

Driving forces behind business cycles in the 1990s*

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The article provides an abridged presentation of an analysis of the driving forces behind cyclical fluctuations in Norway in the 1990s, which Statistics Norway has carried out for the Employment Commission¹. The analysis shows that the main conclusions of previous studies of business cycles in the 1980s also apply to the 1990s to a large extent. Measured by the deviation from an estimated trend, the contributions from international product markets have been counter-cyclical, while petroleum investment has had a pro-cyclical effect and fiscal policy a counter-cyclical effect throughout the period, except towards the end of the cyclical upturn when it had a pro-cyclical impact. Whereas studies of developments in the 1980s confirmed that the deregulation of financial and housing markets provided the strongest contributions to cyclical fluctuations, this analysis shows a large, albeit declining, unexplained residual with negative cyclical contributions. We interpret this as the effect of impulses that arose prior to the period analyzed, including the after-effects of the deregulation. Among the new impulses that are analyzed in this study, the impulses from interest and exchange rates appear to have had a pro-cyclical effect during most of the period.

Previous analyses of cyclical impulses in the Norwegian economy

Statistics Norway has previously conducted analyses of business cycles in the Norwegian economy. Wettergreen (1978) demonstrated that the cyclical fluctuations in the Norwegian economy in the period from the end of the 1950s to the end of the 1970s were largely driven by international developments via their effects on Norwegian production and prices of export goods, particularly as regards industrial raw materials and semi-finished goods. Any effects via international interest rates and exchange rates were blocked by the regulation of interest rates and the foreign exchange market in Norway (including fixed exchange rates). With an expansionary low interest-rate policy at the trough stage, the regulation of credit, building permits, etc. and fiscal policy could keep domestic demand in check in such a way that overall output in Norway remained relatively steady.

Wettergreen's analysis raised the question of whether the development of the oil sector into the 1970s was

changing the cyclical pattern of the Norwegian economy. Signs of a break with the traditional pattern became increasingly clear in the years that followed. The cyclical fluctuations in the Norwegian economy became far more pronounced in the 1980s than they had been in the previous decades.

Total output showed wider fluctuations than manufacturing production, and the variations were more pronounced than among trading partners. Moreover, Norway was out of sync with cyclical developments abroad. This represented a clear break with the post-war cyclical pattern, and indicated that the fluctuations reflected domestic economic developments.

This was the background for Statistics Norway's next project on the history of Norwegian business cycles, which covered the period 1973-1993. The investigation included a number of different studies published as separate articles: a short overview with references is provided in Statistics Norway (1997). The analyses showed that even if there were some traces of the traditional cyclical pattern described above, developments were dominated by shocks associated with important structural changes in the Norwegian economy during that period. In addition to the development of the oil sector, these shocks were related to the extensive deregulation of housing, credit and foreign exchange markets, and the discontinuation of the low inter-

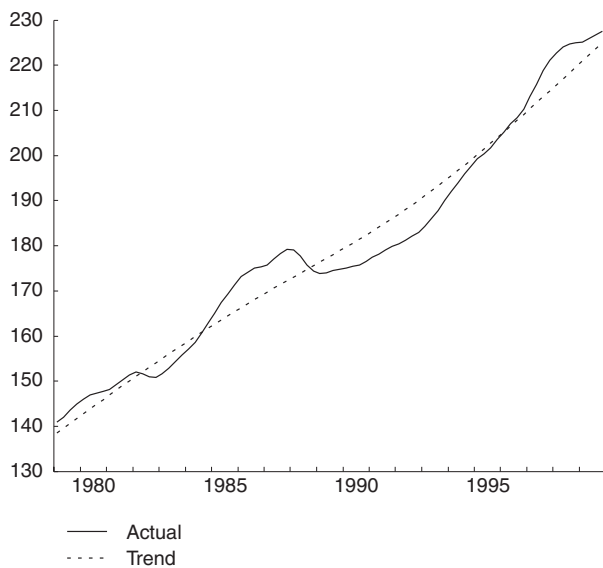
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¹For further details concerning the assumptions underlying the estimated results, see Annex 11 of the report of the Employment Commission. NOU (2000).

