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1. Introduction

One of the longest lasting economic-historical debates concerns the development of standard of living in the pre-industrial and early industrial period. Starting already with Marx, Engels and the Classical Economists the question of whether the standard of living increased, or not, during the Industrial Revolution has been fiercely debated between 'optimists' and 'pessimists' (see e.g. Taylor 1975). In the early 1980s new evidence and estimations further fuelled this debate regarding the English case (Crafts 1982; Lindert and Williamson 1983). More recently there has also been a growing interest in the differences in standard of living between the East and the West, and what may have caused these differences (e.g. Frank 1998; Goody 1996; Lal 1998; Landes 1998; Pomeranz 2000; see also O'Brien 2001). This debate is also intimately connected to the broader question of why the West, rather than the East, was first to experience modern economic growth. In this debate a

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multitude of factors have been stressed, such as differences in natural endowments, technological development, institutional setting, access to colonial markets, cultural or religious factors, etc.

While some authors have approached the issue by constructing various macroeconomic indicators on production, wages or productivity, others have focused more on indicators of 'quality of life', such as housing conditions, workers' conditions, etc. There have also been attempts at measuring living standards by the health status of the population. One of the most straightforward ways of doing this is to study the development of life expectancy and mortality, where increased longevity could be seen as the ultimate indicator of a higher standard of living. In the last decades we have also seen a rapidly growing attention to various anthropometric measures (heights, body mass index, etc.) as indicators of standard of living (e.g. Engerman 1976; Steckel 1979; Komlos 1985; Steckel and Floud 1997; Floud, Wachter and Gregory 1990; Fogel 1993).

In this paper we propose a rather different measure of standard of living, which has been developed within a comparative project[1] as a complement to the more traditional measures. It focuses on the way individuals and families in pre-industrial society responded to short-term economic stress, by which is meant short-term changes in income, employment opportunities or food availability. We make a long-term study of the mortality and fertility response to short-term economic stress, as measured by grain price fluctuations, for a rural area of western Scania, Sweden, during the period 1766-1895, taking into account the structural changes this economy underwent. The analysis will focus on the landless, i.e. the social group that can be expected to have lived closest to the margin, and therefore was most vulnerable to economic stress, but also had the least possibility of counteracting the negative effects of economic stress (see Bengtsson and Dribe 2000). By studying how the landless responded to economic stress over time, we are able to give a new dimension to their standard of living. Mortality responses to short-term economic stress must be regarded as a clear indicator of a low standard of living, and a development towards a weaker mortality response should be interpreted as a positive development of living standards. Similarly, we argue that the existence of a fertility response to economic stress – whether intentional or not –

[1] The EurAsia Project on Population and Family History (EAP) is a comparative project dealing with historical demography from a household perspective in five European and Asian populations: Belgium, China, Italy, Japan and Sweden. For a description of the basic ideas see e.g. Bengtsson and Campbell (1998). For a description of the measure developed see Bengtsson (forthcoming).

also could be interpreted as an indication of a high degree of vulnerability to economic fluctuations, and thereby of a rather low level of standard of living. Before turning to these issues, however, the previous research on the standard of living development in Sweden will be reviewed, which allows more explicit comparisons to be made between the results using different methods and approaches.

2. The Standard of Living Development in Sweden – Where Do We Stand?

Taking a very broad perspective, there can be little disagreement on the long-term development of standard of living in Sweden between, say, 1750 and 1914. As a result of the agricultural and, perhaps more importantly, industrial revolutions over much of the nineteenth and early twentieth centuries living standards increased tremendously by whatever indicator we use. Real wages, GDP, educational levels, urbanisation and life expectancy all increased, while mortality in most age groups as well as fertility declined. However, when it comes to the development of the standard of living *within* this period there is much more uncertainty as to when, more precisely, the improvements occurred in various social groups.

Starting with the development of agricultural production, most scholars seem to agree that the production of vegetable products (mostly grain) increased more rapidly than the population during the first half of the nineteenth century. Already in the second half of the eighteenth century there are several indications of a new and positive development of Swedish agriculture; most notably the beginning of the enclosure movement. However, it was not until the first decades of the nineteenth century that the process of agricultural transformation gained speed with more rapid and universal enclosures, new crops, crop rotations, improved tools and land reclamation (see e.g. Gadd 2000; Heckscher 1949; Magnusson 1996; Martinius 1982; Schön 2000; Utterström 1957). Most scholars also seem to agree that both agricultural production and productivity, at least in the sense of increased production per employed in agriculture, increased as a result of these changes. Judging mainly from various indirect evidences on consumption and foreign trade Utterström believed production of vegetable products to have increased by 100 percent between 1815 and 1860, while population increased only by 60 percent (Utterström 1957: 700). Also using information on exports of agricultural products, and making assumptions regarding the development of domestic consumption, Martinius estimated that labour productivity in agriculture increased by 0.6-0.9 percent annually

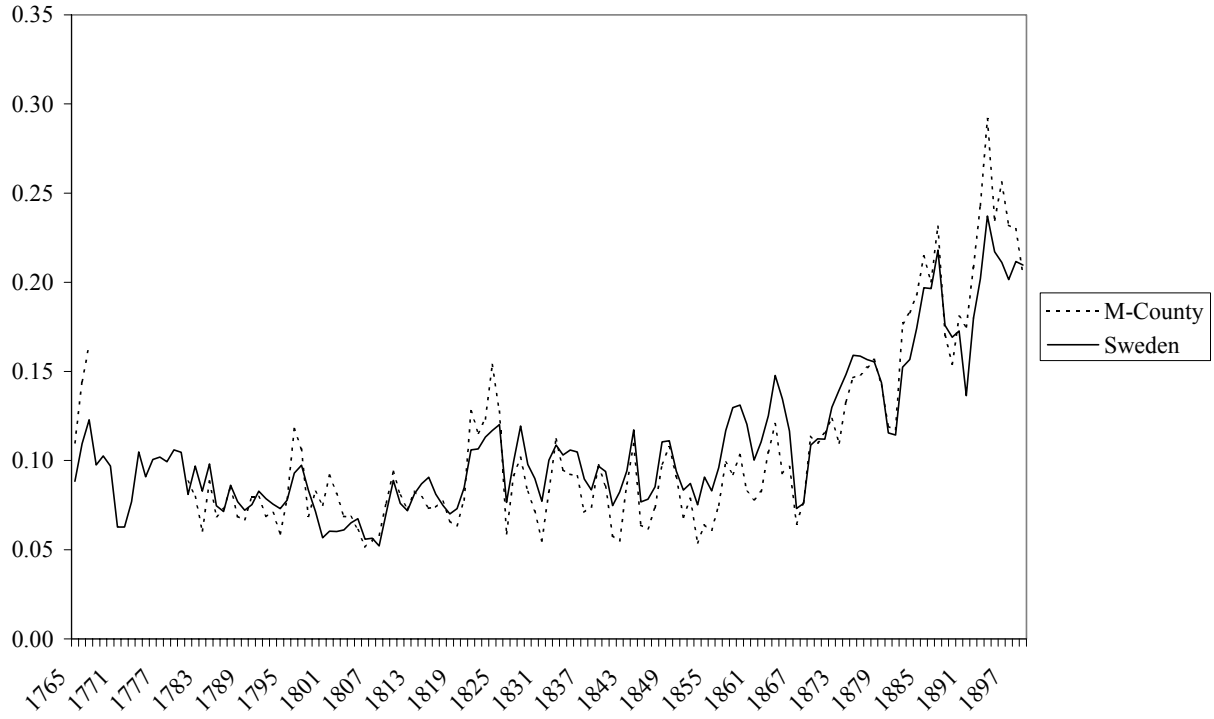
between the 1830s and 1860 (Martinius 1970: 168-74). One important novelty in this regard was the increased cultivation of potatoes in Sweden, as well as in other parts of Europe, during this period. Potato cultivation together with increased usage of iron tools was important factors in overcoming diminishing returns on the newly reclaimed land (Gadd 1983; see also Schön 2000). In the Historical National Accounts of Sweden Schön (1995) also presents a similar picture: starting from the 1820s production per capita of both vegetable and animal products increased rapidly, while it stagnated during the 1830s and 1840s. From the late 1840s, and especially from the 1850s, agricultural production per capita of both vegetable and animal products increased rapidly. In particular in Scania, this agricultural development was also paralleled by increased foreign exports of grain (e.g. Fridlizius 1981), which further indicates the economic growth that took place.

Thus, there seems to have been a pronounced positive economic development in the agricultural sector at least from the first decades of the nineteenth century. This, however, does not tell us very much about the development of standard of living in various social groups. To find out about this, we need more information on the distribution of the increased product between different groups in society.

