Economic Crisis, Manorialism, and Demographic Response: Southern Sweden in the Preindustrial Period

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Abstract

Previous research has consistently found demographic responses to grain price fluctuations in preindustrial Europe, both at macro and micro level. Grain prices serve as a summary measure of the workings of the preindustrial economy, reflecting not only local harvest conditions but trade patterns and market integration. All over preindustrial Europe the manorial estate was an important institution in the rural economy. It offered opportunities to insure tenants against extreme events such as harvest failures, impossible to achieve for independent peasants in a society without well-functioning markets for capital or insurance, and in the absence of state subsidies. In this paper we look at the impact of regional economic fluctuations on demographic behavior and study whether the presence of estates lowered the demographic impact of economic crises on the population. We will do this by utilizing a newly developed database on agrarian output together with county-level grain price data and parish level information on vital events and land tenure for about 400 parishes in the province of Scania in southern Sweden. The results show a clear response in births and deaths in ages 1-25 to fluctuations in grain prices and output levels. Manorial parishes show a considerably lower response in the year of the economic change, but the same response as in other parishes in the year after. This indicates that the manors, at least partially, functioned as insurers against risk, which had beneficial effects of its inhabitants by smoothing consumption.

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Introduction

Previous research has consistently found demographic responses to grain price fluctuations in preindustrial Europe, both at the aggregate level (Galloway 1988; Lee 1990; Bengtsson and Reher 1998) and at the individual level (Bengtsson et al. 2004; Allen, Bengtsson and Dribe 2005; Bengtsson and Dribe 2010). Individuals in preindustrial society could not insulate themselves from these short-term economic fluctuations by migrating or by deliberately adjusting fertility, which lead to increases in mortality. Grain prices serve as a summary measure of the workings of the preindustrial economy, reflecting not only local harvest conditions but trade patterns and market integration. In most of the research in this area, however, grain price variations have been interpreted as variations in grain production. In reality, grain prices entail much more information than the local harvest outcome, which makes it important to study not only demographic responses to prices but also to fluctuations in output.

The strong demographic response to economic stress has also been interpreted as an important dimension of the standard of living of people in the past. Being unable to deal with economic uncertainties to avoid premature death clearly indicates a low standard of living (Bengtsson 2004; Allen, Bengtsson and Dribe 2005), and hence being able to hedge against the risks of economic crisis would be considered a major improvement in the standard of living, regardless of the average level of income, life expectancy, etc.

The older research in this field usually was done at aggregate level, often using data at the country level, although more disaggregated data (e.g. province or county) have frequently been used as well. More recently micro-level research has also appeared, which has enabled studies of the differential response by socioeconomic status, household context, etc (e.g. Bengtsson et al. 2004, Tsuya et al. 2010). This line of research has shown that the mortality and fertility response was much more prominent among lower socioeconomic strata, further stressing the importance of the demographic response to economic stress as a crucial living standards indicator.

All over preindustrial Europe the manorial estate was an important institution in the rural economy. Especially in Marxist scholarship most attention has been directed towards the exploitative character of the estates, and the relation between the tenants and the landlord (e.g. Brenner 1985, Dobb 1963; Hilton 1976; see also Hatcher and Bailey 2001). One hypothesis, however, going back at least to the early writings of new economic history, is that the relation between tenant and landlord was contractual, where the tenant worked for the landlord in exchange for various forms of protection (e.g. North and Thomas 1971). It could

be protection against war, violence or legal protection more generally, but it could also be protection against severe economic crisis. Because of its mere size, the estate offered opportunities to insure tenants against extreme events such as harvest failures, impossible to achieve for independent peasants in a society without well-functioning markets for capital or insurance, and in the absence of state level subsidies.

If the estates in preindustrial society were able to insure its inhabitants against the apparent risks of economic downturns in agricultural production, they would have contributed in a major way to a better standard of living for tenants and other people living and working on the estates. One way of investigating the extent to which this was the case is to look at the demographic response to short term economic fluctuations and compare the response in manorial parishes to the response in other parishes.

In this paper we do this by looking at the impact of economic stress on demographic outcomes (births and deaths in ages 1-25) in the province of Scania in southern Sweden in the period 1749-1859, and study whether the presence of estates lowered the demographic impact of economic stress on the population. The demographic response is measured at the parish level using two different measures of economic stress at higher level of aggregation: short-term fluctuations in rye prices at the county level and in grain output at the provincial level. Price data comes from the Market Price Scales, published by Lennart Jörberg (1972), while the output data comes from a newly developed database on agrarian production in preindustrial Scania (Olsson and Svensson 2009). The economic information is used together with parish level information on vital events (births and deaths) and land tenure. Data for about 400 parishes is included in the analysis.

The next section provides a background discussion on the demographic response to economic stress in preindustrial society, and on the characteristics of the manorial economy. Then follows an account of the study area, data and methods used, a presentation of the empirical results and a concluding discussion.

Background

By now there is a long list of studies showing a clear demographic response – in mortality, fertility and nuptiality - to short-term fluctuations in food prices, or sometimes real wages, in preindustrial society (e.g. Lee 1981, 1990; Weir 1984; Bengtsson and Ohlsson 1985; Eckstein, Schultz and Wolpin 1985; Galloway 1985, 1988). While the initial focus of research clearly was on northwestern Europe (mainly England, Sweden and France) subsequent research has basically confirmed the existence of a demographic response to short-term

economic fluctuations for other parts of the preindustrial world as well (see Bengtsson and Reher 1998; Hammel and Galloway 2000; Feeney and Kiyoshi 1990).

The fertility response was usually much stronger than the mortality response (Galloway 1988). It was a direct effect and not explained by a price effect working through nuptiality (Carlsson 1970; Bengtsson 1993). At least partly the fertility response to economic stress seems to have been intentional as families deliberately postponed childbirth in times of economic hardship (Bengtsson and Dribe 2006, 2010; Dribe and Scalone 2009).

The mortality response was strongest among children (over the age of 1) and adults in working ages, while it was weaker among infants and elderly (Bengtsson and Ohlsson 1985; Bengtsson 1999; Bengtsson et al. 2004). The fact that infant mortality to a large extent followed its own cycles is also quite well established (see e.g. Utterström 1957: 207-208; Bengtsson 1999; Oris, Derosas and Breschi 2004), and is explained by the fact that most infants were breast-fed. For elderly, on the other hand, the weaker response to economic stress compared to working age adults, could have been a result of an already low consumption, which made it difficult to further lower in times of economic hardship. The fact that their work load was also lower than for people in working ages might also have contributed to this.

While most research in this area has been based on aggregated data (at country, or sometimes regional, level) more recently there has also emerged studies using micro-level data, following individuals over time and studying the response of aggregated price or real wage data on the individual risks of mortality or fertility (e.g. Bengtsson et al. 2004; Allen, Bengtsson and Dribe 2005; Tsuya et al. 2010). These studies have been able to show considerable differentials in the demographic response to economic stress by gender, socioeconomic status and household context. Generally speaking, and quite as expected, the individuals or groups with less resources showed the strongest demographic response to economic stress, and this seems to have been true for both fertility and mortality. In southern Sweden, for example, the non-landed groups, who were dependent on working for others to cover their subsistence needs, were much more vulnerable to economic stress as shown by their stronger, and much more consistent, response to grain price fluctuations (Bengtsson 2004; Bengtsson and Dribe 2005, 2006). Migration does not seem to have been an effective way to deal with economic stress in this area, most likely because of the lack of an urban sector close enough where the labor market could absorb masses of people fleeing from the countryside (Dribe 2003). The landless and semi-landless families in this area appear to have deliberately postponed child birth in times of hardship (Bengtsson and Dribe 2006), but these

efforts were clearly not enough, as shown by the profound mortality response to economic stress in all age groups, somewhat weaker among infants and elderly than among children and adults in working ages (Campbell, Lee and Bengtsson 2004:69).

The strong dependency of demographic outcomes on economic conditions was a salient feature of preindustrial society and could be linked more generally with the Malthusian situation before the onset of modern economic growth (e.g. Wrigley and Schofield 1981). Even though the standard of living in Europe was not completely stagnant for the whole preindustrial period, it seems quite clear that the improvement for ordinary people was modest before industrialization, and this situation seems to have been similar in different parts of the world, with the possible exception of the most developed parts of northwestern Europe, such as southern England and the Netherlands where an improvement, at least relatively speaking, in real wages of laborers can be noticed in the early modern period preceding the Industrial Revolution (see e.g., Broadberry and Gupta 2006; Clark 2007; Parthasarathi 2001; Pomeranz 2000; Allen 2009; de Vries and Van der Woude 1997; van Zanden and van Riel 2004).

Indeed, the vulnerability to economic stress has been seen as a crucial indicator of the standard of living in preindustrial society (Bengtsson 2004, Allen, Bengtsson, and Dribe 2005). The mere fact that mortality depended on economic fluctuations, and especially the fact that mortality of children and people of working ages rose profoundly in times of economic distress, can be seen as an indication that at least parts of society enjoyed a low standard of living. The fact that the demographic response to economic fluctuations generally disappeared as the preindustrial society was transformed into an industrial society following the agrarian and industrial revolutions of the eighteenth and nineteenth centuries, is also consistent with this interpretation of the demographic response to economic stress being a fundamental indicator of (low) standard of living. Thus, being able to avoid the adverse impact of economic stress should be viewed as being connected to a higher standard of living, even though it might not imply that the average income level was higher.

Both food production and food prices affected short-term economic conditions in preindustrial society; exactly how depended on whether prices were exogenously determined or not. If prices merely reflected the local harvest, prices and output would measure the same thing. However, if prices did not completely follow harvests, because of price regulations, trade or other factors influencing prices, changes in output and prices would affect living conditions separately as well as jointly (Hiltpold 1989).

