuredly placed as the hegemonic economic power. Therefore, the Ravallion model was run from 1650 with both Amsterdam and London as the reference market, for continuing to base the model on the hegemony of Amsterdam could lead to biased results.

²³ P. Gunst, ‘Agrarian Systems of Central and Eastern Europe,’ in ed. D. Chirot, *The Origins of Backwardness in Eastern Europe*, (London 1989) p. 62; N. Hybel, ‘The Grain Trade in Northern Europe before 1350,’ *Economic History Review*, 55 (2002), pp. 219-47; K.G. Persson, *Grain Markets in Europe, 1500-1900*, (Cambridge 1999); M. Tits-Dieuaide, *La Formation des Prix Céréalières en Brabant et en Flandre au XV^e siècle*, (Brussels 1975); M. Tits-Dieuaide, ‘The Baltic Grain Trade and Cereal Prices in Flanders at the end of the Middle Ages’ in ed. W. Minchinton, *The Baltic Grain Trade*, (Exeter 1985), pp. 20-42; M. Tits-Dieuaide, ‘L’Évolution du Prix du Blé dans Quelques Villes d’Europe Occidentale du XV^e au XVIII^e siècle,’ *Annales ESC*, n^o 3 (1987), pp. 529-548.

²⁴ Quoted in J.G. van Dillen, ‘Economic Fluctuations and Trade in the Netherlands, 1650-1750,’ in ed. P. Earle, *Essays in European Economic History, 1500-1800*, (Oxford 1974), p. 204.

²⁵ J.I. Israel, *Dutch Primacy in World Trade, 1585-1740*, (Oxford 1989); J.I. Israel, *The Dutch Republic: Its Rise, Greatness and Fall, 1407-1806*, (Oxford 1995); I. Wallerstein, *The Modern World System, II: Mercantilism and the Consolidation of the European World-Economy, 1600-1750*, (London 1980), pp. 3-9; and I. Wallerstein, ‘Dutch Hegemony in the Seventeenth Century’ in ed. M. Aymard, *Dutch Capitalism and World Capitalism*, (Cambridge 1982), pp. 36-73.

²⁶ R.F. Engle and C.W.J. Granger, ‘Co-Integration and Error Correction: Representation, Estimation, and Testing,’ *Econometrica*, 55 (1987), pp. 257-9.

Finally, due to *a priori* considerations of collinearity, an error correction mechanism (ECM) was opted for in the estimation of equation (2), taking the form of:

$$(3), \Delta \ln P_{it} = (\alpha_i - 1)(\ln P_{it-1} - \ln P_{1,t-1}) + \beta_{io} \Delta \ln P_{1,t} + (\alpha_i + \beta_{io} + \beta_{il}) \ln P_{1,t-1} + \alpha + e_{it},$$

where the dependent variable equals the change in the logarithmic price in the *i*-th market in time *t*, the first regressor equals the difference between the logarithmic prices in the *i*-th market and the reference market in time *t-1*, the second regressor equals the change in the logarithmic price in the reference market in time *t*, the third regressor equals the lagged logarithmic value of the reference market price, α equals a constant, and e_{it} represents the error term.²⁷ Table one below gives a stylized view of the early modern process of market integration. Here, we find the results of the market integration regressions concerning the two previously mentioned hypotheses of short-run and long-run integration.

Referring to table one below, the measures for short-run integration are presented under the various designations for β_{io} (e.g. β_{bo} for Brussels) while those for long-run integration are presented under the various designations for $\Sigma \alpha_{ij} + \Sigma \beta_{ij}$ (e.g. $\alpha_b + \beta_{bo} + \beta_{bl}$ for Brussels); stated once again, the attainment of unity in the measures fulfils the condition for perfect integration, whether short-run or long-run. What immediately emerges from table one is the high degree of long-run market integration evident for the entire period and region under consideration; the average deviation from unity is a mere three per cent, pointing to the inescapable fact that strong forces towards greater integration were, indeed, at work in this period. What is more, we see that the nature of market integration was not only quantitatively but also qualitatively changing at this time,

²⁷ A posteriori, the use of an error correction mechanism also allowed for superior performance on the basis of the Chow and predictive failure tests as well as in consideration of heteroskedasticity; this finding is in agreement with previous research which likewise found an error correction mechanism to be superior to Ravallion's original formulation – see C. Alexander and J. Wyeth, 'Cointegration and Market Integration,' *Journal of Development Studies*, 30 (1994), pp. 303-28.

for we see in all of the series a strong rise in the level of short-run integration, suggesting that the international market was functioning more efficiently through time. Additionally, the comparison of results obtaining from Amsterdam and London as the respective reference markets does lend much credence to the dating of the eclipse of Amsterdam by London sometime around 1650-1700 as we see both the measures of short-run and long-run integration based on London leadership make considerable gains on those calculated for Amsterdam, most notably in the Brussels and Köln markets. Furthermore, table two below demonstrates that the inferences drawn from the results reported in table one are valid as the data are markedly stationary throughout the period (and various sub-periods) under consideration.

Finally, figures seven and eight below represent the core of the analysis of market integration based on regression analysis. What these depict is the evolution of long-run market integration over time as detected by a battery of rolling regressions. Essentially, this process involved running an ECM regression over a centred, moving 50-year period from 1525 to 1775 (i.e. the measure of long-run market integration reported for 1525 is that for the regression from 1500-1550).²⁸ As can be clearly seen in figures seven and eight, this regression analysis strongly affirms the path of market integration sketched before, namely greater integration up through c. 1650 followed by, in turn, a strong regressive path lasting until c. 1700 and then a renewed and vigorous ascent into the nineteenth century; at the same time, this analysis, also lends greater credence to the growing hegemony of London over Amsterdam starting from the mid-seventeenth century.

IV.D Conclusions from the tests for market integration. As should be clear, the view of the early modern period as one of increasing market

²⁸ In the accompanying graphs, the coefficient values have been fitted with sixth-order polynomials in order to aid in clearly delineating the underlining movements. The specific use of the sixth-order polynomial for this purpose was predicated on its remarkable conformity with the 'shape' of corresponding moving-average figures (for various lengths) and on avoiding the problem of exactly where to centre a moving-average series which is itself based on a 50-year window.

integration and economic interdependence among nations is still valid – given a reasonable demarcation of the economic units involved. Interpretations which would have us hold that economic integration is a relatively recent phenomenon are clearly untenable. This fault arises from a lamentable admixture of confused economic boundaries, a general lack of operative criteria for market integration, and an undue reliance on certain summary statistics to describe the process of market integration (e.g. price differentials or variants thereof).

It should be made clear that what is being argued here is not that the entirety of Europe had become engrossed in a complete and overarching system of markets, but rather that certain regions within the continent were becoming more highly integrated within themselves and perhaps among one another. This observation has been clearly borne out by the amassed statistical evidence; on all three counts of testing, the Baltic-North Seas region unarguably demonstrate a progression towards greater market integration. Likewise, the results emerging from the three tests tell a story of relatively strong initial integration followed by some improvement until the midpoint, c.1650, at which time the system suffered a strong shock which was to be followed by the final period in which the process of market integration showed no evident signs of regression.