Turning first to the development of real wages for agricultural workers, it is difficult to detect a secular increase before the second half of the nineteenth century (Jörberg 1972: Vol. II, 337). As shown in Figure 1, real wages (measured as day-wages deflated by the prices of rye)[2] for Sweden as a whole seem to have declined between the late 1770s and the early 1800s, and then increased up until the early 1820s after which a slight decline took place until around 1850. After 1850 a secular increase in real wages took place, indicating a steady increase in standard of living for agricultural labourers. The development in Malmöhus County (in which the area of concern in this study is located) deviates somewhat from this picture, by not showing any decline in real wages in the final decades of the eighteenth century. Instead, the real wage level stayed rather constant, albeit with marked short-term fluctuations, until the 1850/60s after which it increased for the remainder of the century.

[2] As Jörberg points out, using the rye price instead of a cost of living index, containing a more realistic bundle of consumption goods, will give a reasonably good approximation until the final decades of the nineteenth century when the real wage gain will be somewhat overestimated (Jörberg 1972: Vol. II, 335).

Figure 1. *Real wages (day-wage/rye price) in Sweden and Malmöhus County 1765-1899.*



Source: Jörberg 1972.

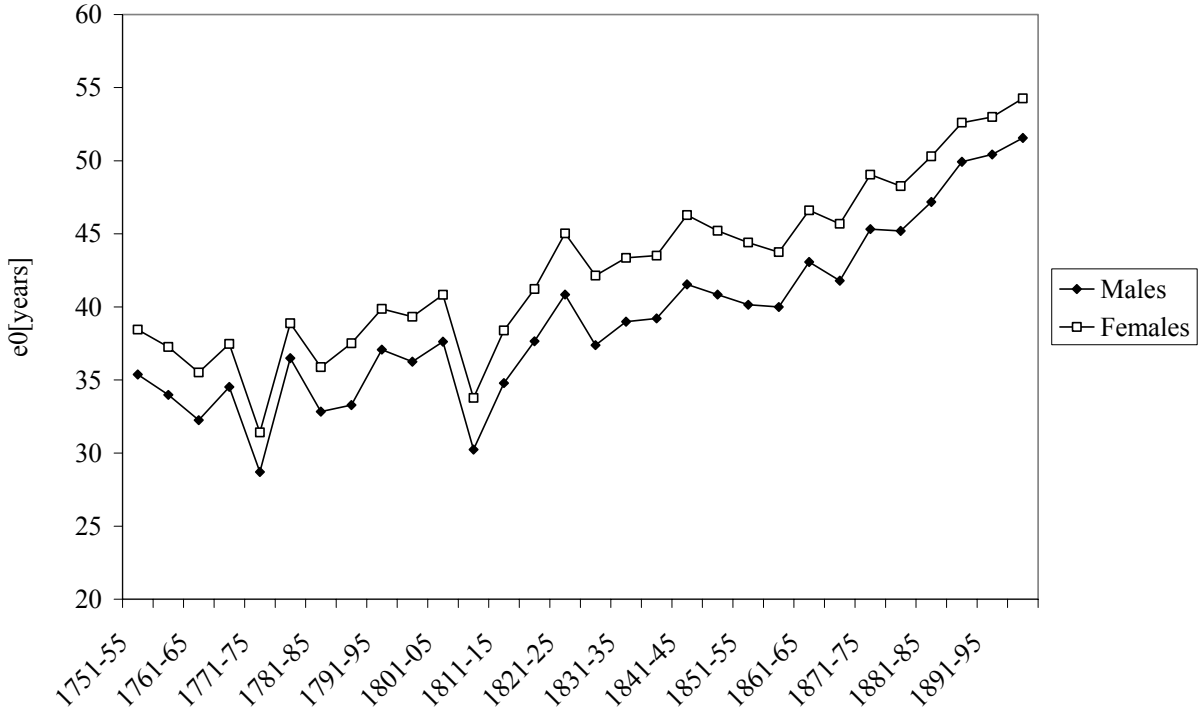
However, as was pointed out above, the rate of growth toward the end of the period is exaggerated due to the use of rye price as the deflator (see footnote 2). Nonetheless, there can be little doubt that real wages increased secularly from the 1860s onwards. Thus, to the extent that real wages for day-labourers give an accurate picture of the standard of living for landless labourers, it does not seem as if they gained very much from the agricultural transformation during the first half of the nineteenth century. However, the agricultural transformation might also have led to a higher, and seasonally more even, employment for agricultural workers, which means that stagnating real day-wages need not to have implied declining real income (e.g. Schön 2000). For England it has been estimated that the number of hours worked per year in agriculture increased by around 30 percent between 1760 and 1830 (Voth 2001: 129), which supports the idea that labor input increased considerably during the agricultural revolution. To conclude, while it seems indisputable that the standard of living for labourers increased after the 1860s, it is more difficult to draw firm conclusions regarding the development during the first half of the nineteenth century.

The level of investment in human capital has often been seen as an important dimension of standard of living, and some measure of educational level is usually included in indices of standard of living,

such as the Human Development Index (HDI). The level of literacy in Sweden, as measured by writing ability, shows an increase from 10-30 percent in 1800 to over 90 percent in 1900. The increase was rather modest in the beginning, but accelerated considerably after 1850 (see Johansson 1977), perhaps partly as a result of the introduction of compulsory education in 1842. A more detailed study of Scania, however, has shown marked discontinuities in the development of literacy in the early nineteenth century, when the level of writing ability varied with economic cycles (Nilsson and Svärd 1994). This study also clearly demonstrates the marked social differences in writing ability in this period, where about half of the males freeholders could write, while this was true for only ten percent of the landless. Moreover, there were also considerable regional differences between peasants in the commercialised areas of southwestern Scania and the more peripheral regions in the northeast. Thus, while freeholders demanded writing skills, and also possessed the resources necessary to make the investment, already in the late eighteenth century, the mass of landless labourers did not start to learn to write until the second half of the nineteenth century. This seems to indicate that the development of literacy corresponds fairly well with the development of real income in the different groups as was discussed above.

Turning to the demographic indicators of standard of living, Figure 2 reports the period life expectancy at birth (e_0) in Sweden from 1751/55 to 1896/99. The second half of the eighteenth century shows no clear trend. In the years 1772-73 and 1808-09 life expectancy dropped quite dramatically due to widespread famine following severe harvest failures (1771-72) and epidemics (e.g. typhus) during the Finnish War (1808-09) (Hofsten and Lundström 1976: 47). After 1810 life expectancy increased until the early 1820s, followed by a stagnation, or very weak increase, between the late 1820s and late 1850s. After 1860 life expectancy increased secularly for the rest of the nineteenth century. Broadly speaking, this development seems to agree fairly well with the real wage development as pictured in Figure 1. Until around 1810 real wages declined somewhat followed by an increase until the mid-1820s, after which comes a period of stagnation before the secular increase starts in the mid-1860s. Thus, it appears as if both the economic and demographic indicators show a similar development: some improvement in the beginning of the nineteenth century; stagnation during the period of agricultural transformation 1825-1860 and secular increase after the 1860s.