In most preindustrial societies land was the main asset and output from the land determined the prosperity, and thus the possibility of survival, of rural people. Low

agricultural output implied less food in the local economy, especially for the landless groups since the landholding peasants would meet their consumption needs first, before supplying food to the market. Even if the local economy was open, and thus exposed to trade, a harvest failure most often struck a larger geographical entity than the local community, which created a food shortage at the regional level. Since import of food from more remote areas was more expensive and in some cases, as in Scania, trade organization in food was organized predominantly for exports and not for imports, short-term food shortages would be hard to cover. Moreover, bad harvests meant less working opportunities for the laborers, and hence lower income, which negatively affected the possibilities of buying food for this group, even if prices were not higher than normal. So, low production in itself, irrespective of price level, might hit poorer segments of the population hard. For landholding peasants, lower production meant less food to eat or at least less food to sell. However, if low production coincided with high prices, either through the economy being closed (no-trade) or by accident (with exogenous prices), the loss in production might be less than the increase in income obtained from higher prices (Abel 1980). During severe failures, though, even this group would probably be harmed (Dribe 2000:169).

Exogenously set prices in turn might influence living conditions regardless of output level. High prices meant not only that poorer segments of the population had difficulties of reaching subsistence, due to falling real wages, but also that surplus-producers sought to sell their products on markets offering these high prices. So, irrespective of the level of the local harvest, peasants would try to sell their products where they could get the best price. Only if transport costs were as high as to erase the possible profit from selling on high price markets, peasants would sell their products on the local market for potentially lower prices. In reality, prices were to a high extent exogenously determined (i.e. by other factors than the local harvest yield) as shown by the high degree of market integration not only in Sweden but in the whole of northwestern Europe (Dribe 2000: Ch. 7; Persson 1999). However, when looking at higher levels of aggregation prices and output will naturally show a higher degree of correlation. Nonetheless, prices at county level reflected conditions far beyond the regional grain output.

In essence, both in years with high prices and when production failed the lower stratum of the population faced difficult living conditions, either through a general lack of food or through not being able to afford buying food. For landholders the effects of harvest failures would probably negatively affect living conditions while high prices would be beneficial if production was normal or higher.

There were different ways to avoid the negative impact of fluctuations in grain prices or agricultural output. One was the opportunity to save in good times, in order to have assets or stored grain to use in times of scarcity. The fact that landless groups seem to have been more severely affected by economic fluctuations than the landed groups could probably be explained by the lack of these kinds of resources among the poorer segments of the population.

Another way of dealing with stress would be to borrow capital on the market or, to insure against risk by buying various kinds of insurance policies. This is one way of dealing with risk used frequently in modern societies. To be effective it assumed the existence of well-functioning markets for capital and insurance, which we know did not characterize most preindustrial rural economies, even though the local economies entailed substantial financial interaction between individuals and families (e.g. Hoffman 1996: 69-80; Rosenthal 1994; Svensson 2006). Moreover, even in cases where there were markets for capital, some kind of collateral was usually required, which made it impossible for the non-landed, lower status, groups to make use of this opportunity. One could also expect that it was most difficult to get credit when it was needed the most, i.e. in times of crisis when those who had savings often needed them for their own survival. Yet another way of dealing with economic stress is through governmental transfers. Again, this is a common way to deal with uncertainties in contemporary societies (social insurance, unemployment benefits, aid to farmers, etc), but something very rare in preindustrial societies. Although there were poor relief systems working in many places, they were usually designed to help only the very poor and destitute, and could not provide relief to large groups of people in times of economic crisis (see the discussion in Bengtsson 2004).

In the absence of own savings or stored grain, insurance policies, easy accessible credits through the market, or a well-developed welfare state, the opportunities to deal with stress for people of low economic status were quite small, as is also shown by their strong response to economic stress. There is one institution, however, which might, at least to some extent, have performed these functions, namely the preindustrial manor. Already Marx wrote about: "…all the guarantees of existence afforded by the old feudal arrangements" (Marx 1867: 705). The appearances of such "guarantees of existence" were later formulated in contractual terms by North and Thomas, who characterized the serfdom of the manorial system in Western Europe as "…a contractual arrangement where labor services were exchanged for the public good of protection and justice" (North and Thomas 1971:778).

This contractual approach to serfdom has, however, been criticized for not taking into account the element of enforcement inherent in the system. A contract must not only be a mutual agreement, it must also be voluntarily accepted by the parties involved. Nonetheless, in contrast to Western European early medieval serfdom, early modern seignorialism in Eastern and Northern Europe never could be justified by the absence of juridical protection from kings and states.

The landlords basically offered land in exchange for labor services. It has been argued that in return for high fixed rents the landlord also provided insurance in times of need turning the manor "into a unit of insurance as well as exploitation" (Fenoaltea 1976:133). Consequently, since the tenants paid for their insurance with surplus rents they were not better off as compared to freeholders (see also Bloch 1966: 77-83). However, for this to hold true in respect to short-term economic crises, the freeholders must have had the possibility of putting aside means during good years to cover future bad years. Moreover, there are examples of landlords providing also for the landless part of the population, either directly or indirectly through the tenants (Plakans 1975:639). This means that in order for a comparable situation to exist for freeholders the same links must have existed between landholding peasants and landless people. Following the arguments above on the negative impact of short term economic stress on landless groups, this seems not to have been the case.

The Swedish manorial system was founded on mutual agreements between landlords and peasants, and serfdom and moving restrictions were non-existing, except in a few special cases (Lundh and Olsson 2008; Olsson 2003). Hereditary tenancies, like in some parts of east and central Europe, were never offered in Sweden, but land transfers to tenants' sons and daughters were nonetheless a common feature at the estates (Dribe, Olsson and Svensson 2009). Although seldom formalized in contractual terms, the landlords could offer some social protection as well. In manorial parishes the same retirement systems were practiced as in parishes dominated by freeholders, in spite of the fact that the retiring tenants had no legal claims on such subsidies (Lundh and Olsson 2002). In the seventeenth century some noble landlords additionally founded hospitals, which was a poorhouse with some basic nursing facilities (Jeppsson 2001). Similar arrangements, often more unconditional for the seignors the more dependent their peasants were, existed in east and central Europe (Blum 1978: 91–92).

There are also some evidence that the lord of the manor could help out in events of harvest failures, e.g. by lending grains or by postponing land rents (e.g. Dyer 2005:174; Fenoaltea 1976:133). Outstanding debts from tenants can occasionally be identified in

manorial accounts, and in preserved letters between bailiffs and landowners the welfare of the tenants could be discussed and elaborated in cases of harvest failures. This was not only the case in medieval England but from qualitative sources we can exemplify how the manorial system could act as an insurance institution also in eighteenth and nineteenth century Sweden. Bjersgård was a normal mid-sized Scanian estate. Around 1800 about 200 hectoliters of seed were annually sown on the demesne fields and the number of tenant farmers was about 85, most of them living in the same parish as the manor. Their principal land rent was defined as whole or half corvée (*hoveri*) and 89 percent of the estate income came from demesne production, the rest from tenant dues in money or products (Olsson 2002:122-131). The owner of the estate, Axel Erik Gyllenstierna, was the governor of the adjacent county of Halland, and did not live on the manor 1794–1810. During these years the estate bailiff, Christian Tullstedt, wrote reports every month, asking his master for permission to take actions and measures of different kinds. A frequent topic was the welfare of the tenants, which in times of hardship could conflict with the owner's interest of profit from the estate. In December 1794 bailiff Tullstedt wrote to Gyllenstierna:

> …I cannot leave any forecast on future grain sales. The needs of the peasants are at the moment impossible to estimate, but I can with certainty assure that they will be bigger than before, because most of them will run out of grain by Easter, and some even before that. It is highly necessary that His Lordship leaves the grain where it is, except for the wheat, so the peasants can be saved for the future, because I fear that no grain will be here to get during the next year (Olsson 2002: 128).

In this case the estate supported the tenants by holding back external grain sales and instead preserving it for their needs. The same was the case after the harvest failures of 1798 and 1806. The latter year the bailiff wrote to his master that he will "…charge the tenant farmers and crofters 10 *riksdaler* per barrel rye, but 12 *riksdaler* from strangers" (Olsson 2002: 129). Thus, another way of supporting the tenants in times of hardship was to subsidize their grain prices.

So, even if the initial contractual relations of the Middle Ages concerning legal protection and protection against war and violence definitely became obsolete long before the eighteenth century, insurance against economic crisis could have been an importance aspect of the manorial institution. By selling or lending grain to its needy inhabitants the estate could act as an insurance institution against extreme events. This kind of arrangement was harder to

implement among independent peasants. Needless to say, such an insurance function by the manors would have had a great impact on the living standards of its inhabitants.

In the analysis below we study the extent to which the manors performed this kind of insurance function, by looking at the demographic response in more than 400 geographic units (parishes, or groups of parishes), classified according to their degree of manorialism. If the manors insured their inhabitants against economic hardship we expect parishes dominated by manors to show less demographic response to economic stress more generally, and to economic crises in particular.

Study area

Two hundred years ago the region of Scania, the southernmost province of Sweden, had about 250,000 inhabitants of which less than ten percent lived in towns. Agriculture was the dominant occupation and the backbone of the agriculturalists was landholding peasants. Generally, Scania can be said to have contained all sorts of different peasant ecotypes. There were tenants under the nobility forming crowded villages on the plains surrounding a manor as well as small scale freeholders in wooded areas. However, the reverse existed as well.

