

**The price revolution of imported food
to Norway in the nineteenth century:
Transfer and Innovation in European Food Consumption**

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Abstract

On the basis of newly utilized data on wages and prices this paper concludes that imports of food to Norway increased dramatically due a dramatic price revolution on imported food. This made real wages increase and thus, shift demand over to more luxurious imported food. At the same time declining import prices mirrored the internationalization of the economy, and thus Norway drew on the advantage of importing low priced food.

Introduction

During the nineteenth century Norwegian imports of food increased dramatically. This can be explained by a number of factors. One is economic growth and thereof a significant increase in the standard of living, causing a positive shift in demand for colonial goods.

Another important explanation seems to be the modernization and specialization of the economy, making Norway utilize its comparative advantages to a greater extent, and, thus, importing more food for consumption.

This makes us pay attention to a third and related explanation, in particular investigated here, i.e. the development of prices on imported goods. We will in particular examine prices on imported food. These showed a dramatic fall both in absolute and relative terms during the nineteenth century, making imported food more competitive compared to domestically produced food.

The present paper offers new series of price developments for domestically produced and imported food into Norway, along with new series on real wages as measure of the development of the standard of living 1800-1914. By using these new data series we can offer a better quantitative understanding of the tremendous growth of imported food into Norway in the nineteenth century.

Data

In the present paper we are present continuous nominal and real wage series for the total economy and five main industries. Our source is basically one of the largest manual historical archives on prices and wages in the world, i.e. Professor Dr. Ingvar B. Wedervang's Historical Archive on Wages and Prices, kept at the Norwegian School of Economics and Business Administration in Bergen.

The archive was first set up in the 1930s by the two Norwegian professors Ragnar Frisch and Ingvar Wederang. It was partly financed locally, but chiefly by the Rockefeller Foundation. Up to 46 assistants were engaged in collecting data on wages, prices and business accounts. The idea was that the data should be used as decisive information in an ongoing project examining the Norwegian economic structure and the nature of business cycles. The Second World War brought a considerable halt to the work

connected to the archive, which has been under utilized ever since, despite international attention.¹

The data in the archive is stretching back to 1641 and cover the period till 1940. It holds several million direct observations on prices and wages, and reflects some two digit million observations drawn from different accounts with wage and price data. The data are compiled from market places, institutions, stores, private firms, merchant houses, product bourses, price currents, employers' and employees' organizations, and public records and offices. They reflect most kinds of labor costs and wages and different kinds of price data, e.g. product prices, import and export prices, gross prices, consumer prices, factor prices and market prices.

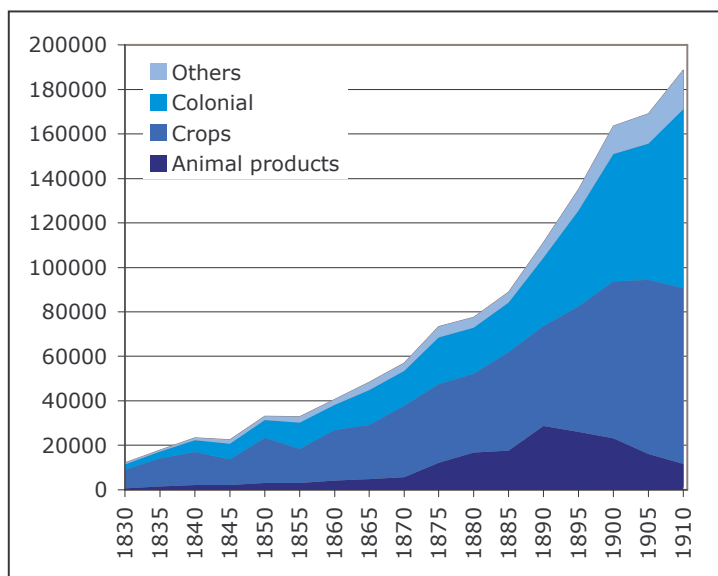
In addition to data from the Wedervang Archive, we also utilize records compiled from previous research on historical wages and prices along with data kept and published by Statistics Norway.

Imports of food

During the nineteenth century the Norwegian economy saw substantial growth. This made Norway a comparatively wealthy country even in European standards during the second half of the century. Given this substantial economic growth one would expect food to become relatively less important both as output and consumption.

Chart 1. Imports of food to Norway in 1000 NOK-1866.

¹ Jacks 2002, Jacks 2004, Jacks 2005 and Jacks 2006.



Sources, NOS 1969, 252-279.

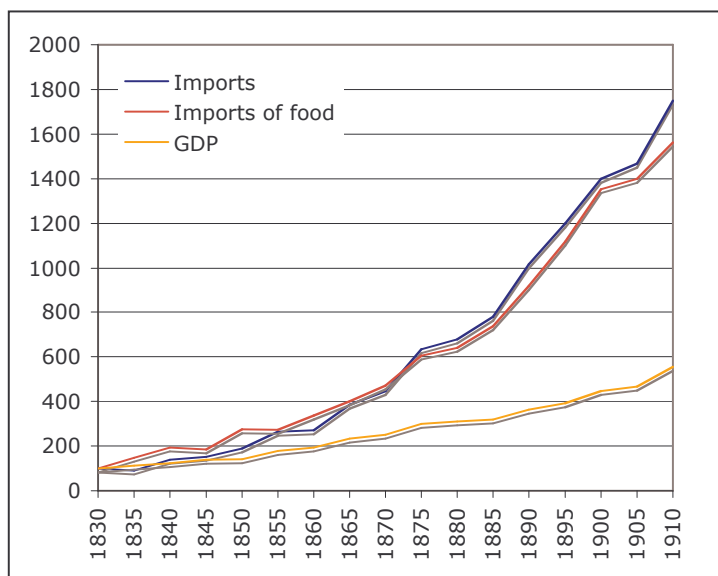
However, looking at the foreign trade statistics we find that the increase of food imported to Norway in fact grew almost as much as imports in total (chart 1). From 1830 till 1900 Norwegian imports of food multiplied with a considerable factor of 13.5, when total imports increased by a factor of almost 14.² In comparison the GDP-volume multiplied with a factor of less than 4.5.³ In other words, food imports into Norway made an astonishing record during the nineteenth century, as shown in chart 1.