Figure 2. *Life expectancy at birth (e_0) in Sweden 1751/55-1896/99.*

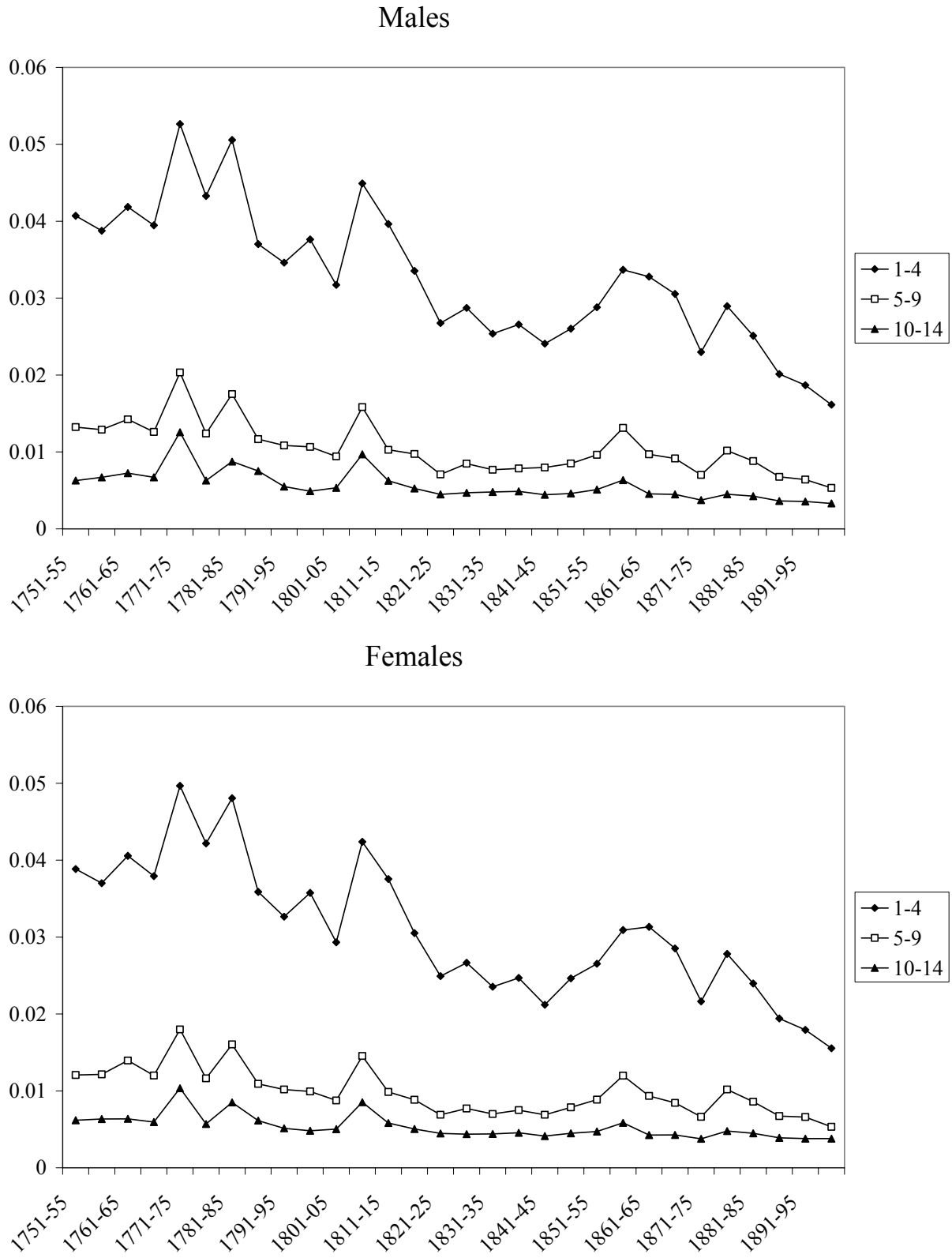


Source: Berkeley Mortality Database, Department of Demography, University of California, Berkeley. http://demog.berkeley.edu/wilmoth/mortality.

For Malmöhus County the development seems to deviate somewhat regarding the early nineteenth century improvement in real wages, otherwise it looks quite similar.

The increased life expectancy can to a large extent be accounted for by the dramatic decline in infant and child mortality from the late eighteenth century onwards. Adult mortality shows an increasing tendency during the late eighteenth century, but then starts to decline in the first decades of the nineteenth century (e.g. Statistics Sweden 1999: 116). In the late 1840s and early 1850s child mortality (1-15 years) turned upwards again, quite substantially but only temporarily, as shown in Figure 3. Sandberg and Steckel (1988) have argued that this increase to a large extent was caused by typical 'children's diseases', whose outcomes are known to be related to nutrition, e.g. measles, whopping cough and dysentery (see also Hofsten and Lundström 1976: 47-9; Rotberg and Rabb 1985: 305-8). This led them to conclude that the nutritional status of children probably declined during this period (Sandberg and Steckel 1988). Fridlizius, however, questioned this conclusion, arguing that most of the *increase* in child mortality during this period was caused by diseases only weakly, or not at all, related to nutrition: scarlatina, diphtheria, and croup, while measles and whopping cough show roughly the same frequency as before (Fridlizius 1989).

Figure 3. *Age-specific death rates for children (1-14 years) by sex in Sweden 1751/55-1896/99.*



Source: See Figure 2.

Thus, although child mortality unquestionably increased during the late 1840s and 1850s, it still remains unclear to what extent this was related to changes in nutrition.

In more recent years increasing attention has been devoted to various anthropometric measures of standard of living, most notably heights and body mass index (see e.g. Steckel 1995 for a review). Here we will limit our attention to heights, since this is the only measure available to us for Sweden in this period. Human final height serves as a measure of net-nutrition, which is actual food intake minus claims on nutrition made by maintaining body functions, work and disease. Even if genetic factors have an impact on individual height, the differences in average heights between different populations can largely be accounted for by environmental rather than genetic factors (Steckel 1995). In particular the nutritional intake and disease load during infancy and adolescence – the two most pronounced growth phases of humans – are important determinants of final height.

Sandberg and Steckel have in several articles studied the development of heights in Sweden using data for soldiers (Sandberg and Steckel 1980, 1987, 1988, 1997). They found soldiers born in the early nineteenth century to have been about one centimetre taller than their counterparts born in the second half of the eighteenth century, indicating an improvement in standard of living (Sandberg and Steckel 1980). However, what is perhaps more interesting is their finding that the cohorts born in the late 1830s and 1840s experienced declining heights, which would indicate a worsening of the situation, at least for the social groups from which the soldiers were recruited, during this period (Sandberg and Steckel 1988). It is difficult to immediately connect the declining stature for cohorts born during the 1840s to lower living standards, since, as was made clear above, it is uncertain to what degree the increase in child mortality was related to changes in standard of living. Since heights measure net- rather than gross-nutrition, it may well be the increased disease load facing these cohorts that accounts for the decline in stature, which in turn might be only weakly related to nutrition and standard of living. Thus, also in the case of heights it turns out to be difficult to draw any firm conclusions concerning the standard of living development for landless in the phase of agricultural transformation. In the period after this temporary decline in stature a secular increase begins, showing no adverse effects of the more rapid industrialisation in the final decades of the nineteenth century (Sandberg and Steckel 1997).

The period of agricultural transformation from the late eighteenth century onwards also witnessed a dramatic change in the social structure of the Swedish population during what has been termed the proletarianisation of the countryside. While the number of peasants increased by 10 percent between 1750 and 1850 the number of landless quadrupled (Wohlin 1909: 197, 257; see also Winberg 1975: 17). This increase of the landless population came mostly as a result of increased household formation in the landless groups, and not from social differences in fertility. It became increasingly common that children to landed peasants could not maintain the social status of their parents. The development of agriculture, and in particular the increased demand for labour it gave rise to, made it possible to establish an independent household without having access to land; something that was much more difficult, if not impossible before the agricultural transformation. Malmöhus County was proletarianised earlier than the country as a whole, and the proportion of landless was considerable already in the second half of the eighteenth century (Lundh 1999).

The commercialisation of the agricultural sector and the increased production and productivity raised incomes for market producing peasants, leading to an increased stratification of the peasant group (Winberg 1975). One indication of this process is the increasing consumption of textiles already from the 1830s onwards. Initially the demand for higher qualities grew fastest, which may be interpreted as indicating rising incomes in the better-off segments of society. From the late 1840s the demand for more basic qualities also started to increase, which reflects rising incomes also for broader groups of peasants (Schön 1979).

Another question is whether this proletarianisation process also implied a pauperisation of the population, thereby increasing the number of poor and destitute. In a pioneering study of nineteenth century middle Sweden, Lundsjö used taxation data to measure poverty ratios, in which the poor is defined as those who could not pay even the lowest tax. The poverty ratios varied closely with the harvest outcome indicating that the number of poor according to this definition was highly dependent on the economic circumstances. However, it is difficult to find a clear pattern linking proletarianisation with increased poverty. Quite the contrary, the region with the most pronounced agricultural development and proletarianisation (the western parts of the country) showed declining poverty, while the eastern part, with a much slower economic and demographic development, experienced rising poverty rates (Lundsjö 1975). Similarly, Söderberg, using the same measure for southern Sweden in the nineteenth century, found declining poverty

rates in the most rapidly transforming areas, while the slower growing areas saw their poverty ratios increase (Söderberg 1978).

To conclude this section, it appears as if a more pronounced increase in the standard of living for the lower social segments of society did not take place until the second half of the nineteenth century. The agricultural transformation during the first half of the nineteenth century raised incomes of market producing peasants, widening the gap between landed peasants on the one hand and landless and semi-landless groups on the other. However, to what extent the standard of living of the landless and semi-landless declined or just remained unchanged during this process remains unclear from the evidence presented here. Several indicators point to stagnation rather than decline, while the development of stature, and possibly also mortality, could indicate a worsening of the situation at least among children. Moreover, since the demographic data presented above refers to the whole population and it seems likely that the landed groups saw an improvement of their situation, the standard of living development of the landless could actually have been even worse than indicated by the aggregate figures.

