Staff Memo

Calculation of weights for the regional network

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Abstract

This memo documents the structure and use of weights for observations from the regional network. With effect from round 3/09, observations from the network have been weighted using a new set of weights that better capture variations in size between sectors and regions and over time. The national and sector averages based on the new weights are nevertheless highly correlated with the averages based on the old weights.

Since October 2002, there have been between four and six rounds of interviews a year with firms in the regional network, which spans seven regions: Inland, Mid-Norway, North, North-West, South, South-West and East. The firms in the sample are intended to reflect the production side of the economy both sectorally and geographically. These firms represent a total of ten sectors: building and construction, manufacturing (including the subsectors of domestically-oriented manufacturing, export industry and suppliers to the petroleum industry), public sector, services (including the subsectors of household services and corporate services), and retail trade. The main themes covered by the interviews are demand and output, investment, employment and the labour market, costs and prices, and the output gap. The interviews are used to calculate scores for the various themes for each sector in each region. The results are published on Norges Bank's website (`www.norges-bank.no/regional_network`), and the network is described in more detail in Kallum, Sjåtil and Haugland (2005), and Brekke and Halvorsen (2009).

To calculate averages for the themes across regions, sectors and the country as a whole, it is a good idea to weight the individual observations. We have produced three sets of weights for the different themes: output weights, employment weights and investment weights. The *output weights* are used for observations for the themes of demand and output, market outlook, selling prices, profitability, and capacity utilisation. The *employment weights* are used for the themes of employment, annual wage growth, and the labour market. The *investment weights* are used only to weight observations for investment.

One of the aims with the new set of weights is to calculate current weights based on official statistics. The main sources are the national accounts, regional accounts by county, and register-based employment statistics. All of the data we have used come from Statistics Norway's databank. The sources are described in more detail below. There has nevertheless been a need to exercise discretion in the calculation of some weights. While the main sectors in the regional network

follow the NACE standard for industrial classification, this is not the case for the subsectors (domestically-oriented manufacturing, export industry, suppliers to the petroleum industry, household services and corporate services). The calculation of weights for these subsectors is described below. These subsectors are used only for the themes of demand and output, and selling prices.

It takes some time for Statistics Norway to publish the national accounts, and so the weights are updated with a lag. At the time of writing, national accounts data are available up until 2008, whereas regional accounts data are available only up until 2006. This means that results from the network may be subject to revision once Statistics Norway updates its tables. The regional accounts are published only in current prices, which means that the weights are based on value rather than volume.

The remainder of this memo is structured as follows: section 1 describes how we have calculated the output weights, while section 2 documents the employment weights, and section 3 the investment weights. To be able to calculate averages for each region across all sectors and for each sector across all regions, the weights must also reflect each region's share of a sector and each sector's share of a region. To calculate national averages, we also need to calculate a sector's share of the total.

1   Output weights

The output weights are used for observations for the themes of demand and output, market outlook, selling prices over the next 12 months, selling prices over the past 12 months, profitability, and capacity utilisation. For each theme, X, we aim to calculate the average for each sector across all regions:

$$\overline{X}_{nt} = \sum_r \psi^n_{nrt} X_{nrt} \tag{1}$$

where X_{nrt} is an observation for theme X for sector n in region r in year t, and ψ_{nrt}^n is the output weight. The sector average, $\overline{X}_{nt}$, tells us how X varies over time in each sector. The weights, ψ_{nrt}^n, add up to 1 for each sector across all regions (hence the superscript n). We also calculate the average for each region across all sectors:

$$\overline{X}_{rt} = \sum_n \psi_{nrt}^r X_{nrt}, \tag{2}$$

The regional average, $\overline{X}_{rt}$, tells us how X varies over time in each region. The weights, ψ_{nrt}^r, add up to 1 for each region across all sectors (hence the superscript r). The average for the whole country is calculated as:

$$\overline{X}_t = \sum_n \psi_{nt} \overline{X}_{nt}, \tag{3}$$

The weights used to calculate the national average, ψ_{nt}, add up to 1 across all sectors. In other words, we need to calculate three sets of weights $(\psi_{nrt}^n, \psi_{nrt}^r, \psi_{nt})$ which vary between sectors and regions and over time.

1.1   Regions' share of output in each sector

The weights used to calculate the sector averages, ψ_{nrt}^n, show how output in a sector is distributed between regions and are calculated mathematically as:

$$\psi_{nrt}^n = \frac{Y_{nrt}}{Y_{nt}} \tag{4}$$

where Y is value added. The source of the weights listed in Table 1, is gross value added by kind of activity in the regional accounts (Statistics Norway, 2009b). The weights for each individual sector add up to 100 in each year. To calculate weights for the manufacturing subsectors of domestically-oriented manufacturing, export industry and suppliers to the petroleum industry, we have started with the annual national accounts and calculated export weights for the various sectors (see

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Table 1: Regions' share of output in each sector. Per cent. Source for new weights: Regional accounts – gross value added, by kind of activity (Statistics Norway, 2009b).

