NEW ESTIMATES OF SWEDISH HISTORICAL GDP SINCE THE BEGINNING OF THE NINETEENTH CENTURY*

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The first Swedish historical national accounts were compiled in the 1930s, and that pioneering work formed the main basis for later estimates until now. In this paper, an attempt to construct new historical accounts for 1800–1980 is presented. First, the methodology is discussed, particularly concerning series in constant prices adapted for analysis of growth and structural changes. In principle Paasche deflators should be used, but for such a long period they are inadequate due to the huge changes in the goods composition of production as well as of consumption and investment. Instead, a division of the whole period into shorter subperiods is made and within these, Paasche deflators are applied. Then the series for the deflation periods can be linked in order to arrive at longer series. Second, some findings of the work (still in progress) are reported. The new series show a slower growth rate in the second half of the nineteenth century than the earlier ones, and Sweden can internationally no longer be seen as the country where this period's economic miracle took place. Instead, concerning rate of growth of GDP per capita as well as its level, Sweden seems to have been a middle-way country compared to other European countries. In the first half of the 20th century, on the other hand, the growth rate was high in an international comparison. The Swedish sectoral changes followed a general pattern with decreasing agricultural and increasing industrial shares. The service share was not unusually high in the nineteenth century. Within this service production a very distinct pattern of structural change is evident. Finally, a plea is made for a regional breakdown of the national GDP data in order to obtain a better understanding of the economic growth and modernization process.

INTRODUCTION

The first Swedish historical national accounts were computed in the late 1920s and the early 1930s.[1] They were not only the first in Sweden: "As far as I am aware, they were the first in the world to cover such a long period of time. In addition, they have been rather exemplary in describing methods of calculation."[2] This national income study was part of a larger research project, "Wages, Cost of Living and National Income in Sweden 1860–1930," undertaken at the Institute for Social Sciences at Stockholm University. This project was initiated by Professor Gösta Bagge, and many economists were employed—some of them were or became later very well known, e.g. Erik Lindahl, Gunnar Myrdal, Erik Lundberg and Ingvar Svennilson.

Most of the data for the period of study, 1861–1930, came from material gathered in the Swedish archives, and guesstimates were made on some minor items. However, the archival material, containing data on public finance, production in various sectors etc., is far from complete especially for the earlier part of the period; records were made up on the basis of the dominant opinions among

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[1]Lindahl/Dahlgren/Kock (1937).

[2]Ohlsson (1953, p. 45). On the history of this first Swedish national income project, see Carlsson (1982).

contemporary economic experts on what should be considered important. Thus, parts of the economy were neglected in the statistical sources. Successively, however, the material became more complete, and, therefore, towards the end of the period the series constructed in Lindahl/Dahlgren/Kock's national income study often covered more of what they were intended to cover than in the beginning; the validity increased. Besides, very scrupulous researchers were employed in collecting data and making the calculation work. This contributed to the high reliability of the series in the sense that they were in accordance with the source material, but also to an overestimation of the Swedish economic growth in the 19th century, when computed on the basis of these.

Only current values were calculated in this pioneering work. Some brief comments on the national income in constant prices were made, but no special deflators were constructed. Instead, for illustrative purposes, the series were deflated with a cost-of-living index.

For almost fifty years the quantitative work on long-term Swedish macroeconomic changes has in one way or another had the series constructed by Lindahl/Dahlgren/Kock as the point of departure. In the beginning of the 1950s Olof Lindahl made a GDP calculation. For the period 1861–1930 he used the older series with a few minor revisions and for 1930–50 he made preliminary new estimates. The next work was published in the 1960s by Östen Johansson, who relied heavily on the previous series except for certain reestimations and a new calculation for the building and construction sector.[3]

Olof Lindahl only made a rough volume calculation while Johansson made a more elaborate one. He assigned deflators for the gross output of the various branches. Then he computed constant value series which were summed up to totals on the production as well as on the destination side of the account. These values were not, however, added up to a total GDP series in constant prices. Instead, such a series computed with a cost-of-living index as deflator was published. Thus, Johansson did not actually go any further than Lindahl/Dahlgren/Kock.[4]

The next Swedish historical national product series were constructed and published in the 1970s by Krantz/Nilsson.[5] For the period up to 1950 the current value series from Johansson's book were used with certain minor revisions. On the other hand, the deflators and, thus, the constant value series were new. For the period 1950–70 material from the official national accounts computed at the National Central Bureau of Statistics was employed. Krantz/Nilsson's study was a preliminary one and the intentions were two-fold; to raise some methodological issues, and to come to terms with the most serious deficiencies in the earlier works. It was clear that even these new volume series had shortcomings, but at the same time they gave a more reliable picture of the Swedish economic growth and pattern of change since 1861 than the earlier estimates.

The methods adopted in Krantz/Nilsson's study formed one of the points of departure for the research project "Structural Changes in the Swedish Economy

[3]Lindahl (1956) and Johansson (1967).
[4]For a critical evaluation of Johansson's deflation procedure, see Krantz/Nilsson (1975, pp. 22ff).
[5]Krantz/Nilsson (1975).

1800–1980. Construction and Analysis of National Product Series," within the Research Programme on Structural Economic Changes at the Department of Economic History, Lund University.[6] In this project, completely new series are calculated for the 19th century, and partly new, partly revised series for the 20th century up to 1950. For the period after 1950, data from the official national accounts are used.