In the remainder of this paper we will try to shed some new light on this issue of the standard of living of the landless groups during the agricultural transformation and early industrialisation by using a new approach to the study of standard of living, focusing on the vulnerability to economic fluctuations, which will be presented in the following section. In the empirical analysis we will work with three different periods reflecting the pre-transformation phase (1766-1815), the transformation phase (1815-1865) and the post-transformation, or industrialisation phase (1865-1895).

3. A New Approach to Standard of Living

We measure the standard of living through the ability to overcome short-term economic stress. If you cannot fulfil your long-term plans – to marry, have children and survive – in face of acute short-term changes in the environment, you can be said to enjoy a rather low standard of living. Thus, sensitivity to short-term economic stress reveals a low level of standard of living. By short-term economic stress, we mean variations in income or cost of living, in particular in food prices, from one year to another or even within shorter time spans. Variations in food prices were often substantial and possibilities to compensate by increasing income were few. An alternative would be to use temperature data as an indicator of short-term economic stress. The idea is that since poorer households have fewer resources to heat their

house during the winter their members will consequently be frailer to diseases than members of wealthier households. But short-term economic stress could stem from other sources as well, such as highly virulent epidemics, changes in taxation, wars, etc. Still there is no doubt that the changes in harvests and food prices were of great concern for a majority of the population up until the twentieth century, which is the reason for choosing food prices as the indicator of short-term economic stress.[3] The basic argument is that most people spent a major share of their income on food and bread dominated the diet.[4]

To justify the choice of grain price as an indicator of short-term economic stress, we need to show the relation between food prices and consumption. Generally, it is believed that the change in production is smaller than in price (Wrigley 1987: 93; Livi-Bacci 1991: 61; see also Bengtsson, forthcoming). Even though large price changes – 30 percent or more from one year to the next – were common, changes in production were somewhat smaller. How much will then the calorie intake change with such changes in grain production? While we do not have any calorie calculations for southern Sweden, we have it for nearby Copenhagen. The yearly decline in calorie intake per head in Copenhagen could be as much as 14 percent during the worst years of the eighteenth century (Thestrup 1971: 258-9). This figure is based on the assumption that the quantity/quality of other food items, like pork and beef, were not influenced by the bad harvest, which is optimistic. Since not all people had to lower their consumption in bad years, some inhabitants had to lower it more. A qualified guess is that a decline in the calorie intake for the poorer parts of the population of about 10 to 20 percent was a likely outcome of quite normal price increases during the pre-industrial period. In years of very high prices, the effects are bound to be much bigger for these groups while other groups certainly benefited from high prices.

Since people in the past were well aware of the short-term variation in harvests and demand for labour they also planned for it. The most obvious measure to take would be to store food, but storage was very costly in the past, since a large part of the stored grain was lost when stored. When storing grain, as much as 20 percent per year might very well be lost and for potatoes the figure would be even higher. Moreover, the nutritional content of the stored food was degraded. Consequently,

[3] See Section 4 below for a discussion on the relationship between harvest outcome and grain prices at the local level, and how grain prices can be assumed to have affected the landless.

[4] For example, in nineteenth century Sweden, the cost for foodstuff was 83 percent of the budget (Myrdal 1933: 115) of which 59 percent was grain (Jörberg 1972: Vol. II, 182).

the quantities of food stored in the past was only very limited (see e.g. Persson 1999: chap. 3). Saving money to buy food could be costly as well, since prices went up in years of bad harvests. Diversification of production was therefore necessary. If harvests failed, more efforts were made to find additional sources of consumption in other vegetables and meat. It is, however, unlikely that it was possible to fully smooth consumption this way. Another potential way of smoothing per capita consumption was to send some of the family members away to seek opportunities elsewhere. This way the food lasted longer for the remaining part of the family and hopefully the migrating family member could bring something back as well.

If these measures failed, the family could borrow food or money to maintain consumption. Kin, neighbours, employers and churches gave loans for consumption. Possibilities to borrow from the church or a bank depended, however, to a large extent on access to land or other resources (Svensson 2001). The best opportunities for help and borrowing was instead from relatives and employers. Employers also had a legal responsibility of taking care of their workers as had parents of their children.

If all these measures failed, the local community or state might provide help. The poor law system, which was a local responsibility, became more regulated all over Sweden during the 1830s and 1840s (Skoglund 1992). The problem was that it covered only a few percentages of the population – the totally poor, often elderly and/or handicapped with no resources at all.[5] Other social welfare measures, such as extra social spending on roadwork, etc. in years of unemployment were modest. The spending on creating new jobs averaged around one percent of the annual governmental expenditures with a peak of 2.6 percent in 1846 (Olofsson 1996: 121).

Naturally, the measures to smooth consumption are likely to have differed between different groups in society. Therefore, one important question is how different individual and household characteristics, such as land-ownership, social status, position in the household, etc., influenced the demographic response to economic and demographic stress. For example households that farmed their own land and employed servants or labourers, were probably in a better position to avoid the most serious effects of economic stress, while those totally lacking resources had much smaller opportunities to undertake such measures, which made them highly vulnerable to stress.

[5] The proportion of the population that got poor relief in Sweden in 1829 was only 2.1 percent. It was even less in Scania (Skoglund 1992).

The idea of analysing the demographic response to short-term economic stress within different social groups combining longitudinal micro-demographic data with macro-economic data was first developed by Bengtsson (1989, 1993) and has been refined within the EAP project, in particular when it comes to the importance of household characteristics and transfers within the household in conditioning the response to stress. Although this standard of living concept after modification also can be used in modern welfare societies, it has been developed for situations where data are sparse and where living standard is low. The idea originates to from analyses of the effects of economic stress, measured by food price variation, on mortality, fertility and nuptiality carried out at macro level.

These studies have shown that there was a considerable demographic response to yearly changes in grain prices in the past in various parts of the world (see surveys by Bengtsson and Reher 1998; Galloway 1988; Lee 1993). Mortality, fertility, nuptiality, and migration were all affected by variations in prices. This was the case in times of severe famines, but smaller changes in prices also affected the populations. The fertility response was particularly sensitive to price variation in all European populations, while the mortality response varied more from country to country, and generally was much weaker (Galloway 1988). It is also clear that the fertility response was not an indirect result of the effect of prices on nuptiality (Carlsson 1970). At least to some extent, both permanent and temporary migration was also influenced by economic cycles (Bengtsson 1990).

The fertility response in Sweden was similar to the rest of Europe and stronger than the mortality response (Bengtsson 1986). Analysis of age-specific mortality shows, however, quite a strong mortality response among adults and elderly, which becomes weaker over time (Bengtsson and Ohlsson 1985). These analyses do not, however, shed any light on the response in specific social groups, which is one of the main aims of this paper.

While the idea to the new concept of standard of living comes from macro studies, it bears some similarities to Amartya Sen's concepts 'functionings' and 'capabilities'. According to Sen, private goods, obtained trough labour or other income, are transformed into more intermediate goods, such as calories and proteins, called material characteristics. But environmental factors also have an impact on these characteristics. These include public goods such as clean air, the absence of crime, and individual liberty. These factors can either be goods themselves, or represent a set of institutional constraints. The material characteristics together with personal characteristics, such as

metabolism, determine a person's capability. In the next step, a person's physical state, for example possession of religious faith, together with his capability, determines the functionings he or she will achieve. This in turn determines the level of utility.

The major point in Sen's argument is that even if utility is the ultimate goal, it cannot be used for comparative measures. Neither incomes, nor access to goods, are appropriate measures of living standards since needs and wants vary due to personal and societal characteristics. Instead living standard is a matter of functionings (beings and doings), not opulence (income), commodities (goods) or utilities (Sen 1987: 26). One such functioning that Sen discusses is being "ashamed to appear in public", referring to Adam Smith (Sen 1987: 17). Smith's own example is that a person needs to wear a linen shirt to appear in public not to be ashamed. Other functionings vary from such elementary things as being adequately nourished, being in good health, avoiding escapable morbidity and premature mortality to more complex ones such as being happy, having self-respect, and so forth (Sen 1992: 39).

Thus, the new standard of living measure we propose is obviously a sort of a functioning, using Sen's concept. The difference to the ones discussed by Sen is mainly that it – a person's ability to overcome short-term economic stress – is a dynamic concept at individual level, while Sen is discussing stock and/or aggregated measures, such as health or life expectancy.