As for property rights, about half of Scanian land was owned by the nobility and the other half was owned either by the Crown or by owner occupiers (freeholders). The freeholders owned their land and paid taxes to the Crown. They had representatives in Diet of the Four Estates (a kind of parliament) and from the late seventeenth century and onwards their property rights were strengthened, gradually giving the peasants the right to divide farms, to sell them on the land market and to break up from the village organization. The Crown leased most of its land to tenants, whose legal and economic status were very much like that of freeholders, and most of them had bought their farmsteads by the mid-nineteenth century, turning them into freeholds. The manorial parishes very typically organized in a classic mode: A manor house surrounded by demesnes; one or more dependent peasant villages with their arable and pasture land; forests and outlands regulated by the estate authorities; corvée as the villagers' predominant land rent and hardly any taxes to the Crown, or, on the whole, other forms of interference.

The nineteenth century saw a development full of contradictions. At the same time as Scania experienced a late wave of manorialism, with multiplied corvée dues and a massive closing down of tenant farms to increase manorial demesne farming (Olsson 2006), the freeholders in adjacent villages were fully emancipated. They initiated enclosures, developed their farming techniques and became more and more commercialized in the course

of a strong agrarian upswing (Svensson 2006). In both types of areas the social differentiation increased during this period. While the number of landless people in freehold parishes increased due to a larger demand for labor, this process was supplemented in the manorial parishes by the process of including farms into the demesne and thereby turning landholding tenants into landless laborers. From table 1 it is clear that the share of landholding peasants declined over time, a general development in Sweden, in both types of parishes. What the table conceals is that in the freehold/Crown parishes some of the landholding peasants did not have farms large enough to support a family. These peasants had to work for others to cover their subsistence needs. Therefore, generally speaking, there does not seem to have been any large differences between manorial areas and freehold areas in terms of proletarianization.

Table 1 here

While Scania as a whole was a grain-surplus region providing food for other areas of Sweden, the geographical conditions differed over the Scanian countryside. Following earlier ethnological and geographical classifications it can be divided into three types of areas (e.g. Campbell 1928; see also Bohman 2009). The plain district was situated mainly along the coasts in the south and west but stretched into the middle of the region on some places. The soil was predominantly clay or clay based sand and it was the most fertile soil in Sweden. This allowed for relatively large villages with a denser population directing their production towards grain. However, also animals were needed since ploughing this soil demanded a large number of draught animals. The northern and central part of the region was a forest district displaying a more differentiated production including timber and tar but also grain and animals. Besides smaller villages there were frequent isolated single farms in the landscape. In between these two distinctly different parts of Scania, an intermediate brushwood district formed the transformation of the landscape from plains to forest. In this third part, animal breeding constituted one important preoccupation but also here grain was produced to a large extent. In the two latter districts soil conditions differed a lot but in general it was lighter soils than in the plains with smaller pieces of arable land located in between grazing areas and forests. Although many manors were situated where the plains gradually transformed to brushwood and forest districts, in all three districts as well freeholder and crown tenants as manorial estates with subordinate tenants were situated.

Data and Methods

We look at the demographic response at parish level. In total we have 31,051 observations for 459 geographical units consisting of a single parish or a pair of two parishes (*pastorat*). The data comes from the Tabular Commission, a predecessor to Statistics Sweden who started to gather nation-wide data in 1749. Vital events were recorded annually, while the populations at risk (divided by age, sex, etc) were usually recorded every three to five years. In this preliminary analysis we only use the vital events, while we intend to calculate parish-specific demographic rates in future revisions. The problem is that the geographic units reported change over time, which makes it a time-consuming task to construct coherent geographical units over time (see, e.g. Claësson 2009). However, by controlling for time period (10-year dummies) and county in the analysis the time trends in number of vital events, and basic inter-county differences in parish sizes, should not affect the basic patterns in the relationship between short-term economic fluctuations and demographic outcomes.

We look at annual number of births and deaths of children (age 1-9) and young adults (15-24), because this is the data available at present. In the final analysis we plan to include deaths in all age groups in the analysis. However, as was previously discussed, the demographic response is usually strongest for children over the age of 1 and for adults in working ages, which implies that if there is no clear pattern in these age groups, it is quite unlikely that we would find such a pattern for other age groups. Table 2 shows that there are an average of about 27 births, 3.3 child deaths and 0.8 young adult deaths across all observations.

Table 2 here

We include two different measures of the economic conditions facing people in this region: rye prices at county level and output estimates of grain production for the province of Scania as a whole. This is done since prices were set exogenously of the local harvest in this region (Dribe 2000:164) and following the reasoning earlier on separate effects of output and price shocks.

The output series come from the Historical Database of Scanian Agriculture (HDSA) and were derived from tithe payments to the local clergy. The tithes in this region were divided into three distinct parts: to the Crown, to the church, and to the local clergy. By government regulations in the 1680s the two former were set to a fixed annual amount, which remained unaltered for over 200 years. In some cases the tithes to the local clergy was also

fixed after agreements with the parishioners, but in many cases this part remained a flexible annual production tax, until the 1860s. The clergymen kept accounts on each farmer's annual tithe payments. These payments, besides some minor dues and boon days, consisted of every thirtieth sheave of the harvest and every tenth living animal born. Measured in production values animal breeding constituted about ten percent of the average farm output, and will not be further elaborated in this study. The crop output was dominated by barley and rye, and to a lesser extent oats and wheat. Additionally, farmers often grew some peas and beans on their fields, and occasionally buckwheat in districts with sandy soils. In the early nineteenth century potatoes moved out from the kitchen gardens into the arable and became an important crop in most districts.

The series displayed in Figure 1 was estimated from these flexible tithe payments in 34 parishes with a total of about 2,200 farm units. The sample reflects existing differences in property rights and geographical conditions of eighteenth and nineteenth century rural Scania. The individual farm production series are of different length, between 20 and 130 years, and on average 450 farms are present each year. The absolute levels of output differ between the parishes. To create the aggregated series, we first estimated the annual averages for each parish. Then a conversion figure for each parish was created, by comparing the mean values of the first five years it appeared in the database, with the current mean values. The individual farm series was smoothed with their respective parish's conversion figure, and finally an annual mean value was calculated from the whole sample.[1] Output is estimated as total production (in hectoliter) per average farm in the sample in 1770, using the measurement of farm size in the poll-tax registers (*mantal*). The high reliability of the output estimates is shown by their congruence with contemporary qualitative harvest reports, their high correlations with each other, and their negative correlations with regional grain prices.[2]

Figure 1 here

Data on the price of rye, which was the dominating bread grain in this period, is available from the Market Price Scales and was published by Lennart Jörberg in his price history of Sweden (Jörberg 1972). The Market Price Scales were administrative prices used to

[1] For further information on the methods of constructing the output estimates in the HDSA, see Olsson and Svensson 2009.
[2] On village level the mean correlation coefficient for 293 pair wise estimations is 0.54, with distances up to 100 kilometers in between, and their correlations with regional grain prices are typically -0.5, in both cases after trend elimination through first differences.

value the various payments made in kind. The rules governing the manner in which these prices were established varied somewhat over time, but generally speaking they were based on market prices gathered at lower levels, such as towns, judicial districts (*fögderi*) or parishes in the county. The procedure to weigh these prices into the Scales also changed over time; sometimes being the results of negotiations between various representatives, sometimes being simple averages (see Jörberg 1972I: 8-18). Despite the administrative character of the prices Jörberg argued that they reflected the true market prices in a satisfactory way, and that they hence were an invaluable source for a study of Swedish price history (Jörberg 1972I: Ch. 3). We use rye prices for the two counties in Scania – Malmöhus and Kristianstad – and have recalculated the published figures into a single unit: *kronor*/hectoliter (see Figure 2). It is quite clear that the developments of the prices in the two counties are highly similar both in terms of trends and fluctuations.

Figure 2 here

Figures 1 and 2 clearly show the strong upward trend in both prices and grain output. To measure the short-term fluctuations we de-trended the logarithms of the series using the Hodrick-Prescott filter with a smoothing parameter of 6.25, which is suitable for annual data (Hodrick and Prescott 1997). In contrast to first differences, which measure the change between two consecutive years, our de-trended values measure the degree of departure in the series from a smoothed trend. Thus, while a change from low to medium would equal a change from medium to high using first differences, our residuals measure the conditions in the year under consideration in relation to normal years in the period. The de-trended values used in the analysis are shown in figures 3-5, and even though there is some increase in the variance over time in the output series they can be considered quite stationary. In contrast to long-term trends, short-term variations differ between the price series and the output series. To check for possible threshold effects in the response we also categorize price and output residuals. We use absolute values of more than 0.12 for output and 0.20 for grain price as high/low deviations from normal. This corresponds to a 13 percent higher/lower output than normal and a 22 percent deviation in the rye price level. Over the entire period about 12-13 percent of the years were characterized by high prices/low output (see table 2), and these are the years which we consider as crisis years.

Figure 3-5 here

We analyze the demographic response to economic stress by estimating a series of pooled OLS models where the number of births, child deaths (1-9), and young adult deaths (15-24) are the dependent variables. We also estimated random effects panel regression models to account for the panel structure of the data (31,051 observations for 459 geographical units), but since the Hausman test indicated that the crucial assumption of independence between the random effects and the regressors could not be upheld we chose to report the OLS estimates. The two sets of estimates were also highly similar yielding the same substantive results. The standard errors are robust to the clustering of observation at the parish level, and thus allows for within-cluster correlation of errors (see Baum 2006:138-139).