General Comments on Computation Methods

Gunnar Myrdal once remarked that GDP data are mostly constructed by one group of researchers and used by another group and there is almost no communication between these two groups. This "turns out to be the main explanation for the general abuse of the GDP concept when dealing with long-term problems of growth and development. I have often thought that we do need more confrontation between these two groups, leading to a much more careful analysis of how these statistics are actually produced and how they should be produced."[7]

Concerning the historical series on Swedish national product, a gap between users and producers often exists, too. Erik Lindahl and his research group were certainly competent economists and/or statisticians, and they made the first analysis of their new series in the book from 1937. However the main result of their efforts is the collection of data, which later on has been frequently used in studies of economic growth. But, these data and the various series built on them have seldom been critically examined by the users. They have been accepted by economists and often by economic historians who have not been aware of the construction of the series.[8] When for instance deflation is made using only a cost-of-living index as deflator, it is not meaningful to discuss sectoral or other divisions "in constant prices."

Regarding the new national product series, the same research group is making the computational work as well as the (first) analysis of the data. This is, of course, no guarantee at all that in the future the series will not be used in contexts to which they are not adapted. The risk of this is present even if—as in the Swedish case—all the material is published with detailed accounts of the underlying techniques of compilation and methods of calculation applied. Thereby, it is in principle possible for anyone to use this material for constructing their own national product series suited for the purpose of the study.

The reason for emphasizing this possibility is that aggregated national account series in constant prices can not have universal validity i.e. be founded on a single set of generally applicable principles. Instead, they should be adapted for the purpose of the series. To a certain extent this is also true for series in current prices. In this case, however, it is possible to proceed from a general system of national accounts.

[6]For a methodological discussion, see also Krantz (1983).

[7]Myrdal (1973, p. 191).

[8]One example is that a Swedish economist once in a lecture made a point of his finding that the performance of the implicit GDP deflator since 1861 was remarkably similar to that of the cost-of-living index. That this index had been used as deflator was unknown to him.

Ingvar Ohlsson has discussed these problems at length, and he mentions various purposes to which the national product series could be adapted.[9] First, business cycles analysis with reference to Keynesian theory is noted. A second purpose is the analyses of results of economic activity i.e. comparisons over time and space. It is often maintained that national product series show welfare changes, but in this context, the series, according to Ohlsson, are often misused. Third, structural analyses is an important field where national accounts data are frequently employed. This is close to analysis of results in certain instances. Fourth, planning purposes, including forecasts should be mentioned.

Historical studies is a field of research which is not explicitly discussed by Ohlsson. Also, in this field there can be a set of possible national account series suited for different purposes; for instance studies of long-term welfare changes or studies based on neoclassical production theory. In the present paper, however, only series adapted for studies of structural changes in connection with economic growth shall be discussed. In constructing historical series, techniques should be applied which in important respects differ from those used for purposes implying a short-term perspective.

Of special importance in historical series is the deflation procedure. Generally, when dealing with this issue, many problems have to be solved; for instance, concerning new goods and services that are introduced and old ones which disappear during the deflation period. A related question has to do with quality changes in goods and services. When should these changes be considered large enough for the item to be seen as a new one? These are serious problems in series with a short-term perspective and even more so for historical series. The solutions or attempts to solutions to these kinds of problems require clarification of the definitional issues. In other words, the problems are to a large extent of a practical rather than a theoretical nature.

Especially when constructing historical series, a more fundamental issue is the choice of weight systems, or more generally expressed, the choice of deflation method. Different methods usually lead to different performances for the same aggregate during the same period. Consequently, it is essential to be able to give the results a clear-cut interpretation.

A technique which could be of doubtful value is to use series constructed for other purposes as deflators e.g. cost-of-living indices. The base years in such indices are often arbitrarily chosen for the purpose of deflating national product series meant for historical analysis. "One must consider that price and cost-of-living indices so far have been constructed by scholars and institutions interested mainly in changes in prices and cost-of-living for their own sake. Those engaged in investigating long-term trends in national income and its components cannot hope to arrive at satisfactory results unless they embark on construction of price indices especially designed to serve the needs of their work."[10] If, moreover, several series constructed in different ways are used for various parts of the total, the weighting can be obscure.

[9]Ohlsson (1953). The examples in the text are taken from Ohlsson's discussion in DsFi 1986, 13, pp. 67ff. See also Krantz (1983) and Kendrick (1968).

[10]Gerschenkron (1962, pp. 443ff).

Many different weighting techniques for the national product deflators can be imagined. There are, however, three types which are discussed and used more often than the others, Laspeyre, Paasche and chain indices (the last one sometimes being called divisia indices). For chain indices the weight systems are changed often, usually every year. This is not the case with Laspeyre or Paasche indices. Therefore, Paasche indices are best suited as deflator since the volume series arrived at in the deflation procedure will be of a Laspeyre type. This means that they are in principle calculated using the prices of the base year; expressions like "in 1929 prices" get a clear-cut meaning with this deflation procedure. The use of Paasche and Laspeyre indices also enables the scholar to study the impact of changes of weights between the base and the comparison years, i.e. the structural changes during the period under review. Gerschenkron emphasizes this possibility when he talks about the index-number problem as an important ingredient in the historian's arsenal of methods.[11]

However, these two types of indices are less suited for series over very long periods. Extensive changes in the composition of goods and services may occur and, thus, only part of the total can be covered. A solution to this problem is to divide the whole period into shorter subperiods and apply the chosen technique to each of these shorter intervals. Thereafter, these subseries can be linked to a series over the whole time span. This division into sub-periods should be made on the basis of principles stated in the points of departure for the study.