Chart 2, which plots GDP, total imports and imports of food illustrates the impressive records of Norwegian imports of food in the period. In fact until the early 1870s the growth in imports of food to Norway was higher than the growth in total imports, and substantially higher than the growth in total output from the Norwegian economy. Thereafter, food imports grew moderately lower than total imports, but still significantly higher than the growth of total output. According to chart 1, the imports of crops and colonial goods increased most of the important food import products, when the import of animal products had its peak around 1890.

Chart 2. Norwegian GDP and imports. Volume indices (1830=100).

² NOS 1969, 252-279.

³ NOS 1969, 252-279, NOS 1965, 340-371 and Grytten 2004b, 272-285.



Sources, NOS 1969, 252-279 and Grytten 2007, 343-384.

What were the reasons for this surprisingly high growth of imported food into Norway during the nineteenth century? Since imported food at large made up more luxurious products than many of those produced domestically it is natural to ask if an increase of the standard of living could have caused this development. Another relevant explanatory question would be: what happened to the import prices of food? Did they decline relative to other prices? If so, relative price changes, making prices on imported foods to decline relative to other products, may contribute to explain the success of imported food products in nineteenth century Norway.

In order to answer these questions, we have to examine different parameters. The first one is the standard of living and its consequence on consumption composition. The second one is prices on imported food relative to domestically produced food and prices in general.

Standard of living

In order to map the development of the standard of living in Norway in the nineteenth century new series of real wages are presented here. These are basically constructed on the basis of data material kept in the Professor Dr Ingvar B. Wedervang's Archive on Historical Wages and Prices located at the Norwegian School of Economics and Business

Administration in Bergen, along with records kept by Statistics Norway and data compiled in previous historical research on wages and prices. By deflating nominal wage series by a representative historical consumer price or cost of living index we arrive at real wages.

Method

In order to arrive at real wages we have to deflate nominal wage series. The deflation procedure is taken care of by using the Norwegian central bank's combined historical cost of living (CLI) and consumer price index (CPI) for the period in question. This price index is like most other general historical CLIs and CPIs constructed as a Laspeyres index (P_L) with weighted arithmetic averages, according to equation (1):

$$(1) \quad P_L = \frac{\sum (p_{it} \cdot q_{i0})}{\sum (p_{i0} \cdot q_{i0})}$$

Here p denotes price, q volume, i product and t year of observation.

The wage data are added up from micro series to sub-industry and main industry series. Ideally we would use annual quantity weights for each micro series in our aggregated series according to the Paasche approach (V_P). That is, we would prefer to use the annual number of employed persons in each micro series in order to compute running annual aggregated series of average wages, as shown in equation (2):

$$(2) \quad V_P = \sum (v_{jt} \cdot q_{jt})$$

Here v denotes nominal wages, q volumes, and, j industry and t year of observation.

When this approach has been possible we have done so. However, in most cases it has not been possible, due to shortage of employment observations. In consequence, we have used aggregated Laspeyres series with fixed weights during time intervals, according to equation (3):

$$(3) \quad V_L = \sum (v_{jt} \cdot q_{j0})$$

New weights have been used according to the availability of employment data. The nominal wage series are, thus, principally Laspeyres price deflated Paasche wage series (4) and secondary Laspeyres price deflated Laspeyres wage series (5), as stated in equation (4) and (5):

$$(4) \quad \frac{V_P}{P_L} = \frac{\sum (v_{jt} \cdot q_{jt})}{\sum (p_{it} \cdot q_{i0}) / \sum (p_{i0} \cdot q_{i0})}$$

$$(5) \quad \frac{V_L}{P_L} = \frac{\sum (v_{jt} \cdot q_{j0})}{\sum (p_{it} \cdot q_{i0}) / \sum (p_{i0} \cdot q_{i0})}$$

Wages

Substantial effort has been put into research on the development of real wages in Norway. Most of this work has been rather fragmental, however, and few aggregated series on a nation wide level have been published. Most studies concentrate on local industrial plants, communities or branches of industries.⁴ Though, some work is also done on national aggregates.⁵

The major sources for the first decades of the nineteenth century are previous research conducted by writers on Norwegian economic history and thereafter files from the Wedervang Archive before Statistics Norway takes over as the major provider of data during the last decades of the nineteenth century and until World War I.

1. Agriculture and forestry

We have been able to construct a dataset of wages for agriculture and forestry back to 1820. Historical wage data for hired labor on farms can basically be found in accounts from 57 major farms. These are kept in the Wedervang Archive.⁶ Most observations are

⁴ See e.g. Gjølberg 1974, Gjølberg 1979, Fløystad 1979, Goksøyr 1982, Ramstad 1982 and Lønningdal 1984.

⁵ Myhre 1986, Minde and Ramstad 1986 and Hodne 1995.

