Comparative Studies of Sami and Norwegian local Communities in the early Seventeenth Century: Selected regression results

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1. Introduction

It is commonly understood that the hunting culture was the oldest Sami culture north of the Arctic Circle and thus that Sami economic activity was concentrated on hunting and fishing as part of a semi-nomadic life characterised by migration between seasonal settlements within the *siida* areas. [1] The relative importance of the specific economic resources has varied with place and time. However, it is generally agreed that during the earlier stage, wild reindeer were a particulary important prey. In addition to these, inland and coastal fishing were essential. It is further accepted that the hunting culture developed into various culture types characterised by special Sami economic and settlement forms. The nomadic tradition, where the Sami based their whole economic life on the domesticated reindeer herd, is one of the develpments. Transition to permanent cultivation is another. In the Northern Norwegian coastal regions the Sami permanent settlement had to be based on the combination of agriculture and sea fishing which was typical for the Norwegian population.

While it is considered that the nomadic tradition was in expansion from about 1600, one is inclined to believe that the development of the permanent Sea Sami settlements on the coast of Northern Norway was a long process influenced by the Norwegian peasant-fisherman culture.

The movement towards Norwegian culture can be assumed to have been occurring during the Middle Ages. It seems that it has moved from the south to the north along the Northern Norwegian coast. [2] Among the major problems connected with research into the early history of coastal Sami are the very restricted sources before 1600, something which is also true of studies of the Norwegian

[1] The Sami are the Scandinavian people formerly known as the Lapps.

[2] The hunting/fishing culture is described among others by: TANNER: Antropogeografiska studier inom Petsamo-området. Helsingfors 1929. VORREN, ØRNULV: Lappish settlement in the Arctic Region, the Use of Land and resources in Ecological Terms. The History of Northern Scandinavia: An Interdisciplinary Symposium, Umeå 1980.

settlement areas. Several Sea Sami settlements are found within the borders of the administrative district of Salten in Norland around 1600. It is characteristic that the Sami occupied the inner areas along the fiord, somewhat separated from the Norwegian settlements. Ofoten and Hamarøy, are examples of this tendency, with Sami settlements by the fiords of Skjomen and Sagfjord, and Norwegian settlements lying in the external area. [3]

Research results have shown that the North Norwegian local communities were influenced by the comprehensive agrarian crises resulting in population decline and abandoned farms which hit Norway in the late Middle Ages; [4] this also applies to Ofoten and Hamarøy. In these areas there are few signs of any growth in settlement before 1500. In the sixteenth century however, with the help of a few preserved tax lists, it is possible to detect a very strong growth, generally speaking to the level from before the crisis. Tax lists which register Sea Sami show a corresponding strong demographic growth in several villages in Salten, including Hamarøy and Ofoten, in the XVIth century. Whether and to what extent it represents the regaining of the previous level of population or new settlements is unclear. [5]

There are few written sources from the XVIth century and thus they give a poor basis for comparative studies of the Sami and Norwegian economy. At the beginning of the XVIIth century however, we find substantially more numerous sources on both Norwegian and Sami history. [6] A prime intention of this analysis has been to exploit this large source material to gain information about the economic adjustment of the Sami population. While an economy based on agriculture and fishing with production and trade relationships with the Northern European trade system is assumed to be characteristic for the Norwegian population, the comparison of variables from Norwegian and Sami local communities becomes a natural instrument for gaining insight into the adjustment of coastal Sami.

[3] See enclosed map. A survey of all Sea Sami settlements in the Salten district is to be found in: Stensland, Rolf Harald Økonomisk utvikling i norske og samiske bygder i første halvdel av det 17. århundre. Bodø 1987. pp. 10-12.