Necessarily, we would expect that such a strong movement towards greater economic unity would generate analogously strong effects in the constituent economies. Indeed, earlier work placing this process of market integration within the context of the early modern economy, namely by examining how market integration shaped and was shaped by the wider institutional and economic setting, has affirmed the role of market integration in the propagation of regional and international patterns of specialization and, thereby, of the early modern growth process.²⁹

However, our attention must now be turned towards the perhaps more important and certainly more difficult questions of what was driving

²⁹ D. S. Jacks, *Market Integration in the North and Baltic Seas, 1500-1800*. London School of Economics, Working Papers in Economic History, no. 55/00, (April 2000).

the process of integration and why this process followed its particular path. What the next section aims at is the identification of some of the proximate factors in shaping the course of market integration, yet it must be recognized that the constraints of time and space being what they are will necessarily limit the discussion to those factors which transcend regional and national boundaries. Therefore, detailed examination of the country-specific institutional constellations underlying these factors and the development of market integration are left for future research.

V. Charting the course of market integration in the early modern age

To begin with, students of the early modern European economy have always been aware of the existence of certain monetary and price trends which, although variant in their periodicity and intensity, appeared in roughly similar form across many areas of the European land mass, particularly in the regions under current consideration.³⁰ Unless the picture we have painted previously of market integration has been too rosy, it should be obvious that these trends, coupled with idiosyncrasies of regional production, distribution, etc., did allow for some divergence in prices, especially in particular years when exogenous shocks – such as wars or harvest failures – occurred. And where such divergence was evident, one would expect that the prospects of successful arbitrage across markets would lead to the interaction of international markets; indeed, it is this assumption which has been the implicit basis of all the foregoing discussion of market integration. Furthermore, in confronting this expectation with the historical record, one is not to be disappointed, in that it is clear that the Dutch, English, and Polish markets, at the very least, were all linked by the allure of profits arising from inherent price differentials.³¹

³⁰ J. de Vries, *The Economy of Europe in an Age of Crisis, 1600-1750*, (Cambridge 1976), pp. 16-21, 244-7; and I. Wallerstein, *The Modern World System I: Capitalist Agriculture and the Origins of the European World-Economy in the 16th Century*, (London 1974), pp. 69-77.

³¹ M. Bogucka, 'Amsterdam and the Baltic in the First Half of the 17th Century,' *Economic History Review*, 26 (1973), p. 435; and A. Maczak, 'The Balance of Polish Sea Trade with the West, 1565-1646,' *Scandinavian Economic History Review*, 18 (1970), pp. 115-6.

What remains to be determined is the extent to which the prospects and/or the realisation of successful arbitrage were hampered in the context of the early modern world. Naturally, our attention is once again reverted to the simple identity, $P_1 = P_2 + t$. However, in this instance, it may be instructive to decompose t into costs of transportation and transactions.

First, the theme of the dearness of transportation, especially that overland, in the early modern age is one which is not easily lost, for even at the beginning of the nineteenth century, 'the furthest possible distance [overland] for transporting timber or grain was about twelve miles: beyond it the cost of freight began to exceed the value of the goods'.³² And even for those who would have us look to nearly costless water transport as an effective escape from this situation,³³ one must counter with the objection that the empirical record simply does not bear out this assumption.³⁴

One may, therefore, expect that the particular course of market integration in the North and Baltic Seas area may be educible in part to changes in transportation costs. However, as Menard holds, 'if we begin in the early 14th century, the case for a European transport revolution led by technological innovations vanishes. Freight charges in the mid-18th century were only slightly lower than in the best years of the high Middle Ages'.³⁵ Furthermore, this interpretation is in congruence with the historical record of freight rates originating in Amsterdam which point more to external determinants (specifically

³² S. Pollard, *European Economic Integration*, (London 1974), p. 38.

³³ K. Berrill, 'International Trade and the Rate of Economic Growth,' *Economic History Review*, 12 (1959), pp. 351-9.

³⁴ Cf. P. Jeannin, 'The Sea-borne and the Overland Trade Routes of Northern Europe in the XVIth and XVIIth Centuries,' *Journal of European Economic History*, 11 (1982), pp. 30-5; J.H. Parry, 'Transport and Trade Routes,' in eds. Rich and Wilson, *The Cambridge Economic History of Europe*, vol. IV, (Cambridge 1967), pp. 216-8; S. Pollard, *European Economic Integration*, 39; T.S. Willan, *River Navigation in England, 1600-1750*, (London 1936), pp. 114-30; and L. Zytkowicz, 'Trends of Agrarian Economy in Poland, Bohemia and Hungary from the Middle of the 15th to the Middle of the 17th Century,' in eds. Maczak *et al*, *East-central Europe in Transition from the 14th to the 17th Century*, (Cambridge 1985), p. 60.

³⁵ R.R. Menard, 'Transport Costs and Long-Range Trade, 1300-1800: Was There a European 'Transport Revolution' in the Early Modern Era?' in ed. J.D. Tracy, *The Political Economy of Merchant Empires*, (Cambridge 1991), p. 274.

the international diplomatic environment) than any inherent progression of transportation services.³⁶

The inability of falling transport costs alone to explain the course of market integration, therefore, leads us to consider the role of transaction costs. At this point, we shall reinvoke North's definition of transaction costs as 'all the costs of human beings interacting with each other,' which along with production costs define 'whether trade, specialization, and production and interchange will occur'.³⁷ Furthermore, we shall explore the ramifications of innovations which North singles out as essential to economic growth. These were to be 'innovations that lowered transaction costs,' which 'consisted of organizational innovations, instruments, and specific techniques and enforcement characteristics that lowered the costs of engaging in exchange over long distances,' and which 'occurred at three costs margins: 1) those that increased the mobility of capital; 2) those that lowered information costs; and 3) those that spread risk'.³⁸

Beginning with those innovations that increased the mobility of capital, we find in this era and region – as does North – the evolution of the bill of exchange of particular importance. Benefiting from their Flemish counterparts' superior experience with bills of exchange,³⁹ Amsterdam merchants were able to transform the city into the nexus of international payments on balances of trade from the 1550s; and the bill of exchange was to long remain one of the bedrocks of this precocious multi-lateral payments system.⁴⁰ Additionally, to this innovation, we might also add two further developments, particular to the Baltic-North Seas region which invariably increased the mobility of capital, namely the evolution

³⁶ J.I. Israel, *Dutch Primacy in World Trade*, pp. 87-90, 135-137.

³⁷ D.C. North, 'Institutions, Transaction Costs, and the Rise of Merchant Empires,' in ed. J.D. Tracy, *The Political Economy of Merchant Empires*, (Cambridge 1991), p. 24.

³⁸ *Ibid.*, 27.

³⁹ H. van der Wee, *The Growth of the Antwerp Market and the European Economy*, Vol. II, ('s Gravenhage 1963) *passim*.