4. Area, Data and Statistical Model

The dataset is based on family reconstitutions carried out within the Scanian Demographic Database[6] for nine parishes in western Scania in southern Sweden. The sample used in this paper consists of four of these nine parishes: Hög, Kävlinge, Halmstad and Sireköpinge. The social structures of the parishes varied somewhat. Hög and Kävlinge were dominated by freeholders and tenants on crown land – a group rather similar to the freeholders regarding its social characteristics – while Halmstad and Sireköpinge were totally dominated by tenants on noble land (see Bengtsson and Dribe 1997; Dribe 2000). In addition to the peasant group, the parishes also hosted various landless and semi-landless groups, dependent on working for others to cover the

[6] The Scanian Demographic Database is a collaborative project between the Regional Archives in Lund and the Research Group in Population Economics at the Department of Economic History, Lund University. The source material is described in Reuterswärd and Olsson (1993).

subsistence needs of the family, and in this paper we will focus all our attention on the landless. Table 1 shows the social status of family heads in the four parishes. The peasant group has been subdivided according to type of land (freehold/crown land and noble land) and the productive potential of the landholding measured in *mantal*.[7] The dividing line chosen – 1/16 of a *mantal* – was the minimal amount of land required in the beginning of the nineteenth century to be considered as a landed peasant (*besuttenhetsgräns*) and corresponded roughly to 15 acres in Scania at that time (Sommarin 1939: 23, 29). As Table 1 clearly shows, the number of smallholders increased over the nineteenth century both on freehold/crown land and on noble land, implying that the proportion of peasants having landholdings below the minimum requirement increased, which serves to indicate the social stratification of the peasant group as was discussed in section 2 above. Viewed as a single group, however, the peasants with land taxed in *mantal* remained fairly constant over the entire period.

Table 1. *Social structure of family heads in the four parishes 1766-1895.*

Social group	1766-1815	1815-1865	1865-1895
Higher occupations/nobility	1.7	4.3	9.6
Landed peasants:			
Freeholders/crown tenants >1/16	12.2	9.3	6.8
Freeholders/crown tenants <1/16	0.2	3.0	4.3
Noble tenants >1/16	15.2	8.9	6.1
Noble tenants <1/16	0.0	4.2	9.6
Landless groups:			
Crofters	0.6	12.6	7.1
Labourers/cottagers	46.0	38.0	34.5
Artisans/qualified labourers	4.9	4.6	10.1
Soldiers	5.7	5.6	4.4
Lodgers	1.2	6.1	4.6
Others/N.A.	12.3	3.3	2.9
Total	100	100	100
Person years	14674.2	27284.9	16960.9

Source: Parish records (vital events), Poll-tax registers.

[7] *Mantal* is an old tax unit used to measure the productive potential of the farm and as a basis for the taxes to be paid to the Crown (see e.g. Dribe 2000: 26-7).

The crofters – a semi-landless group having a small plot of land to farm for themselves, but dependent on labouring for others for their subsistence – increased from almost nothing in the pre-transformation period to over 12 percent in the transformation period and then declined to 7 percent in the final period. The exact status of this group is unclear, even though there is much to indicate that they should be considered as a semi-landless group, perhaps more similar to the group of smallholders than to the completely landless labourers (e.g. Jonsson 1980; see also Dribe 2000). However, there also appears to be changes in the classification of these groups over time, implying that people that were listed as cottagers at one point in time became crofters later, without it being possible to know whether any real change took place or not (cf. Lundh 2002; Persson 2002). Most likely, the agricultural transformation implied that the crofters emerging really were different from previous landless cottagers, but this is hard to prove. In any case, we can safely assume that crofters did not belong to the group of market-producing peasants that we believe gained most from the agricultural transformation, which makes it reasonable, at least for our purposes in this paper, to merge crofters into the landless group.[8]

The landless group consisted of over 60 percent of the families and was quite heterogeneous, including landless labourers, cottagers and lodgers as well as artisans, soldiers and qualified labourers working at the estates. It also changed in composition over time; during the eighteenth century cottagers, artisans and soldiers dominated it, while during the later periods the number of wage labourers and married servants (*statare*) increased, at the expense of the cottagers (e.g. Eriksson and Rogers 1978). This also implies that the living conditions for this group of non-landholders might have worsened as a result of the increasing market penetration of rural society during the nineteenth century. Thus, although productivity in agriculture increased during the agricultural revolution, it also created new social groups, who may well have been more vulnerable to fluctuations in the agricultural economy. This process is also connected to a more general social differentiation of rural society in the nineteenth century, where not only new landless groups emerged, but also the differences within the peasant group grew larger, as was clear from the increasing number of smallholders and crofters in Table 1 (see also Winberg 1975: 55-6). Thus, according to this view, eighteenth century Scania might have been more egalitarian, although being at a lower general level of standard of living, compared to the first half of the nineteenth century, which in turn also might have

[8] We also tested to analyse the truly landless group separately, which yielded practically identical results.

increased the vulnerability of these groups in times of economic hardship.

In 1766 the four parishes had 1,310 inhabitants, which increased to 3,866 by 1894: an annual increase of 0.8 percent during this 128-year period. The growth rate was lower in the second half of the eighteenth century (0.8 percent between 1766 and 1800) than in the first half of the nineteenth century (1.0 percent between 1800-1850). Then in the second half of the nineteenth century the rate of growth fell back to the same level as in the late eighteenth century (0.7 percent 1850 to 1894), primarily due to considerable out-migration following the urbanisation process of this period (Bengtsson and Dribe 1997).

The family reconstitutions were carried out using data on births, marriages and deaths, for the period from the late seventeenth century up till 1894. The material is of high quality, with only a few years missing, even though a certain degree of under-recording has been discovered (Bengtsson and Dribe 1997). The reconstitutions were carried out automatically using a computer program. The method used has been described and evaluated in considerable detail in previous work, and need not be reproduced here. Suffice to say that the performance of the method seems satisfactory overall (Bengtsson and Lundh 1991). Additional manual linking and corrections has also increased the number of linked events considerable (see Dribe 2000: 26). The database contains all individuals born in or migrated into any of the parishes. Instead of sampling a certain stock of individuals, for example a birth cohort, each individual is followed from birth, or time of in-migration, to death or out-migration.

In order to obtain information on where the families lived, and whether they had access to land or not, the poll-tax registers (*mantalslängder*) have been used. The poll-tax registers were yearly registers, used in collecting taxes and containing information on the size of the landholding, the type of ownership (i.e. noble, crown, church or freehold) and information on the number of servants and lodgers. Information from these registers has been linked to the reconstituted families, whereby information has been obtained, not only on the demographic events, but also on the economic realities of these families.

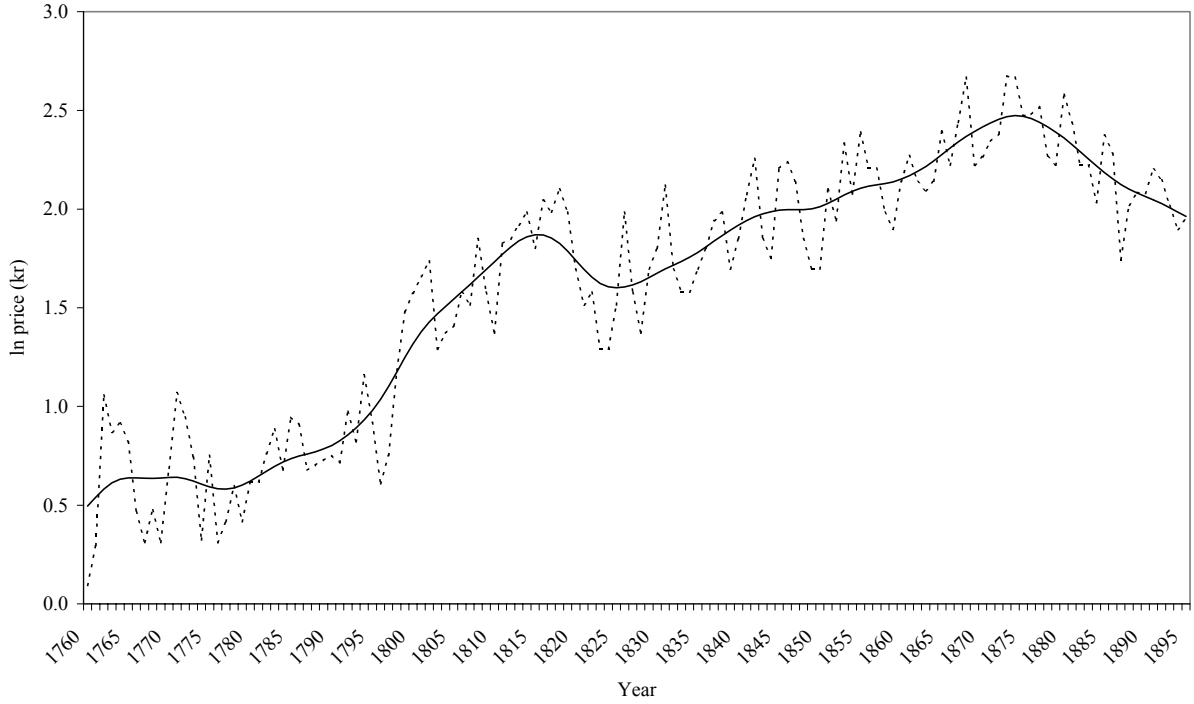
Turning to the measurement of economic stress, information on grain prices and wages at different administrative levels are available in the market price scales (*markegångssättningen*). In a previous study we have presented this material for the area of concern here, and analysed the price development of different crops (Bengtsson and Dribe 1997). We will not reproduce that analysis in this paper, but only stress some of the more important findings of relevance for the present analysis.