[4] Several local historical studies have examined the period of decline in the late Middle Ages in Northern Norwegian communities, for instance: Holtet, Turid Følling: Ødegarder i Gildeskål og Beisan ca. 1440-1660. Oslo 1971. Aarsæther, Ragnhild: Bosettinga i salten fjerding, Salten len, fra høymiddelalderen til ca. 1660. Tromsø 1979. Ellingsen, Harry: Bosettinga i Meløy fjerding fra høgmiddelaldern til ca. 1660. Tromsø 1979. Fossheim, Solbjørg Ellingsen: Bosettinga i Hadsel fra høgmiddealderen til ca. 1620. Tromsø 1980. Guttormsen, Helge: Ressurser og bosetning i Andenes len og Sortland fjerding ca. 1000-1660 e. Kr. f. Tromsø 1983.

[5] Stensland, op cit. 1979, pp. 161-186.

[6] A more comprehensive description of the sources use is to be found in my dissertations refered to above.

It seems to be of particular interest to investigate the extent of relationships with international trade. It is known that the Norwegian coastal population had already in the Middle Ages been part of the Hanseatic trade network as producers of stockfish for export and as importers of corn, an adjustment which is also characteristic for the XVIIth century even though the position of German suppliers in Bergen was then on the decline. [7] Less is known about the Sami economy which relates to the hunting culture theory and lack of sources from before ca. 1600. In the XVIIth century the sources are sufficient to form the basis of comparative studies of the Norwegian and Sami economies.

2. Sources and variables - further details

2.1. Tax lists

We will be concerned primarily with ethnically specific tax lists. The Norwegian authorities collected annually the leidang tax, a kind of poll tax on individuals who were most often male heads of households. The tax was payable in stockfish, and taxpayers can be divided into various tax classes. Leidang was collected from Norwegians and from Sea Sami but the two groups can be differentiated because they were entered separately for bookkeeping purposes. The lists are annual 1611/12-1636/37.

The application of leidang lists to variables treated in various ways can be proposed. If one chooses the number of taxpayers one can use the total number of taxpayers, one can aggregate some classes or exploit a single tax class. If a larger population were investigated focussing on the individual, aggregation of the data across the regional and ethnic boundaries should be considered.

On the basis of earlier research it is possible to understand the variationa in the number of taxpayers as resulting partly from demographic and partly economic grounds. [8] This means that the taxpayers are entered into the tax lists or disappear from them as a result of birth, death, in-or out-migration. Thus variation is of an economic character because the economic conditions influence demographically-based changes. Taxpayers are assumed to move between the tax classes, enter or leave the lists as a result of relatively simultaneous variations in living standard and hence variations in the ability to pay tax. It is reasonable to believe that influence of this kind is strongest in the lower tax classes where the material resources were weakest. It has already been pointed out that it

[7] Coldevin, Axel: Næringsliv og priser i Nordland 1700-1800. Bergen 1938. Helle, Knut: Bergen Bys historie Bd. I. Fossen, Anders Bjarne: Bergen Bys Historie, Bd. II. Bergen 1979.

[8] Stensland, op cit. 1987, pp. 85- 89.

could be interesting to compare different population groups as far as this aspect is concerned. [9] This may be done through the comparison of parts of or all the Sami taxpayers with the trends in the lowest tax class in the Norwegian group of taxpayers.

2.2 Tithes: Local corn tithe and fish tithe from Lofoten

Agriculture and fishery were two factors in the Northern Norwegian economy. There are statistics for a fjerding, a district where often both Norwegian and Sami lived, e.g. Hamarøy or Ofoten, for corn production, cattle and local fishing as annual total for the district. As regards the area under investigation it has been found reasonable to study the influence of local corn production on changes in the number of taxpayers.