⁶ Wedervang Archive, files W027, W028, W204, W205 and W207.

cash-wages for hired labor, where board and lodging are not included. Thus, they have to be added.⁷

In public records published by Statistics Norway, we find observations of daily wages for agricultural workers for every fifth year from 1850 onwards, where board and lodging are included.⁸ The five-annual series can be complimented with annual figures found in the Wedervang Archive as indicator of the annual development.

Scholars working on the Wedervang Archive have tried to map the value of non-cash payments.⁹ They all conclude that board and lodging was by far the most important factor of income for hired labor in agriculture in the nineteenth century. A problem with most of these estimates is that they add a fixed share of compensation to the cash wages. Here, we try to examine annual values of compensation independently of cash wages.¹⁰ We estimate food provided to labor on the farms according to a consumption basket, where the estimated consumption volumes are multiplied by annual prices.¹¹ This operation provides us with more reliable series of non-cash wages in agriculture than hitherto.¹²

2. Secondary industries

As for wages within the secondary industries we have been able to trace the development of the construction industry, the manufacturing and mining industry with its two sub-industries, engineering and textile, and finally, crafts.

The main source of wages within construction work is the Wedervang Archive. On the basis of these sources we are able to follow five different occupations over some time. These are road construction, railway construction, bricklayers, telecommunication and

⁷ Gjølberg 1974, 135-153 and Lønningdal 1984, 141-163.

⁸ NOS 1949, 366-367.

⁹ Wedervang Archive, files W089 and W091, Gjølberg 1974, 139-144, Lønningdal 1984, 37-43.

¹⁰ Statistical Office of Kristiania 1915, 144-149, Ramstad 1982, 482-492, Minde and Grytten 1997, 79 and Grytten and Minde 1998, 52-55,

¹¹ Grytten 2004a, 78-93.

¹² Lønningdal 1984, 108, Wedervang Archive, files W089 and W091

harbor construction and maintenance. The road construction data from the Wedervang Archive is the most impressive part of this material and reflects more than 13.4 million observations of daily wages for piecework 1850-1920. The corresponding number for workers on fixed salaries was almost 1.1 million. The data are reported practically from the entire country.¹³

The second most important group of wage data in the construction industry stems from railway construction. The records in the Wedervang Archive rest on 11.6 and 1.7 million observations of piecework and fixed daily wages respectively. The number of observations of hourly wages reflected in the archive is astonishingly 139.3 and 22.8 million respectively.¹⁴

Wage data on manufacturing and mining are compiled from a number of sources. They have to be modified in order to arrive consistent time series. We have been able to follow numerous occupations annually from 1820 onwards our first source being Matti Goksøyr's wages series from the Alvøen industrial plant. The company was founded in 1797 and was a pioneer in paper production based on hydraulic power.¹⁵ Here we utilize wage data covering the period 1820-65 combined with records from the Wedervang Archive. Board and lodging have to be added.

Surveys from the mid 1800s provide us with information on the size of non-cash payment. We arrive at about 60 per cent in 1850 and around 70 per cent in the early 1820s. By drawing information on annual price movements and linking this to our consumption basket making up for non-cash payments we arrive at the values of the salaries paid by other means than money.¹⁶

¹³ Wedervang Archive, files W118, W119A, W120A and W249.

¹⁴ Wedervang Archive, files W245 and W249 and Alme 1993, 64-65.

¹⁵ Goksøyr 1982.

¹⁶ Grytten and Minde 1998, 52-54 and Grytten 2004a, 90-93.

The Wedervang Archive gradually takes over as the key source. From the 1870s the archive reports annual data on the basis of some thousands observations¹⁷ Statistics Norway becomes our main source for manufacturing wages prior to 1920, as the office recorded data from almost 50 towns and industrial communities.¹⁸

As for crafts the Wedervang Archive is the main source.¹⁹ We first use wage data for senior blue-collar workers at the Kongsberg Sølvverk and the Cappelen-Ulefoss industrial plant.²⁰ From 1875 the data have substantially better coverage, reporting daily wages for painters, masons, carpenters, bakers, tailors, shoe makers in urban areas of Norway. From 1915 they include thousands of observations of eleven occupations.²¹

3. Transports and communications

We use data from the Wedervang Archive on sailors' wages for the entire period in question.²² Sailor's wages were basically measured without board and lodging until the last decades.²³ The data from the Wedervang Archive was collected from basically three types of sources, i.e. recruitment lists, crew lists and dischargement lists, of which the first category is the one mostly used by us.²⁴ Note that domestic ocean transport is excluded from the data. The total number of monthly wage observations taken from the archive and used here is 688.368.²⁵ The empirical bases of the series are quite strong from the early 1800s, and particularly from 1816 onwards.

¹⁷ See e.g. Wedervang Archive, file W284.

¹⁸ NOS 1918-1941.

¹⁹ Wedervang Archive, file W417.

²⁰ Wedervang Archive, files W046 and W055.

²¹ Wedervang Archive, file W284.

²² Wedervang Archive, file W043 and W044..

²³ Akstun 1960, 45-52 and NOS 1921-1941.

²⁴ Wedervang Archive, files W030, W032, W034, W035, W036, W038, W039, W063, W172, W173, W174, W176, W182, W184, W185, W186, W187, W188, W189, W193, W320, W327, W329, W330 and W407.

²⁵ Wedervang Archive, files W030, W032, W034, W035, W036, W038, W039, W043, W044, W063, W172, W174, W176, W182, W184, W185, W186, W187, W188 and W189, W248, and W349.

