

Value added and household income: a regional perspective

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This article aims to examine the regional distribution of gross value added (GVA), and the regional distribution of household income (primary and disposable income). A main question is whether value added and household income follow the same pattern when it comes to the regional distribution. We will see that the regional distribution of value added depends, among other factors, upon the regions' composition of industries and workers' productivity. This is compared with the regional distribution of the income of households. We find that regions with a relatively high share of total GVA also have a relatively high share of total household income.

Introduction

The basis for this article is an earlier published document on the Norwegian regional accounts for 1993, Edvardsen (1998), and an article published in Statistics Norway's Weekly Bulletin, Sørensen (1998), on the regional distribution of household income. The calculations of income are based on the figures of the national accounts for 1993-1996. With the help of tax return accounts, data from the National Insurance Administration, and population figures, the income of households was regionalised. This regional distribution will be compared with the regional distribution of value added, as given in the regional accounts. The regional level is Statistics Norway's REGIN 2. For certain purposes this classification is accepted when reporting figures to Eurostat, and it is comparable to the NUTS2 classification.

The national accounts figures are not yet regionalised for any of the years after 1993. The analyses will therefore be limited to this particular accounting year. Even though the figures are not up-to-date, they may still be of interest, since they may provide important information on the allocation of certain measures of welfare.

Value added

In the national accounts the value added of an industry emerges as the difference between output and intermediate consumption. Value added is measured at basic prices, which is the amount the producer is left with after taxes are withdrawn and subsidies received. In other words: Value added may be viewed as the total result of the production process.

$$\begin{aligned} \text{Value added} &= \text{Output} - \text{Intermediate consumption} \\ &= \text{Compensation of employees} \\ &+ \text{Consumption of fixed capital} \\ &+ \text{Operating surplus} \\ &+ \text{net other taxes on production} \end{aligned}$$

Gross domestic product (GDP) emerges when the amount of total net product taxes (VAT, taxes on tobacco, etc.) is added to the value added of the different industries. A correction item is the FISIM, i.e. Financial Intermediate Services Indirectly Measured. FISIM is the interest margin of the financial institutions. It is not allocated to various uses, but is recorded as intermediate consumption, a convention that might be changed if international agreement is reached.

Gross domestic product is measured at purchasers' prices, and similarly for regional gross domestic product (RGDP). In the Norwegian regional accounts of 1993, net taxes on production and FISIM are allocated to the regions according to the region's total GVA. This implies that the regional distribution of value added and of gross domestic product is the same.

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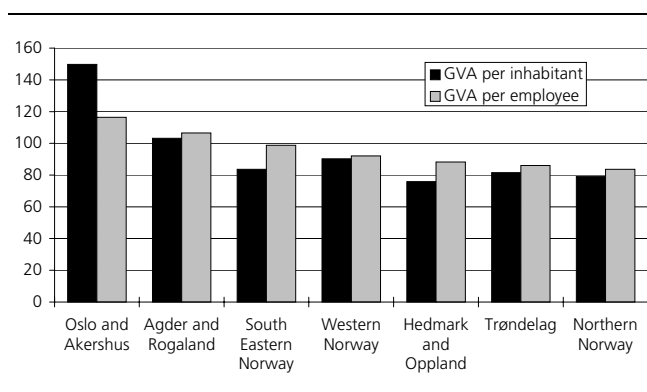
REGIN 2:

Region 1 - Oslo and Akershus	Oslo and Akershus
Region 2 - South Eastern Norway	Østfold, Buskerud, Vestfold and Telemark
Region 3 - Hedemark and Oppland	Hedemark and Oppland
Region 4 - Agder and Rogaland	Aust-Agder, Vest-Agder and Rogaland
Region 5 - Western Norway	Hordaland, Møre og Romsdal and Sogn og fjordane
Region 6 - Trøndelag	Sør-Trøndelag and Nord-Trøndelag
Region 7 - Northern Norway	Nordland, Troms and Finnmark

Table 1. Main results from the Norwegian Regional Accounts 1993. Ordinary regions