Commercial fishing linked producers with the trade economy. In this connection participation in seasonal fishing outside the home village was an important factor for many in the local community. The Lofoten fishery was particulary important for the inhabitants of Salten. Easy access to arctic cod which reached Lofoten spawning places from the Barents Sea where it matured made the fishermen here inclined to visit the stations on the Lofotens from Røst in the west to Skrova in the east. The Lofoten fishing season took place in February and March. District accounts contain annual figures for the Crown third of the fish tithe from various parts of Lofoten, including Vågan and Skrova, the dominant producing areas in the Lofotens. [10]

The Lofoten catch was a major part of the fish delivered to Bergen for export. Import of corn in exchange was particularly important since local production of corn in the Northern regions could cover only a minor part of the demand. Variation in the size of the catch was of importance for the size of supply and hence for the standard of living and ability to pay taxes.

2.3 Corn import prices: Gdansk Prices

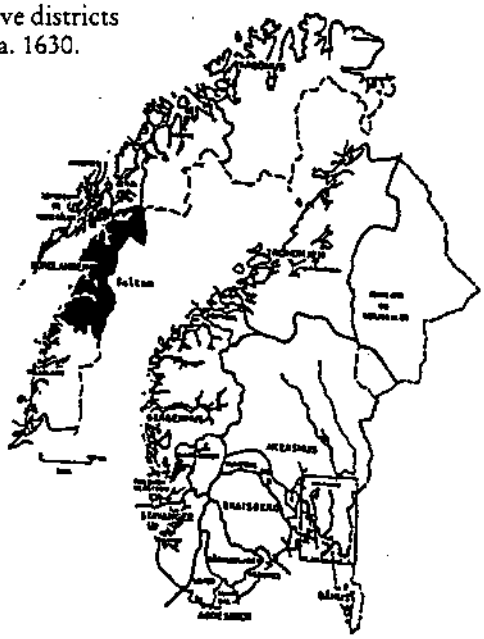
Prices of imported products were also an important factor for the satisfaction of demand, the standard of living and the ability to pay taxes. Generally speaking foreign price indices for corn during the early seventeenth century seem to show a high degree of co-variation. [11] Knowledge of the trading econ-

[9] Stensland, op cit. 1987, p. 6.

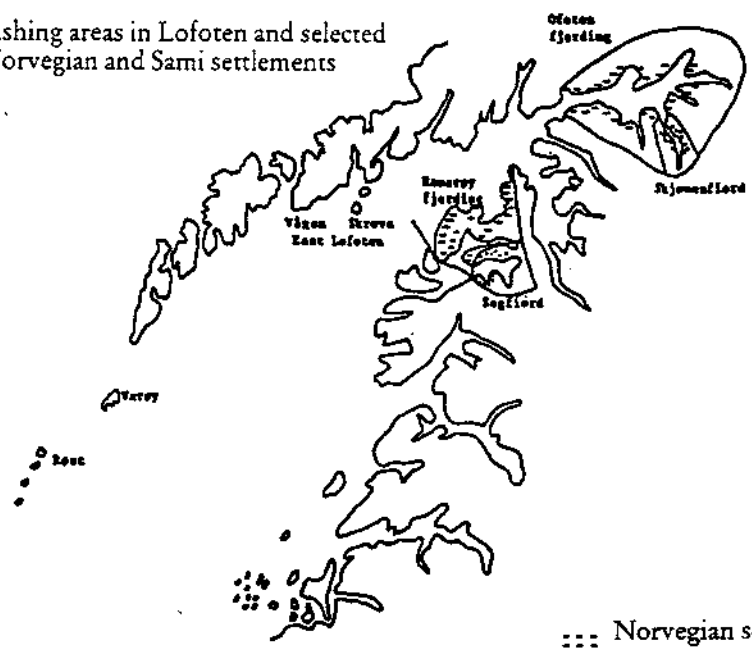
[10] Se enclosed map. Tithe statistics from Lofoten as found in Lindbekk, Kari: Lofoten og Vesterålens Historie 1500-1700, 1978, p. 278.

[11] Abel, Wilhelm: Agrarkrisen und Agrarkonjunktur. 1966, Tabellen.

Administrative districts
in Norway ca. 1630.