The New Swedish Historical National Accounts[12]

Current values. Contemporary national accounts are built up of a very large number of accounts on different levels of aggregation. They are very detailed and cover most of the economic transactions in the society. From these accounts the GDP estimates are calculated separately from the production, expenditure and income side.

It is not possible due to lack of data to construct such detailed historical national accounts, and it is very tricky as well to make reliable separate estimates of GDP from the production, income and expenditure side. Instead, another estimation technique, the output statistical method, is often applied. This technique is also used in the construction of the new Swedish series for the period from 1800. The gross output of each branch and sector of the economy is estimated and then allocated to different uses, and this procedure is applied to imports as well. These uses can be inputs to the sectors and branches, consumption, invest-

[11]Gerschenkron (1962, p. 3). The term Gerschenkron effect refers to a type of change which appears in index constructions when indices with base-year weights produce higher growth rates than indices with comparison-year weights.

[12]Lennart Schön is responsible for the estimates of production in the agricultural and manufacturing sectors, Lars Pettersson for building and construction, Jonas Ljungberg for some of the goods production deflator constructions, and Olle Krantz for the production in all service sectors. The estimates are presented in separate publications for each sector except housing which is treated together with private service production. These works which are published in Swedish also contain detailed reports on the source material and computational techniques. The estimates will be summarized and published in English together with an analysis of the economic changes 1800–1980. Some books have appeared, Krantz (1986) and (1987b, c), Pettersson (1987), Schön (1988) and Ljungberg (1988).

ments and exports. After summation, the totals on the respective sides of the account have to correspond on purely arithmetical grounds.

In the Swedish case, value added of the sectors and branches is also computed on the basis of estimated value added shares. The sum total of the value added of all sectors is the GDP. Only this part of the GDP computations is considered in the present paper.

The sector classification used is as follows:

Agriculture with ancilleries
Manufacturing industry and handicrafts
Building and construction
Transports and communications
Private service production
Public service production
Housing

This sectoral division is the same as the one used in the earlier estimates of Swedish historical national product series with one exception: In Lindahl/Dahlgren/Kock (1937) domestic work is defined as a separate sector, whereas in the other historical computations it is included in private service production.

A similarity with Lindahl/Dahlgren/Kock's computations but different from Lindahl's (1956) and Johansson's (1967) is that in addition to conventional GDP calculations, the value of unpaid household work is also estimated. It does not, however, comprise all this work, but only that which is performed by the part of the total labour force—almost exclusively women—who have their main occupation at home.

The supply of data sources is generally satisfactory for the 20th century when official and other statistics are rather ample, but, as mentioned above, the supply is smaller the further back in time the estimates pertain to. Consequently, to various degrees for different parts, estimates from more and more scattered sources are necessary.

The agricultural statistics are chronically unreliable till the beginning of the 20th century. In certain instances this material has to be supplemented or even substituted by other sources, which together with certain assumptions are used for the production estimates. The backbone of the computation of the production series for manufacturing industry and handicrafts is the official industrial statistics. However, this is far from complete for the 19th century, and for important parts estimates based on various other sources are made. For the first half of the 19th century, the series of production in the building and construction sector has to be based on point estimates. Then these data are linked on the basis of certain assumptions concerning the changes in production over time.

Data on service production performed by the central government can be taken directly from the official statistics except for a small part, the military force paid in kind. Here, however, estimates can be based on other official sources. The computation of service production performed by the local governments in the first half of the 19th century is based on weak material and certain assumptions concerning the changes. However, the official statistics subsequently become more complete. Transports are partly covered for the first part of the 19th century.

Some data exist for foreign and domestic shipping and for part of the land transports, but for other parts of this sector assumptions and guesstimates have to be made. This is the case for much of the private production of services, as well. Retail and wholesale trade constitutes a large part of these services, and the production in this branch must be estimated using data for goods production and consumption.

Volume values. Theoretically and methodologically, the choice of a deflation procedure has two main influences. On the theoretical side Schumpeter's and especially the Swedish economist Johan Åkerman's economic thinking can be mentioned. While it is not possible within the space of this paper to dwell on the theoretical issues, it is important to underline that structural changes play a central role and that a sequence of structurally homogeneous periods can be discerned in the long-run economic development. These periods can be delimited with the help of what Åkerman calls a causal analysis of the long-term economic performance. In each of these sub-periods, according to Åkerman, different sets of economic mechanisms are at force, making different economic models relevant e.g. for economic-political purposes and of course also for the analysis of historical changes.[13]

The other source of influence is Gerschenkron's writings on historical development and problems of deflation. One of his main points is that the construction of volume series must be made in such a way that the weighting procedure is clear so that it is possible to evaluate critically. "The better understanding of the index-number problem will not eliminate the arbitrariness of our approaches, but it will make it possible to gauge its extent and reveal the historical significance of the weighting choices which are made."[14]

Those two points of departure provide a deflation procedure where the whole investigation period is divided into more or less homogeneous sub-periods. Within each of these, Paasche deflators are constructed for sub-branches, branches, sectors and the total, i.e. from the lowest level of aggregation to the highest. To obtain a series for the entire period, the series for the sub-periods are linked together.