Figure 1. GDP Mainland Norway. Bn. 1996-kroner per quarter

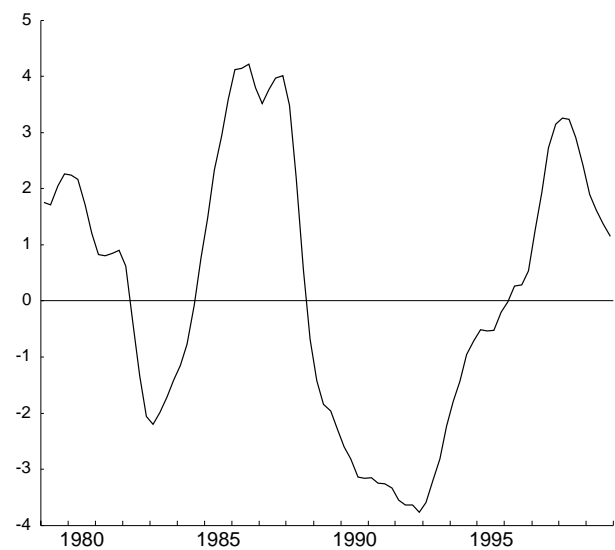


est-rate policy (including the effects of changes in the taxation of interest income/expenditure) in the 1980s.

The question of whether a new and stable *cyclical pattern* for the Norwegian economy had been established was only partially answered as developments in the 1980s were dominated to such a large extent by deregulations. A deregulation is manifestly a one-off event that can not in itself be part of a permanent pattern. However, it may have changed the functioning of the economy, paving the way for a new pattern. Calculations based on Statistics Norway's quarterly macroeconomic model KVARTS show, for example, that deregulation has resulted in an increase in the multipliers for the Norwegian economy (Hove and Eika, 1994). This means that the contribution from fiscal policy has increased both when the fiscal stance is counter-cyclical and pro-cyclical.

Furthermore, the interest-rate sensitivity of the Norwegian economy has increased, which raises the question of whether interest rate developments have curbed or amplified cyclical fluctuations. One would, for example, expect international interest rate developments to reduce cyclical impulses from the international economy via export markets. In this connection, it is also necessary to take into account the impact on exchange rate developments. Finally, it is important to point out that petroleum sector activity in the period 1973-1993 contributed to amplifying cyclical fluctuations. With increased multipliers and a lower import

Figure 2. Business cycles in GDP Mainland Norway. Deviations from trend (per cent)



share in petroleum investment than in the 1970s, it can be assumed that petroleum investment has become an absolutely decisive cyclical factor for the Norwegian economy.

Business cycles 1979-1999

An analysis of business cycles focuses on the variations (cycles) in economic variables as opposed to the more long-term trend in the series. There are a number of problems associated with making such a distinction between cycle and trend, and there is no set way of operationalizing it. Developments in key economic variables influence each other whether developments are due to cyclical or trend factors.

On the other hand, as short-term fluctuations in economic activity may have an impact on the level of activity in the longer term, it is of considerable interest to introduce such a distinction. A stable growth path may lead to a consistently higher use of resources (including lower unemployment) and thereby stronger economic growth over time than a path with wide fluctuations in the level of activity.² In effect, a wide gap between the level of activity and the supply of resources may entail substantial real economic costs in the long term, whether the level of activity is too low or too high. If activity is too low the effect will be direct, and if it is too high, the effects will come indirectly through the process that eventually brings activity back to a level that is consistent with developments in the supply of resources.

2 The KVARTS model functions this way. However, it cannot be ruled out that recession may have favourable effects that are not incorporated in the model, e.g. by contributing to freeing up resources for new activities (creative destruction) or reducing distributional conflicts (wage discipline). From a welfare perspective, however, it is difficult to argue in favour of any other conclusion than at best these are positive side-effects of an otherwise negative event.