First, the prices and wages in the market price scales seem to reflect the market prices in the towns and the regions in a satisfactory way. We analysed the prices at town, county, and *härad* level (*härad is* an administrative level between the county and the parish) in our previous analysis and found a very high degree of correspondence.

Secondly, the price developments of different crops (rye, barley and oats) show a very similar development over time. We will use the price of rye in the analysis below as an indicator of economic fluctuations, but it can probably be seen as a more general indicator, which is not highly dependent on the actual mix of different crops in consumption and production. However, we lack data for long periods of time for some of the increasingly important commodities, such as potatoes, animal products, housing, clothing etc. Although we can expect that they became more important in the family budgets over time, a large proportion of the food budget was spent on grain also in the later part of the nineteenth century (Myrdal 1933). Thus, we believe that the fluctuations in grain prices were of great importance to rural families throughout the period of concern here, and that they therefore will serve as rather good indicators of the economic situation of families, in particular for the landless.

We also lack data on nominal wages at, or below, county level for the first part of our period. Up until the 1850s or 1860s nominal wages were constant for long periods of time, implying that real wages, in the short term, mainly reflected grain price fluctuations. As was discussed previously, real wages, as measured by nominal wages deflated by the price of rye, stayed quite constant in Malmöhus County until the mid-1860s, and then increased steadily for the rest of the century (see Figure 1 above). In the short run real wages show considerable variation, mostly due to variation in the rye price. Since our prime concern in this paper is with the demographic response to short-term economic fluctuations, it makes sense to use the rye price as an indicator of economic stress.

Figure 4. *Natural log local rye prices, in kronor (actual values and HP-trend) 1760-1895.*



Source: Bengtsson and Dribe 1997.

Traditionally, particularly in aggregate studies, grain prices have often been used as proxies for harvest outcome, so that high grain prices reflect a bad harvest and low food supply, leading to increased mortality, delayed marriages, etc. However, when doing micro studies on small communities, the relationship between local harvest outcome and grain prices can be expected to have been rather weak, since a number of other factors become more important, i.e. trade, different external factors, the harvest outcome outside the region, etc. A comparison of grain prices and harvest outcome in western Scania also corroborates this expectation; there is only a very weak relationship between local harvest outcome and grain prices in the region.[9] In times of a local harvest failure, grain could be bought from other regions, moderating the price effect. Similarly, severe harvest failures in other regions or other exogenous events could drive up local grain prices, without changes in the local harvest outcome. This implies that the grain price can only serve as a very poor indicator of the local harvest outcome. Instead, local grain prices must be seen as determined mainly exogenously. Ideally, we should include both the local harvest outcome and grain price in the analysis. For shorter periods of time this is also

[9] For a more detailed discussion and analysis of this problem see Dribe (2000: chap. 7).

possible, and have shown to be fruitful in the analysis of migration (Dribe forthcoming, 2002). For the long period of time analysed here, however, this has not been possible, why we have to limit the analysis to grain prices.

For the landless group studied here, rising grain prices can be expected to have lowered the real wages provided that they were paid money wages and dependent on the market for their consumption. In reality, we know that they got part of their salary in kind and part of it in money (e.g. Granlund 1944), but even in cases where they were paid in kind the wage could be denoted in money and then converted into grain using the market price sales, implying that if prices were high the payments in kind would also be negatively affected. Hence, we can probably assume that completely landless labourers were negatively affected by high grain prices.

In estimating the models in the empirical analysis we use combined time-series and event-history analysis, which makes it possible to run regressions on the change of life status, i.e. dying or giving birth to a child, measuring the effects of different explanatory variables (or covariates) on the hazard of the event. More specifically, we use the Cox proportional hazards model, which is distinguished from other proportional hazards model by not requiring any specification of the underlying hazard function (Cox 1972; see also Collett 1994). The main interest in this case is to estimate the impact of different covariates on the hazard of the event.[10] The model applied to mortality can be written as:

$$h_i(a) = h_0(a)\exp[\beta_1 X_1+\beta_2 X_2+\ldots+\gamma Z(t)]$$

where $h_i(a)$ is the hazard of the event for the ith individual at age a; $h_0(a)$ is the 'baseline hazard', i.e. the hazard function for an individual having the value zero on all covariates; β_s are the parameters for the individual covariates (X_1, X_2, …), that are estimated; and γ is the parameter for the external covariate $Z(t)$.

In the fertility analysis, we use time since last birth as the duration time (a) instead of age. In discussing the results below, relative hazards (or hazard ratios) are used as measures of the difference between groups with different values on the covariates. The relative hazards are the difference in the hazard of the event for the group under consideration,

[10] For the basic concepts of event-history analysis see any standard textbook on the topic, e.g. Collett (1994).

relative to the reference category. A value of 1.50 implies that the hazard of the event of interest in the group is 50 percent higher than in the reference category, while a figure of 0.50 implies that the hazard is 50 percent (or half) of the hazard in the reference category.

The aggregated economic indicator (de-trended values of natural log rye price) is included in the regressions as a communal, or external, covariate (see e.g. Bengtsson 1993), which means that the aggregate economic information is used as a time-varying covariate common to all individuals in the risk set at each point in calendar time. A one-unit deviation in this price index corresponds to a 273 percent deviation in the price. The typical deviation during the period under consideration was between 0.2 and 0.4 above or below normal (see Bengtsson and Dribe 1997), which means that a price coefficient on mortality in the regressions of 1.50 implies that the mortality rates increased by 10 to 20 percent in a typical year of high prices.

5. Mortality Response to Economic Stress

From our previous discussion of what we know about the standard of living development using traditional measures, we would expect the mortality response to economic fluctuations among landless to be much the same until after mid-nineteenth century, when we expect it to become weaker. We expect it to be pronounced for children above age one and for adults in working ages. The reason why we do not expect infant and elderly, i.e. the groups normally considered to be the most vulnerable, to gain most from increasing standards of living is that these groups seem to depend more on other factors than external economic stress. Infants seem to be more dependent on breast-feeding practice and elderly on abilities in earlier in life to accumulate income and on relations to relatives, etc.[11] We also expect the change in mortality response to economic stress in the second half of the nineteenth century to be much the same for males and females, since opportunities to work outside the home increased for both sexes.

The reason why we do not expect the response to short-term economic stress to decline during the period of transformation of the agricultural sector in the beginning of the nineteenth century is that this development seems to have favoured the landed groups rather than the landless, as was previously discussed. Contemporary evidence also indicates that the landless had problems of finding jobs in bad harvest

[11] Estimations of models for infants and elderly not reported here also support this conclusion.

years in the beginning of the nineteenth century. Furthermore, the poor relief system was reorganised during this period, indicating previous incapability to take care of the poor.

With regard to the social welfare system, we expect the conditions to be much the same in the four parishes we are analysing since such a small fraction of the population is taken care of by the poor law system. If any difference, it should be between Hög and Kävlinge, dominated by freeholders and crown tenants, and Halmstad and Sireköpinge, dominated by estate owners, since the economic and social motivation, as well as opportunities, might vary between these groups. Table 2 shows the Cox regression estimates for adults in working ages, 25 to 55 years.[12] In model 1 the covariates are parish, sex, birth year and rye prices. In model 2 we also estimate the effects of short-term economic stress on females and males individually, by including an interaction term. All estimations are made for the three periods 1766-1815, 1815-1865 and 1865-1895. The number of events is between 100 and 284, with the lowest number for the last period.

Somewhat surprisingly we only find a strong mortality response during the second period, while we are unable to detect any evidence for a mortality response among the landless in working ages during both the pre-transformation period (1766-1815) and the industrialisation period (1865-1895). The response during the transformation period is quite strong; a one-unit increase in natural log rye prices (273 percent) almost quadruples mortality, which means that the mortality rates could almost double in years with very high prices.

Are men and women in working ages differently affected by short-term economic stress? Even though the coefficients for sex and price interactions are substantially different from 1 (Table 2, model 2) during the second and third periods, they are not statistically significant according to a likelihood ratio test. In the last period, neither the interaction between sex and prices or the total model is statistically significant. If we trust the coefficients more than the test statistics, we would believe that women suffered less than men did during the transformation phase, but more during the industrialisation period.