Our data for domestic transports start in 1850 and are compiled from the Wedervang Archive. An important group of labor for the first decades is public road construction workers providing their own horse. The number of daily observations taken from all over the country varied between 225 and 29,685.²⁶ For the period 1854-1910 the Wedervang Archive also provides records of wages from railway companies, taken from the railway workers union.²⁷

As for other communication industries we find data from 1850.²⁸ The major profession during the first decades is railway workers. Data are given for both fixed wages and piecework.²⁹

4. Private services

Our major occupations within private services are domestic services.³⁰ A problem connected to this sub-industry is that domestic services were basically low paid jobs, when some professions within private services, e.g. finance and consulting were well paid. Aggregated series are found by adjusting the nineteenth century data from the Wedervang Archive and Statistics Norway with the aggregated level for the entire industry in 1915.³¹ By examining the composition of consumption expenditures from the nineteenth century and link these to current prices we arrive at running values for non-cash payments.

5. Public services

The best available source for public services for the nineteenth century is Kjell Bjørn Minde's, study on the profitability of higher education in Norway 1885-1955, which offers annual tariff salaries for public servants.³² By drawing on information from his

²⁶ Wedervang Archive, W118, W119A, W120A and W249.

²⁷ Wedervang Archive, W058.

²⁸ Wedervang Archive, files W058, W118, W119A, W120A, W245 and W249

²⁹ NOS 1918-1941.

³⁰ Wedervang Archive, files W028 and W204.

³¹ Gjølberg 1974, 85-107.

³² Minde 1993, 25-123* (appendix).

work we are able to give representative estimates of wages for public services for the last decades of the 1800s onwards.

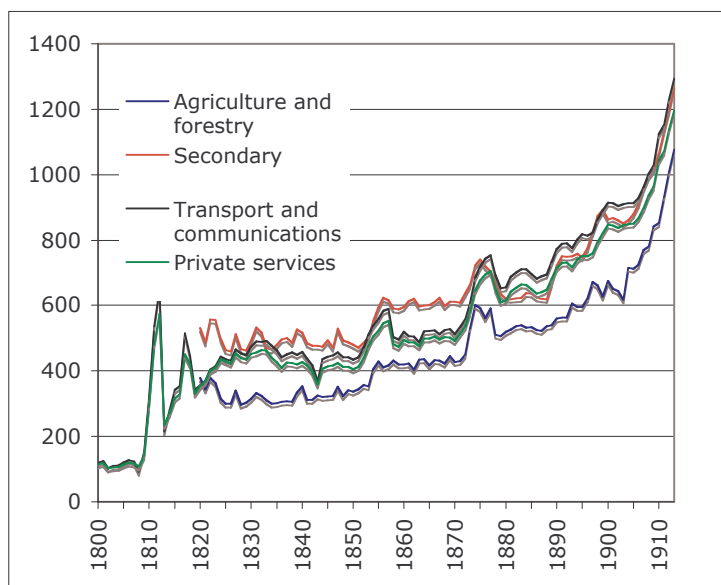
Minde primarily pays attention to public administration and education. He offers wage data on public servants in the central and local public administration. Most of his data report wages of senior bureaucrats. Thus, they are higher than the average of the industry in general. However, he also gives wages for technical personnel and assistants and some junior staff. By adding extra payments to the tariff wages and constructing a normal distribution of employees according to the tariffs, we arrive at reliable estimates of public administration wages, inclusive central ministries.³³

6. Total

By summing up all industries we arrive at average wages for the total Norwegian labor force for the nineteenth century and until World War I. In order to do so, we have weighted the industries according to their relative shares of labor recorded in the population censuses. Our unit of account is kroner per man-year. Nominal wages for key industries are plotted in chart 3. Since the data for the public sector covers a fraction of the period only, they are omitted in the chart.

Chart 3. Annual nominal wages for key industries in NOK.

³³ Minde 1993, 25-123* (appendix).



Source, Grytten 2007, 366-383.

Prices

In order to construct real wage series we have to deflate our new nominal wage series. In doing so, we use a mixed cost of living and a consumer price index, newly constructed for the Norwegian central bank.³⁴

The historical joint CLI and CPI of the central bank covers the period from 1516 till present. From 1819 it includes 29 product items in eight consumption groups. The numbers increase to 47 commodities, representing nine consumption groups from 1830 and 55 items representing ten consumption groups from 1850, when the cost of living index (CLI) by Ramstad has been adopted.³⁵ From 1901 the CLI index adopted from the Kristiania Statistical Office by Statistics Norway.³⁶

The index is, as already stated, constructed by a Laspeyres approach, meaning we have fixed commodity weights during sub-periods. The key source for price data is again the Wedervang Archive. From the early 1800s price data were collected almost all over the

³⁴ Grytten 2004a, 47-98

³⁵ Ramstad 1982, 158-238.

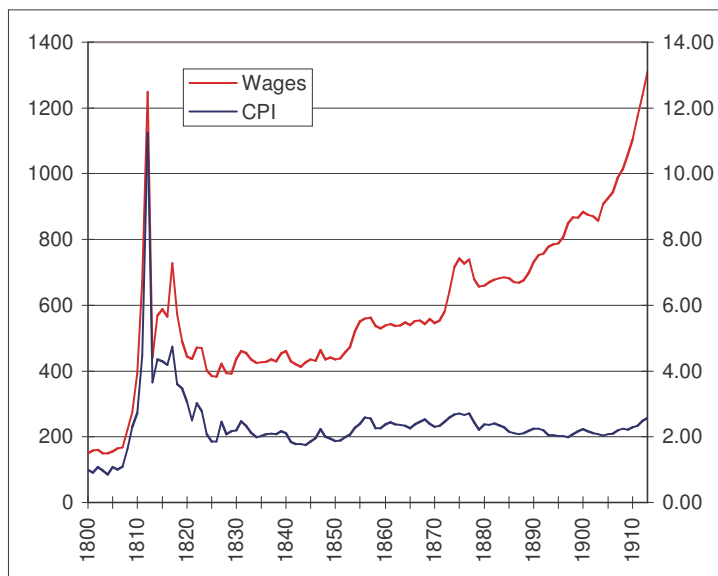
³⁶ NOS 1978, 515-520.