The division of the long period into shorter, homogenous intervals, used as deflation periods, is based on an analysis of the Swedish economic historical development.[15] A pattern of change was revealed where periods with different economic characteristics, roughly corresponding to long swings, i.e. with approximately 15–25 of length were established. These deflation periods together with the base years are shown in Table 1.

There are fundamental differences between the construction of the data for various parts of the total historical national accounts. These differences are of special importance when choosing deflation techniques. On the one hand, goods production and parts of service production—mainly transports and communications—are measured by prices and quantities; the series are of a $\sum pq$ type, which

[13]Åkerman (1939, 1944) and (1949). For a discussion of the structural approach compared to a neoclassical one, see Krantz (1987a).

[14]Gerschenkron (1962, p. 444).

[15]To a certain extent this division into deflation periods must be considered preliminary since new research, even the new historical national product series, can show a different picture from the one postulated here. So far, however, this has not occurred.

TABLE 1

DEFLATION PERIODS AND BASE YEARS

Deflation period	Base period
1800-1826	1800/02
1826-1848	1826/28
1848-1869	1848/50
1869-1888	1869/71
1888-1910	1888/90
1910-1929	1910/12
1929-1953	1929/31
1953-1980[a]	1953/55

[a]The last year is of course not chosen on the basis of structural economic criteria but on practical grounds.

make the deflation procedure a clear-cut one from a technical point of view. Price series are weighted together using quantity weights, and thereby, volume series are computed with the help of adequate deflators. In addition, this kind of series may be used, for example, in productivity measurement since output and inputs are measured separately.

On the other hand, for a large part of the service production, the measures are built up using costs of inputs since data on prices and/or quantities are non-existent. Labour costs are often the largest cost element, and therefore, production is usually measured as labour times remuneration plus some minor cost elements. Consequently, it is impossible to construct a wholly adequate deflator of a $\sum pq$ type, and deflation has to be made using some other techniques. Though the problem is well known an entirely satisfactory solution has not been reached. In studies of contemporary changes, indicators which are assumed to show the volume performances are sometimes used, e.g. number of patients in hospitals for medical care or number of students for higher education.[16] However, severe criticism can be levelled against such procedures, among others that quality changes are neglected. Besides, for historical series, it is difficult or even impossible to find sufficiently detailed indicators.

Cost-of-living indices have been used as deflators for this kind of series in historical national product computations, but it has not been shown that this deflator is adequate.[17] Mostly, the issue is not even discussed. The consequence of using a cost-of-living index in this context is a statement (usually implicit) that, since the current value series are mainly constructed as labour times remuneration, the productivity changes in the sector are similar to the changes in real wages. If this should actually be so, rather rigid theoretical preconditions have to be met.

In the new Swedish historical national accounts, the special features of the service production data has led to a deflation procedure where wage indices are

[16]See e.g. DsFi 1986, p. 13.

[17]Hansen (1974) and Johansson (1967).

used (except for transports and communications). This implies an assumption that the productivity changes in the sector can be neglected. The procedure employed is the same as the one applied in contemporary national accounts for government services.

It is, thus, accepted that the total production has two main segments with fundamentally different characteristics and with different construction of their production measures in current as well as in constant prices. From this it could be argued that they should not be put together in a national product total. On the other hand, there is a tight interdependence between the various parts of the entire economy. Further, total GDP is an often used and well established concept, but it is important to be aware of its weaknesses.

Some Findings

The growth pattern. According to the new national product series, the Swedish economic growth increased around the end of the 1840s after a long period with a very low rate. Thereafter, in a long-term perspective, an acceleration took place as seen in Table 2 where growth rates of GDP per capita between benchmark years are shown.[18] The choice of periods in this table is made on the basis of a pattern, established from the movements of many variables, such as those pertaining to capital formation, production and foreign trade.

TABLE 2

Growth Rates for the Swedish GDP *per capita* 1801-1980

1801/05-1846/50	0.4		
1846/50-1871/75	1.4	1846/50-1891/95	1.2
1871/75-1891/95	0.9		
1891/95-1906/10	1.9	1891/95-1926/30	1.5
1906/10-1926/30	1.2		
1926/30-1951/55	2.8	1926/30-1976/80	2.9[a]
1951/55-1971/75	3.5		
1841/45-1976/80	1.9		

[a]The growth rate for 1926/30-1971/75 is 3.1.

The three long periods discerned are characterized by successively higher growth rates. When the first halves of these periods are compared the same pattern is evident and this is true for the second halves as well. Within the first two periods, but not in the third, the second half had a slower growth than the first.[19]

[18]Data for parts of the goods production are still to a certain extent preliminary, but the main tendencies are quite clear. The GDP figures in Table 2 do not include unpaid household work, since they should be comparable with GDP data for other countries.

[19]If, on the other hand, the first "half" of the third period is extended some years, the earlier pattern shows up. The growth rate 1926/30-1961/65 is 3.0 percent and 1961/65-1976/80 2.5. As hinted on in the text, GDP growth rates are not the only criteria for the choice of periods for the Swedish economic performance. Many variables and indicators point in a similar direction, some of them also to a boundary in the beginning of the 1960s. See further Krantz/Schön (1983) and Krantz (1987a).