⁴⁰ A. Attman, *Dutch Enterprise in the World Bullion Trade*; M. North, 'Bullion Transfer from Western Europe to the Baltic and the Problem of Trade Balances: 1550-1750,' in *From the North Sea to the Baltic*, (Aldershot 1996); and J. Schneider, 'The Significance of Large Fairs, Money Markets and Precious Metals in the Evolution of a World Market from the Middle Ages to the First Half of the 19th Century,' in eds. Fischer *et al*, *The Emergence of a World Economy, 1500-1914, Part I*, (Stuttgart, 1986).

of forward contracts on grains and other commodities in the early XVIIth century⁴¹ and the rapid rise in the early XVIIth century 'of the factorage system which at that time became the vital organizational basis for international exchange'.⁴²

In regards to innovations that lowered information costs, North cites the printing of manuals detailing particulars of weights, measures, customs, etc. alongside the more important development of compendiums of commodity prices and exchange rates. For the North and Baltic Seas area, this latter development was summed up in the *prijscourant* of Amsterdam. Printed weekly from 1585 (and perhaps even earlier), the *prijscouranten* quickly broadened their scope to include not only commodity prices on an astonishingly wide range of goods but also the means of settlement, i.e. money, exchange, and insurance. Their indispensability to the early modern northern economy is attested to by their presence in archives in such varied locales as Antwerp, Brussels, Danzig, Copenhagen, London, and Stockholm.⁴³

Finally, those innovations which are thought to have spread risk were found in particular abundance at this time. First, we may take note of the emergence of marine insurance. Again, taking their lead from Flemish and Italian predecessors, the Dutch and English, in the sixteenth century, evolved a relatively sophisticated market for the insurance of goods and ships, culminating in the establishment of chambers of assurance – in 1598 for Amsterdam and in 1601 for London.⁴⁴ Furthermore, these developments were to be later followed by similar ones in the wider northern seas arena.⁴⁵

⁴¹ M. Malowist, 'The Economic and Social Development of the Baltic Countries from the 15th to the 17th Centuries,' *Economic History Review*, 12 (1959), p. 186.

⁴² M. Bogucka, 'Amsterdam and the Baltic in the First Half of the 17th Century,' 440; see also, M. North, 'The Grain Trade of Royal and Ducal Prussia in the 16th and 17th Centuries,' in ed. W. Minchinton, *The Baltic Grain Trade*, (Exeter 1985), pp. 24-5.

⁴³ N.W. Posthumus, *Nederlandsche Prijsgechiedenis, Vol. I*, (Leiden, 1943) XXX-XXVIII.

⁴⁴ V. Barbour, 'Marine Risks and Insurance in the 17th Century,' *Journal of Economic History*, 1 (1929), pp. 572-3; A.H. John, 'The London Assurance Company and the Marine Insurance Market of the 18th Century,' *Economica*, 25 (1958), pp. 126-41; and F.E. de Roover, 'Early Examples of Marine Insurance,' *Journal of Economic History*, 5 (1945), pp. 172-200.

⁴⁵ G.A. Kiesselbach, *Die Wirtschafts- und Rechtsgeschichtliche Entwicklung der Seeversicherung in Hamburg*, (Hamburg, 1901), pp. 20-32; F. Spooner, *Risks at Sea: Amsterdam Insurance and Maritime Europe*, (Cambridge 1983), pp. 43-4; and C. Thorsen, *Det Kongelig Oktroierede Sø-Assurance Kompagni*, (Copenhagen 1926), pp. 43-75.

Second, changes in business organization may also be looked to as sources of risk spreading. On the part of the Dutch, we see the development of shares in shipping and the distribution of investment via 'fractional ownership,' or *partenrederijen*, which allowed for a wide scale of investment opportunities ranging from 1/64th to 1/8th shares in an even wider range of seagoing vessels;⁴⁶ this system of *partenrederijen*, interestingly enough, was to find an alternate expression as a form of limited partnership which eventually spread to find applications in the whole gamut of commercial and industrial enterprises of the Republic.⁴⁷ Similarly, in both England and Holland, we see the increasing importance of regulated and joint-stock companies as a powerful means of diversification in investment.⁴⁸

To this somewhat cursory sample of transaction-costs-reducing innovations may be added a number of others: the extension and intensification of parcel and passenger services among many of the cities of the northern seas region, the establishment of the *Wisselbank* of Amsterdam and the Bank of England, the emergence of sale by sample, formal business schooling, and the increasing use of double entry bookkeeping to name just a few. What all the aforementioned have in common is an insistence on economies of scale in the transactions sector; and if, for the moment, we cast our investigation of market integration in the mould of that patterned by Reed, we might be able to make some progress in explaining the course of market integration.

Essentially, it is Reed's contention that growth in this period is explainable by the interaction between significant economies of scale in the transaction sector and an effective extension of the market through population growth. To quote, the model postulates that "given the

⁴⁶ V. Barbour, 'Marine Risks and Insurance in the 17th Century,' pp. 569-70.

⁴⁷ J. de Vries and A. van der Woude, *The First Modern Economy: Success, Failure, and Perseverance of the Dutch Economy, 1500-1815*, (Cambridge 1997), pp. 338.

⁴⁸ A.B. Du Bois, *The English Business Company after the Bubble Act, 1720-1800*, (Oxford 1938) pp. 84-97; J.A. van Houtte, *An Economic History of the Low Countries, 800-1800*, (London 1977), pp. 198-201, 280-1, 309; W.R. Scott, *The Constitution and Finance of English, Scottish and Irish Joint-Stock Companies to 1720, Vol. II & III*, (Cambridge 1911) *passim.*; and N. Steensgaard, 'The Dutch East India Company as an Institutional Innovation,' in ed. M. Aymard, *Dutch Capitalism and World Capitalism*, (Cambridge 1982).

relatively constant technology of the period, growth, both extensive and intensive, can be explained by the population increase in conjunction with economies of scale; that the source of economies of scale lay in the transactions sectors...[that] the population growth beginning in the sixteenth century [gave] rise to large market areas and thereby allow[ed] realization of the economies of scale inherent in the transactions sector; and that the productivity increases brought about through realization of these economies of scale made possible...[a] continued population increase and...an increasing standard of living".⁴⁹

Following this reasoning, it may be then posited that market integration should be viewed as a function of population growth. The connection is, of course, obvious: with increasing population, a certain critical mass is reached in the transactions sectors which create more and greater opportunities to profit from the spatial and perhaps temporal differentiation of prices, prompting an increase in market integration through the realisation of these self-same arbitrage opportunities.

In many respects, the demographic experiences of England and the northern Netherlands, if taken as broadly representative of our sample, bear out this view.⁵⁰ When projected upon the background of the population trends of the two countries in the first one hundred and fifty years of this study, our earlier measurements of market integration track the developments in population growth exceptionally well: in both countries, the nearly continuous growth in population is mirrored in a nearly continuous decrease in the coefficients of variation, a less rapid increase in the R-statistics, and general improvements in long- and short-run market integration as evidenced by the ECM regressions.

However, as our attention is drawn towards the midpoint of our study, 1650, the applicability of the model apparently falters; for as population levels out in the two countries, the various measures of market integration almost unanimously indicate a serious disruption in the underlying,

⁴⁹ C.G. Reed, 'Transactions Costs and Differential Growth in Seventeenth Century Western Europe,' *Journal of Economic History*, 33 (1973), pp. 177-8.