Fishing areas in Lofoten and selected
Norwegian and Sami settlements



::: Norwegian settlement
:::: Sami settlement

omy suggests that prices of corn coming through the Baltic ports from the corn producers inland should be of special interest.

Among the foreign price series which have been examined in this study, Gdansk prices offer the best results; the price series were taken from Pelc. [12] His study is part of the presentation of the city's price history from the sixteenth century to 1815. Municipal and hospital accounts are the main sources for the data from the seventeenth century. The sources provide detailed information on prices of corn and cereal products. Pelc lists quarterly prices of various goods, e.g. rye — maximum and minimum prices and estimated quarterly averages which in turn are the basis for annual averages.

3. Method

The source material forms the basis for comparison of poll tax lists, tithe figures and corn prices as time series of annual observations. Since we have exogenous variables encapulating important features of the coastal economy with which to model the ethnically specific endogenous variables, it was possible to use regression analysis in the study of comparative time series. The need for a precise instrument in this kind of investigation was the prime reason for applying regression.

The results of coefficient estimation of the models may be given in absolute figures. Comparison of the importance of the independent variables can be seen as a problem. It may be more appropriate here to use elasticities. Elasticity expresses the relationship between two relative changes and may be estimated in the following way:

$$El\ (y \text{ given } x_i) = (\text{mean}(x_i)/\text{mean}(y)).b_i$$

where: y - the dependent variable,

x_i - the i'th independent variable, and

b_i - the regression coefficient of the i'th independent variable.

In the model:

we obtain the following estimates:

$\hat{a}$ estimated constant,

[12] Pelc, Julian: CENY W GDANSKU W XVI WIEKU. Die preise in Danzig im XVI und XVII. Jahrhundert. LWOW 1937. pp. 48 and 155-173.

$\hat{y}_t$ numbers of taxpayers estimated on the basis of the exogenous variables for the selected population group, from among the Sami groups in Skjomen or Sagfjord or the lowest tax class for the Norwegian groups in Hamarøy or Ofoten, for year t,

b_1 estimated change in the number of taxpayers following a unit change in corn production for the corresponding fjerding equal to one barrel of corn about 71 kg. in the preceding year.,

b_2 estimated change in the number of taxpayers following a unit change in stockfish production for East Lofoten equal to one våg about 18.52 kg. in the preceding year,

b_3 estimated change in the number of taxpayers following a unit change in price of rye in Gdansk denominated in zloties in the preceding year.

$\hat{u}$ model residual variance, the variance in the number of taxpayers which remains unexplained after including the above three independent variables.

Here the price elasticity for the Sami population group in Sagfjord is taken as expressing the annual change in the number of Sami taxpayers in that associated with a unit change in corn prices in Gdansk.

Result

The regression study below is based partly on experience from earlier work and partly on follow-up research.

A comparative examination of the leidang as regional time series of annual sums of taxpayers from 18 Norwegian and Sami settlement areas in Salten was conducted by means of factor analysis. We thus discovered and described the main clusters in the 1600's time series for the different population groups. Hence we can continue theoretical and empirical with statistical modelling of the series for single areas. [13]

Factor analysis showed three development patterns in the 1600's poll tax material from areas in question. As far as the main development pattern is con-

[13] Stensland, Rolf Harald: Tax register data for the study of areas of Norwegian and Sami settlement. (summary) Studia Historca Septentrionalia 14:1. Rovaniemi 1987, and Stensland, op. cit. 1987 pp. 58-74 and 141-192.

cerned, the relationships which may be of interest are indicated by the correlation coefficients between the annual number of leidang payers for single areas. The times series for the Sami group has been correlated with the lowest tax class for the Norwegians within the same fjerding; in Hamarøy the coefficient estimate between the two groups is 0.71, while the corresponding figure for Ofoten is 0.70. We can see that there is a strong positive covariation between the series. For areas like Hamarøy and Ofoten the importance of a negative trend has been suggested. [14] This development seems to be characteristic for Salten and possibily of larger parts of the coast.