We control for period by including a set of 10-year period categorical variables. In this way the increasing number of vital events stemming simply from population increase over time is controlled for when estimating the price and output effects. We also control for county and type of area (following Campbell 1928).

Our main variable, in addition to rye price and grain output, is the degree of manorialism. From data on the distribution of land ownership by parish[3] we categorized the variable into "high" (80 percent or more of the land in the parish belonged to dominant manors), "low" (80 percent or more of the land in the parish was freehold land or crown land), or "medium" (all other parishes). In order to test the hypothesis about the manors having an insurance function we estimate interaction models where the degree of manorialism is interacted with the economic variables to see if the demographic response differ in a significant way between the different parishes.

Results

Before studying the potential insurance effect of manorialism in times of short-term economic stress, we must start by substantiate the existence of a demographic response to changes in prices and output. Table 3 reports the estimates of basic models including all the control variables as well as prices and output. The regression coefficients have been re-calculated to elasticities indicating the percent change in the dependent variables of a one percent change in the explanatory variables (a categorical variable represents a 100 percent change). Looking first at births (panel A), there is evidently a clear response to both prices and output. The

[3] Derived from Gillberg 1765 and 1767. Manorial demesnes and rectories are excluded from the estimates. We are greatful to Lars Persson, Department of Social and Economic Geography, Lund University, for helping us with his digitalized excerpts from Gillberg on distribution of land ownership.

effects in the current year are very small, while the effects with a one year lag are more sizable. This is also what could be expected because of the waiting time between conception and birth. Previous studies have indicated a quite rapid fertility response, but not before the final part of the year of the price change (Bengtsson and Dribe 2006). The price elasticity of lagged prices is 0.144 which implies that prices 10 percent higher than normal were associated with a roughly 1.5 percent decline in births. Thus, the magnitude of the response is by no means huge, and for grain production it is even less.

Table 3 here

For child deaths the pattern is similar, with a statistically significant response already of current prices, but a stronger response with a one year lag. According to the estimates, years when prices were 10 percent above normal were associated with slightly less than 3 percent more deaths in the following year, while years with an output 10 percent below normal were associated with about 6 percent more deaths. This shows that economic stress clearly affected families in Scania by increasing the risks of child deaths, which has also been shown previously both at aggregate and at micro level (Bengtsson 1984; Bengtsson and Dribe 2005).

Also when looking at deaths of young adults in ages 15-24, we find a statistically significant response to both rye prices and grain output. As with births and child deaths, the response is stronger with a one year lag, but is visible and statistically significant also in the current year. Prices 10 percent above normal are associated with a 1.2 percent increase in the number of deaths in the current year and a 1.5 percent increase the year after. The corresponding figures for output are 2.6 percent more deaths in the current year and about 4 percent in the year after.

These results clearly establish the existence of a demographic response to prices and output, which was also what could be expected from previous research. It shows that the rather approximate method of using number of events rather than demographic rates seem to work sufficiently well to reproduce expected results.

The main issue in this paper, however, is the possible role of manors in dealing with economic stress. To get at this we estimate a series of interaction models where the degree of manorialism (measured as a categorical variable) is interacted with rye prices and grain output, controlling for the same variables as before. Table 4 shows the elasticities of the main effects and the interaction effects. For births (panel A) none of the interaction effects are

statistically significant. However, looking at the interaction effects of high degree of manorialism reveals that they are opposite to the main effects indicating a weaker response in the manorial parishes.

Table 4 here

For child deaths (panel B) the interaction effects of high degree of manorialism are statistically significant for current rye prices, and again they go in the opposite direction from the main effects. The magnitude of the effects show that almost the entire mortality response of current prices is removed in the manorial parishes, pointing to a strong insurance effect of the manors. In the year after, however, there are no signs of any interaction between the degree of manorialism and rye prices. Evidently this protective effect of manorialism was only short-term as shown by the absence of any interaction effect of lagged prices. For production the interaction effects are not statistically significant, but the pattern is similar to the one for prices, even though the beneficial effects of manors seem lower than for prices. Again, there is no visible effect of manorialism in the second year. Turning to deaths of young adults in panel C, there is much less of a consistent pattern. Here the only indication of an interaction effects is for lagged prices, but not for lagged output. There is no interaction effect for current prices, while the pattern for current output is the same as for child deaths, but not statistically significant.

Up to now we have been looking at effects of economic variables in continuous form. To assess the possibility that the demographic responses are not linear we estimate models with economic variables categorized into "high", "normal" and "low" as described above. For births in panel A (table 5), there does not seem to be any real non-linearities in the price response, as shown by the positive (statistically significant) elasticity of "Low" prices, and the negative elasticity of the same magnitude of "high" prices. The picture is basically the same for current prices and lagged prices. These results are in line with results at the micro level, where the fertility response to rye prices showed a similar linear pattern (Bengtsson and Dribe 2006). For grain output, on the other hand, there appears to be clear threshold effects in that there are only effects of "Low" output, while the effects of "High" production is negligible, and not statistically significant.

Table 5 here

For child deaths (panel B) there are more indications of a non-linear response also to prices, although the effects of "Low" prices are negative, but not statistically significant. The effects of high prices/low production are much stronger than the effects of low prices/high production, which clearly supports the idea that the mortality response mainly resulted from times of crisis. The magnitudes of the crisis effects are also larger than what was implied by the linear effects in table 3, further indicating the threshold effects in the mortality response. For young-adult deaths the pattern is less clear cut and there is no strong support for non-linearities in the response.

Finally, we look at the effects of crisis years ("high" prices and "low" production) on the demographic outcomes by the degree of manorialism to see if the previous pattern of a weaker effect of economic stress in manorial parishes still holds (see table 6). Generally speaking the picture is the same as previously. There is a crisis response for both births and deaths, and the interaction between high degree of manorialism and crisis run in the opposite direction from the base effect indicating a weaker, or sometimes negligible, response in parishes dominated my manors. The pattern is clearer in the case of production for births, but for prices in the case of child deaths. As before, the protective effect of manorialism is only visible in the year of the crises, but not in the year after. This points to the conclusion that even though living on manorial land might have improved one's condition in times of crisis, the effect was mainly short-term, and in the year immediately following the crisis one suffered as much as people outside the manorial system. This is not to say the beneficial effect of living in manorial parishes was negligible. According to the estimates they avoided an increase in the number of child deaths by about 8 percent in years of crisis (measured by prices), but then suffered most of the 20 percent more deaths in the year following the crises (the interaction effect of -7 percent is not statistically significant).

Table 6 here

Conclusion

In this paper we have studied the possible role of the manorial system – an important institution in the local rural economy of many parts of Europe in the preindustrial period – in insuring the parishioners, thereby facilitating the dealing with risk and lower their vulnerability to economic stress. Most preindustrial populations seem to have been highly sensitive to economic fluctuations, stemming from variations in agricultural output or grain prices, and rural Scania was no exception. We found a clear demographic response – in births,

child deaths and young adult deaths – to short-term fluctuations in grain output and rye prices. Generally speaking, years of economic crisis, when prices rose with about 20 percent or more and output levels were about 15 percent or more below normal, led to a decline in births by 3 percent already in the year of the crisis, and about 7 percent in the year after. For child deaths the corresponding effects were about 7 percent, and 16 percent, respectively, and for young adult deaths 6 percent and 10-15 percent (table 5). Thus, even though these effects might not appear to be at a disastrous level they are still noticeable and important.

In theory there are different ways of dealing with this kind of economic stress. One way is to live off personal savings or stored food, a second way is to borrow capital from various kinds of credit institutions, and a third way is to insure against risk through some kind of insurance policy. There is also the possibility that national, regional or local authorities provide assistance to the needy in times of crisis and in this way makes sure that they are not too severely affected by the distress. It is quite clear that in preindustrial society neither of these options worked in a satisfactory way. The amount of stored grain was too low to really make a difference in times of scarcity, and the public systems, such as poor relief, were not designed to take care of large numbers of people facing economic difficulties in times of crisis, but rather to help a limited number of poor and destitute. Similarly, capital and insurance markets were not developed enough to lower vulnerability to economic stress to those mostly affected, i.e. landless laborers. The only local institution with the potential of acting to lower the impact of economic stress in the population was the manorial estate. At least in the area under study many manors were big enough to be able to act as lenders of food, or to help by subsidizing food to people in need.

The question posed in this study was whether, or not, the manorial system actually performed this role and, the extent to which it had a real impact of the demographic response to economic stress. We approached the issue by looking at the parish-level demographic response to short-term fluctuation in grain output and rye prices, and specifically to see if the response differed between parishes dominated by manors and other parishes. Using both prices and output have provided us with the opportunity of testing two ways of measuring short-term economic stress. As argued above, these indicators do differ, but sometimes coincide, in an economy with exogenously set prices and the results show that both types of crises affected the well-being of the rural population. However, looking at the effects themselves the impact of the two types of crises did not differ much.

The results gave quite strong support to the idea that the manorial system actually had a kind of insurance effect, lowering the impact of economic stress. In the years of

crisis the entire demographic response to short term economic stress was avoided, when we looked at child deaths, and also for births and deaths in young adult ages we found a similar pattern. This implies that the manorial lords not only helped their tenants by allowing arrears or subsidizing their food purchases, but that they also directly or indirectly helped the landless groups of the parish population. In the year following the crisis, however, we found no protective effect of living in a manorial parish, compared to living in other parishes. This shows that it was only in the short-term that estates could really make a difference for the standard of living of the inhabitants by reducing their vulnerability to economic stress. In a way this shows the apparent imperfections in the institutional structure of preindustrial rural societies, which made the population highly vulnerable to economic stress. At the same time it provides valuable insights into the workings of the manorial economy in the late preindustrial period.