Region	Inhabitants	Employment (1000 persons)	Regional Gross Domestic Product (RGDP)	
			(mill. Nkr)	
The whole country	4 311 991	2025	722 527	
Oslo and Akershus	902 883	546	226 581	
South Eastern Norway	830 129	330	116 272	
Hedmark and Oppland	370 343	150	47 086	
Agder and Rogaland	595 362	271	102 985	
Vestlandet	765 190	352	115 723	
Trøndelag	382 125	170	52 182	
Nord-Norge	465 961	207	61 698	

	RGDP per inhabitant		RGDP per employee	
	Nkr per inhabitant	Index, the whole country =100	Nkr per employee	Index, the whole country=100
The whole country	167 562	100	356 856	100
Oslo and Akershus	250 953	150	415 288	116
South Eastern Norway	140 065	84	213 109	99
Hedmark and Oppland	127 142	76	86 301	88
Agder and Rogaland	172 979	103	188 755	106
Vestlandet	151 234	90	212 102	92
Trøndelag	136 558	81	95 641	86
Nord-Norge	132 410	79	113 083	84

Figure 1. GVA per inhabitant and per employee. Norwegian regions 1993. Index, the whole country, excluding the extra-region = 100

The figures for RGDP are shown in table 1.

In the regional accounts, employment is registered by place of work. Commuting will therefore result in a difference between GVA per capita and GVA per employee. This is why the index of GVA per employee is lower than the index per capita for Oslo and Akershus. For all the other regions the opposite is true. In spite of this, the capital region of Oslo and Akershus is 16 per cent above the country average in the index of GVA per employee.

The composition of industries

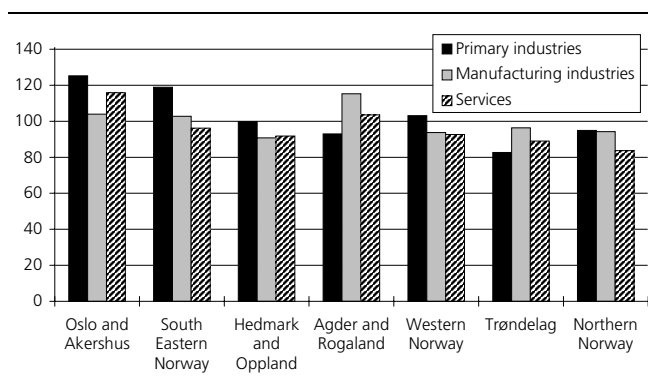
An employee's contribution to GVA depends, among other factors, on the degree of capital intensity in the industry, and the employee's own productivity. The contribution to GVA will be higher, the more capital the industry applies in its production. The extreme example is oil-related industries¹. In general, regions with a high concentration of capital-intensive industries have a high GVA per employee.

On average, a person employed in agricultural industries contributes Nkr 199 1000 to GVA, whereas a person employed in manufacturing industries contributes Nkr 346 600 to total GVA. A person employed in services contributes Nkr 319 900, on average. Such differences in structure can explain much of the variations in the regions' GVA per employee, since the industry mix differs between the regions.

Still, if we take such structural differences into account, some differences in the regions' GVA per employee remain. Such differences may roughly be viewed as regional differences in employees' productivity. Figure 2 shows indices per employee in the main economic activities. The whole country is set 100.

1 The main activities connected to oil and gas extraction on the Norwegian Continental Shelf are allocated to a constructed extra-region. The extra-region also cover the activity on Svalbard, Jan Mayen, and other activity abroad.

Figure 2. GVA per employee in main activities. Norwegian regions 1993. Index, the whole country = 100



Altogether we see that it is only Trøndelag and Northern Norway that do not exceed the country average for at least one of the main industries.

Public production of most importance in Northern Norway

Not only the composition of industries varies from region to region. Also the share of total production and GVA that are produced by the government varies. Each region's total GVA may be divided by category. We then distinguish between production for own final use, market production and non-market production of non-profit institutions serving households, non-market production of local government, and non-market production of central government.