	Sector	Inland	Mid-Norway	North	North-West	South	South-West	East	Total
	Manufacturing	6.7	7.0	5.5	12.3	15.5	20.2	32.9	100.0
	Domestically-oriented	8.1	7.4	5.8	10.9	13.6	17.8	36.4	100.0
	Export industry	5.5	5.3	5.8	13.7	17.9	20.9	30.8	100.0
	Suppliers to petro ind.	4.1	5.7	2.4	14.1	17.0	30.5	26.1	100.0
2002	Construction	7.8	8.1	7.4	6.6	14.7	17.4	37.9	100.0
	Retail trade	5.2	6.6	6.0	5.0	10.6	14.1	52.4	100.0
	Services	5.1	7.4	6.4	4.7	9.1	16.4	51.0	100.0
	Corporate	3.9	7.3	5.6	4.3	8.5	16.8	53.5	100.0
	Households	7.0	7.5	7.9	5.4	10.0	15.6	46.6	100.0
	Manufacturing	6.6	6.4	5.5	11.4	15.4	21.6	33.1	100.0
	Domestically-oriented	7.8	7.2	5.6	10.4	13.6	19.3	36.1	100.0
	Export industry	5.6	4.8	6.0	12.7	18.0	22.0	30.8	100.0
	Suppliers to petro ind.	4.6	4.6	2.1	11.8	15.1	33.5	28.4	100.0
2003	Construction	7.1	8.8	8.2	6.8	13.6	19.6	35.9	100.0
	Retail trade	6.0	8.1	6.2	5.5	10.7	17.5	46.1	100.0
	Services	5.0	7.5	6.2	4.5	8.8	16.4	51.6	100.0
	Corporate	3.8	7.3	5.5	4.2	8.2	16.7	54.3	100.0
	Households	7.0	7.7	7.2	5.0	9.8	16.0	47.3	100.0
	Manufacturing	6.4	6.5	6.4	11.7	15.4	22.2	31.7	100.0
	Domestically-oriented	7.7	7.5	5.9	10.4	13.5	19.8	35.3	100.0
	Export industry	5.2	4.9	7.2	13.6	18.1	22.7	28.4	100.0
	Suppliers to petro ind.	4.4	5.2	2.3	10.7	15.2	34.3	27.9	100.0
2004	Construction	8.2	8.8	7.4	7.3	14.0	20.4	33.9	100.0
	Retail trade	5.0	6.5	5.9	4.8	10.5	14.0	53.3	100.0
	Services	5.3	7.1	6.2	4.5	8.8	16.5	51.6	100.0
	Corporate	4.0	7.0	5.6	4.2	8.5	17.0	53.8	100.0
	Households	7.3	7.3	7.2	4.8	9.4	15.8	48.2	100.0
	Manufacturing	6.2	6.7	5.6	11.3	15.8	24.1	30.3	100.0
	Domestically-oriented	7.6	8.1	6.1	9.6	13.7	21.2	33.7	100.0
	Export industry	5.0	5.0	5.7	13.5	18.4	25.0	27.4	100.0
	Suppliers to petro ind.	4.1	4.9	2.6	10.4	15.9	36.8	25.4	100.0
2005	Construction	7.2	8.7	9.1	6.5	13.8	18.8	36.0	100.0
	Retail trade	5.2	7.3	5.7	4.7	10.5	13.9	52.7	100.0
	Services	5.1	7.0	5.6	4.2	8.6	16.5	52.9	100.0
	Corporate	3.8	6.9	5.0	4.0	8.4	17.2	54.7	100.0
	Households	7.4	7.1	6.6	4.6	9.0	15.4	49.9	100.0
	Manufacturing	5.4	6.5	6.0	11.7	16.0	24.8	29.6	100.0
	Domestically-oriented	6.6	7.6	6.4	10.3	13.9	21.2	34.0	100.0
	Export industry	4.6	4.8	6.3	13.7	18.8	25.5	26.2	100.0
	Suppliers to petro ind.	3.6	5.0	2.4	10.6	15.1	39.7	23.5	100.0
2006	Construction	6.8	8.3	9.3	6.7	14.4	18.8	35.5	100.0
	Retail trade	5.2	7.1	5.9	4.8	10.7	14.5	51.9	100.0
	Services	4.9	7.0	5.6	4.3	8.3	16.9	53.0	100.0
	Corporate	3.6	6.9	4.9	4.1	8.1	17.6	54.9	100.0
	Households	7.1	7.2	6.8	4.6	8.8	15.7	49.7	100.0

Appendix A for details). When it comes to the service sector, we have assumed that transport, post and telecommunications, and financial services are aimed in equal parts at households and firms (see Table A2 in Appendix A). Hotels and restaurants are assumed to derive an overweight of their sales from households. Business services are assumed to be aimed 100 per cent at corporate customers, while other social and personal services are defined as 100 per cent household-oriented. By applying the weights in Tables A1 and A2 to the distribution of gross value added by kind of activity in the regional accounts, region-specific shares have been calculated for domestically-oriented manufacturing, the export industry, suppliers to the petroleum industry, household services and corporate services (see Table 1).

We can see from Table 1 that, when it comes to manufacturing, Region East trended down over the five years with a decline of around 3 percentage points, while Region South-West increased its share by 4 percentage points during the same period. In 2002, the gap between the two regions was more than 12 percentage points, whereas in 2006 it was less than 5. Region Inland trended slightly down, decreasing by 1.3 percentage points over the period, while the remaining regions were relatively constant. When it comes to building and construction, Region East again declined by more than 2 percentage points, while Region North gained almost 2 percentage points. Region South-West also grew in this sector, but by just 1 percentage point. Retail was a stable sector in most regions. Region East fell by more than 6 percentage points from 2002 to 2003 but then stabilised around 52 per cent. When it comes to services, Region East and Region South-West had a slightly increasing share of the sector, while the other regions saw a corresponding decline. East is also the region that had the largest share of all sectors in every year we have looked at.