References

Abel, W. 1980. *Agricultural Fluctuations in Europe from the Thirteenth to the Twentieth Centuries*. London: Methuen & Co.

Allen, R. C. 2009. *The British Industrial Revolution in Global Perspective*. Cambridge: Cambridge University Press.

Allen, R. C., T. Bengtsson, and M. Dribe (eds.) 2005. *Living Standards in the Past. New Perspectives on Well-Being in Asia and Europe*. Oxford: Oxford University Press.

Baum, C. F. 2006. *An Introduction to Modern Econometrics Using Stata*. College Station: Stata Press.

Bengtsson, T. 1984. Harvest fluctuations and demographic response: Southern Sweden 1751-1858, in T. Bengtsson, G. Fridlizius, and R. Ohlsson (eds.) *Pre-Industrial Population Change. The Mortality Decline and Short-Term Population Movements*. Stockholm: Almqvist & Wiksell International.

Bengtsson, T. 1993. A re-interpretation of population trends and cycles in England, France and Sweden, 1751–1860. *Histoire & Mesure* 8: 93–115.

Bengtsson, T. 1999. The vulnerable child. Economic insecurity and child mortality in pre-industrial Sweden: A Case study of Västanfors, 1757-1850. *European Journal of Population* 15:117-151.

Bengtsson, T. 2004. Living standards and economic stress, in T. Bengtsson et al. *Life Under Pressure. Mortality and Living Standards in Europe and Asia, 1700-1900*. Cambridge, MA: The MIT Press.

Bengtsson, T. and M. Dribe. 2005. New evidence on the standard of living in Sweden during the eighteenth and nineteenth centuries: Long-term development of the demographic response to short-term economic stress, in R. C. Allen, T. Bengtsson, and M. Dribe (eds.) *Living Standards in the Past. New Perspectives on Well-Being in Asia and Europe*. Oxford: Oxford University Press.

Bengtsson, T. and M. Dribe. 2006. Deliberate control in a natural fertility population: Southern Sweden, 1766-1894. *Demography* 43:727-746.

Bengtsson, T. and M. Dribe. 2010. Economic stress and reproductive responses, in N. O. Tsuya, et al. (eds.) *Prudence and Pressure. Reproduction and Human Agency in Europe and Asia, 1700-1900*. Cambridge, MA: The MIT Press.

Bengtsson, T. and R. Ohlsson. 1985. Age-specific mortality and short-term changes in the standard of living: Sweden, 1751-1859. *European Journal of Population* 1: 309-326.

Bengtsson, T. and D. Reher. 1998. Population and the economy, part D. Short and medium term relations between population and economy, in C-E. Núñez (ed.) *Debates and Controversies in Economic History*. Madrid: Fundación Ramón Areces.

Bengtsson, T., C. Campbell, J. Z. Lee, et al. 2004. *Life Under Pressure. Mortality and Living Standards in Europe and Asia, 1700-1900.* Cambridge, MA: The MIT Press.

Bloch, M. 1966. *French Rural History. An Essay on Its Basic Characteristics*. Berkeley: University of California Press.

Blum, J. 1978. *The End of the Old Order in Rural Europe*. Princeton: Princeton University Press.

Bohman, M. 2009. *Bygder eller bara bönder. Tradition och rationalitet i den skånska jordbruksomvandlingen*. Unpublished Ph.Lic. dissertation, Lund University, Department of Economic History.

Brenner, R. 1985. Agrarian class structure and economic development in pre-industrial Europe, in T. H. Ashton and C. H. E. Philpin (eds.) *The Brenner Debate. Agrarian Class structure and Economic Development in Pre-Industrial Europe*. Cambridge: Cambridge University Press.

Broadberry, S. N. and B. Gupta. 2006. The early modern great divergence: Wages, prices and economic development in Europe and Asia, 1500-1800. *Economic History Review* 59:2-31.

Campbell, Å. 1928. *Skånska bygder under andra hälften av 1700-talet*. Uppsala: Lundequistska Bokhandeln.

Campbell, C., J. Z. Lee, and T. Bengtsson. 2004. Economic stress and mortality, in T. Bengtsson et al. *Life Under Pressure. Mortality and Living Standards in Europe and Asia, 1700-1900*. Cambridge, MA: The MIT Press.

Carlsson, G. 1970. Nineteenth-century fertility oscillations. *Population Studies* 24:413-422.

Claësson, O. 2009. *Geographical Differences in Infant and Child Mortality during the Initial Mortality Decline – Evidence from Southern Sweden, 1749-1830*. Unpublished Ph.Lic. dissertation, Lund University, Department of Economic History.

Clark, G. 2007. *A Farewell to Alms. A Brief Economic History of the World*. Princeton: Princeton University Press.

de Vries, J. and A. van der Woude. 1997. *The First Modern Economy. Success, Failure, and Perseverance of the Dutch Economy, 1500-1815*. Cambridge: Cambridge University Press.

Dobb, M. 1963. *Studies in the Development of Capitalism*. New York: International Publishers (rev. ed.).

Dribe, M. 2000. *Leaving Home in a Peasant Society. Economic Fluctuations, Household Dynamics and Youth Migration in Southern Sweden, 1829-1866*. Södertälje: Almqvist & Wiksell International.

Dribe, M. 2003. Dealing with economic stress through migration: Lessons from nineteenth century rural Sweden. *European Review of Economic History* 7:271-299.

Dribe, M. and F. Scalone. 2009. Detecting deliberate fertility control during the pre-transitional period in a sample of German villages. Paper presented at the annual meeting of the Population Association of America, Detroit, MI, May 2009.

Dribe, M., M. Olsson, and P. Svensson. 2009. Land transmissions in the manorial system. The case of southern Sweden 1766–1859. Paper presented at the Economic History Society's annual conference, University of Warwick, April 2009.

Dyer, C. 2005. *An Age of Transition? Economy and Society in England in the Later Middle Ages*. Oxford: Oxford University Press.

Eckstein, Z., T. P. Schultz, and K. I. Wolpin. 1985. Short-run fluctuations in fertility and mortality in pre-industrial Sweden. *European Economic Review* 26: 295-317.

Feeney, G. and H. Kiyoshi. 1990. Rice price fluctuations and fertility in late Tokugawa Japan. *Journal of Japanese Studies* 16:1-30.

Fenoaltea, S. 1976. Risk, transaction costs, and the organization of medieval agriculture. *Explorations in Economic History* 13:129-151.

Galloway, P. R., 1985. Annual variation in deaths by age, deaths by cause, prices, and weather in London 1670-1830. *Population Studies* 39: 487-505.

Galloway, P. R., 1988. Basic patterns in annual variations in fertility, nuptiality, mortality, and prices in pre-industrial Europe. *Population Studies* 42: 275–303.

Gillberg, J.L. 1765. *Historisk, Oeconomisk och Geographisk Beskrifning öfver Malmöhus Län uti Hertigdömet Skåne*. Lund: Berling.

Gillberg, J.L. 1767. *Historisk, Oeconomisk och Geographisk Beskrifning öfver Christianstad Län uti Hertigdömet Skåne*. Lund: Berling.

Hammel, E. A. and P. R. Galloway. 2000. Structural and behavioral changes in the short-term preventive check in the northwest Balkans in the 18th and 19th centuries. *European Journal of Population* 16: 67–108.

Hatcher, J. and M. Bailey. 2001. *Modelling the Middle Ages. The History and Theory of England's Economic Development*. Oxford: Oxford University Press.

Hilton, R. H. 1976. *The Transition from Feudalism to Capitalism*. London: New Left Books.

Hiltpold, P. 1989. The price, production, and transportation of grain in early modern Castile. *Agricultural History* 63: 73-91.

Hodrick, R., and E. Prescott. 1997. Post-war U.S. business cycles: An empirical investigation. *Journal of Money, Credit and Banking* 29: 1-16.

Hoffman, P. T. 1996. *Growth in a Traditional Society. The French Countryside 1450-1815*. Princeton: Princeton University Press.

Jeppsson, G. 2001. Hospital och huvudgård. Adelsdonationer under 1500- och 1600-talen, in K. Arcadius and K. Sundberg (eds.) *Skånska godsmiljöer*. Lund: Skånes hembygdsförbund årsbok 2001.

Jörberg, L. 1972. *A History of Prices in Sweden 1732-1914*, Vol.I-II. Lund: Gleerups.

Lee, R. D. 1981. Short-term variation: Vital rates, prices and weather, in E. A. Wrigley and R. S. Schofield, *The Population History of England, 1541-1871. A Reconstruction*. London: Edward Arnold.

Lee, R. D. 1990. The demographic response to economic crises in historical and contemporary populations. *Population Bulletin of the United Nations* 20: 1-15.

Lundh, C. and M. Olsson. 2002. The institution of retirement on Scanian estates in the nineteenth century. *Continuity and Change*, 17: 373–403.

Lundh, C. and M. Olsson. 2008. Tenancy contracts in Scania from the middle ages to the nineteenth century, in B. van Bavel and P. Schofield (eds.), *The Development of Leasehold in Northwestern Europe, c. 1200–1600*. Turnhout: Brepols.

Marx, K. (1867). *Capital: A Critique of Political Economy. Vol. I. The Process of Capitalist Production.* Chicago: Charles H. Kerr and Co, 1906.

North, D. and R. P. Thomas. 1971. The rise and fall of the manorial system: A theoretical model. *Journal of Economic History* 31: 777-803.

Olsson, M. 2002. *Storgodsdrift. Godsekonomi och arbetsorganisation i Skåne från dansk tid till mitten av 1800-talet.* Stockholm: Almqvist & Wiksell International.