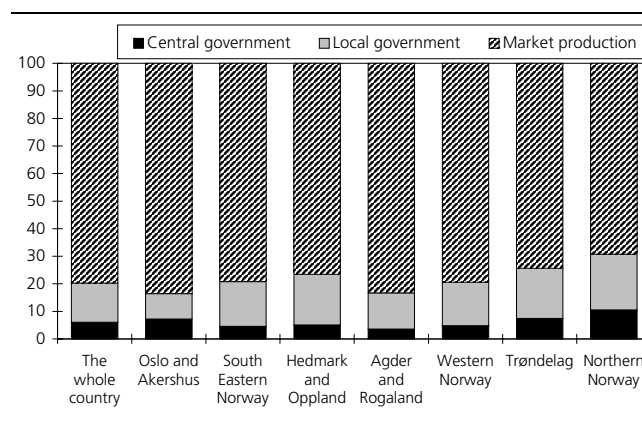
Water supply and public sewage and refuse disposal services are considered market production. Production for own final use is mainly the production of housing services, but also the value of own production such as hunting and fishing for own use, etc., are included.

The production of housing services for owner-occupiers is imputed in the national accounts. The imputed services are estimated from market rents paid by tenants for comparable dwellings. The non-market production of local and central government is valued by the product costs: the sum of employment costs, intermediate production, capital consumption and net taxes. The operating surplus is assumed to be zero (non-profit). Figure 3 illustrates the importance of the government sector for the regions' total GVA. As a simplification, "market production" refers to the sum of the categories market production and non-market production of non-profit institutions serving households and production for own final use.

Measured this way, the central government contributes 6 per cent to total GVA, excluding the extra-region. Local government has 14 per cent of total GVA; while the remaining 80 per cent is classified as "market production".

The various regions deviate from this average, particularly the northern region. Central and local government contri-

Figure 3. The composition of GVA. Norwegian regions 1993



bute 30 per cent of total GVA in Northern Norway. For Oslo and Akershus is the corresponding share 16 per cent, as for Agder and Rogaland. This is in contrast to the fact that central government is highly centralised in the capital area, and in the oil districts of Agder and Rogaland.

Highest income in Oslo and Akershus

Earlier calculations of household income revealed that Oslo and Akershus in the period 1993-1996 had a relatively large share of household disposable income compared with the share of total population. For 1993, which is the year of primary interest here, Oslo/Akershus was the only region above the country average for disposable income. Measured per inhabitant we find South-Eastern Norway, Agder and Rogaland and Western Norway just below the country average. The lowest levels for household disposable income were found for Trøndelag, Hedmark and Oppland and for Northern Norway. The variations in disposable income are primarily due to the regional variations in primary income. Earned income accounts for approximately 80-85 per cent of households' total income, and measured per employee, earned income varies between the different industries. This implies that the primary income of households reflects one side of the regions' economic base.

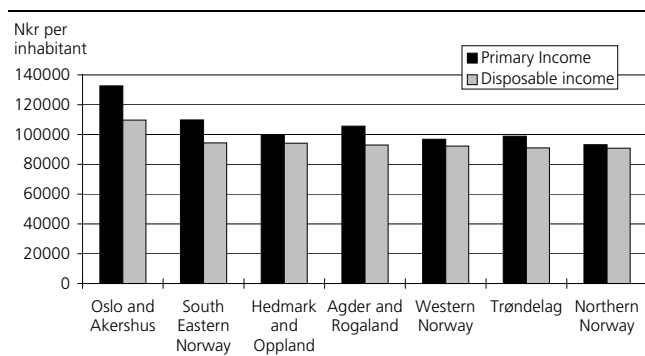
The primary income of households also covers property income received minus property income payable by resident households. For the year 1996, Oslo and Akershus and Western Norway were the only regions with positive net property income. In the period 1993-1996, interest rates declined in Norway, and this has reduced interest costs payable for households in all regions. For Oslo and Akershus, the decline in interest rates had a larger effect in this region because households had relatively more debt than households had in other regions. None of the regions had positive net property income for households in 1993.

The change in the method for calculating the operating surplus from housing services (see separate box) had some, albeit small impact on the figures. The mid-region of Hedmark and Oppland and Trøndelag are still found on the

Table 2. The income of households 1993, per inhabitant and per person over the age of 17. Index, the whole country = 100

	Per inhabitant		
	Primary income	Disposable income	Property income
The whole country	100	100	100
Oslo and Akershus	123	114	127
South Eastern Norway	92	98	92
Hedmark and Oppland	86	94	92
Agder and Rogaland	102	98	97
Vestlandet	98	96	96
Trøndelag	91	94	94
Nord-Norge	90	96	85

	Per person over the age of 17	
	Primary income	Disposable income
The whole country	100	100
Oslo and Akershus	121	112
South Eastern Norway	91	96
Hedmark and Oppland	84	92
Agder and Rogaland	105	102
Vestlandet	99	98
Trøndelag	92	95
Nord-Norge	90	96

Figure 4. Income of households. Norwegian regions 1993. Nkr per inhabitant

bottom list of well-off regions, measured by income. Whereas Trøndelag in the earlier calculations was found to have the lowest disposable income by person, it is now Hedmark and Oppland. The highest figures are still found for the capital region of Oslo and Akershus. The oil-related-region of Agder and Rogaland comes next.