These weights were previously set on a discretionary basis and were constant over time and common to all themes. For all sectors other than suppliers to the

petroleum sector, each region had the same weight (12.5 per cent) except for Region East which had a double weight (25 per cent). For suppliers to the petroleum sector, Region South-West had a double weight (25 per cent), while Region East had the same weight as the other regions (12.5 per cent). If we compare the new weights in Table 1 with the old ones, we can see that there was previously slight underweighting of Region East and Region South-West, and periodic underweighting of Region South. These are economically important regions and home to some of the country's largest towns and cities. The Inland, North and Mid-Norway regions in particular were overrepresented in the old set of weights.

1.2 Sectors' share of output in each region

As mentioned in the introduction, Norges Bank's regional network will increasingly be publishing regional averages. This means that we need to calculate weights that specify each sector's share of output in each region in a given year, ψ_{nrt}^r:

$$\psi_{nrt}^r = \frac{Y_{nrt}}{Y_{rt}} \qquad (5)$$

Table 2 shows the calculation of these weights based on gross value added by kind of activity in the regional accounts (Statistics Norway, 2009b). The weights for the main sectors add up to 100 for each region in each year, whereas the weights for the subsectors add up to the weight for the main sector in question. Table B1 in the Appendix presents the subsectors' share of output in each region excluding suppliers to the petroleum industry. These weights are used for the themes of market outlook, profitability and capacity utilisation.

There is considerable variation between the sectors' share of output in each region. The service sector accounts for the largest share of output in all regions except for Region North-West, where manufacturing is most important. The next most important sector in each region is generally manufacturing, the exception

Table 2: Sectors' share of output in each region. Per cent. Source: Regional accounts – gross value added, by kind of activity (Statistics Norway, 2009b).

	Sector	Inland	Mid-Norway	North	North-West	South	South-West	East
	Manufacturing	25.8	21.4	19.4	41.1	30.5	26.5	15.9
	Domestically-oriented	15.7	12.4	10.3	18.3	13.3	11.7	8.8
	Export industry	8.5	7.1	8.2	18.2	14.0	10.9	5.9
	Suppliers to petro ind.	1.6	1.9	0.9	4.8	3.4	4.0	1.3
2002	Construction	12.9	10.6	11.2	9.4	12.2	9.7	7.7
	Retail trade	17.2	17.3	18.1	14.3	17.7	15.7	21.4
	Services	44.1	50.7	51.3	35.3	39.7	48.1	55.0
	Corporate	21.5	31.4	27.9	20.2	23.4	31.0	36.2
	Households	22.6	19.3	23.4	15.1	16.3	17.1	18.8
	Manufacturing	25.1	18.8	19.4	38.9	30.5	26.2	16.0
	Domestically-oriented	14.9	11.4	10.1	17.9	13.6	11.8	8.8
	Export industry	8.6	6.0	8.6	17.3	14.1	10.6	5.9
	Suppliers to petro ind.	1.7	1.4	0.7	3.9	2.9	3.9	1.3
2003	Construction	11.4	10.7	12.1	9.6	11.3	9.9	7.3
	Retail trade	19.3	19.9	18.2	15.8	17.9	17.8	18.8
	Services	44.3	50.6	50.3	35.7	40.3	46.1	57.9
	Corporate	21.0	30.8	28.1	20.8	23.4	29.1	37.9
	Households	23.3	19.8	22.2	14.9	16.9	17.0	20.0
	Manufacturing	24.1	20.2	21.5	39.9	30.3	27.3	15.0
	Domestically-oriented	14.6	12.3	10.5	17.9	13.3	12.3	8.4
	Export industry	8.0	6.4	10.3	18.8	14.3	11.3	5.4
	Suppliers to petro ind.	1.5	1.5	0.8	3.3	2.7	3.8	1.2
2004	Construction	13.7	12.0	11.4	11.0	12.2	11.1	7.1
	Retail trade	15.8	16.6	16.9	13.5	17.0	14.2	20.8
	Services	46.4	51.2	50.2	35.6	40.5	47.5	57.1
	Corporate	22.1	31.3	28.1	21.0	24.2	30.3	37.0
	Households	24.3	19.9	22.1	14.6	16.3	17.2	20.1
	Manufacturing	24.1	20.4	20.3	40.1	30.9	29.1	14.1
	Domestically-oriented	14.7	12.6	11.0	17.0	13.3	12.7	7.8
	Export industry	8.0	6.4	8.4	19.7	14.7	12.3	5.2
	Suppliers to petro ind.	1.5	1.5	0.9	3.5	3.0	4.2	1.1
2005	Construction	12.5	11.9	14.9	10.4	12.2	10.3	7.6
	Retail trade	16.7	18.3	17.2	14.0	17.1	13.9	20.4
	Services	46.7	49.5	47.6	35.4	39.7	46.8	57.9
	Corporate	21.8	30.9	26.8	21.2	24.4	30.7	37.7
	Households	24.9	18.6	20.8	14.2	15.3	16.1	20.2
	Manufacturing	23.2	20.8	22.0	41.9	32.4	30.2	14.5
	Domestically-oriented	13.5	12.3	11.4	17.6	13.5	12.4	8.0
	Export industry	8.2	6.8	9.7	20.5	15.9	13.0	5.4
	Suppliers to petro ind.	1.6	1.7	0.9	3.9	3.1	5.0	1.2
2006	Construction	13.0	11.9	15.3	10.7	13.0	10.3	7.8
	Retail trade	17.7	18.0	17.3	13.8	17.3	14.1	20.4
	Services	46.0	49.3	45.4	33.6	37.2	45.5	57.3
	Corporate	21.4	30.8	25.1	20.2	22.8	29.9	37.5
	Households	24.6	18.5	20.3	13.4	14.4	15.6	19.8
Total for each region in each year		100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 3: Sectors' share of output nationally. Per cent. Source for new weights: National accounts, yearly – production and uses, by kind of activity (Statistics Norway, 2009g).