These periods correspond roughly to the chronology of the so-called Kondratieff waves in the economic development of the industrialized economies; the first one according to van Duijn being 1845–92, the second one 1892–1948 and the third one from 1948 onwards.[20] Slightly different chronologies have also appeared, and one of the discrepancies from the van Duijn chronology is that the boundary between the second and the third wave is often fixed at 1939.[21]

A distinction between the general Kondratieff chronology and the Swedish one concerns the boundaries around WWII, 1939 or 1948 for the former and the beginning of the 1930s for the latter. This could be due to the different industrial structures between the European continent, including the United Kingdom, and Sweden. In the former case there were severe growth problems during the interwar period combining slow technological change and strong vested interests in many industrial branches, especially in the iron and steel industry and in energy production.[22] This economic sclerosis could have contributed to a prolongation of the second phase of the long wave. Structural rigidities also affected Sweden in the 1920s, but not to the same extent as the areas mentioned. Thus, a renewal of the structure could gain momentum earlier than on the continent. A contributing factor to the different economic performances could also be that Sweden was a non-belligerent in the two World Wars.

Sectoral changes. The long-run changes in the sectoral composition is shown in Table 3. This comprises data in current prices only since, as mentioned earlier, the construction of the data differ between goods and services. Productivity changes are implied in the measures of goods production but not, by definition, in those of a large part of the services.

The main features in the view given by conventionally defined data, i.e. those excluding unpaid domestic work, are well-known from all countries which have gone through an industrialization process. The share of agriculture with ancilleries went down, slowly at first and then, from the second half of the 19th century, at an accelerating pace, and manufacturing increased relatively up to to the 1960s. The services share behave in a more irregular fashion than the other two, but there seems to be a downward tendency during the 19th century and an upward one in the 20th.

In the main, the tendencies are the same when unpaid domestic services are included, but the levels are different. In the beginning of the period, the service share is more than 10 percentage points higher than the corresponding share conventionally defined, and in the end the difference is about 3 percentage points. As a consequence, the service share is higher in the beginning than in the end of the period.

The share of the service sector in the second half of the 19th century is approximately 40–45 percent of the total GDP. This share does not diverge very much from the one in the earlier estimates of the Swedish historical national product. The likelihood of the production in these sectors being almost half of the total during this period has been questioned: "Unfortunately, no studies have

[20]van Duijn (1983, p. 143).
[21]See for instance Rostow (1978, pp. 111ff), and Mensch (1977, p. 48).
[22]Svennilson (1954).

TABLE 3

PERCENTAGE SHARES OF TOTAL PRODUCTION IN CURRENT PRICES 1800–1980

	Agriculture	Manufacturing	Services
	A. Exclusive of unpaid household work		
1801/09	40	14	46
1831/39	41	15	44
1851/59	39	22	39
1871/79	37	24	39
1891/99	30	28	42
1911/19	26	34	40[a]
1931/39	15	39	46
1951/59	11	46	43
1971/79	4	43	53
	B. Inclusive of unpaid household work		
1801/09	30	11	59
1831/39	31	12	57
1851/59	30	16	54
1871/79	29	19	52
1891/99	24	24	52
1911/19	22	29	49[a]
1931/39	13	34	53
1951/59	9	42	49
1971/79	4	40	56

[a]It could be suspected that the figures for 1911/19 were affected by the conditions created by WWI. This, however, does not seem to have been the case when the shares for 1906/1914 are compared:

Exclusive of unpaid household work:			
1906/14	25	33	42
1911/19	26	34	40
Inclusive of unpaid household work:			
1906/14	21	28	51
1911/19	22	29	49

been made, which can give an explanation to this large share and its very small changes during the last hundred years."[23]

A comparison with the shares for some other countries shows, however, that the Swedish share can hardly be considered extremely high in the second half of the 19th century (Table 4). This seems to be a firm conclusion even if the comparability of the GDP data is far from perfect, due to differences in definitions as well as in the quality of the data.

Further, if the composition of the service sector is taken into consideration, it does not seem unreasonable that the changes in its share of the total GDP were small. To show this, a division of the service production into four categories can be applied.[24] The first category consists of "new" services, i.e. services which have expanded recently. In the second category services complementary to production in manufacturing and other goods production branches are included, i.e.

[23]Jörberg (1984, p. 12).

[24]This division resembles the one suggested by Katouzian (1970), but he uses only three categories.

TABLE 4

SERVICE PRODUCTION SHARES OF TOTAL GDP IN CURRENT PRICES AROUND 1870 AND 1900

	Circa 1860-70	Circa 1900-10
Australia	47	44
Canada	24	39
Denmark	33	43
France	28	28
Germany	44	43
Italy	25	31
Japan	21	36
Norway	45	50
Sweden	39	41
U.K.	44	54
U.S.A.	47	48
Arithmetic average	36	42

Source: Kuznets (1966), Table 3.1, pp. 88ff. For Denmark, Hansen (1974) has been used and for Sweden, the new historical GDP computations.

goods-related services. Services complementary to the social life and process in general, i.e. society-related services, constitute the third category. The fourth category, consists of "old" services, i.e. services which are presumed to have been more important before industrialisation than later. It is not without problems to make such a classification of the service branches, but even if it can not be perfect and clear-cut, the main tendencies are laid bare.