country by request from the central government. Both their validity and reliability seem high. In the first place they do reflect market prices to consumers. Secondly, these price data were collected by local civil servants on a monthly quarterly basis according a strict regime set by the central authorities.³⁷

The commodity weights in the index are chosen on the basis of different consumption surveys.³⁸ The deflator seems reasonably reliable for the period 1819-1830 and reliable thereafter. The development of prices and nominal wages (total) in Norway 1800-1913 are plotted in chart 4.

According to our series presented in the chart nominal wages and prices moved in the same direction until the 1880s, despite a relative decline in prices. From the 1880s they move in opposite directions.

Chart 4. CPI and nominal wages for Norway 1800-1913.



Left hand side-scale = nominal annual wages.
Right hand side scale = CPI, where 1950=100.

³⁷ Circular. 4th Ministry, dated January 20th 1816.

³⁸ Grytten 2004a, 63-66.

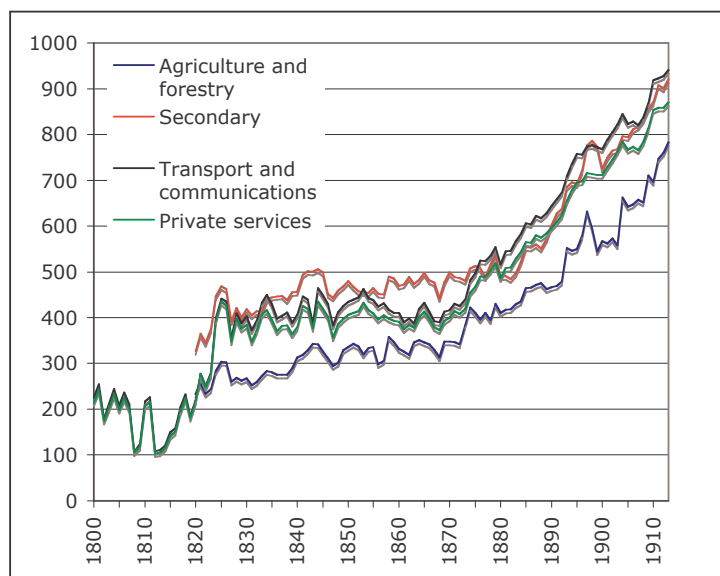
Sources, Grytten 2004, 92-93 and Grytten 2007, 366-383.

Real wages

By deflating the new nominal wage series by the new historical combined cost of living and consumer price index we obtain real wage series according to the method described in equations (1) – (5) above.³⁹

According to chart 5 below long-term real wages stayed fairly stable until the 1820s. However, in the short run there were huge fluctuations, mostly due to volatile prices. From the late nineteenth century we observe increasing rates of real wage growth. At the same time the short-term fluctuations became more modest. During the 1870s, 1880s and the first half of the 1890s this was very much due to deflation. This deflation was to a large degree imported. Thus, lower international prices made real wages to increase, not only during these decades, but also during most of the nineteenth century. Finally, the growth of real wages from 1905 onwards can be seen as a consequence of rapid industrialization and economic growth in Norway, but also internationally.

Chart 5. Annual real wages for Norway 1800-1913 in NOK-2000.



Sources, Eitrheim 2007, 395-402, Grytten 2004a, 92-93 and Grytten 2007, 366-383.

³⁹ Eitrheim 2007, 395-402.

The growth rates of real wages by industry are reported in table 1 below. The rates are calculated both as exponential first-to-last observation growth rates and as log-linear trend estimates. The latter ones are found by running log-linear regressions, where the dependent variable, real wages are logged with their natural logarithm, when the independent variable is time, i.e. year of the observations.

According to table 1 real wages stepped up substantially from 1820 till 1910. When the standards of living is assumed to have increased by less than 0.01 percent annually during the last three centuries before our period starts, it averages more than one percent annually 1820-1910. The growth of real wages was also exponential during the nineteenth century, as mirrored in the differences between the first-to-last and the log-linear rates. This is emphasizing the shift from a static, long-term non-growth economy to a dynamic and long-term continuous growing economy.

Table 1. Growth rates of real wages and GDP per capita 1820-1910.

Industry	Growth rate	
	first-last	log-lin
Agriculture and forestry	1.22	1.06
Transports and communications	1.54	1.03
Private services	1.53	0.98
Secondary industries	1.1	0.76
Total	1.34	1.03
GDP per capita*	1.21	1.06

* 1830-1910

Consumption pattern

Having mapped the increase of real wages, we are able to trace how this development has influenced the consumption pattern. On the basis of previous work by Minde and Grytten we are able to present an overview of the development of an average consumption basket for a Norwegian household during the nineteenth century (table 2).⁴⁰

Table 2. Consumption basket for working class families in Norway. Relative shares in percent.

	1825	1850	1875	1900
Food	55	50	44	41
Beverages and tobacco	6	6	7	7
Rent, lighting and heating	21	21	20	16
Durable household goods and domestic services	6	8	11	12
Clothing and footwear	7	7	8	8
Personal services	2	3	4	8
Other	3	5	6	8
Total	100	100	100	100

Sources, Grytten and Minde 1998, 42-58 and Grytten 2004a, 66, 78.