⁵⁰ J. de Vries, 'The Population and Economy of the Preindustrial Netherlands,' *Journal of Interdisciplinary History*, 15 (1985), pp. 674-8; and E.A. Wrigley and R.S. Schofield, *The Population History of England, 1541-1871*, (London 1981) pp. 168, 402-3.

integrative processes, dating from c. 1650 until c. 1680 at the earliest. At this time, another contributory factor in the course of market integration immediately suggests itself, namely the exigencies of the state, as particularly exhibited by the international diplomatic environment.

Naturally, the role of the state in channelling and re-shaping the flows of trade was not easily lost on the commercial participants of the time; the sensitivity and, at times, outright fragility of international trade upon the political arena, reflected in highly variable commodity prices and rates of freight and insurance alike, was the cause of much consternation.⁵¹ Certainly, no period of this study was wholly immune to such considerations, but the period from 1650 to 1680 witnessed an incredible volatility for the Baltic-North Seas region as a whole.

It begins with a souring of relations between the English and the Dutch, brought about by economic rivalry, which was to receive its first overt manifestation in the Navigation Act of 1651 and which directly led to the First Anglo-Dutch War of 1652-4.⁵² This, in turn, was followed by a second Navigation Act in 1660 and a Second and Third Anglo-Dutch War in 1665-7 and 1672-4, respectively. In relation to the wider northern region, the First and Second Dutch Wars were to gain particular significance in that both witnessed the Danish Sound being closed to all English traffic and the cessation of much and, at times, all seagoing traffic from Amsterdam and London.⁵³ Punctuating this already precarious situation, we find the Swedish-Polish War of 1655-60 which cut off Danzig's exports for five years and saw the (far-from-last) intervention of Dutch military forces in Poland, a simultaneous war between Poland and Russia, a series of wars between Denmark and Sweden up until 1660 which was resumed between 1674 and 1678, and a devastating war between the Netherlands and France which coincided with the Third Anglo-Dutch War in 1672 – all of which were to be executed with tremendously detrimental effect upon the respective

⁵¹ H.Q. van Ufford, *A Merchant Adventurer in the Dutch Republic*, (Amsterdam 1983), pp. 52-3.

⁵² J.E. Farnell, 'The Navigation Act of 1651, the First Dutch War, and the London Merchant Company,' *Economic History Review*, 16 (1964), pp. 439-54.

⁵³ J.R. Jones, *The Anglo-Dutch Wars of the 17th Century*, (London 1996), p. 26; C. Wilson, *Power and Profit*, (London 1957), pp. 72, 75, 140, 156.

national and international economies alike.⁵⁴ That the cause of market integration should suffer in this unstable environment should occasion no surprise.

But for all this, the period from 1650 to 1680 merits our especial attention for another reason in regards to the role of the state; for whereas the entire era from 1500 to 1800 may be said to evidence particular sensitivity to external political shocks such as war, this period also marks a transition in that the germination of a novel approach of states to the structure of markets may be seen. However, before anything may be further said about this novel approach, we would do well to examine the market structure prevailing prior to 1650.

In this respect, the observations of the Dutch economist T.P. van der Kooy are particularly enlightening.⁵⁵ According to van der Kooy, the vagaries of the early modern economy – shoddy transport, communication and production apparatus – were such as to require a distributive network based on a single, general world entrepôt which would control price formation and, thus, production and consumption.⁵⁶ In this way, the model relates back to the assumptions made previously with the Ravallion model in that the staple market was to function as ‘the keystone of a hierarchical system of local and regional markets, from which surpluses passed on to markets of a higher order...[and to which] the marginal unit of a given product found its way...so that price regulation became an accomplished

⁵⁴ P. Andersen, *Lineages of the Absolutist State*, (London 1974), pp. 200, 291.; J.A. Faber, ‘Friesland and the Baltic Trade,’ in eds. Heeres *et al*, *From Dunkirk to Danzig: Shipping and Trade in the North Sea and the Baltic, 1350-1850*, (Hilversum 1988) pp. 18-9; J.I. Israel, *Dutch Primacy in World Trade*, pp. 213-9; W. Minchinton, Introduction to *The Baltic Grain Trade*, (Exeter 1985), pp. 7-8; W. Sondstrom, ‘Evidence on Dutch-Swedish Trade in the 17th Century,’ in eds. Lemmink and van Koningsbrugge, *Baltic Affairs: Relations between the Netherlands and North-Eastern Europe, 1500-1800*, (Nijmegen 1990), pp. 214-7; J. Topolski, ‘Economic Decline in Poland from the 16th to the 18th Centuries,’ in ed. P. Earle, *Essays in European Economic History, 1500-1800*, (Oxford 1974), pp. 129, 135; and J. de Vries and A. van der Woude, *The First Modern Economy*, p. 377.

⁵⁵ T.P. van der Kooy, ‘Holland als Centrale Stapelmarkt in de Zeventiende en Achttiende Eeuw,’ in ed. P.W. Klein, *Van Stapelmarkt tot Welvaartsstaat*, (Rotterdam 1970); and especially, T.P. van der Kooy, *Hollands Stapelmarkt en Haar Verval*, (Amsterdam 1931).

⁵⁶ Although the observations of van der Kooy were first formulated over 70 years ago, they remain valid, particularly in light of recent research on the functions of entrepôt trade in the present day – see G.H Hanson and R.C. Feenstra, ‘Intermediaries in Entrepôt Trade: Hong Kong Re-Exports of Chinese Goods,’ *NBER Working Paper W8088 (January 2001)*.

fact'.⁵⁷ The concentration of supply and demand that arose from this situation allowed for transparency in the market which reduced uncertainty and risk and allowed for the development and refinement of services essential to the system's proper functioning. In other words, the development of Amsterdam as the staple market of Europe from 1500 to 1650 may be taken as yet another institutional innovation which struck at the drag on economic activity and growth induced by transaction costs.

Such a concentration of supply and demand certainly had other particular allures for states besides the dispersal of transaction costs, one of the most obvious being the attraction as an easy source of taxation. Perhaps this lesson was most duly taken in England where, from the mid-seventeenth century, 'it became a major object of policy to make Britain "the common depositum, magazine, or storehouse for Europe and America, so that the medium profit might be made to centre here"'.⁵⁸ This political objective of the English to usurp the role of Amsterdam was based on the popular assumption 'that the trade of the world is too little for us two, therefore one must down,⁵⁹ – perhaps giving the mission a much needed sense of urgency – and came to centre around two policy tools, the Navigation Acts and the use of export bounties.

First, the Navigation Acts were fundamentally 'aimed at securing by compulsion an increased flow of trade' in the hopes of creating 'by legislative act an entrepôt system which pleased those who preached that England should follow Holland's way to wealth'.⁶⁰ Their accomplishments in this direction sprang from their insistence on controlling the flow of imports into the country and on compelling the employment of English shipping over that of the Dutch, thus, acting as a spur to the shipping industry in particular and the transactions sectors in general through the adoption of Dutch-inspired techniques and institutional innovations.⁶¹

In this sense, the First Anglo-Dutch War, as a natural adjunct of the first Navigation Act, also made a powerful contribution. For English

⁵⁷ P.W. Klein, 'The Trip Family in the 17th Century,' *Acta Historiae Neerlandica*, 1 (1966), p. 187.