Table 1. Business cycles for GDP Mainland Norway 1980-99

Period	Peak/trough	Up/down	High/low	
80.1-82.1		Cyclical downturn	Boom	Cooling
82.2-83.1	Trough i 83.1	Cyclical downturn	Recession	Contraction
83.2-84.3		Cyclical upturn	Recession	Cath-up
84.4-86.3	Peak i 86.3	Cyclical upturn	Boom	Overheating
86.4-87.3		Cyclical downturn	Boom	Cooling
88.4-92.4	Trough i 92.4	Cyclical downturn	Recession	Contraction
93.1-96.1		Cyclical upturn	Recession	Cath-up
96.2-98.1	Peak i 98.1	Cyclical upturn	Boom	Overheating
98.2-		Cyclical downturn	Boom	Cooling

Mainland GDP is used as a reference variable for cyclical fluctuations, i.e. total value added for Norway excluding oil and shipping.³

Figure 1 shows developments in mainland GDP in the period 1979-1999. The figure also shows the estimated trend.⁴ As a linear, rising trend implies a percentage decline in growth, we see that estimated trend growth was falling through the 1980s. On an annual basis, trend growth fell from 3 per cent in 1980 to a little less than 2 per cent 1989. Thereafter, trend growth is estimated at close to 2.5 per cent through the 1990s. Hence, even the smooth trend assumed here still shows fairly large variations in underlying growth.

Cyclical movements are portrayed as fluctuations in actual series around the estimated trend rate of growth. Using figure 1 as a basis, we can define the various phases of the business cycle:

- *Recession* is the period where the actual series is below trend, i.e. the deviation is negative, whereas the opposite is the case for a *boom*.
- *Cyclical troughs and peaks* are reached when the numerical value of the deviation between the actual series and trend is highest. At these points, actual growth is equal to trend growth.
- A *cyclical downturn* is the period starting from the cyclical peak and ending at the cyclical trough. A *cyclical upturn* is the period from the trough to the cyclical peak.

As all cyclical phases characterize developments in actual series in relation to trend, the deviation between the actual series and trend provide a clearer picture. Figure 2 shows the percentage deviation of mainland GDP from trend in the period 1979-1999.

Table 1 provides a summary of the features characterizing the various phases for mainland GDP in Norway in the 1980s and 1990s using various concepts. In addition to these concepts, we have introduced concepts that describe the various combinations of recession/boom and cyclical upturn/downturn that may occur.⁵

In order to capture both the degree of cyclical deviation and the amplitude of cyclical expansion/contraction, the phase diagram of business cycles can be used (see figure 3). The cyclical deviation is measured on the horizontal axis and the growth rate (measured as the deviation from trend growth) along the vertical axis. On the left-hand side of the vertical axis, the economy is in recession and the right-hand side illustrates a boom. Below the horizontal axis, the economy is in a cyclical downturn and in an cyclical upturn above this axis. The figure is based on quarterly data for the period 1989-1999, and the first quarter of each year is indicated.

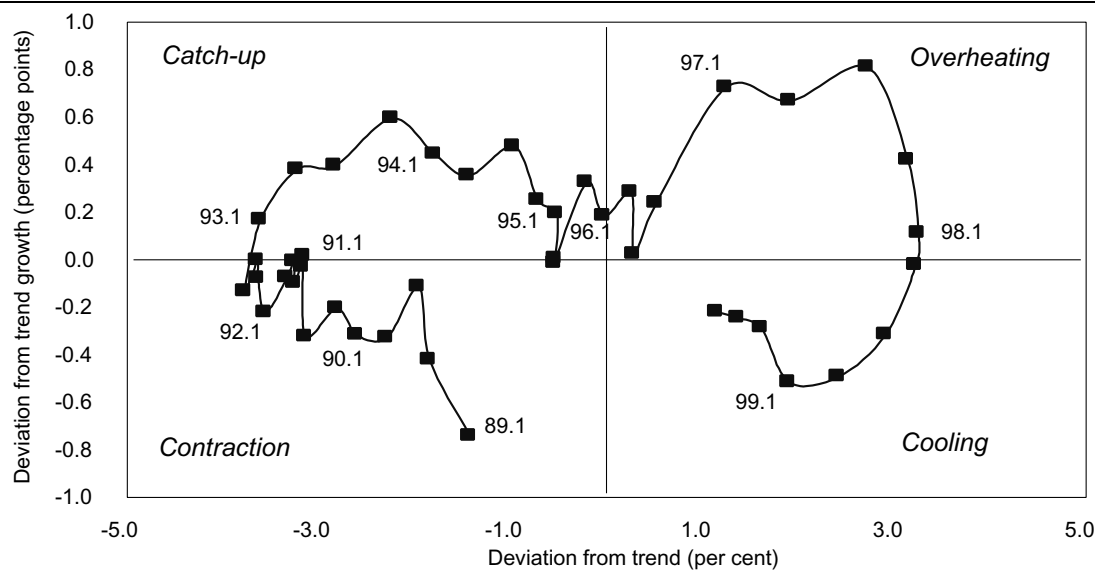
The figure shows that the Norwegian economy was headed for a soft landing in the period 1994-1996 when the production level approached trend value (vertical axis), at the same time that production growth gradually fell towards trend growth (horizon-