Sector	Old	2002	2003	2004	2005	2006	2007	2008
Manufacturing	30.6	23.0	23.1	23.3	23.4	22.7	22.3	22.3
Domestically-oriented	14.9	13.5	13.3	13.1	13.0	12.6	12.5	12.5
Export industry	12.3	7.4	7.7	8.1	8.3	8.1	7.8	7.8
Suppliers to petro ind.	3.5	2.1	2.1	2.1	2.1	2.0	2.0	2.0
Construction	10.2	8.3	8.0	7.8	7.4	6.9	6.8	6.6
Retail trade	15.0	20.2	20.5	20.9	20.7	23.0	23.4	23.4
Services	44.1	48.5	48.4	48.1	48.5	47.3	47.5	47.7
Corporate	26.7	29.5	29.3	29.1	29.8	29.0	29.1	29.2
Households	17.4	19.0	19.1	19.0	18.7	18.3	18.4	18.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

being Region East where the retail trade has a weight of around 20 per cent. This pattern is stable, although the weights can vary somewhat over time. Building and construction generally has a slightly smaller weight than the retail trade. The manufacturing sectors have become slightly more important in Region North, Region South and Region South-West over time, whereas the importance of the service sectors has declined.

1.3 Sectors' share of national output

The sectors' share of national output, ψ_{nt}, is used to calculate averages for the whole country:

$$\psi_{nt} = \frac{Y_{nt}}{Y_t} \tag{6}$$

where $\frac{Y_{nt}}{Y_t}$ is sector n's share of GDP. The sector weights are shown in Table 3 (and in Table B2 excluding suppliers to the petroleum industry).[1] We can see that the sector weights for output do not vary greatly from year to year, but may change slightly over a longer period. The service sector has the largest weight of almost

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[1]Table B1 presents the sectors' share of output excluding suppliers to the petroleum industry.

50 per cent. The retail trade and manufacturing have roughly equal weights of just over 20 per cent, while building and construction has the smallest weight of 6–8 per cent.

The first column in Table 3 ("Old") presents the sector weights used up until round 2/09, which were based on the provisional national accounts for 2003. If we compare the old sector weights with the new ones, we can see that manufacturing previously had a larger weight, whereas retail and services had smaller weights.

2 Employment weights

We have produced a set of employment weights $(\nu_{nrt}^n, \nu_{nrt}^r, \nu_{nt})$ to weight the themes of em-ployment over the past three months, employment over the next three months, annual wage growth, and the labour market. These are used to produce sector averages for the main sectors (building and construction, manufacturing, public sector, services, and retail trade) as well as regional and national averages.

2.1 Regions' share of employment in each sector

To calculate the sector averages, we have calculated weights that reflect each region's share of employment in each sector:

$$\nu_{nrt}^n = \frac{N_{nrt}}{N_{nt}} \tag{7}$$

where N_{nrt} is employment in sector n in region r in year t. These weights are calculated on the basis of the register-based employment statistics Statistics Norway (2009d) (see Table 4).

Region East has the largest weights in all sectors, followed by Region South and Region South-West. The Inland, Mid-Norway, North and North-West regions have roughly equal shares of all sectors. Manufacturing accounts for a slightly higher

Table 4: *Regions' share of employment in each sector. Per cent. Source for new weights: Employment, main figures – employed persons per 4th quarter, by industry divisions and sex. (Statistics Norway, 2009d).*