Olsson, M. 2006. Manorial economy and corvée labour in southern Sweden 1650–1850. *Economic History Review* 59: 481–497.

Olsson, M. and P. Svensson. 2009. Agricultural production in southern Sweden 1702–1864 – estimates and explanations, in M. Olsson and P. Svensson (eds.) *Production and Productivity in European Agriculture in a Historical Perspective*. Turnhout: Brepols (forthcoming).

Oris, M., R. Derosas, and M. Breschi. 2004. Infant and child mortality, in T. Bengtsson et al. *Life Under Pressure. Mortality and Living Standards in Europe and Asia, 1700-1900*. Cambridge, MA: The MIT Press.

Parthasarathi, P. 2001. *The Transition to a Colonial Economy. Weavers, Merchants and Kings in South India, 1720-1800*. Cambridge: Cambridge University Press.

Persson, K. G. 1999. *Grain Markets in Europe 1500-1900. Integration and Deregulation*. Cambridge: Cambridge University Press.

Plakans, A. 1975. Seigneurial authority and peasant family life: The Baltic area in the eighteenth century. *Journal of Interdisciplinary History* 5:629-654.

Pomeranz, K. 2000. *The Great Divergence. China, Europe and the Making of the Modern World Economy*. Princeton: Princeton University Press.

Rosenthal, J-L. 1994. Rural credit markets and aggregate shocks: The experience of Nuits St. Georges, 1756-1776. *Journal of Economic History* 54: 288-306.

Svensson, P. 2006. Peasants and entrepreneurship in the nineteenth-century agricultural transformation of Sweden. *Social Science History* 30: 387-429.

Tsuya, N. O. et al. (eds.) 2010. *Prudence and Pressure. Reproduction and Human Agency in Europe and Asia, 1700-1900*. Cambridge, MA: The MIT Press.

Utterström, G. 1957. *Jordbrukets arbetare*. Stockholm: Tiden.

Van Zanden, J. L. and A. van Riel. 2004. *The Strictures of Inheritance: The Dutch Economy in the Nineteenth Century*. Princeton: Princeton University Press.

Weir, D. 1984. Life under pressure: France and England, 1670-1870. *Journal of Economic History* 44: 27-47.

Wrigley, E. A. and R. S. Schofield. 1981. *The Population History of England, 1541-1871. A Reconstruction*. London: Edward Arnold.

Table 1. Percentage of landholding peasants of total heads of households in manorial and freehold/crown parishes 1751-1840.

	Manorial parishes	Freehold/Crown parishes
1751	62	64
1775	52	56
1800	45	49
1840	37	49

Source: The Tabular Commission, The Demographic Database, Umeå University.
Note: The sample consists of 20 parishes where more than 80 per cent of the land was noble land, and 16 parishes where more than 80 per cent of the land was freehold or Crown land.

Table 2. Descriptive statistics.

Dependent variables:				
	Mean	St. Dev.		
Births	27.1	0.104		
Deaths 1-9	3.3	0.021		
Deaths 15-24	0.8	0.007		
Explanatory variables:	%			
Degree of manorialism				
High	18.4			
Medium	45.3			
Low	36.2			
Period				
1749-1759	8.0			
1760-1769	7.6			
1770-1779	7.8			
1780-1789	8.3			
1790-1799	8.7			
1800-1809	9.5			
1810-1819	9.9			
1820-1829	10.1			
1830-1839	10.3			
1840-1849	10.0			
1850-1859	10.0			
County				
Kristianstad	37.8			
Malmöhus	62.2			
Type of area				
Plain	39.1			
Intermediate	43.2			
Forest	17.7			
Economic variables:		Percentage in groups:		
	Mean	Low	Normal	High
Rye price residuals	-0.004	9.6	78.7	11.7
Grain output residuals	0.001	13.1	77.5	9.4
Observations	31051			
Geographical units	459			

Sources: The Tabular Commission, The Demographic Database, Umeå University, Jörberg 1972; Olsson and Svensson 2009; Gillberg 1765, 1767, digitized by Lars Persson, Department of Social and Economic Geography, Lund University.

Table 3. Regression estimates (elasticities) of demographic response to short-term economic fluctuations, 1749-1859.

A. Births

	Price				Output			
	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|
Price/output (t)	-0.052	0.000	-0.041	0.000	-0.024	0.082	-0.001	0.945
Price/output (t-1)	---	---	-0.144	0.000	---	---	0.082	0.000
Period								
1749-1759	ref		ref		ref		ref	
1760-1769	0.020	0.010	0.009	0.276	0.023	0.004	0.021	0.008
1770-1779	0.027	0.015	0.022	0.043	0.025	0.024	0.025	0.026
1780-1789	0.020	0.124	0.014	0.283	0.019	0.144	0.019	0.144
1790-1799	0.091	0.000	0.082	0.000	0.093	0.000	0.091	0.000
1800-1809	0.113	0.000	0.113	0.000	0.111	0.000	0.111	0.000
1810-1819	0.269	0.000	0.261	0.000	0.268	0.000	0.267	0.000
1820-1829	0.459	0.000	0.452	0.000	0.461	0.000	0.458	0.000
1830-1839	0.507	0.000	0.504	0.000	0.506	0.000	0.506	0.000
1840-1849	0.650	0.000	0.645	0.000	0.651	0.000	0.648	0.000
1850-1859	0.738	0.000	0.731	0.000	0.738	0.000	0.737	0.000
County								
Kristianstad	ref		ref		ref		ref	
Malmöhus	-0.184	0.002	-0.184	0.001	-0.184	0.002	-0.184	0.002
Type of area								
Plain	ref		ref		ref		ref	
Intermediate	0.339	0.000	0.339	0.000	0.339	0.000	0.339	0.000
Forest	0.389	0.000	0.389	0.000	0.389	0.000	0.389	0.000
Degree of manorialism								
High	0.016	0.814	0.016	0.813	0.016	0.815	0.016	0.815
Medium	ref		ref		ref		ref	
Low	0.017	0.786	0.017	0.784	0.017	0.786	0.017	0.786
Observations	31051		31051		31051		31051	
R^2	0.250		0.251		0.250		0.250	
F	44.6	0.000	45.1	0.000	43.9	0.000	42.0	0.000

B. Deaths, ages 1-9

	Price				Output			
	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|
Price/output (t)	0.168	0.000	0.147	0.000	-0.351	0.000	-0.521	0.000
Price/output (t-1)	---	---	0.286	0.000	---	---	-0.612	0.000
Period								
1749-1759	ref		ref		ref		ref	
1760-1769	-0.224	0.000	-0.201	0.000	-0.218	0.000	-0.204	0.000
1770-1779	-0.124	0.000	-0.114	0.000	-0.114	0.000	-0.112	0.000
1780-1789	-0.178	0.000	-0.166	0.000	-0.173	0.000	-0.173	0.000
1790-1799	-0.147	0.000	-0.128	0.000	-0.143	0.000	-0.130	0.000
1800-1809	-0.116	0.000	-0.117	0.000	-0.107	0.001	-0.109	0.001
1810-1819	-0.059	0.062	-0.045	0.160	-0.053	0.093	-0.053	0.097
1820-1829	0.133	0.000	0.148	0.000	0.136	0.000	0.154	0.000
1830-1839	0.221	0.000	0.226	0.000	0.224	0.000	0.222	0.000
1840-1849	0.172	0.000	0.182	0.000	0.184	0.000	0.199	0.000
1850-1859	0.580	0.000	0.593	0.000	0.581	0.000	0.583	0.000
County								
Kristianstad	ref		ref		ref		ref	
Malmöhus	-0.210	0.001	-0.210	0.001	-0.211	0.001	-0.211	0.001
Type of area								
Plain	ref		ref		ref		ref	
Intermediate	0.247	0.000	0.247	0.000	0.247	0.000	0.247	0.000
Forest	0.113	0.241	0.113	0.242	0.114	0.241	0.114	0.240
Degree of manorialism								
High	0.042	0.587	0.042	0.588	0.042	0.586	0.042	0.585
Medium	ref		ref		ref		ref	
Low	0.013	0.846	0.013	0.849	0.013	0.845	0.013	0.846
Observations	31051		31051		31051		31051	
R^2	0.061		0.062		0.061		0.064	
F	27.9	0.000	27.5	0.000	27.3	0.000	27.5	0.000

C. Deaths, ages 15-24

	Price				Output			
	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|
Price/output (t)	0.129	0.001	0.118	0.002	-0.149	0.014	-0.261	0.000
Price/output (t-1)	---	---	0.148	0.000	---	---	-0.404	0.000
Period								
1749-1759	ref		ref		ref		ref	
1760-1769	-0.107	0.001	-0.096	0.005	-0.107	0.001	-0.098	0.003
1770-1779	0.147	0.000	0.152	0.000	0.154	0.000	0.155	0.000
1780-1789	0.054	0.138	0.060	0.099	0.057	0.116	0.057	0.115
1790-1799	0.004	0.916	0.013	0.693	0.004	0.905	0.012	0.710
1800-1809	0.315	0.000	0.314	0.000	0.321	0.000	0.319	0.000
1810-1819	0.301	0.000	0.308	0.000	0.305	0.000	0.305	0.000
1820-1829	0.323	0.000	0.331	0.000	0.323	0.000	0.335	0.000
1830-1839	0.468	0.000	0.471	0.000	0.470	0.000	0.469	0.000
1840-1849	0.645	0.000	0.651	0.000	0.650	0.000	0.661	0.000
1850-1859	0.611	0.000	0.618	0.000	0.612	0.000	0.613	0.000
County								
Kristianstad	ref		ref		ref		ref	
Malmöhus	-0.200	0.003	-0.200	0.003	-0.200	0.003	-0.200	0.003
Type of area								
Plain	ref		ref		ref		ref	
Intermediate	0.339	0.000	0.339	0.000	0.339	0.000	0.339	0.000
Forest	0.361	0.000	0.360	0.000	0.361	0.000	0.361	0.000
Degree of manorialism								
High	0.016	0.823	0.015	0.824	0.016	0.823	0.016	0.822
Medium	ref		ref		ref		ref	
Low	0.040	0.569	0.040	0.570	0.040	0.569	0.040	0.569
Observations	31051		31051		31051		31051	
R^2	0.052		0.052		0.052		0.053	
F	23.3	0.000	22.0	0.000	23.3	0.000	22.1	0.000

Note: Elasticities express percent change in y of a one percent change in X (categorical variables represent a 100% change in X). Elasticities are calculated at means of variables. Based on OLS estimates with standard errors adjusted for clustered observations (by parish). Sources: See Table 2.