The production in the transport sector as a whole is classified as goods related services. Perhaps an exception should have been made for part of the passenger transports which could be considered as belonging to category 1, but no regard has been paid to this because the share is not very large.

Public production of services for personal use, i.e. education, medical and social care etc., are included in the first category. In practise these are mostly produced by local authorities in Sweden. Consequently, for the sake of convenience, all the production performed by these authorities is considered as services for personal use. The other part of the public production includes administration, maintenance of law and order etc. and is assumed to be complementary to the social change, i.e. consisting of society-related services. Consequently, this production constitutes the third category. This type of production is partly very old, but irrespective of social regime it can be seen as complementary. An interesting question here is whether it has gained in importance as the society grew more complex as a consequence of the industrialization. All the service production performed by the Swedish central government is considered as part of the third category. This division of the publicly produced services is open to criticism since the central government also produces services for private use and the local authorities also produce infrastructural services. However, these parts can be assumed to cancel out.

Domestic work and religious services—both privately and publicly produced—are assigned to the fourth category, "old" services. Trade, banking and insurance, legal services, and the production in hotels and restaurants are included

in the second category, goods-related services. This could also to a certain extent be questioned, since, for instance, part of the hotel and restaurant services are used privately with no immediate connection to industrialization, but this part is rather small. Finally, medical care produced by private producers, dental services, entertainment of various kinds etc. are assigned to the first category.

When this classification is used, shares of the Swedish service production excluding and including household work are arrived at and are shown in Table 5. The data excluding unpaid domestic services show that the share of goods-related services increased from the middle of the 19th century and culminated in the second decade of the 20th century. Then a decrease started which accelerated during the last decades of the period. On the other hand, society-related services seem to have been relatively stable. A small decrease in the 19th century was followed by a small increase in the 20th. The shares for category 1 were small up to the end of the 19th century. Then an increase began, which accelerated

TABLE 5

PERCENTAGE SHARES FOR FOUR CATEGORIES OF THE TOTAL SERVICE PRODUCTION IN SWEDEN 1800-1980. CURRENT PRICES

	Category 1 "New" Services		Category 2 Goods-related Services		Category 3 Society-related Services		Category 4 "Old" Services	
	E	I	E	I	E	I	E	I
1801/09	2	1	58	28	13	6	27	65
1831/39	2	1	59	28	13	6	26	65
1851/59	3	2	63	30	10	5	24	63
1871/79	4	2	68	35	10	5	18	58
1891/99	7	4	72	42	9	5	12	49
1911/19	8	5	76	49	8	5	8	41
1931/39	14	10	71	52	9	6	6	32
1951/59	19	14	68	53	11	8	2	24
1971/79	30	26	60	51	10	9	1	15

Note: E = Excluding, I = Including unpaid domestic services.

during the last fifty years of the period. The fourth category did not change much during the first half of the 19th century, but then a steady decrease started, roughly coinciding with the distinct acceleration of the economic growth process in Sweden. Some of the tendencies described here were the same irrespective of inclusion or exclusion of unpaid domestic work. A difference, however, is than when data inclusive of unpaid domestic work are used there is no culmination of the goods-related services share in the 1910s followed by a decrease. The changes were rather small from that time onwards.

From these data it can be inferred that the small changes shown by the share of services of total production during the period from 1800 were not unreasonable, or an effect of inadequacies in the underlying data material. Instead they are results of fundamental structural changes.

International comparisons. A common opinion about Sweden around the middle of the 19th century is that she was a relatively poor country measured by

GDP *per capita*. She is even said to have been one of the poorest countries in Europe around the middle of the century, with only Russia and Finland showing as low or lower *per capita* incomes. Then, in the latter half of the 19th century, a very rapid economic growth started in Sweden, the rate being one of the highest of all countries up to WWI.[25]

If the figures for Sweden used in earlier comparisons of growth rates and *per capita* GDP levels are replaced by data from the new GDP calculations another conclusion must be drawn. The growth rates given by Maddison are shown in Table 6 together with those from the new Swedish computations.[26]

The new Swedish rate of growth for the latter part of the 19th century is not as impressive as the old one.[27] It is near the average for the sixteen countries.

TABLE 6

ANNUAL PERCENTAGE GROWTH OF GDP *PER CAPITA* IN CONSTANT PRICES 1820-1979

Country	1820-70	1870-1913	1913-50	1950-73	1973-79	1820-1979
Australia	—	0.6	0.7	2.5	1.3	—
Austria	0.7	1.5	0.2	5.0	3.1	1.5
Belgium	1.9	1.0	0.7	3.6	2.1	1.7
Canada	—	2.0	1.3	3.0	2.1	—
Denmark	0.9	1.6	1.5	3.3	1.8	1.6
Finland	—	1.7	1.7	4.2	2.0	—
France	1.0	1.5	1.0	4.1	2.6	1.6
Germany	1.1	1.6	0.7	5.0	2.6	1.8
Italy	—	0.8	0.7	4.8	2.0	—
Japan	0.0	1.5	0.5	8.4	3.0	1.8
Norway	1.0	1.3	2.1	3.1	3.9	1.8
Netherlands	1.5	0.9	1.1	3.5	1.7	1.5
Switzerland	1.7	1.2	1.5	3.1	−0.2	1.6
Sweden	0.7	1.5	2.1	3.3	0.8	1.6
U.K.	1.5	1.0	0.9	2.5	1.3	1.4
U.S.A.	1.4	2.0	1.6	2.2	1.9	1.8
Arithmetic average	1.1	1.4	1.1	3.9	2.0	1.6
Standard deviation	0.52	0.41	0.57	1.49	0.96	0.14
Coefficient of variation	0.47	0.29	0.51	0.38	0.48	0.09

Note: 1. The growth figures for Sweden according to the earlier computations are respectively 0.6, 2.1, 2.2, 3.1, 1.5 and 1.8. 11. The arithmetic averages are approximately the same if the old or the new growth figures for Sweden are used.