According to table 2 the share of food in the consumption basket fell by 25 per cent between 1825 and 1900. At the same time more luxurious goods and services, such as durable household goods, domestic services and personal services stepped up by 150 per cent. This clearly illustrates the effect of the increase in real wages.

Why then did import of food increase dramatically? One explanation seems to be the changes in the consumption pattern of food. This is illustrated in table 3, which reports a consumption basket of food for Norwegian working class families during the nineteenth century. Again, the data are compiled from research done by Minde and Grytten.

Table 3. Consumption basket of food for working class families in Norway. Relative shares in percent.

	1825	1850	1875	1900
Fish products	12	11	9	8
Milk products	12	15	19	21
Meat products	11	12	14	17
Barley, oat and maslin, incl. flour	35	26	16	8

⁴⁰ Grytten and Minde 1998, 42-58 and Grytten 2004a, 66, 78.

Rye and wheat, incl. flour	8	11	16	16
Potatoes, peas and vegetables	12	11	9	7
Colonial goods	5	7	11	16
Misc	5	7	6	7
Total	100	100	100	100

Sources, Grytten and Minde 1998, 42-58 and Grytten 2004a, 66, 78.

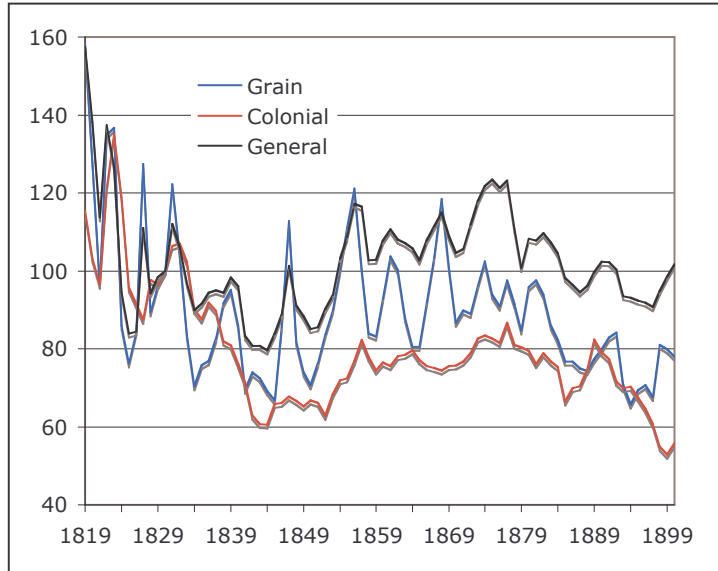
According to table 2 the import products rye and wheat, including flour from these two kinds of crops doubled its share in a typical working class food basket 1825-1900, when colonial goods increased its share with astonishing 220 percent. At the same time typically domestically produced goods, like fish, potatoes, peas and vegetables lost substantial ground. A major reason for these changes seems to have been the increase in the standard of living. According to Engel's Law food takes a relative lower share of consumption when income increases, as more money can be used on luxury goods. At the same time food consumption shifted from basic staple goods over to more luxurious food. Hence, we see a shift from domestically produced barley, oat and maslin to foreign produced wheat and rye, from crops and fish to meat, milk and colonial goods.

Import price revolution

Increasing internationalism and improvements of decreasing transaction costs gave new possibilities to profit from foreign trade from the 1840 onwards. Utilization of comparative advantages and economy of scale gave opportunities to cost reductions. Thus, it is of interest to compare the consumer prices for typically imported goods to the general consumer price level.

The historical CPI from the central bank is made up by different sub-indices. By using these we can compare price developments for different kinds of goods. Here we have picked colonial goods and rye and wheat, which was chiefly imported to Norway. These are compared with the general price level (CPI) in chart 6. The chart reveals that prices on these imported goods fell relatively to the general price level. In particular this happened from 1830 onwards.

Chart 6. CPI for Norway. General index and sub-indices for typically imported goods. (1830=100).



Sources, Grytten 2004, 90-93 and Ramstad 1982, 482-493.

The development is seen more clearly when the series are smoothed. In order to do this we apply the Hodrick-Prescot filter (HP-filter).

The HP-filter is in fact an algorithm for finding polynomial trends of time series. The filter separates an observed time series, x_t , into a smoothed or a trend component, T_t , and a cyclical component, C_t , as stated in equation (6):

$$(1) \quad x_t = T_t + C_t$$

The cyclical component will here be the deviations from the trend series, and can be measured according to equation (2):

$$(2) \quad C_t = \log x_t - \log T_t$$

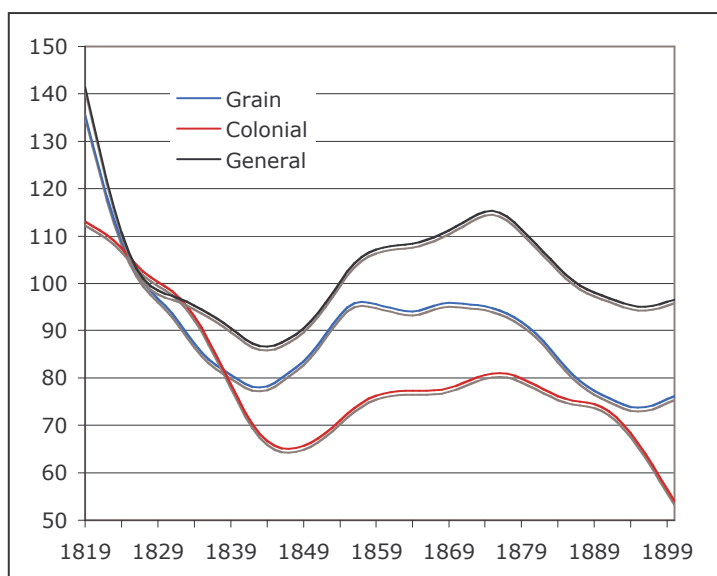
The objective function of the filtered series will have the form stated in equation (3):

$$(3) \quad y_t^{hp} = \sum_{t=1}^m C_t^2 + \lambda \sum_{t=2}^{m-1} ((T_{t+1} - T_t) - (T_t - T_{t-1}))^2$$