Table 4. Price and output effects on demographic outcomes by degree of manorialism, 1749-1859. Regression estimates from interaction models.

A. Births

	Price				Output			
	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|
Price/output (t)	-0.064	0.000	-0.053	0.000	-0.028	0.147	-0.008	0.688
Price/output (t)xManor high	0.024	0.250	0.023	0.279	0.025	0.513	0.029	0.477
Price/output (t)xManor low	0.019	0.275	0.018	0.311	0.000	0.990	0.005	0.878
Price/output (t-1)	---	---	-0.149	0.000	---	---	0.074	0.000
Price/output (t-1)xManor high	---	---	0.003	0.903	---	---	0.011	0.783
Price/output (t-1)xManor low	---	---	0.011	0.615	---	---	0.016	0.601
Observations	31051		31051		31051		31051	
R^2	0.250		0.251		0.250		0.250	
F	40.5	0.000	37.8	0.000	39.6	0.000	34.7	0.000

B. Deaths, ages 1-9

	Price				Output			
	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|
Price/output (t)	0.222	0.000	0.198	0.000	-0.403	0.000	-0.557	0.000
Price/output (t)xManor high	-0.197	0.030	-0.195	0.031	0.216	0.180	0.175	0.314
Price/output (t)xManor low	-0.039	0.591	-0.033	0.649	0.036	0.776	0.012	0.929
Price/output (t-1)	---	---	0.307	0.000	---	---	-0.557	0.000
Price/output (t-1)xManor high	---	---	0.006	0.943	---	---	-0.116	0.457
Price/output (t-1)xManor low	---	---	-0.063	0.377	---	---	-0.093	0.447
Observations	31051		31051		31051		31051	
R^2	0.061		0.063		0.061		0.064	
F	25.1	0.000	22.5	0.000	24.6	0.000	22.7	0.000

C. Deaths, ages 15-24

	Price				Output			
	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|
Price/output (t)	0.107	0.049	0.093	0.085	-0.145	0.104	-0.241	0.010
Price/output (t)xManor high	-0.011	0.921	0.005	0.963	0.195	0.257	0.169	0.371
Price/output (t)xManor low	0.067	0.462	0.068	0.448	-0.106	0.420	-0.137	0.338
Price/output (t-1)	---	---	0.187	0.004	---	---	-0.347	0.003
Price/output (t-1)xManor high	---	---	-0.175	0.090	---	---	-0.074	0.714
Price/output (t-1)xManor low	---	---	-0.009	0.925	---	---	-0.118	0.506
Observations	31051		31051		31051		31051	
R^2	0.052		0.052		0.052		0.053	
F	20.8	0.000	18.0	0.000	20.9	0.000	18.4	0.000

Sources and Note: See Table 2. Models also control for all the variables in the basic model (Table 3).

Table 5. Effects of categorized prices and output on demographic outcomes, 1749-1859.

A. Births

	Model without lags				Model with lags			
	Price		Output		Price		Output	
Price/Output (t)	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|
Low	0.023	0.000	0.012	0.005	0.014	0.024	0.010	0.024
Normal	ref		ref		ref		ref	
High	-0.019	0.000	0.001	0.808	-0.033	0.000	0.004	0.490
Price/Output (t-1)								
Low	---	---	---	---	0.043	0.000	-0.026	0.000
Normal	---	---	---	---	ref		ref	
High	---	---	---	---	-0.068	0.000	-0.005	0.391
Observations	31051		31051		31051		31051	
R^2	0.250		0.250		0.251		0.250	
F	42.7	0.000	41.5	0.000	40.6	0.000	38.3	0.000

B. Deaths 1-9

	Model without lags				Model with lags			
	Price		Output		Price		Output	
Price/Output (t)	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|
Low	-0.022	0.154	0.172	0.000	-0.001	0.927	0.203	0.000
Normal	ref		ref		ref		ref	
High	0.034	0.033	-0.024	0.202	0.070	0.000	-0.024	0.213
Price/Output (t-1)					ref			
Low	---	---	---	---	-0.010	0.588	0.229	0.000
Normal	---	---	---	---	ref			
High	---	---	---	---	0.165	0.000	0.136	0.000
Observations	31051		31051		31051		31051	
R^2	0.060		0.063		0.062		0.067	
F	25.9	0.000	26.1	0.000	24.3	0.000	27.7	0.000

C. Deaths 15-24

	Model without lags				Model with lags			
	Price		Output		Price		Output	
Price/Output (t)	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|
Low	-0.035	0.102	0.048	0.028	-0.024	0.264	0.063	0.004
Normal	ref		ref		ref		ref	
High	0.037	0.108	-0.063	0.014	0.058	0.017	-0.078	0.003
Price/Output (t-1)								
Low	---	---	---	---	0.061	0.013	0.173	0.000
Normal	---	---	---	---	ref		ref	
High	---	---	---	---	0.095	0.000	0.035	0.238
Observations	31051		31051		31051		31051	
R^2	0.052		0.052		0.053		0.054	
F	21.8	0.000	21.9	0.000	19.7	0.000	20.7	0.000

Sources and Note: See Table 4.

Table 6. Effects of crises (high prices/low output) on demographic outcomes by degree of manorialism, 1749-1859. Regression estimates from interaction models.

A. Births

	Model without lags				Model with lags			
	Price		Output		Price		Output	
	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|
Crisis (t)	-0.026	0.001	0.022	0.056	-0.041	0.000	0.020	0.083
Interaction Manor x crisis								
Manor. High	0.012	0.323	-0.041	0.105	0.010	0.409	-0.041	0.103
Manor. Low	0.006	0.631	-0.007	0.759	0.005	0.707	-0.006	0.776
Crisis (t-1)	---	---	---	---	-0.074	0.000	-0.013	0.226
Interaction Manor x crisis								
Manor. High	---	---	---	---	-0.001	0.944	-0.031	0.228
Manor. Low	---	---	---	---	-0.004	0.815	-0.019	0.309
Observations	31051		31051		31051		31051	
R^2	0.250		0.250		0.251		0.250	
F	40.250	0.000	39.380	0.000	37.240	0.000	34.380	0.000

B. Deaths 1-9

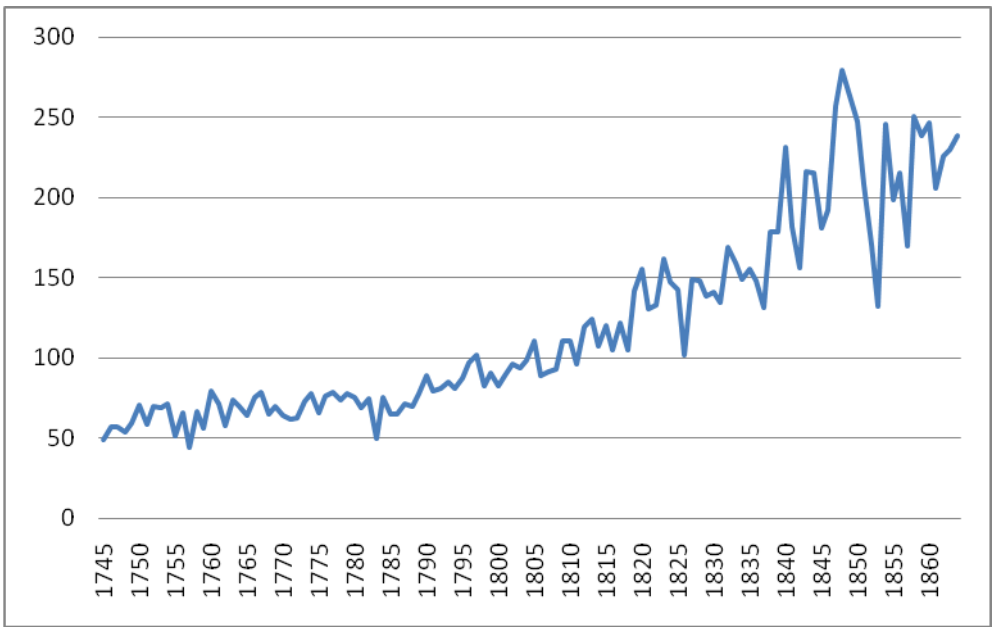
	Model without lags				Model with lags			
	Price		Output		Price		Output	
	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|
Crisis (t)	0.045	0.069	0.195	0.000	0.083	0.002	0.211	0.000
Interaction Manor x crisis								
Manor. High	-0.075	0.090	-0.058	0.390	-0.084	0.069	-0.056	0.398
Manor. Low	0.018	0.619	-0.024	0.643	0.010	0.784	-0.024	0.637
Crisis (t-1)	---	---	---	---	0.203	0.000	0.201	0.000
Interaction Manor x crisis								
Manor. High	---	---	---	---	-0.076	0.106	0.041	0.499
Manor. Low	---	---	---	---	-0.060	0.128	-0.015	0.728
Observations	31051		31051		31051		31051	
R^2	0.062		0.063		0.063		0.066	
F	24.4	0.000	25.2	0.000	22.2	0.000	24.0	0.000