	Sector	Inland	Mid-Norway	North	North-West	South	South-West	East	Total
2002	Manufacturing	7.5	7.4	6.3	11.0	15.6	24.5	27.6	100.0
	Construction	8.3	8.9	9.7	7.8	14.4	17.6	33.3	100.0
	Retail trade	6.2	7.6	8.0	6.1	12.4	16.4	43.3	100.0
	Services	5.7	7.8	8.1	5.6	10.9	16.5	45.5	100.0
	Public sector	7.9	9.0	12.0	7.2	13.0	16.9	34.0	100.0
2003	Manufacturing	7.3	7.5	6.3	10.7	15.3	21.6	28.2	100.0
	Construction	8.3	9.0	10.2	7.7	14.6	19.6	32.3	100.0
	Retail trade	6.2	7.6	7.9	6.1	12.6	17.5	43.0	100.0
	Services	5.8	8.0	8.1	5.7	10.9	16.4	44.7	100.0
	Public sector	7.9	9.2	11.9	7.2	13.1	9.9	33.5	100.0
2004	Manufacturing	7.2	7.4	6.3	10.6	15.6	25.0	28.0	100.0
	Construction	8.4	9.4	9.8	7.4	14.5	18.3	32.1	100.0
	Retail trade	6.2	7.7	8.0	6.2	12.7	16.6	42.7	100.0
	Services	5.9	7.9	8.1	5.7	11.0	16.9	44.5	100.0
	Public sector	7.9	9.3	11.9	7.2	13.1	17.3	33.3	100.0
2005	Manufacturing	7.1	7.6	6.2	10.8	15.5	25.0	27.8	100.0
	Construction	8.3	9.2	9.6	7.2	14.4	18.6	32.7	100.0
	Retail trade	6.1	7.6	7.9	6.2	12.8	16.7	42.6	100.0
	Services	5.8	7.9	8.0	5.6	11.0	17.0	44.8	100.0
	Public sector	7.8	9.3	11.8	7.2	13.0	17.4	33.4	100.0
2006	Manufacturing	7.0	7.6	6.1	10.7	15.2	26.4	27.2	100.0
	Construction	8.0	9.2	9.6	7.1	14.6	18.7	32.8	100.0
	Retail trade	6.1	7.6	7.8	6.2	12.9	16.8	42.7	100.0
	Services	5.6	7.9	7.8	5.7	11.0	17.3	44.7	100.0
	Public sector	7.9	9.4	11.7	7.1	12.9	17.5	33.4	100.0
2007	Manufacturing	6.8	7.7	6.1	10.7	15.0	26.6	27.2	100.0
	Construction	8.0	8.9	9.7	7.0	14.5	19.1	32.7	100.0
	Retail trade	6.1	7.5	7.8	6.2	12.9	17.1	42.5	100.0
	Services	5.6	8.0	7.7	5.7	11.0	17.5	44.4	100.0
	Public sector	7.8	9.4	11.7	7.1	13.1	17.5	33.5	100.0
Old	All sectors	12.5	12.5	12.5	12.5	12.5	12.5	25.0	100.0

share of employment in Region North-West than in the other regions, while Region North has a relatively large public sector. Region South-West's share increased slightly in all sectors from 2002 to 2007, while the reverse applies to Region East, and the other regions have changed very little over the years.

A comparison with the old weights, where all regions were weighted at 12.5 per cent in each sector except for Region East which had a double weight of 25 per cent,

shows that the Inland, Mid-Norway, North and North-West regions in particular were overweight, while Region East and Region South-West were underweight. Region South was most accurately weighted, with all sectors varying between 10 and 16 per cent with the new weights after previously being weighted at 12.5 per cent.

2.2 Sectors' share of employment in each region

To calculate regional averages, we have defined the various sectors' share of employment in each region as:

$$\nu_{nrt}^r = \frac{N_{nrt}}{N_{rt}} \tag{8}$$

Table 5 shows the calculation of these weights based on the register-based employment statistics (Statistics Norway, 2009d). Note that these weights, which were not previously computed, add up to 100 for each region in each year.

We can see that the public sector has been stable between 30 and 45 per cent and is the most im-portant sector in all regions except for Region East where the service sector is most important. In Region North, the public sector accounts for 45 per cent of employment. Manufacturing is more important in Region North-West, Region South and Region South-West than in the other regions. The various sectors' share of employment in the regions is in many ways similar to their share of output. Unique to the employment weights, however, is that manufacturing has trended down in all regions.

Table 5: Sectors' share of employment in each region. Per cent. Source for new weights: Employment, main figures – employed persons per 4th quarter, by industry divisions and sex. (Statistics Norway, 2009d).

	Sector	Inland	Mid-Norway	North	North-West	South	South-West	East
	Manufacturing	15.1	12.8	9.6	21.8	17.3	19.4	10.3
	Construction	8.5	7.7	7.5	7.8	8.1	7.1	6.3
2002	Retail trade	11.7	12.3	11.4	11.3	12.9	12.1	15.1
	Services	25.3	29.4	26.9	24.1	26.4	28.6	37.2
	Public sector	39.3	37.8	44.6	35.0	35.4	32.8	31.1
	Manufacturing	14.1	12.0	9.1	20.4	16.2	18.5	10.2
	Construction	8.2	7.5	7.6	7.5	8.0	6.9	6.0
2003	Retail trade	11.9	12.1	11.3	11.5	13.1	12.2	15.3
	Services	25.3	27.7	26.2	24.2	25.9	28.1	36.2
	Public sector	40.5	39.6	45.8	36.4	36.8	34.2	32.2
	Manufacturing	13.5	11.5	8.9	19.7	15.9	18.1	9.9
	Construction	8.4	7.9	7.4	7.4	8.0	7.1	6.1
2004	Retail trade	11.9	12.2	11.5	11.8	13.3	12.3	15.4
	Services	25.5	28.5	26.3	24.4	26.1	28.3	36.4
	Public sector	40.7	39.8	45.9	36.7	36.7	34.2	32.2
	Manufacturing	13.2	11.6	8.7	19.8	15.7	17.7	9.6
	Construction	8.6	7.9	7.5	7.4	8.1	7.4	6.3
2005	Retail trade	11.9	12.1	11.5	11.8	13.4	12.3	15.3
	Services	25.7	28.8	26.7	24.6	26.4	28.7	36.9
	Public sector	40.5	39.6	45.6	36.3	36.3	34.1	31.9
	Manufacturing	13.2	11.6	8.6	19.6	15.4	18.3	9.4
	Construction	8.7	8.0	7.8	7.5	8.5	7.5	6.5
2006	Retail trade	11.9	11.9	11.4	11.8	13.4	12.0	15.2
	Services	25.6	29.1	26.7	25.0	26.7	28.9	37.2
	Public sector	40.7	39.3	45.4	36.0	36.0	33.4	31.7
	Manufacturing	12.8	11.7	8.7	19.6	15.0	18.2	9.4
	Construction	9.1	8.1	8.2	7.7	8.7	7.8	6.7
2007	Retail trade	12.2	11.9	11.5	11.8	13.5	12.2	15.3
	Services	26.1	29.8	26.9	25.5	27.2	29.4	37.5
	Public sector	39.8	38.6	44.8	35.4	35.5	32.4	31.2
Total for each region in each year		100.0	100.0	100.0	100.0	100.0	100.0	100.0