⁵⁸ T.S. Ashton, *An Economic History of England: The Eighteenth Century*, (London 1955), p. 61.

⁵⁹ S. Pepys, *The Diary of Samuel Pepys, Vol. IV*, ed. H.B. Wheatley, (London 1920), p. 31.

⁶⁰ C. Wilson, *Profit and Power*, pp. 57, 150.

⁶¹ D. Ormrod, 'English Re-exports and the Dutch Staplemarket in the 18th Century,' in eds. Coleman and Mathias, *Enterprise and History*, (Cambridge 1984), p. 93.

shipping, it resulted in the transfer of up to one thousand vessels into English hands through privateering, an addition which was reckoned to constitute nearly 50% of the English merchant fleet in 1654 and which was to serve as a basis for learning prized Dutch shipbuilding techniques;⁶² at the same time, the war was to advance the direct carrying trade of England in several important areas, including the Baltic.⁶³

Second, the increasing use of export bounties from the 1670s, too, was to alter the structure of trade in important ways. By stimulating and supporting the burgeoning trade in grains and the accompanying rise in specialist grain exporters, export bounties allowed for the gradual circumventing of the heretofore inescapable Dutch *entrepôt*.⁶⁴ Furthermore, the rise in the grain export trade was to come to represent yet another encouragement to English shipping by ensuring that the trade was carried on in English bottoms.⁶⁵ Yet in many ways, the most important role of the export bounties was that which they played in absorbing transaction costs for commercial agents, thereby enhancing the competitiveness of English grains on international markets.⁶⁶ In this way, the export bounties heralded an era where England not only challenged 'the Baltic countries as a supplier of grain to Dutch granaries; she also replaced the Dutch as the carrier of that grain'.⁶⁷ Perhaps encouraged by the initial success of grain export bounties, the English government throughout the later seventeenth and early eighteenth centuries was to legislate similar enactments on a wide range of goods, only adding to the effects of the grain bounties.⁶⁸

Cumulatively, what these policies came to signify was more than a mere boost to national esteem as recourse to the Dutch *entrepôt* became

⁶² R. Davis, *The Rise of the English Shipping Industry in the 17th and 18th Centuries*, (London 1962), pp. 12-3; and R.W. Unger, *Dutch Shipbuilding before 1800*, (Assen 1978), p. 109.

⁶³ J.E. Farnell, 'The Navigation Act of 1651,' p. 451.

⁶⁴ D. Ormrod, 'Dutch Commercial and Industrial Decline and British Growth in the Late 17th and Early 18th Centuries,' in eds. Krantz and Hohenberg, *Failed Transitions to Modern Industrial Society: Renaissance Italy and 17th Century Holland*, (Montréal 1975), p. 39.

⁶⁵ D. Ormrod, *English Grain Exports and the Structure of Agrarian Capitalism, 1700-1760*, (Hull 1985), p. 75.

⁶⁶ *Ibid.*, p. 50.

⁶⁷ D. Ormrod, 'Dutch Commercial and Industrial Decline,' p. 40.

⁶⁸ C. Wilson, *Anglo-Dutch Commerce and Finance in the 18th Century*, 56-62; and C. Wilson, 'The Economic Decline of the Netherlands,' *Economic History Review*, 9 (1939), pp. 114-6.

less necessary and the corresponding fortunes of London waxed. Rather, by establishing a viable alternative in London, English commercial policy effectively (and inadvertently) bolstered the cause of market integration via reduced transaction costs, in two respects. Firstly, this policy allowed for the development of even more institutional innovations of the like detailed above; for instance, the development of London 'by the middle of the eighteenth century...[into] the most important marine insurance centre of western Europe' was directly attributable to the pursuit of 'a positive economic policy' on the part of the English government.⁶⁹ This type of development painfully underlined for the Dutch an elemental lesson of the early modern era, namely that 'economic innovations are invariably short lived, fatally easy to imitate'.⁷⁰

Likewise, it also certainly contributed to a lowering in both transaction and transportation costs among London and a number of other cities in so far the situation was no longer obtaining as that in the seventeenth century when English merchants '[did] oft-times know no better way to transport their Goods to such Foreign Parts as they design, than to carry them to Amsterdam, and from thence to other places'.⁷¹ Obviously, the transshipment of goods from England via Amsterdam then to the final destination was an expensive and a seemingly unnecessary process with handling and reshipment charges approaching ten per cent.⁷² However, through the establishment of direct trading links and the development of transportation capabilities of the nation, both the need and profitability of the indirect trade through Amsterdam were increasingly put into jeopardy.⁷³

While England may have been the first country not only desirous but also capable of by passing the Dutch, in time, it was joined by a number of others. Chief among these was Hamburg which by taking advantage of its role as 'the universal neutral,' began to develop its own facilities and seize key entrepôt functions from Amsterdam.⁷⁴ Similarly, we see the blossoming of such cities as Bremen, Copenhagen, and Stockholm from

⁶⁹ A.H. John, 'The London Assurance Company and the Marine Insurance Market,' pp. 127, 141.

⁷⁰ C. Wilson, *The Dutch Republic and the Civilisation of the 17th Century*, (London 1968), p. 39.

⁷¹ Quoted in V. Barbour, *Capitalism in Amsterdam*, p. 20.

⁷² D. Ormrod, *English Grain Exports*, p. 42.

⁷³ H.R.C. Wright, *Free Trade and Protection in the Netherlands*, (Cambridge 1955), p. 8.

nearly passive participants into thriving centres within the northern seas trade. Underlying all of these transformations, however, were two common elements: the adaption of state policy with the view of enhancing the productive and mercantile capabilities of the polities in question and a corresponding development of both transportation facilities and institutional innovations along the lines detailed above – both of which had the result of substantially reducing transaction costs and, thus, promoting market integration. Although this interpretation of government ‘interference’ actually promoting market integration at first seems counterintuitive, the apparent paradox disappears once one realizes that ‘the cost [of moving goods] has two parts, that due to transport [broadly construed] and that due to trade barriers (such as tariffs)’;⁷⁵ therefore, as long as a change in the latter is more than offset by a change in the former the cost of transacting declines and the cause of market integration may be advanced.

VII. Conclusion

As we have seen, the concept of market integration remains a highly useful one for the economic history of early modern Europe. By first strictly delineating our expectations of what the process should and should not entail, we arrived at a set of operative criteria which allowed for a fuller exploration of the process; the failure to do so may in part explain the conclusions of previous studies and also cast doubts over their inclusion of economic entities among which the historical record gives us little reason to expect significant integration and their use of only one criteria, the persistence of price differentials, as the means for appraising the (non)occurrence of market integration.

Furthermore, on the basis of our three tests for market integration, we have been able to positively conclude that market integration was, indeed, in effect throughout the region and time-period under consideration. These results, therefore, go far in dispelling the vision of an autarkic and disjointed Europe hobbling into the nineteenth century

⁷⁴ R. Davis, *The Rise of the Atlantic Economies*, (London, 1973), p. 193.

⁷⁵ K.H. O’Rourke and J.G. Williamson, ‘When did Globalization Begin?’ *NBER Working Paper W7362* (April 2000).

era of peace and prosperity advocated by some; and augmented with a view towards the numerous sources regarding the relation of market integration, regional specialisation, and productivity in agriculture and industry and manufacture, the results also strongly reaffirm the role of market integration in the growth experience of the early modern era.