Table 2 shows indices for the household income with the whole country set at 100. There are indices per person, and per person over the age of 17; regional differences in the age structure are the main explanation for differences in these groups. Regions with relatively many young people, under the age of 17 have a higher index for household income per person over the age of 17, than the index per person.

The primary income of households may illustrate households' own ability to produce income, while the regional allocation of disposable income gives the result after taxes are paid and transfers received. The regional distribution of disposable income may, in other words, be viewed as a policy output. When comparing the indices in table 2, we see that the ranking between the different regions may vary some, with the exception of the regions of Oslo and Rogaland where we find the highest indices. Looking at the distribution of household income per person over the age of 17, we find that these regions are the only ones above the country average.

In general we find the gap between the highest and the lowest index score smallest for disposable income. The maximum gap between highest and lowest score is found for property income. In other words, property income is more centralised than other types of household income.

Conclusions

Regions' contribution to total gross value added depends, among other factors, on the economic base of a region, and the region's comparative advantages: The productivity of its employees, and the stock of capital. In general, industries that are capital-intensive in production contribute more to the total value added of the country than industries that require less capital in their production. Differences in the indices for value added per employee may roughly illustrate differences in the workers' productivity. By this measure industries in agriculture are most efficient in

Regional accounts

Regional accounts are a regional specification of the corresponding national accounts. The first regionalisation of the national accounts was for the accounting year 1965, and it was carried out in 1970. Since then regional accounts have been drawn up for the accounting years 1973, 1976, 1980, 1983, 1986, 1990, 1992 and 1993. In 1995 the main revision of the Norwegian national accounts was finished, and the methods recommended in ESA 1995 adopted. The regional accounts of 1992 and 1993 were compiled on the basis of the revised figures.

The regional accounts are compiled with the help of a system of distribution keys, which allocate the flows of the total economy to the regions. As a basis for such distribution keys, industry-related statistics are used as far as possible. If such statistics were not available, certain simplifications were made e.g. the use of indicators, as closely related to the desired variable as possible, to distribute production etc. to the regions. If there are no data for intermediate consumption, it is allocated proportionately with production.

The general principle for location, "the residence principle", is that all production and intermediate consumption should be allocated to the region where the producer is resident. If a firm has local kinds of activity units (LKAUs) in different regions, the value added should be allocated to the region where the LKAU is resident. The same principle is applied to the allocation of gross fixed capital formation (GFCF): Allocation to the region where the investment takes place.

For most industries the application of the residence principle gives an unambiguous regional distribution. There are some exceptions, however, where the practical implementation of the principle may be discussed. We will below briefly discuss how the residence principle is taken into account for some of these exceptions. For more information on the Norwegian regional accounts of 1993, see Edvardsen (1998).

Fishing

Regionalisation of the production activity is not obvious when it comes to fishing, since the activity takes place on the continental shelf outside the ordinary counties. At county-level the place of landing the fish may often differ from the resident location of the fishing vessel. We have

allocated according to the registered county of the vessels. In this way the residence principle as stated above is followed. The problem is of less importance on the regional level in which we are operating, with the 19 ordinary counties adding up to 7 regions.

Construction

Due to the temporary nature of the construction sites, the registration in Statistics Norway's central register of establishments may be insufficient. To allocate the production etc. according to the residence principle a two-step method is applied: Production is, in the first step, allocated in accordance with the information in the central register of establishments. Gross fixed capital investments are in the same step calculated for all industries. In step two we impute a special commodity which redistributes the production according to where it actually was used, as given by the GFCF figures.