Here m is the number of samples and λ is the smoothing parameter, specifying the smoothness of the trend. A normal λ -value for annual data would be 100. Thus, we apply $\lambda=100$ in our analysis.

The HP-smoothed series are reported in chart 7. From 1830 onwards prices on colonial goods fell by 30-40 per cent compared to the general price level, when prices on wheat and rye fell by about 20 percent. Thus, imported food became relatively cheaper than consumption in general and was a good bargain for the consumers.

Chart 7. CPI for Norway. General index and sub-indices for typically imported goods. HP-filtered series (1830=100).

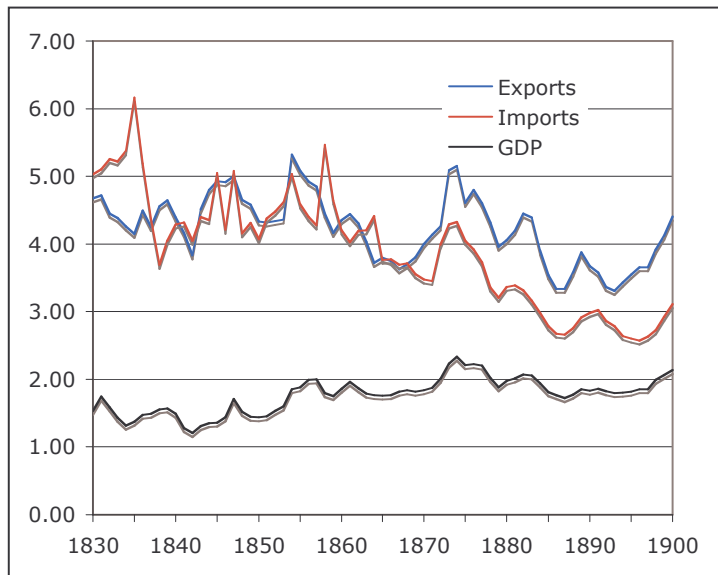


Sources, Grytten 2004, 90-93 and Ramstad 1982, 482-493.

When we look at the implicit deflators from the newly constructed historical national accounts we get the same picture: import prices fell substantially compared with both exports and general prices (implicit GDP deflator), as shown in chart 8.⁴¹ There were significantly more turbulence connected to import and export prices than to the general price level. However, the picture is quite clear. When import prices fell about 40 percent from 1830 till 1900, import prices fell about ten percent. Finally, the implicit GDP deflator had an increase of 25 percent.

Chart 8 below plots the implicit deflators for Norwegian GDP, exports and imports 1830-1900. The relative decline in imports prices is evident from the graphs. Accordingly they reveal the import price revolution, which took place during the nineteenth century, making real wages increase and imported food to become more affordable for Norwegian consumers.

Chart 8. Implicit deflators from the Norwegian historical national accounts (2000=100).

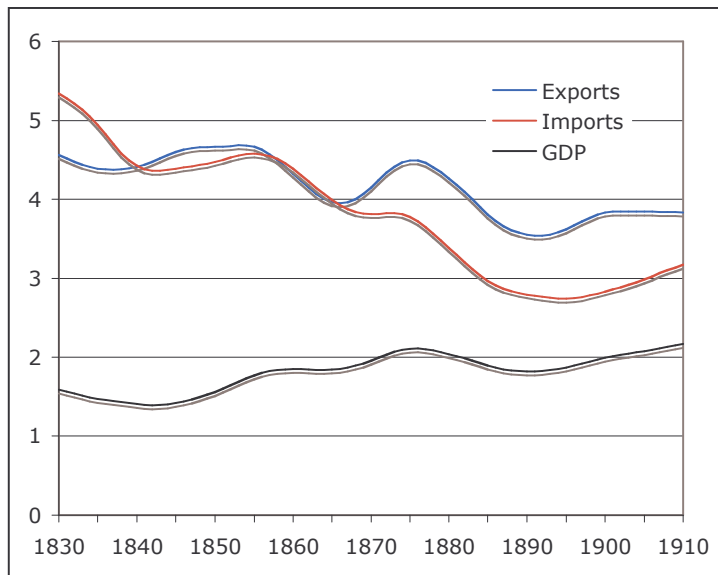


Sources, Brautaset 2002, 268 and Grytten 2004, 281-284.

⁴¹ Brautaset 2002, 268.

The results are easier seen when the graphs from chart 8 are smoothed with a HP-filter, as done in chart 9.

Chart 9. Implicit deflators from the Norwegian historical national accounts. HP-filtered series (2000=100).



Sources, Grytten 2004, 281-284.

Foreign prices declined rapidly during the nineteenth century, when the general price level increased. Import prices fell substantially more than export prices, giving imported products a huge competitive advantage in the Norwegian markets. Thus, import rocketed and imported food became affordable even for the working class in a population with rapid economic growth and, thus, a corresponding increase in the standard of living.