The mortality differentials between the parishes change over time. It is highest in Sireköpinge in the first period, Halmstad in the second and Kävlinge in the third period. We also estimated a model in which the effect of living in a freeholder/crown tenant parish or a noble tenant parish on the vulnerability of short-term economic stress on landless was accounted for by including an interaction term, without finding any

[12] The reason why we start at age 25 and not 15 is that we have a lot of migration among young servants (see e.g. Dribe and Lundh 2002), for which we have no data before 1829.

consistent pattern (not presented here). Thus, the landless are equally vulnerable in the parishes regardless of social structure and potential differences in poor law systems.

As shown in Table 3, we find a rather strong response to short-term economic stress among children aged 1 to 15 during the second period, though not as strong as for their parents. In this case, we find that it is only the girls that suffer. During the first period, there is a somewhat weaker response than in the second period, and it does not differ between boys and girls. Again there is no response during in the final period and in this case, the number of events is quite large (248 deaths).

The level differences between the parishes are small except for the final period when mortality was far higher in Kävlinge, i.e. the same result as for their parents. The effects of economic stress are stronger in the noble tenant parishes during the industrialisation period than in the freeholder/crown tenants parishes, i.e. opposite the case for their parents (not presented here). In the case of children the total numbers of deaths are larger for all periods than for adults – more than twice as large during the final period. Still, we find no influence of short-term economic stress and if we do not find any effect for children.

To summarise, we find very strong effects of short-term economic stress among the landless during the stage of agricultural transformation. This was a period when job opportunities outside agriculture were still very limited in this area. The impact was strong both on parents in their working ages and their children, in particular their daughters. Even with a more complex model taking household composition and the individual's position within the household into account, the main result is the same (Bengtsson 2000; Bengtsson and Dribe 2000).

From previous research of cause-specific mortality, we know that both the adults and the children died from excess mortality in infectious diseases, airborne and waterborne, though not always from the same disease (Bengtsson 2000). Thus, we find no evidence that a single disease was spread in bad years but rather that they died in any common disease due to low resistance, which implies that they were malnourished. Mortality typically increased in the spring after a fall with increasing food prices. The rapid response implies that their resistance was low. Another indication of low resistance is that not only very high prices but also moderate high prices affected mortality, while mortality did not decline much in years of low prices (Bengtsson 2000). Evidently, many among the landless lived close to the margin. Possible measures taken at individual, household or societal level failed for this group.

Table 2. *Cox proportional hazards estimates (relative hazards) mortality in ages 25-55 for landless in the four parishes, 1766-1895.*

		1766-1815			1815-1865			1865-1895	
Covariate	Average	Model 1	Model 2	Average	Model 1	Model 2	Average	Model 1	Model 2
Parish:									
Hög	15.0%	1.00	1.00	14.4%	1.00	1.00	12.9%	1.00	1.00
Kävlinge	16.5%	1.33	1.33	20.9%	1.67**	1.67**	22.7%	1.88	1.88
Halmstad	36.9%	1.15	1.15	31.0%	2.37***	2.37***	23.0%	1.42	1.42
Sireköpinge	31.7%	1.81***	1.81***	33.7%	1.47*	1.47*	41.4%	1.65	1.65
Sex:									
Males	50.6%	1.00	1.00	50.0%	1.00	1.00	50.4%	1.00	1.00
Females	49.4%	0.95	0.95	50.0%	1.03	1.06	49.6%	1.35	1.34
Birth year	1756.9	0.98***	0.98***	1802.3	1.00	1.00	1843.4	1.00	1.00
Log rye price	0.00	1.08	1.05	0.00	3.71***	5.24***	0.00	2.08	0.78
Sex*log rye price:									
Males		---	1.00		---	1.00		---	1.00
Females		---	1.06		---	0.52		---	1.30
Events:		202	202		284	284		100	100
Total time:		20647.4	20647.4		32389.7	32389.7		12370.8	12370.8
Max. log. Likelihood:		-1244.0	-1244.0		-1946.3	-1945.7		-589.7	-589.7
Chi-square test:		18.7	18.7		41.7	42.8		6.5	6.5
Overall p-value:		0.005	0.009		0.000	0.000		0.373	0.482
Parameters		6	7		6	7		6	7

*p<0.10, **p<0.05, ***p<0.01.

Table 3. *Cox proportional hazards estimates (relative hazards) mortality in ages 1-15 for landless in the four parishes, 1766-1895.*

		1766-1815			1815-1865			1865-1895	
Covariate	Average	Model 1	Model 2	Average	Model 1	Model 2	Average	Model 1	Model 2
Parish:									
Hög	15.2%	1.00	1.00	12.5%	1.00	1.00	10.5%	1.00	1.00
Kävlinge	14.3%	1.63**	1.63**	21.3%	1.34*	1.34*	21.4%	1.93**	1.93**
Halmstad	36.5%	1.14	1.14	30.7%	0.98	0.97	23.5%	1.04	1.04
Sireköpinge	34.0%	1.45*	1.45*	35.4%	0.92	0.92	44.7%	1.53*	1.53*
Sex:									
Males	52.9%	1.00	1.00	49.8	1.00	1.00	51.7%	1.00	1.00
Females	47.1%	1.24	1.24	50.2	0.89	0.86	48.3%	1.05	1.05
Birth year	1785.9	1.00	1.00	1832.9	1.00	1.00	1874.1	0.97***	0.97***
Log rye price	0.00	1.77*	1.55	0.00	2.07**	1.17	0.00	0.89	1.12
Sex*log rye price:									
Males		---	1.00		---	1.00		---	1.00
Females		---	1.27		---	3.44**		---	0.64
Events:		221	221		342	342		248	248
Total time:		12807.3	12807.3		24584.5	24584.5		12401.6	12401.6
Max. log. Likelihood:		-1520.5	-1520.5		-2582.1	-2579.7		-1716.9	-1716.8
Chi-square test:		12.2	12.3		16.0	20.6		23.7	23.9
Overall p-value:		0.058	0.090		0.014	0.004		0.001	0.001
Parameters		6	7		6	7		6	7

* p<0.10, **p<0.05, ***p<0.01.

We find no differences in the response among the landless between the two parishes in which the poor relief system was decentralised among the freeholders and crown tenants and in the two parishes in which it was centralised to the estate owners. This is also what could be expected since the poor relief system only took care of a few percentage of the population, and that the other factors like possibilities to borrow were the same in the parishes as were the employers' responsibilities.

Perhaps the most important finding is that the price effects on mortality among children and adults belonging to the landless group are stronger in the middle period than both before and after. We certainly expect it to disappear or at least be weaker in the last period, since we believe that the standard of living increased. But why was it weaker or non-existent during the period before the commercialisation? One might argue that the old ties between employer and employee were stronger before the agricultural transformation (Bengtsson 2000) and the difference between and within various social groups smaller as well as between the sexes. The enclosure movement not only meant that the villages broke up but also that many social ties were broken and new landless and semi-landless groups emerged. The commercialisation of the agricultural sector can also be expected to have increased the market dependency of the landless.

6. Fertility Response to Economic Stress

The existence of a fertility response to economic stress might also be seen as an indicator of standard of living, although the mechanisms are not as straightforward as with mortality. Fertility might both be affected deliberately, through intentional fertility control, and unintentionally through effects of short-term economic stress on fecundity. The problem is how to separate these different effects, i.e. to decide whether an observed response is the result of an intentional act to postpone births, an effect of spousal separation following temporary migration, or a result of an unintentional effect on fecundity. It must be said already at this stage that it cannot be within the scope of this paper to deal with this question in its details.[13] Instead, we will argue that a fertility response to short-term economic stress can be viewed as an indicator of standard of living, regardless of whether the response is intentional or not. That an unintentional fertility response to economic hardship can be viewed as

[13] For a deeper analysis of the fertility response to economic stress in the same area see Bengtsson and Dribe (2002). In this paper the social differences in the response, seasonal patters, linearity, threshold effects, as well as the question of whether the response is intentional or not is discussed in more detail.

an indication of a low level of standard of living is probably not so controversial. However, also a deliberate postponement of births in a year of economic stress must be an indication that the family is trying to counteract the adverse impact of economic stress. Accordingly, this must be seen as a rather good indication that the family is experiencing difficult times. Hence, without being able to separate the effects of intentional and unintentional fertility limitation at this stage, we argue that our measure of the fertility response to economic stress, together with the results on the mortality response presented above, will serve as an indicator of the vulnerability of these families to economic fluctuations, and thus of their standard of living.