Finally, in the consideration of the determinants of the course of market integration, the dominant role of diminishing transaction costs in promoting market integration has been posited. Additionally, two potential forces have been identified, namely population growth and the state, which may have had particular bearing on market integration via the diminishment of transaction costs.

First, it has been asserted that the modelling of market integration as a function of population growth could be a strong descriptive tool in the pre-1650 era as a result of the existence of economies of scale in the transactions sectors. Secondly, for the post-1650 era, the increasingly critical role of the state in shaping the context of international trade and market integration has been argued for; specifically, the gradual encroachment of political force on economic structures – here, the entrepôt functions of Amsterdam – have been hypothesised as being beneficial to the cause of market integration.

Necessarily, this interpretation is at odds with traditional accounts in which the derangement of the ‘natural order’ of things through government intervention was to wreak havoc on the efficient functioning of the market. Some aspects of the promulgation of tariffs, quotas, etc., undoubtedly, were detrimental to the process of market integration; however, the specific role of the state in shaping the opportunity costs and incentive structures facing producers and commercial agents alike counteracted these negative effects, allowing higher levels of market integration to be achieved.

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APPENDIX I: PRICE DATA SOURCES

AMSTERDAM:

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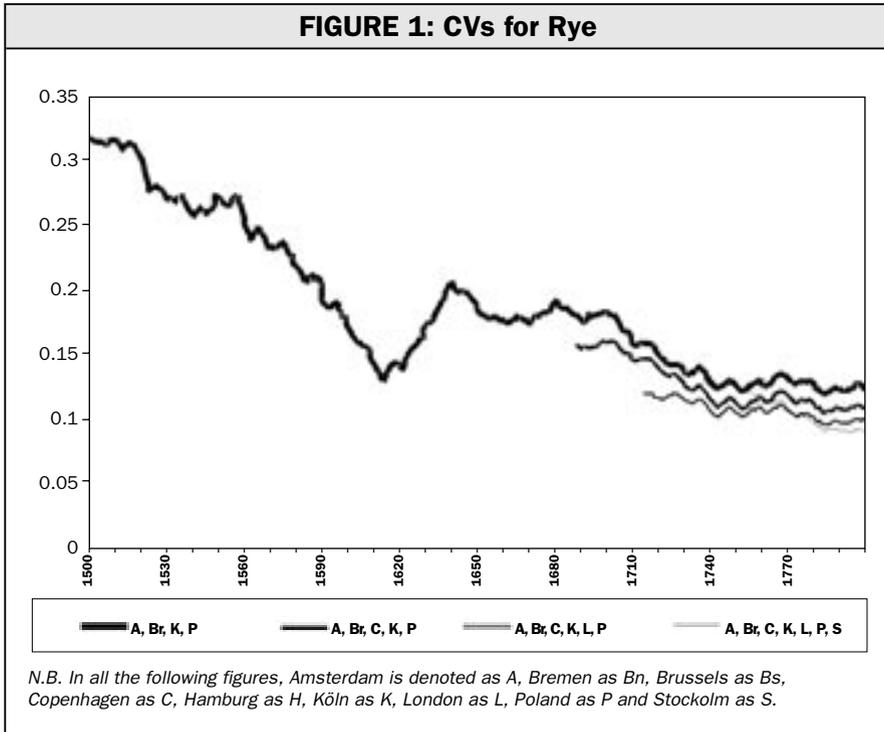
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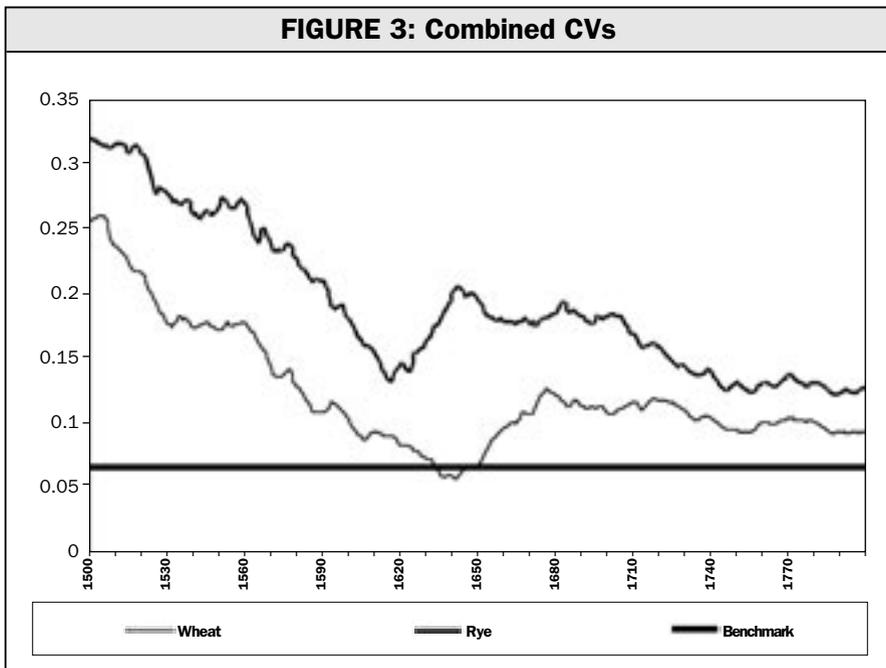
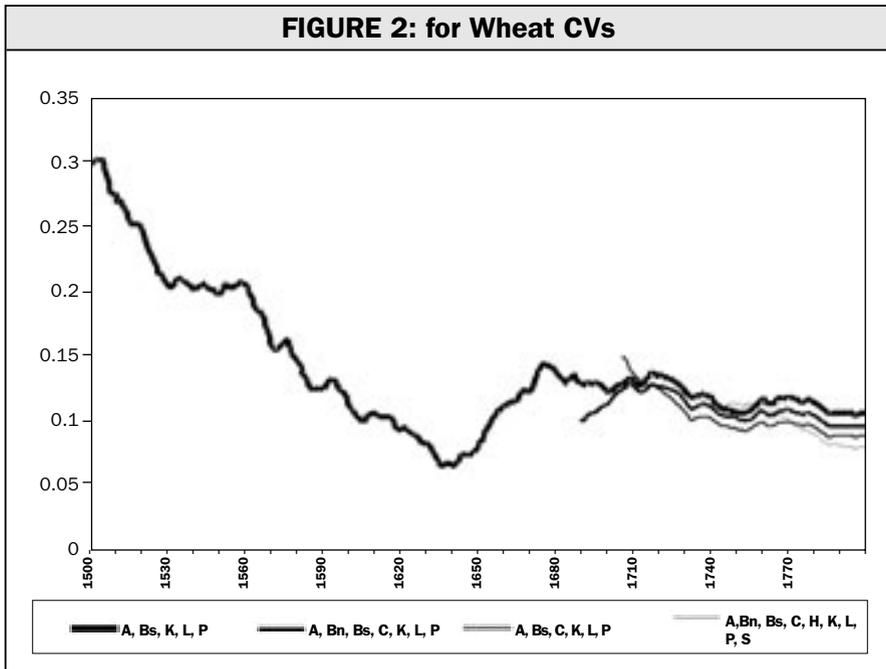
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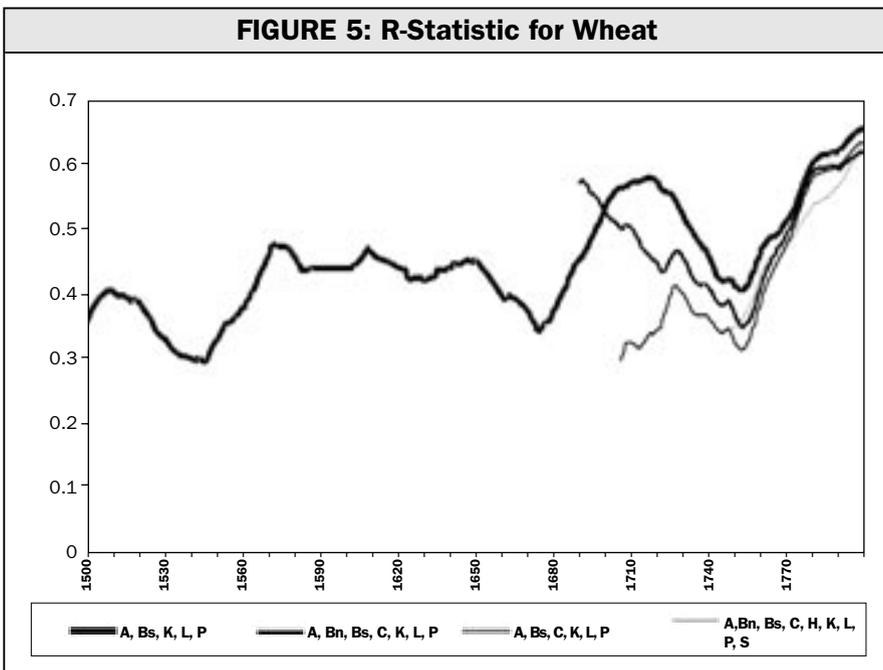
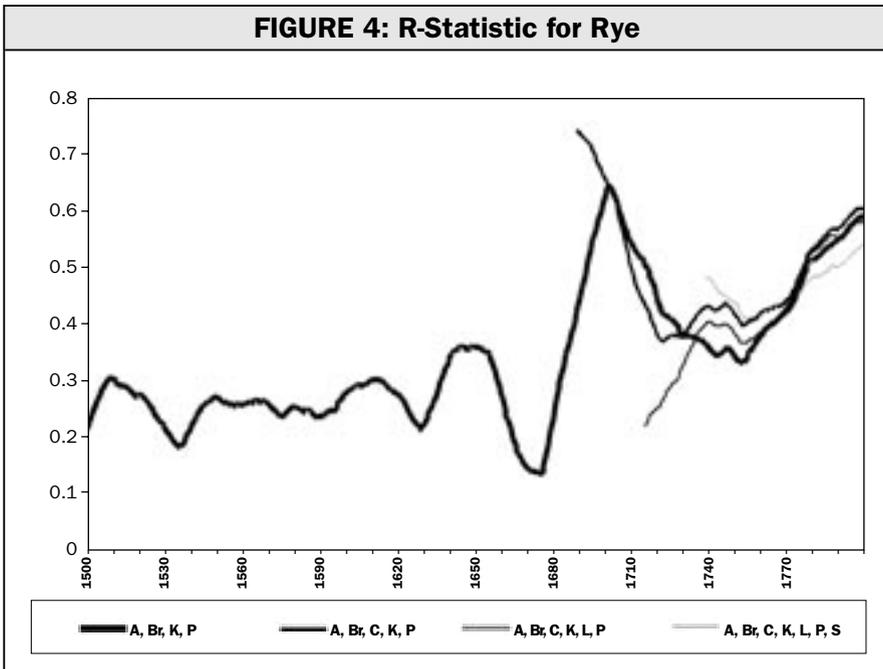
BENCHMARK:

The National Bureau of Economic Research Macrohistory Database found at <http://www.nber.org/databases/macrohistory/contents/index.html>; originally derived from the following: J.E. Boyle, *Chicago Wheat Prices for Eighty-One Years*; *The Economist*; Food Research Institute, Stanford University, 'Wheat Studies,' *Monatshefte zur Statistik des Deutschen Reichs*; *Statistisches Jahrbuch*; and *Vierteljahrshefte zur Statistik des Deutschen Reichs*.

APPENDIX II: Figures and Tables







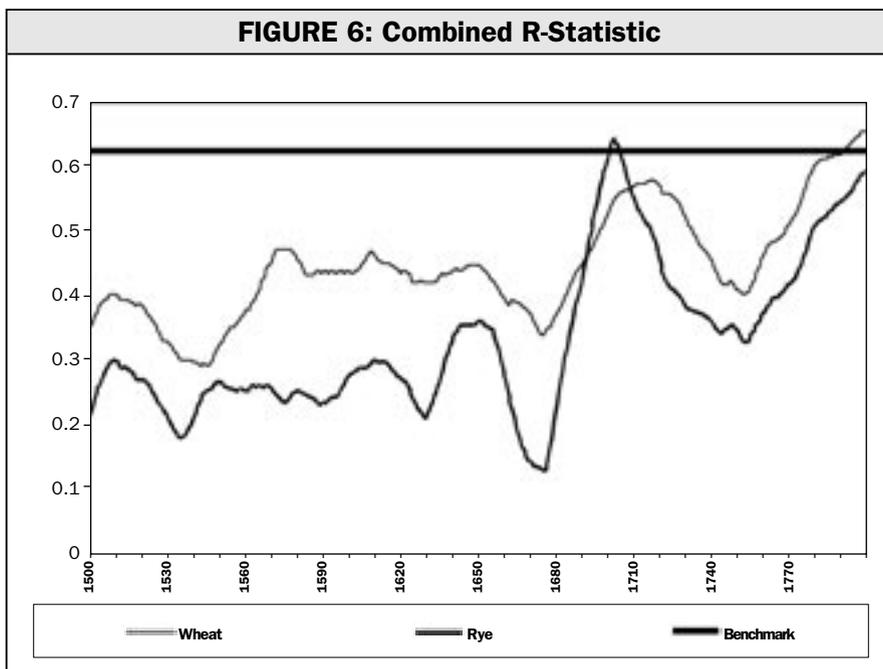


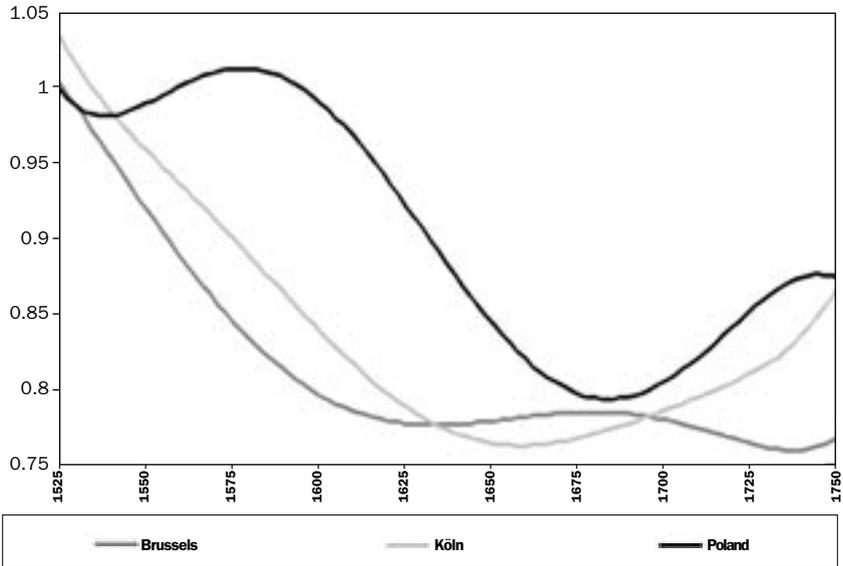
TABLE 1: Results of error correction model regressions:

WITH AMSTERDAM AS THE REFERENCE MARKET, 1500-1800 (PART A)								
	Brussels		Köln		London		Poland	
	β_{b0}	$\alpha_b + \beta_{b0} + \beta_{b1}$	β_{k0}	$\alpha_k + \beta_{k0} + \beta_{k1}$	β_{l0}	$\alpha_l + \beta_{l0} + \beta_{l1}$	β_{p0}	$\alpha_p + \beta_{p0} + \beta_{p1}$
1500-1600	0.17757	0.98274	0.23680	1.01052	0.57207	1.06249	0.14594	0.98513
1550-1650	0.13344	0.73582	0.11248	0.81534	0.36450	0.64024	0.02310	1.02361
1600-1700	0.41394	0.80510	0.42454	0.78159	0.19109	0.62952	0.04637	0.90356
1650-1750	0.43492	0.77589	0.49426	0.74005	0.30667	0.74709	0.23704	0.67984
1700-1800	0.60310	0.76527	0.55495	0.85465	0.51583	0.83901	0.40006	0.88234
1500-1800	0.33264	0.95671	0.30806	0.98067	0.30523	0.95458	0.16446	0.98474
WITH LONDON AS THE REFERENCE MARKET, 1600-1800 (PART B)								
	Amsterdam		Brussels		Köln		Poland	
	β_{b0}	$\alpha_b + \beta_{b0} + \beta_{b1}$	β_{k0}	$\alpha_k + \beta_{k0} + \beta_{k1}$	β_{l0}	$\alpha_l + \beta_{l0} + \beta_{l1}$	β_{p0}	$\alpha_p + \beta_{p0} + \beta_{p1}$
1600-1700	0.14089	0.88519	0.20979	0.79270	0.26658	0.88567	-0.16084	0.66557
1650-1750	0.23010	0.90804	0.33815	0.88519	0.24906	0.81813	0.02196	0.54634
1700-1800	0.43237	0.94288	0.53514	0.94535	0.49758	0.95240	0.21501	0.89298

TABLE 2: Augmented Dickey-Fuller and Phillips-Perron t-Statistics on ECM variables (wheat prices only)												
	1500-1600		1550-1650		1600-1700		1650-1750		1700-1800		1500-1800	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP
Brussels	-8.9383	-18.1730	-4.1662	-11.5660	-4.3783	-10.0270	-4.9872	-10.0930	-5.2292	-10.6410	-15.4810	-26.5130
Köln	-9.9986	-17.6670	-5.0940	-11.1260	-5.5285	-9.2318	-4.7423	-10.3020	-4.7188	-11.8430	-7.6843	-24.1520
London	-10.0490	-12.8200	-5.8341	-11.0490	-4.8276	-11.4610	-5.3843	-10.4230	-5.3222	-8.1256	-8.0828	-20.6500
Poland	-7.3761	-12.5320	-4.7825	-10.3240	-3.1975	-9.9817	-6.0986	-12.0760	-4.4963	-12.0250	-8.6727	-19.7050
<i>Independent variables</i>												
Lagged price differential between Amsterdam and:												
Brussels	-2.3565	-5.1890	-1.8165	-3.9086	-4.4177	-5.5998	-2.2401	-5.7264	-5.1703	-7.4474	-3.2646	-7.1294
Köln	-3.3121	-6.2619	-3.8421	-5.1496	-2.8693	-5.1913	-2.9067	-5.5834	-2.0642	-7.1069	-4.1378	-9.1147
London	-2.7499	-6.4095	-2.7564	-6.5998	-3.2213	-7.1416	-2.3463	-6.5831	-4.1111	-6.1881	-1.6698	-8.2169
Poland	-4.8714	-5.6007	-4.5224	-4.6435	-3.7654	-3.8974	-3.7542	-5.9556	-3.2927	-5.7888	-2.6032	-6.7929
Differenced price:												
Amsterdam	-14.4320	-15.9330	-4.5682	-11.8940	-4.7346	-11.4040	-4.3192	-10.1530	-5.4981	-9.3086	-9.0475	-21.3390
Lagged price:												
Amsterdam	-14.4310	-13.6900	-4.0065	-5.4680	-3.2181	-3.7413	-2.1036	-4.3284	-5.2079	-5.3829	-5.8314	-13.6900

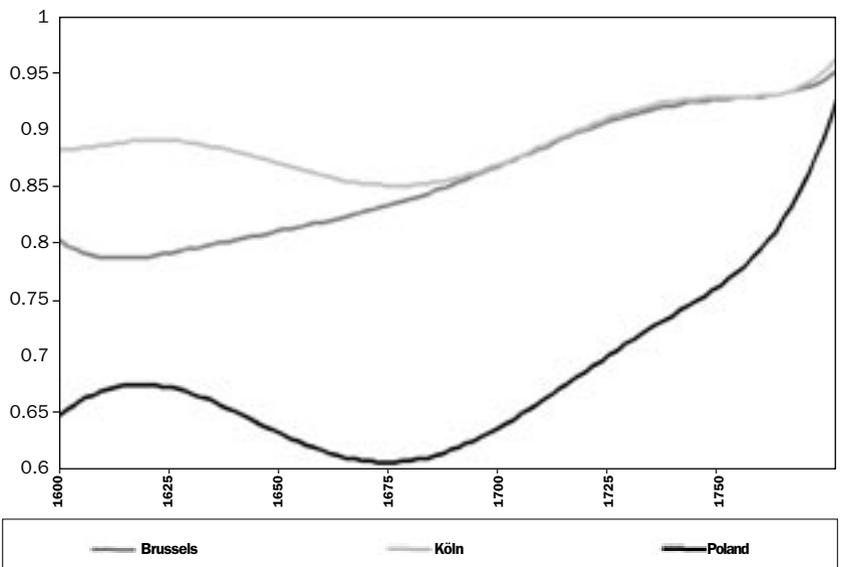
N.B.: t-values in bold signify rejection of null of non-stationary at (a maximum of) 5% significance level.

FIGURE 7: Long-run integration coefficients with Amsterdam as the reference market



N.B. Perfect long-run integration implies a coefficient value of one.

FIGURE 8: Long-run integration coefficients with London as the reference market



N.B. Perfect long-run integration implies a coefficient value of one.