Source: Maddison (1982, p. 44), and the new GDP calculations for Sweden.

[25]Bairoch (1976) and Crafts (1983) give figures for Sweden that are lower than the ones contained in Maddison (1982). It should be added that Bairoch uses data from Johansson (1967) and Maddison and Crafts from Krantz/Nilsson (1975). According to Bairoch and Crafts, even Finland should have had a higher *per capita* income than Sweden in the middle of the 19th century.

On the basis of Bairoch's data, Sandberg (1978 and 1979) has developed a very elegant theory on Sweden's economic history during the 19th century, according to which it is paradoxical that Sweden had very advanced institutions at the same time as she was extremely poor. Since she was not impoverished according to the new data, the paradox evaporates.

[26]The Swedish data in Tables 6 and 7 do not, of course, include unpaid domestic work.

[27]The index 1870 with 1913 = 100 is 31 when Johansson's (1967) data are used, 42 according to Krantz/Nilsson's (1975) data and 54 with the new data.

On the other hand, the first half of the 20th century still appears as a period with a high growth rate in a comparative perspective. Then, as mentioned above, Sweden's problems with old technology and strong vested interests were less severe than those of the countries on the European continent and the U.K. It is now more evident than before that it was during this period that Sweden joined the group of countries with the highest welfare in the world.

The changes in the rate of growth imply that the income *per capita* in absolute terms in the 19th century were not as low as the earlier estimates indicated. Maddison's data and the new figures for Sweden are shown in Table 7, where it can be seen that the Swedish *per capita* income level is approximately the same as Germany's and other countries'.

TABLE 7

GDP *PER CAPITA* AT 1970 U.S. PRICES, 1870 AND 1979

	1870	1979	Coefficient of Multiplication
Australia	1,393	4,466	3.2
Austria	573	4,255	7.4
Belgium	925	4,986	5.4
Canada	619	5,361	8.7
Denmark	572	4,483	7.8
Finland	384	4,287	11.1
France	627	4,981	7.9
Germany	535	4,946	9.2
Italy	593	3,577	6.0
Japan	251	4,419	17.6
Netherlands	831	4,396	5.3
Norway	489	4,760	9.7
Sweden	550	4,908	8.9
Switzerland	786	4,491	5.7
U.K.	972	3,981	4.1
U.S.A.	764	6,055	7.9
Arithmetric average	671-680	4,647	6.9

Note: The figures for Sweden according to the earlier GDP computations are respectively 415, 4,908, 11.8.

Source: Maddison (1982, Table 1.4, p. 8), and the new GDP calculations for Sweden.

CONCLUDING COMMENTS

Taking into account the margins of error of the GDP calculations for all countries, the international comparisons made here would have us conclude that the level of economic development in Europe in the middle of the 19th century consisted of three broad groups of countries. A high income group is comprised of the U.K., The Netherlands and Belgium. A middle income group is the remaining western Europe countries, including Scandinavia (but perhaps excluding the Iberian countries). A third, low-income group, is formed by the Eastern and South-Eastern European countries and possibly Finland.

This grouping of the countries is based on average *per capita* incomes for the entire countries, but there are high-income and low-income regions within the respective countries and thus within the geographical areas of the respective groups. It would certainly be rewarding to study the interaction and competition among these regions. A better comprehension of the process of economic growth and industrialization on a national and an international level could be reached and the differences in per capita incomes between countries and country groups could be understood if such a study were made.[28]

The GDP estimates are, however, not perfect and a lot of work is required to improve the quality of these series for the various countries.[29] This is also important because the estimates constitute a starting point for an analysis of the regional issues. A disaggregation of the historical national accounts into regional series is a complicated matter, but it might be the next step in the study of economic growth in a comparative perspective.

References

Åkerman, J., *Ekonomisk teori* I-II (*Economic Theory* I-II), Lund, 1939, 1944.

———, Strukturgränser i Svensk Ekonomi (Structural Watersheds in the Swedish Economy), *Ekonomisk tidskrift* (*Swedish Economic Journal*), 1, 1949.

Bairoch, P., Europe's Gross National Product: 1800-1975, *Journal of European Economic History*, 2, 1976.

Carlsson, B., Bagge, Lindahl och nationalinkomsten. Om National Income of Sweden 1861-1930 (Bagge, Lindahl and the National Income. On National Income of Sweden 1861-1930), *Meddelande från Ekonomisk-historiska institutionen, Lunds universitet*, Nr. 27, 1982.

Crafts, N. F. R., Gross National Product in Europe 1870-1910: Some New Estimates, *Explorations in Economic History*, October 1983.