The model estimated is very similar to the mortality models presented above; the only difference being the inclusion of several age covariates to control for differences in fertility between women of different ages. The results of model estimations are displayed in Table 4. For all three different time periods, we find the expected age pattern of fertility. Fertility is highest in the age group 25-30 and then drops off gradually at higher ages. Except for the middle period there does not appear to be any systematic differences between the parishes. Year of birth controls for potential average cohort effects on fertility, but in none of the three periods do we find any sign of this kind of effect.

Turning to the main focus of this paper, the response to short-term economic stress, there are some noteworthy differences between the three time periods. In the first period, 1766-1815, we find a statistically significant negative effect of rye price on fertility, which implies that landless families postponed births in times of economic stress, either intentionally or unintentionally. Furthermore, the effect also seems to be strongest in the year following the price change, but weaker during year two (see Table 4). In the second period, 1815-1865, there is an even stronger negative effect, and now we also find an equally strong effect up to two years after the price change. During the final period, there is no significant effect, neither in year one nor in year two. Apparently the previous pattern of fertility fluctuations being sensitive to economic fluctuations, measured with rye prices, had been broken.

Table 4. *Cox proportional hazards estimates (relative hazards) of fertility for landless in the four parishes, 1766-1895.*

		1766-1815			1815-1865			1865-1895	
Covariate	Average	Model 1	Model 2	Average	Model 1	Model 2	Average	Model 1	Model 2
Age:									
15-20	0.6%	0.30*	0.30	0.4%	2.34**	2.28**	0.4%	0.34	0.34
20-25	5.1%	0.82	0.83	6.5%	1.02	1.01	8.8%	0.88	0.88
25-30	16.4%	1.00	1.00	19.6%	1.00	1.00	23.9%	1.00	1.00
30-35	23.2%	0.72***	0.74***	24.8%	0.75***	0.74***	25.2%	0.70***	0.70***
35-40	25.4%	0.52***	0.53***	22.7%	0.54***	0.53***	19.9%	0.67***	0.67**
40-45	20.0%	0.27***	0.27***	18.2%	0.28***	0.27***	15.6%	0.31***	0.31***
45-50	9.3%	0.08***	0.08***	7.7%	0.05***	0.05***	6.3%	0.08***	0.08***
Parish:									
Hög	14.4%	1.00	1.00	13.5%	1.00	1.00	10.4%	1.00	1.00
Kävlinge	19.1%	0.96	0.94	22.4%	1.46***	1.46***	22.8%	0.92	0.92
Halmstad	31.9%	1.20*	1.18	29.4%	1.40***	1.40***	20.7%	1.03	1.03
Sireköpinge	34.6%	1.09	1.04	34.7%	1.58***	1.58***	46.1%	1.01	1.01
Birth year	1758.9	0.99*	1.00	1805.2	1.00	1.00	1846.0	1.00	1.00
Log rye price	0.00	0.70**	0.73*	0.00	0.62***	0.68***	0.00	1.12	1.12
Log rye price (-1)	0.00	---	0.88	0.00	---	0.73**	0.00	---	1.05
Events:		873	873		1584	1584		715	715
Total time:		2381.5	2381.5		4791.5	4791.5		1963.8	1963.8
Max. log. Likelihood:		-5441.5	-5441.3		-10835.8	-10833.2		-4388.1	-4388.1
Chi-square test:		258.7	259.1		530.9	536.2		178.1	178.2
Overall p-value:		0.000	0.000		0.000	0.000		0.000	0.000
Parameters		11	12		11	12		11	12

* p<0.10, **p<0.05, ***p<0.01.

What does these results tell us about the standard of living development in the four parishes? The rather strong fertility response in the first two periods serves to indicate that landless families lived rather close to the margin. The mortality results also pointed in the same direction, especially for the second period, when adult mortality for both men and women was clearly affected by short-term economic stress. The hardship brought by increasing food prices forced landless families to adapt their behaviour, for example by postponing childbirth. It may also be that their nutritional status deteriorated during times of economic stress to such an extent that their fecundity was negatively affected, thereby lowering their fertility. As the analysis of mortality clearly demonstrated, the period of increasing commercialisation, agricultural transformation and the resulting increases in production as well as productivity did not imply any immediate increase in the standard of living for these families. The results on the fertility response show much the same thing. If anything, the fertility response to economic stress got stronger during the second period indicating the marginalisation of the landless during this period. In the final period, however, the improvements in agriculture affected also the landless. The previously strong connection between fertility and food prices was broken, which must be seen as a strong indicator of an increased living standard in this social group.

7. Conclusion: The Long-term Development of Standard of Living

We began this paper by reviewing some of the previous evidence on the development of standard of living in Sweden, and it seems appropriate in this conclusion to put the results of our investigation into the light of this view of the standard of living development. Real wages for agricultural labourers did not start a secular increase until in the 1860s, which does not completely rule out the possibility that real income could have increased before that time, if the number of days worked increased or the mix of consumption changed in favour of cheaper goods. However, evidence on consumption of textiles indicate that that the standard of living did not increase for the lowest segments of society until the second half of the nineteenth century. Similarly, both demographic indicators (life expectancy and age-specific mortality) and heights indicate that it was not until after the 1850s that a sustained improvement in standard of living was realised.

Our results show a similar picture. It is not until the final period (1865-1895) that the close connection between fluctuations in food prices and mortality and fertility is completely broken. During the second half of the eighteenth century, as well as the first half of the nineteenth century, births were postponed, intentionally or unintentionally, in times of economic stress. Furthermore, in the second period adult mortality of both males and females, as well as female child mortality, increased in times of high prices. This clearly shows that landless people were highly vulnerable to economic fluctuations, which as we have argued in this paper, in itself can be seen as an indicator of the level of well-being.

In previous analyses, we have also argued that the landless group had very few opportunities to deal with difficult times once they hit the family. Postponing marriage of their children did not make much of a difference since they did not contribute much to this event in any case (Bengtsson and Dribe 2000). In a similar way migration was often not a viable option before the period of increasing urbanisation and emigration in the final decades of the nineteenth century. Before that time moving the entire family to a similar parish nearby would hardly alter their situation (Dribe forthcoming, 2002). Since their children also during normal conditions left home as soon as they could get a position as servant in another household, it was difficult to send them away much earlier when times got worse (Dribe 2000). The landless also had very small opportunities to act financially to deal with the situation, since they lacked the securities needed in order to take up loans. Finally, as has already been mentioned, the poor relief system was not designed to take care of large segments of society in times of economic hardship, but more to take care of elderly, sick or handicapped people, i.e. only a few percent of the population. This lack of options in dealing with economic stress implied that both their mortality and fertility was affected in times of economic hardship.

Our results also shed some new light on the situation of the landless groups during the period of agricultural transformation in the first half of the nineteenth century. Already from the previously cited evidence, it appeared as if living standards of the lower segments of society did not increase during this period, despite increasing agricultural productivity. Our results not only support this view, but also show that there are clear indications that the standard of living of landless in this period actually deteriorated. Adult mortality of both males and females now became highly responsive to economic stress, as did female child mortality. Similarly, the fertility response seems to have got stronger and lasting longer, compared to the previous period. This illustrates that the agricultural revolution initially brought new landless groups and an

increasing differentiation of rural society, with the standard of living of some groups actually declining, while increasing in other segments of society (cf. Winberg 1975). The importance of this process is also illustrated by the increasing attention to the question of the poor from the 1830s onwards (see e.g. Olofsson 1996).

At least part of the reason behind this increased vulnerability during the agricultural revolution can be found in the dramatic transformation of the countryside in connection with the enclosures during the first decades of the nineteenth century. The break-up of the villages made the situation for landless more precarious in several respects, although it probably also implied better employment opportunities, and, at least in the long term, increased standard of living. The more immediate effect of enclosure and village break-up, however, was to make it more difficult for the landless to use common land in securing their livelihood, e.g. to raise pigs, sheep or geese. Instead, according to nineteenth century observers, they appear to have become more dependent on wage labour (see Utterström 1957: 574-8). It thus seems likely that enclosures made the landless more dependent on the market for employment as well as for consumption, and this could be one important reason for their increased vulnerability during the phase of agricultural transformation. Later on, when real wages started to increase substantially in the second half of the nineteenth century, the standard of living of the landless group also increased.

In addition, it is also possible that the breaking-up of the village communities following the enclosures, which increased the geographic isolation of many landless people, had some negative implications for the assistance given to landless in times of economic stress. This might also have contributed to an increasing vulnerability to economic fluctuations for these people.

To conclude, our results show that this way of approaching the issue of the long-term standard of living development is a useful complement to other measures and provides an important additional dimension to the standard of living in the past. Our results corroborate previous findings on the increase in standard of living for broad groups in society during the second half of the nineteenth century, but also support a more negative view of the standard of living development of the landless during the phase of agricultural transformation in the first half of the nineteenth century.

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