2.3 Sectors' share of national employment

The sectors' share of national employment, ν_{nt}, is used to weight the observations into national averages:

$$\nu_{nt} = \frac{N_{nt}}{N_t} \tag{9}$$

Table 6: Sectors' share of employment nationally. Per cent. Source for new weights: National accounts, yearly – wages, salaries, employment and productivity (Statistics Norway, 2009f).

Sector	Old	2002	2003	2004	2005	2006	2007	2008
Manufacturing	15.4	15.9	15.3	14.9	14.6	14.8	14.9	14.8
Construction	7.6	8.1	8.4	8.5	8.7	9.0	9.5	9.5
Retail trade	16.7	16.3	16.5	16.7	16.6	16.0	15.9	15.8
Services	31.0	31.4	31.0	31.0	31.2	31.5	31.7	32.0
Public sector	29.2	28.3	28.8	29.0	28.9	28.6	28.0	27.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

The various sectors' share of employment are presented in Table 6. Services and the public sector together account for around 60 per cent of employment in the five main sectors. Manufacturing's share has trended down, and building and construction's share up, while there is less variation in the other sectors. There are no major differences relative to the old weights, which are shown in the first column in Table 6.[2]

3   Investment weights

We have produced a corresponding set of investment weights $(\iota^n_{nrt}, \iota^r_{nrt}, \iota_{nt})$ to weight the observations for investment. These are used to produce sector averages for the manufacturing, public, service and retail sectors, as well as regional and national averages.

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[2]Until the September 2005 interview round, the retail trade was not included in the wage growth theme. The old weights for this theme were rescaled to exclude the retail trade.

Table 7: Regions' share of investment in each sector. Per cent. Source for new weights: Regional accounts – gross fixed capital formation, by kind of activity (Statistics Norway, 2009a).

	Sector	Inland	Mid-Norway	North	North-West	South	South-West	East	Total
2002	Manufacturing	6.0	5.7	13.2	20.3	11.6	20.9	22.3	100.0
	Retail trade	5.3	6.2	6.5	4.7	11.7	14.1	51.5	100.0
	Services	4.6	8.2	8.0	4.8	9.3	14.9	50.1	100.0
	Public sector	6.6	9.0	10.7	8.6	15.0	13.5	36.6	100.0
2003	Manufacturing	6.7	6.4	10.1	20.9	12.1	20.5	23.2	100.0
	Retail trade	5.0	7.3	6.0	4.5	9.9	16.2	51.0	100.0
	Services	5.6	7.7	10.8	5.5	9.6	11.7	49.2	100.0
	Public sector	7.7	9.2	11.0	7.5	14.7	15.1	34.7	100.0
2004	Manufacturing	5.6	6.6	6.5	14.9	17.5	23.1	25.8	100.0
	Retail trade	5.2	8.7	7.1	5.5	11.3	13.9	48.4	100.0
	Services	5.6	8.6	8.3	5.5	11.1	18.6	42.4	100.0
	Public sector	7.3	9.4	13.2	7.4	13.2	14.9	34.7	100.0
2005	Manufacturing	6.4	7.2	6.7	12.4	24.9	18.4	24.0	100.0
	Retail trade	6.3	5.9	7.1	6.5	11.5	16.2	46.5	100.0
	Services	4.4	7.1	5.7	5.0	8.9	21.1	47.8	100.0
	Public sector	7.0	9.2	13.1	6.9	12.6	14.9	36.5	100.0
2006	Manufacturing	6.2	7.0	8.8	11.9	16.0	22.9	27.2	100.0
	Retail trade	5.1	6.7	6.8	5.2	12.5	16.6	47.2	100.0
	Services	3.7	6.1	6.3	5.1	9.6	17.8	51.5	100.0
	Public sector	7.2	9.1	13.1	6.8	11.9	15.5	36.3	100.0
Old	All sectors	12.5	12.5	12.5	12.5	12.5	12.5	25.0	100.0

3.1 Regions' share of investment in each sector

To calculate the sector averages, we have calculated weights that reflect each region's share of fixed investment in each sector:

$$\iota_{nrt}^{n} = \frac{I_{nrt}}{I_{nt}} \tag{10}$$

Table 7 shows that the shares vary considerably between sectors and regions and over time. One stable feature, however, is that Region East is largest in every sector, followed by Region South-West. Region North's share of investment in the manufacturing sector is relatively high, but has fallen from more than 20 per cent to 12 per cent. Region South's share of manufacturing invest-ment also varies widely

between 11 and 25 per cent. Region North's share of investment in the public sector is relatively high and rises slightly during the period. The old weights were set at 12.5 per cent for all regions except for Region East which had a double weight of 25 per cent, which meant that the Inland, Mid-Norway, North and North-West regions were overweight in all sectors. The old weights were relatively accurate for Region South, and too low for Region South-West and Region East. In addition, they did not capture variations over time.