Conclusions

The present paper examines the causes of the overwhelming increase in Norwegian imports of food in the nineteenth century. Naturally, Norway concentrated more on her comparative advantages during the years of globalization in the second part of the century. Thus, domestic production of food became less important and imports of food correspondingly more important.

By presenting and analyzing new series on wages and prices the present work also concludes that the growth of the standard of living was rapid for all key industries in the 1800s. This can to great extent be explained by the rapid decline in import prices. Thus, consumption and thereof imports of more luxurious food increased significantly.

Finally, in consequence of the globalization wave and thereby a stronger utilization of comparative advantages, prices on imported food fell relative to the general price level. Thus, demand for imported food showed a significant increase in nineteenth century Norway.

Literature

Akstun, F. 1960, *Mannskapsstatistikk*, Oslo.

Brautaset, C. 2002, *Norwegian Exports 1830-1865: in perspective of historical national accounts*, Bergen.

Eitrheim, Ø O.H. Grytten and J.T. Klovland 2007, 'Historical Monetary Statistics for Norway: some cross checks of the new data', in Ø. Eitrheim, J.T. Klovland and J.F. Qvigstad eds, *Historical Monetary Statistics for Norway – Part II*, Oslo, 385-434.

Fløystad, I. 1979, *Arbeidsmandens lod, det nødtøftige brød: arbeiderlevkår ved Baaseland/Nes jernverk 1725-1807*, Bergen.

Gjølberg, O. 1974, *Reallønnsutvikling og levekår for jordbruksarbeidere ca 1830-1880*, Bergen.

Goksøyr, M. 1982, *Fra tjener til arbeider? En undersøkelse av Alvøen-arbeidernes rekruttering og lønnsforhold, 1801-1865*, Bergen.

Grytten, O. H. 2004a, 'A consumer price index for Norway 1516-2003', in Ø. Eitrheim, J. T. Klovland and J. F. Qvigstad eds., *Historical monetary statistics for Norway 1819-2003*, Oslo, 47-98.

Grytten, O. H. 2004b, 'The gross domestic product for Norway 1830-2003', in Ø. Eitrheim, J. T. Klovland and Jan F. Qvigstad eds., *Historical monetary statistics for Norway 1819-2003*, Oslo, 241-288.

Grytten, O. H. 2005, 'Historisk lønnsstatistikk 1726-2004', in Ø. Eitrheim, and J. F. Qvigstad eds., *Tilbakeblikk på norsk pengehistorie: historisk monetær statistikk for Norge*, Oslo, 2005, 57-80.

Grytten, Ola H. 2007, 'Norwegian wages 1726-2006 classified by industry', in Ø. Eitrheim, J.T. Klovland and J.F. Qvigstad eds, *Historical Monetary Statistics for Norway – Part II*, Oslo, 343-384.

Grytten, O. H. and K. B. Minde 1998, 'The demand for consumer goods in Norway 1850-1920', *Scandinavian Economic History Review*, ILVI, 42-58.

Hodne, F., O. H. Grytten and J. Alme 1994, 'Real wages in Norway 1850-1940', in V. Zamagni and P. Scholliers eds., *Real wages in the nineteenth and twentieth century*, Milan, 59-72.

Jacks, David S. 2004, 'Market Integration in the North and Baltic Seas, 1500-1800', *Journal of European Economic History*, 3/2004, 285-329.

Jacks, David S. 2005, 'Intra- and International Commodity Market Integration in the Atlantic Economy, 1800-1913', *Explorations in Economic History* 3/2005, 381-413.

Jacks, David S. 2006, 'What Drove 19th Century Commodity Market Integration?', *Explorations in Economic History*, 3/2006, 383-412.

Jacks, David S. et al 2002, 'Real Inequality in Europe since 1500', *Journal of Economic History* 2/2002, 322-355.

Lønningdal, T. 1984, *Tjenestejentelønninger i jordbruket: en studie av tjenestejentelønninger på 17 større gårder i østlandsområdet 1850-1910*, Bergen.

Minde, K. B. and J. Ramstad 1986, 'The development of real wages in Norway 1730-1910', *Scandinavian Economic History Review*, XXXIV, 90-121.

Minde, K. B. 1998, 'Was there a Fall in Return to Educational Investment in Norway, 1885-1985?', *Scandinavian Economic History Review*, ILVI, 6-22.

Myhre, J. E. 1986, 'Research into Norwegian living conditions in the period 1750-1914', *Scandinavian Economic History Review*, XXXVI, 38-60.

NOS XII. 163 1965, *National accounts 1865-1960*, Oslo.

NOS XII. 245 1969, *Historical statistics 1968*, Oslo.

Ramstad, J. 1982, *Kvinnelønn og pengeøkonomi: en studie av kvinners lønn i tekstilindustrien i Kristiania ca 1850-1910*, Bergen.

Statistical Office of Kristiania 1915, *Husholdningsregnskaper fort av en del mindre bemidlede familier i Kristiania, Bergen, Kristiansand og Hamar i Aaret 1912/13*, Kristiania.

Archival sources

Professor Dr Ingvar B. Wedervang's Archive on Historical Wages and Prices, files W009, W013, W014, W021, W027, W028, W030, W032, W034, W035, W036, W038, W039, W043, W044, W046, W047, W048, W049, W054, W055, W056, W058, W063, W071, W072, W074, W075, W080, W081, W082, W089, W091, W118, W119A, W120A, W121, W155, W172, W173, W174, W176, W177, W182, W184, W185, W186, W187, W189, W193, W204, W205, W207, W245, W248, W249, W284, W320, W327, W329, W330, W349, W407 and W417.