Looking at the depicted relationship in isolation one can see it as an expression of similarities in the economic and demographic development of the Sami and Norwegian population. This impression can be substantiated by examining the results of the estimated regression models for Hamarøy and Ofoten fjerding, shown in Tables 1 and 2. All of the independent variables have estimated coefficients with signs corresponding to reasonable expectations, and they are all significantly different from zero at at least the 5% level.

Table 1
HAMARØY FJERDING, ELASTICITIES AND COEFFICIENT ESTIMATE, T-VALUES:

Corn	East Lofoten production	Gdansk fish tithe	R2 rye price	DW	
Norwegian lowest tax class	0.22 (3.37)	0.26 (3.56)	−0.44 (=6.26)	76.2%	1.85
Sagfjord Sami taxpayers	0.20 (3.34)	0.15 (2.13)	−0.25 (=3.72)	55.7%	1.36

Table 2
OFOTEN FJERDING, ELASTICITIES AND COEFFICIENT ESTIMATE, T-VALUES:

Corn	East Lofoten production	Gdansk fish tithe	R2 rye price	DW	
Norwegian lowest tax class	0.29 (2.25)	0.53 (3.34)	−0.42 (−2.70)	55.5%	1.37
Sagfjord Sami taxpayers	0.08 (2.16)	0.08 (1.72)	−0.27 (−5.89)	69.7%	1.96

[14] Stensland, op cit. 1987, p. 87.

Regression results for Hamarøy show higher elasticities of production in Lofoten and for corn prices for the Norwegian group, compared with the Sami group in Sagfjord. It seems that the difference in corn price elasticity is more marked. An increase of 10% in the price of corn leads to a 4 - 5% fall in the number of Norwegian tax payers. Corn prices seem to be an important contribution to the understanding of variation in time series, which is reflected in the relatively high t-value, especially for the Norwegian group. The model for the Norwegian group has also a high percentage of explained variance. The Durbin-Watson statistic is close to 2 and thus gives an impression that the model's error term is free from autocorrelation. On the other hand the lower coefficient of determination and positive autocorrelation seem to characterise the model for the Sami group, partly because the effect of the Lofoten fishery and the international corn prices is weaker here. For Ofoten the picture differs somewhat. Here we also get lower elasticities for the Sami group, however, the connection to the market is quite clear through the Gdansk prices which seem to be very convincing. The model for Skjomen, in spite of small elasticities, comes out much better than that for the Norwegian group as far as percentage explanation and autocorrelation is concerned. It is more satisfactory than the model for the Sami group at Sagfjord in Hamaroy. The exogenous variables seem to be of great relevance for the description of variation in the number of tax payers in Skjomen although the depth of their influence is limited.

We can see that, even though fairly strong similarities between the demographic and economic variables for the Norwegian and Sami groups have been found, it is also possible to point out marked differences in the influence of key variables within the coastal economy. The relatively small elasticities can be seen as an expression of stronger resistance to the independent variables in the Sami group and hence smaller dependence on the types of economy they represent. This can suggest that the economic adjustment among the Sami was related to other economic factors to a relatively larger extent. One can assume that those types of economy led to resilience and dampened the fluctuations in the corn and fish production and corn prices more for the Sami than for the Norwegian population. This can be said about both Sagfjord and Skjomen. In the case of Sagfjord the relatively low percentage explanation and Durbin-Watson statistic contribute to this interpetation. In the case of Skjomen, the interpretation of the results depends more exclusively on the size of the elasticities. One could assume that the results for Sagfjord stem from an erroneous specification of the mathematical form of the model, but the good result of the Durbin-Watson statistic for Skjomen does not suggest this is the case (the two Sami groups are approximately equal in size. In spite of the important differences in the empirical results for the Norwegian and Sami population groups, they do confirm the relationship of the Sami minority group to the dominating adjustments in the coastal economy.