Transport

The location of the production may be considered rather difficult for transport industries. For air-traffic and railway transport the GVA is allocated to the regions with the help of traffic indicators and wage shares. We consider this to be in accordance with the ESA principles. For ocean transport the ESA principles state that the GVA should be allocated to the regions where the main harbour is located. When such a main harbour is not found within any of the inland regions, the GVA should be allocated according to wage shares. This pattern has been followed in the Norwegian regional accounts of 1993. As a result, the capital county Oslo has a large share of the total production, intermediate production and employment in these industries.

Hydropower

In the main revision of the national accounts, the hydro-power industry was divided in two: Production and distribution of electricity. For the regional accounts of 1992 and 1993 the allocation has followed the same pattern. Production of electricity has been allocated to the regions according to the production sites, while the distribution was allocated according to wage shares.

South Eastern Norway. Agder and Rogaland have the highest indices for value added per employee in manufacturing, while Oslo and Akershus have the highest score in services.

Government production (local and central government) and its contribution to total GVA are measured by the total costs. Its importance varies between the regions: In Northern Norway government production accounts for approximately 30 per cent of the total GVA of the region. For Oslo and Akershus the corresponding share is 16 per cent.

The disposable income of households was highest for Oslo and Akershus, and lowest for Hedmark and Oppland and for Trøndelag. Still, the regional distribution of household income is quite homogeneous, varying between 112 and 95, with the whole country set at 100. The indices for gross value added per employee had variations from 116-84. In other words: the regional distribution of household disposable income varies much less than the regional distribution of GVA per employee.

The regional distribution of net property income showed a more centralised tendency and a larger gap for the index per inhabitant: 127-85, with the country average set at 100.

Household accounts, an overview of the calculations

The figures in this article are a result of a pilot project on the regionalisation of the household income. Results from the project were earlier published in Weekly Bulletin 42/98 from Statistics Norway, and in Røstadsand (1998). A top-down method was applied when regionalising the figures, to ensure consistency with the national accounts: Tax return accounts have been merged with data on population and data from the National Insurance Administration, in order to distribute the national accounts' figures among the regions.

The distribution of the operating surplus from housing services (produced for own consumption by owner-occupiers) differs from earlier accounts. Tax return accounts were used to regionalise this component of the income. In the new calculations we have used the regional distribution from the regional accounts directly, to facilitate comparison between the regional distribution of household income, and the regional distribution of production, intermediate production and value added. For the time being, the last regional accounts are for the accounting year 1993. This method has therefore not been applied to the distribution of household income for the years 1994- 1996.

The institutional sector households

A household is an institutional unit. It is well defined in the ESA (1995) and in Eurostat (1996). The ESA states that a resident unit is regarded as constituting an institutional unit if it enjoys autonomy in decision-making, and that it has-or can compile if required-a complete set of accounts. It also states that a household always enjoys autonomy of its decision-making in respect to consumption, although it may not always keep a complete set of accounts.

Households as consumers are defined as a "small group of persons who share the same living accommodation, who pool some, or all, of their income and wealth and who consume certain types of goods and services collectively, mainly housing and food. The criteria of the existence of family and emotional ties may be added." The household sector also

includes groups of individuals such as persons living permanently in institutions; long-term patients in hospitals, prisoners serving long sentences and elderly persons living permanently in retirement homes. The production of goods and services by unincorporated enterprises is also included in the household sector. Such enterprises are owned by households, and have no assets or autonomy of decision-making separate from those of their owner. Non-profit institutions serving households are not included in our calculations, although they are considered a part of the household sector.

Primary income

" Primary income is the compensation of employees received plus mixed income (or the operating surplus from their own-account production of housing services) of resident households, plus property income received minus property income payable by resident households. " (Eurostat 1995, p.8). The term "mixed income" is used when the operating surplus also includes an element of compensation to the sole-owner. The operating surplus is defined as in box 1.

Primary income = Operating surplus/Mixed income
+ Compensation of employees
+ Net property income

Disposable income

Disposable income is the balancing item of the secondary distribution of income. The starting point is the balancing item of the primary distribution of income, primary income. To the primary income are added social benefits in kind and other current transfers. Taxes on income and other current taxes are deducted. Other current transfers, such as net non-life insurance premiums, are also deducted.

Disposable income = Primary income + net transfers
+ net benefits
- net taxes and social contributions

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