3.2 Sectors' share of investment in each region

To calculate regional averages, we have defined each sector's share of investment in each region as:

$$\iota_{nrt}^{r} = \frac{I_{nrt}}{I_{rt}} \tag{11}$$

Table 8 shows the calculation of these weights based on gross fixed capital formation by kind of activity in the regional accounts (Statistics Norway, 2009a). These weights were not previously computed. The public sector dominates in all regions except for Region East where the public sector and services alternate in having the highest share of investment. Manufacturing generally has a higher share than the retail trade, except in Region East.

Manufacturing accounted for no less than 16.9 per cent of investment in Region North in 2002, but this fell to 7–8 per cent in 2005 and 2006, while the public sector appears to be growing in impor-tance in the region, climbing from 49.9 per cent in 2002 to 63.4 per cent in 2006.

Manufacturing's share of investment is larger in Region North-West than in the other regions, but has declined over the years from 30 per cent in 2002 to 17 per cent in 2006. Meanwhile, the service sector has trended up in that region: after having the lowest share in 2003 of 19 per cent, it climbed almost 10 percentage points to 29 per cent in 2006. Region South has a relatively volatile manufacturing

Table 8: Sectors' share of investment in each region. Per cent. Source for new weights: Regional accounts – gross fixed capital formation, by kind of activity (Statistics Norway, 2009a).

	Sector	Inland	Mid-Norway	North	North-West	South	South-West	East
2002	Manufacturing	13.1	8.8	16.9	30.1	11.8	17.5	6.9
	Retail trade	5.9	4.9	4.3	3.5	6.1	6.0	8.1
	Services	28.3	35.6	28.9	20.0	26.5	35.0	43.6
	Public sector	52.7	50.8	49.9	46.4	55.6	41.5	41.4
2003	Manufacturing	10.1	7.9	9.9	26.5	9.9	14.2	6.1
	Retail trade	6.2	7.4	4.8	4.7	6.6	9.2	11.0
	Services	23.6	26.3	29.6	19.4	21.7	22.5	36.0
	Public sector	60.2	58.4	55.7	49.4	61.7	54.1	46.9
2004	Manufacturing	9.3	8.0	6.6	21.4	14.5	14.7	7.4
	Retail trade	6.7	8.3	5.7	6.1	7.4	6.9	10.9
	Services	26.0	29.3	23.6	21.9	26.0	33.1	34.2
	Public sector	57.9	54.4	64.1	50.6	52.1	45.2	47.5
2005	Manufacturing	10.8	9.1	7.1	18.6	20.2	10.6	6.1
	Retail trade	6.7	4.7	4.8	6.1	5.9	5.9	7.5
	Services	26.1	31.2	21.2	25.9	25.1	42.4	42.2
	Public sector	56.3	55.0	66.9	49.3	48.8	41.0	44.2
2006	Manufacturing	10.4	8.7	8.6	17.2	13.3	12.7	6.2
	Retail trade	5.1	5.0	3.9	4.5	6.1	5.5	6.4
	Services	24.6	30.0	24.1	29.1	31.3	39.0	46.3
	Public sector	60.0	56.4	63.4	49.3	49.3	42.8	41.1
Total for each region in each year		100.0	100.0	100.0	100.0	100.0	100.0	100.0

sector, its share of investment ranging between 10 and 20 per cent.

3.3 Sectors' share of national investment

National averages are calculated using the sectors' share of national investment, defined as:

$$\iota_{nt} = \frac{I_{nt}}{I_t} \tag{12}$$

We can see from Table 9 that there is considerable variation from year to year in the sectors' share of investment. For example, the service sector's share varies between 30 and 39 per cent, and the public sector's share between 42 and 50 per cent. The old weights did not capture this variation over time and weighted services higher and the public sector lower.

Table 9: Sectors' share of investment nationally. Per cent. Source for new weights: National accounts, yearly – capital stocks and investments, by type and main activity (Statistics Norway, 2009e).

Sector	Old	2002	2003	2004	2005	2006	2007	2008
Manufacturing	16.1	12.8	10.8	11.4	11.0	10.3	11.8	12.3
Retail trade	9.8	6.7	9.1	9.1	7.2	6.5	6.3	6.3
Services	51.3	36.4	29.6	31.1	36.8	39.1	39.1	38.6
Public sector	22.8	44.1	50.5	48.3	45.1	44.0	42.9	42.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

4   Conclusion

In this memo, we have documented new weights used to aggregate observations from the regional network into sector, regional and national averages with effect from round 3/09. These weights are based on publicly available statistics and updated annually. We have compared the new weights with the old ones, which did not vary over time. Have the new weights brought major changes in the sector and national averages for the various themes? Table 10 presents the correlation coefficients for the series with the old and new weights, and reveals very high correlations for all of the themes.

Table 10: Correlation coefficients between national and sector averages based on the old and new weights for the various themes.