C. Deaths 15-24

	Model without lags				Model with lags			
	Price		Output		Price		Output	
	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|	Elasticity	P>|t|
Crisis (t)	0.031	0.355	0.089	0.008	0.054	0.117	0.102	0.002
Interaction Manor x crisis								
Manor. High	0.013	0.835	-0.146	0.014	-0.006	0.923	-0.145	0.015
Manor. Low	0.022	0.671	-0.013	0.802	0.017	0.743	-0.014	0.785
Crisis (t-1)	---	---	---	---	0.128	0.002	0.154	0.000
Interaction Manor x crisis								
Manor. High	---	---	---	---	-0.138	0.027	-0.008	0.897
Manor. Low	---	---	---	---	-0.036	0.518	0.018	0.747
Observations	31051		31051		31051		31051	
R^2	0.052		0.052		0.052		0.054	
F	20.6	0.000	20.8	0.000	17.9	0.000	18.3	0.000

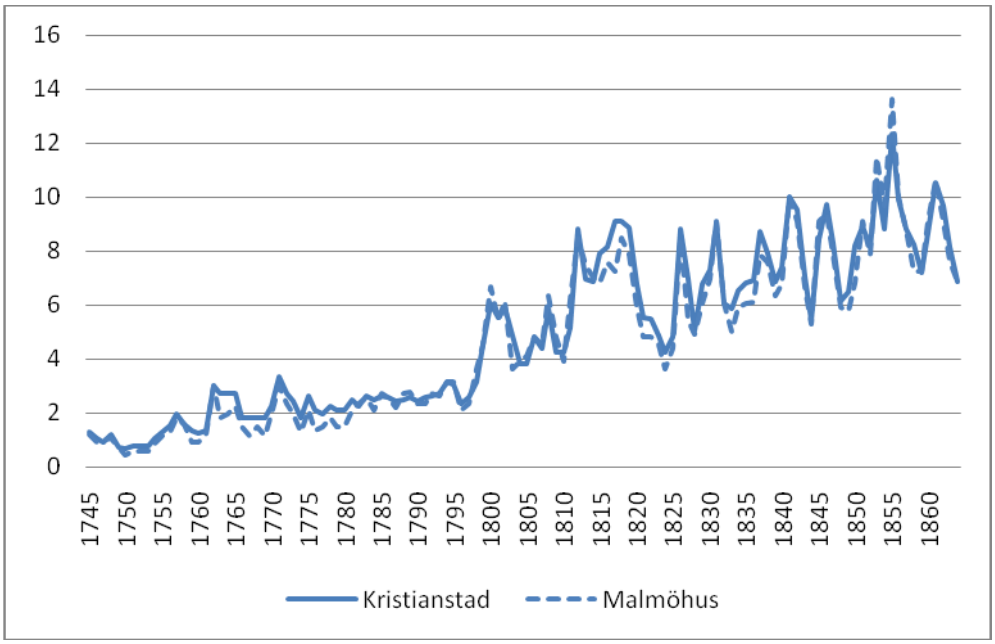
Sources and Note: See Table 4.

Figure 1. Grain output (hectoliter/average 1770 farm) in Scania, 1745-1864.



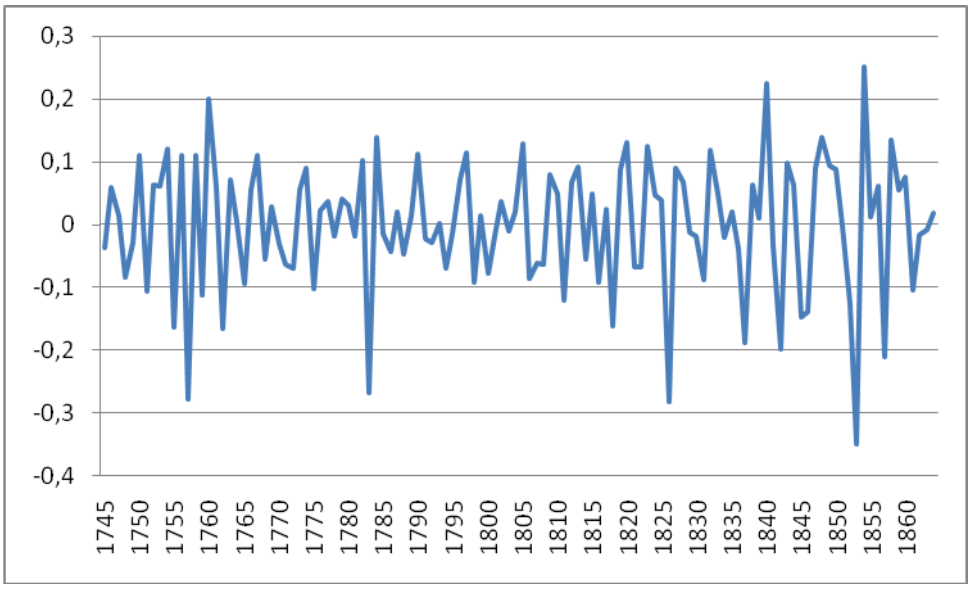
Source: Olsson and Svensson 2009.

Figure 2. Rye prices (*kronor*/hectoliter) in the Scanian counties, 1745-1864.



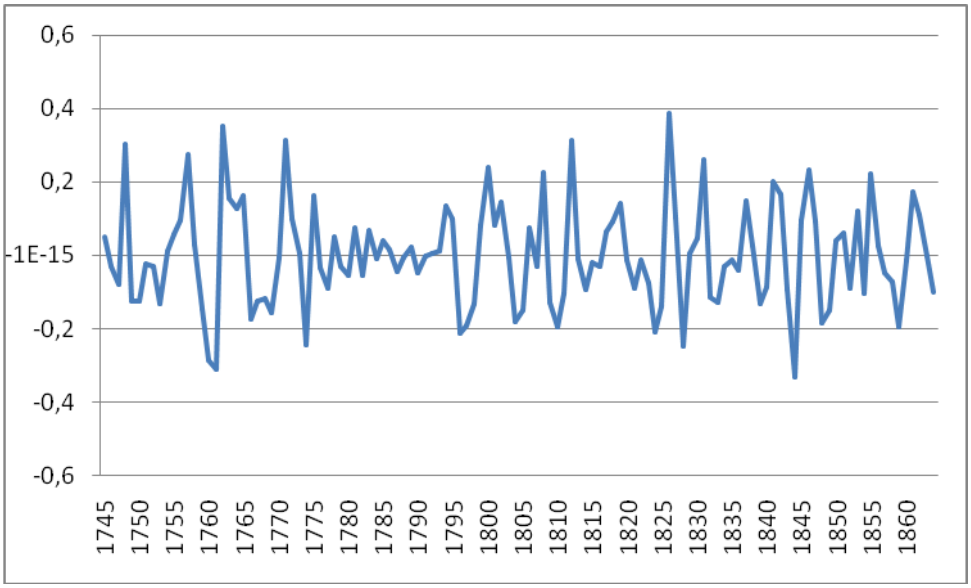
Source: Jörberg 1972, own calculations.

Figure 3. De-trended log grain output in Scania, 1745-1864.



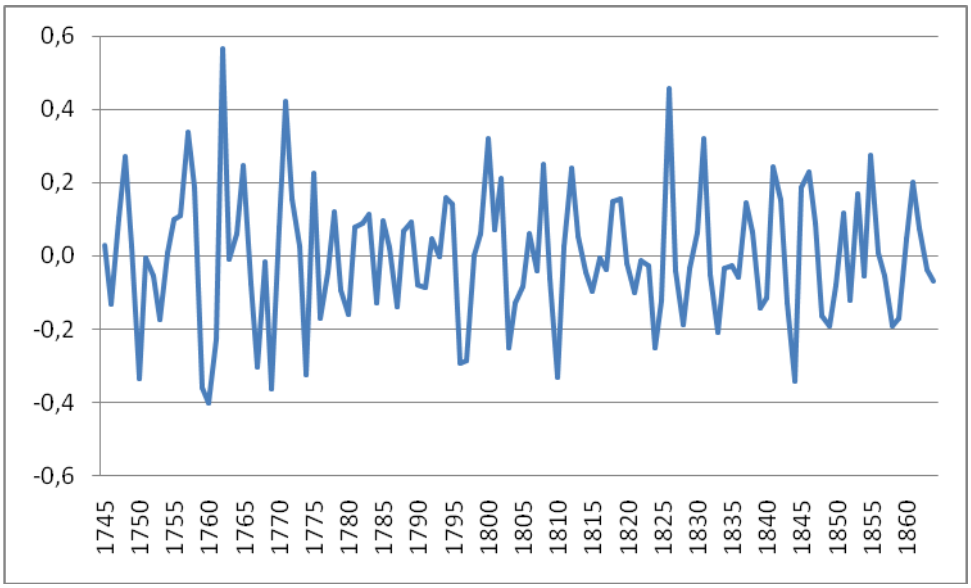
Source: See Figure 1.

Figure 4. De-trended log rye price in Kristianstad county, 1745-1864.



Source: See Figure 2.

Figure 5. De-trended log rye price in Malmöhus county, 1745-1864.



Source: See Figure 2.