Ds Fi, 1986:13. *Offentliga tjänster—sökarljus mot produktivitet och användare* (*Public Services—Searchlight on Productivity and Users*).

van Duijn, J. J., *The Long Wave in Economic Life*, London, 1983.

Gershenkron, A., Problems in Measuring Long-term Growth in Income and Wealth, in *Economic Backwardness in Historical Perspective*, Praeger. New York, 1962.

Hansen, S-Aa., *Økonomisk Vaekst i Danmark* (*Economic Growth in Denmark*), II: 1914-1970, Copenhagen, 1974.

Johansson, Ö., *The Gross Domestic Product of Sweden and its Composition 1861-1955*, Uppsala, 1967.

Jörberg, L., Den svenska ekonomiska utvecklingen 1861-1983 (The Swedish Economic Development 1861-1983), *Meddelande från Ekonomisk-historiska institutionen, Lunds universitet*, Nr. 33, 1984.

Katouzian, M. A., The Development of the Service Sector: A New Approach, *Oxford Economic Papers* 3, 1970.

Kendrick, J. W., National Income and Product Accounts, *International Encyclopedia of the Social Sciences*, Vol. II, 1968.

Krantz, O., Historical National Accounts—Some Methodological Notes, *Scandinavian Economic History Review*, 2, 1983.

———, *Historiska nationalräkenskaper för Sverige. Transporter och kommunikationer 1800-1980* (*Historical National Accounts for Sweden. Transports and Communication 1800-1980*), Lund, 1986.

———, *Utrikeshandel, ekonomisk tillväxt och strukturförändring efter 1850* (*Foreign Trade, Economic Growth and Structural Change from 1850*), Lund, 1987a.

[28]See Pollard (1973), where similar opinions are expressed.

[29]This is also the plea that O'Brien (1986) makes in his article on European economic history: "Like the continent's wine European economic history displays endless and interesting possibilities. As practised in the late XXth century the craft might be distinguished into three basic varieties: The heavy clarets of scholarly surveys, the bubbly champagne of studies purporting to test grand theories of economic development and dry whites of an inductive statistical approach. European economic history seems to have reached a stage where it is necessary to allocate more resources to the production of good dry whites" (p. 333).

———, *Historiska nationalräkenskaper för Sverige. Offentlig verksamhet 1800–1980* (*Historical National Accounts for Sweden. Public Services Production 1800–1980*), Lund, 1987b.
———, *Historiska nationalräkenskaper för Sverige. Husligt arbete 1800–1980* (*Historical National Accounts for Sweden. Domestic Work 1800–1980*), Lund, 1987c.
Krantz, O. and Nilsson, C-A., *Swedish National Product 1861–1970. New Aspects on Methods and Measurement*, Lund, 1975.
Krantz, O. and Schön, L., Den svenska krisen i långsiktigt perspektiv (The Swedish Economic Crisis in a Long-Run Perspective), *Ekonomisk debatt*, 7, 1983.
Kuznets, S., *Modern Economic Growth. Rate, Structure and Speed*, Yale University Press, New Haven, 1966.
Lindahl, E., Dahlgren, E., and Kock, K., *National Income of Sweden 1861–1930*, I–II, London, 1937.
Lindahl, O., Sveriges nationalprodukt 1861–1951 (Sweden's National Product 1861–1951), *Meddelanden från Konjunkturinstitutet*, Serie B, 20, Stockholm, 1956.
Ljungberg, J., *Historiska nationalräkenskaper för Sverige: Deflatorer för varuproduktionen 1888–1955*, (*Historical National Accounts for Sweden: Deflators for Goods Production 1888–1955*), Lund, 1987.
Maddison, A., *Phases of Capitalist Development*, Oxford University Press, Oxford, 1982.
Mensch, G., *Das Technologische Patt*, Fisher Taschenbuch Verlag, 1977.
Myrdal, G., "Tillväxt" och "utveckling," in *I stället för memoarer. kritiska essäer om nationalekonomi* ("Growth" and "Development," in *Instead of Memoirs, Critical Essays on Economics*), Prisma, Stockholm, 1973).
O'Brien, P. K., Do We Have a Typology for the Study of European Industrialization in the XIXth Century? *The Journal of European Economic History*, 2, 1986.
Ohlsson, I., *On National Accounting*, Stockholm, 1953.
Pettersson, L., *Historiska nationalräkenskaper för Sverige. Byggnads- och anläggningsverksamhet 1800–1980* (*Historical National Accounts for Sweden. Building and Construction 1800–1980*), Lund, 1987.
Pollard, S., Industrialization and the European Economy, *Economic History Review*, 4, 1973.
Rostow, W. W., *The World Economy*, MacMillan, 1978.
Sandberg, L., Banking and Economic Growth in Sweden before World War I, *Journal of Economic History*, 3, 1978.
———, The Case of the Impoverished Sophisticate: Human Capital and Swedish Economic Growth before World War I, *Journal of Economic History*, 1, 1979.
Schön, L., *Historiska nationalräkenskaper för Sverige. Industri och hantverk 1800–1980* (*Historical National Accounts for Sweden. Manufacturing Industry and Handicrafts 1800–1980*), Lund, 1988.
Svennilson, I., *Growth and Stagnation in the European Economy*, UN, Geneva, 1954.