Sector	Output and de-mand	Market outlook	Invest-ment	Wage growth	Empl next 3 mths	Empl past 3 mths	Prices past 12 mths
Aggregated	0.997	0.997	0.953	0.998	0.991	0.993	0.987
Construction	0.994	0.996	–	0.997	0.993	0.994	0.998
Manufacturing	0.995	0.997	0.984	0.997	0.986	0.988	0.989
Domestically-oriented	0.995	0.996	–	–	–	–	0.986
Export industry	0.991	0.992	–	–	–	–	0.985
Suppliers to petro ind.	0.957	0.943	–	–	–	–	–
Public sector	–	–	0.970	0.999	0.981	0.985	–
Services	0.996	0.992	0.944	0.995	0.975	0.982	0.988
Households	0.988	–	–	–	–	–	0.925
Corporate	0.994	–	–	–	–	–	0.989
Retail trade	0.986	0.994	0.957	0.995	0.976	0.969	0.938

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Statistics Norway (2009g). National accounts, yearly - production and uses, by kind of activity. Tabell 05112. `www.ssb.no/en/table/05112`

Appendix

A   Export weights for manufacturing sectors

Export weights for the manufacturing sectors have been used to calculate the regions' share of output in each sector (Table 1). The export weight is calculated as the export value of various products as a percentage of gross output in the relevant sector in the national accounts for 2003. Non-exported output is defined as domestically-oriented manufacturing for all manufacturing sectors except for machinery and other equipment etc., and the building of ships, oil platforms and modules. For these two sectors, it is assumed on a discretionary basis that half of

non-exported output goes to the petroleum industry. These weights do not vary between the regions.

Table A1: Estimated distribution of manufacturing output between export industry, domestically-oriented manufacturing and suppliers to the petroleum industry. Export goods in parentheses. Per cent.

	Manufacturing output aimed at		
	export market	domestic market	petroleum industry
Manufacture of food products, beverages and tobacco (food products, beverages and tobacco)	20	80	0
Manufacture of textiles, wearing apparel, leather (textiles, wearing apparel, footwear)	46	54	0
Manufacture of wood and wood products (wood products)	14	86	0
Manufacture of pulp, paper and paper products (pulp, paper and paper products)	65	35	0
Publishing, printing, reproduction (printed products)	2	98	0
Manufacture of refined petroleum, chemical and mineral products (refined petroleum, chemical and mineral products)	46	54	0
Manufacture of basic chemicals (basic chemicals etc.)	77	23	0
Manufacture of basic metals (metals)	95	5	0
Manufacture of machinery and other equipment (machinery and other equipment)	55	23	23
Building of ships, oil platforms and modules (ships, oil platforms and modules)	31	35	35
Manufacture of furniture and other manufacturing (other manufactured goods)	26	74	0

Table A2: Estimated distribution of service output between corporate and household services. Per cent.

	Service output aimed at	
	firms	households
Hotels and restaurants	30	70
Transport	50	50
Post and telecommunications	50	50
Financial intermediation	50	50
Business services	100	0
Other social and personal services	0	100

B   Regions' share of manufacturing output excluding suppliers to the petroleum industry

Table B1: Sectors' share of output in each region excluding suppliers to the petroleum industry. Per cent. Source for new weights: Regional accounts - gross value added, by kind of activity (Statistics Norway, 2009b).

År	Sector	Inland	Mid-Norway	North	North-West	South	South-West	East
2002	Manufacturing	25.8	21.4	19.4	41.1	30.5	26.5	15.9
	Domestically-oriented	16.7	11.9	9.5	24.6	19.8	14.7	7.8
	Export industry	9.1	9.5	9.9	16.5	10.7	11.8	8.1
2003	Manufacturing	25.1	18.8	19.4	38.9	30.5	26.2	16.0
	Domestically-oriented	16.0	10.2	9.5	23.2	19.4	14.2	7.8
	Export industry	9.1	8.6	9.9	15.7	11.1	12.0	8.2
2004	Manufacturing	24.1	20.2	21.5	39.9	30.3	27.3	15.0
	Domestically-oriented	15.6	10.2	10.4	24.3	19.6	13.8	7.2
	Export industry	8.5	10.1	11.4	15.6	11.3	16.9	8.7
2005	Manufacturing	24.1	20.4	20.3	40.1	30.9	29.1	14.1
	Domestically-oriented	15.6	11.6	9.6	24.1	20.0	16.5	6.7
	Export industry	8.5	8.8	10.7	16.0	10.9	12.6	7.4
2006	Manufacturing	23.2	20.8	22.0	41.9	32.4	30.2	14.5
	Domestically-oriented	14.4	11.2	10.1	25.1	20.1	16.3	6.7
	Export industry	8.8	9.6	11.9	16.8	12.3	13.9	7.8

Table B2: Sector weights for output nationally excluding suppliers to the petroleum industry. Per cent. Source for new weights: National accounts, yearly - production and uses, by kind of activity (Statistics Norway, 2009g).

Sector	Gammel	2002	2003	2004	2005	2006	2007	2008
Manufacturing	30.1	23.0	23.1	23.3	23.4	22.7	22.3	22.3
Domestically-oriented	17.7	14.9	14.6	14.4	14.2	13.8	13.8	13.8
Export industry	12.4	8.2	8.5	8.9	9.1	8.9	8.5	8.5
Construction	10.3	8.3	8.0	7.8	7.4	6.9	6.8	6.6
Retail trade	15.2	20.2	20.5	20.9	20.7	23.0	23.4	23.4
Services	44.5	48.5	48.4	48.1	48.5	47.3	47.5	47.7
Corporate	26.9	29.5	29.3	29.1	29.8	29.0	29.1	29.2
Households	17.6	19.0	19.1	19.0	18.7	18.3	18.4	18.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0