3 Quarterly data in the figures and table are smoothed with a five-quarter moving, weighted average in order to eliminate short-term random effects and provide a clearer visual picture.

4 The method for calculating trend in this analysis is the HP filter (Hodrick and Prescott, 1997). In simplifying terms, the trend is computed as a weighted average of the actual series and a straight line through the actual series. With a low weight on the straight line, trend will largely follow the actual series. With a high weight on the straight line, trend will be nearly linear (by first taking the natural logarithm of the series, the straight line corresponds to a growth path with a constant growth rate). Given the deep and long recession in the Norwegian economy that took root towards the end of the 1980s, a high weight ($\lambda=40\ 000$) has been applied to the straight line in order to obtain a trend that is reasonably consistent with underlying developments in the supply of resources during the period (capital stock and working-age population). This weight also results in a relationship between recessions/booms in the 1980s and 1990s, which is fairly consistent with our a priori perceptions of the business cycles in this period.

5 This way of defining cyclical peaks and troughs is not the same as the classification used when the actual series reaches a peak or a trough in terms of level. Figure 1 shows that the actual series for mainland GDP peaked as late as in the 4th quarter of 1987, and the subsequent trough already in the 1st quarter of 1989. Our methods imply that the periods from the 3d quarter of 1986 to the 4th quarter of 1987 and from the 1st quarter of 1989 to the 4th quarter of 1992 – in spite of growth – were to be considered cyclical downturns. This means that output growth in these periods is ascribable to growth in resources, whereas the utilisation of resources decreased.

Figure 3. Business cycles 1989-99



tal axis). However, this tendency was clearly broken in early 1997 (as mentioned all the figures/tables in this analysis are based on smoothed, seasonally adjusted figures; according to non-smoothed figures the pronounced break occurred in the second quarter of 1997).

In the following analysis, we shall on the basis of a macroeconomic model (KVARTS) decompose cyclical developments in mainland GDP in the years 1989-1999 by estimating the effect of a selection of variables of significance to the Norwegian economy when these variables followed actual developments rather than trend. A comparison of the actual and counterfactual paths provides an estimate of the contribution from actual cyclical impulses to the cyclical fluctuations in mainland GDP. The question is then what were the actual contributions from these impulses to the business cycle, disregarding the question of whether it would have been possible to realise the trend paths. This is the same method that was used by Statistics Norway (1997). The KVARTS model is further described in Hove and Eika (1994).

Cyclical impulses 1989-1999

What are to be considered as cyclical impulses depends entirely on the explanatory model used. In principle, impulses may arise abroad or domestically in the Norwegian economy. Because the Norwegian economy is influenced by external conditions through a number of channels, it may be difficult to distinguish between internal and external impulses.

As mentioned, price and volume impulses from mainland enterprises' international markets have traditionally been the primary source of impulses to Norwegian cyclical movements. These impulses are therefore

estimated separately. In pace with increased cross-border capital mobility and the deregulation of financial and foreign exchange markets, developments in financial markets have a greater impact on Norwegian interest rates and the exchange rate. Moreover, the development of the oil sector has increased the sensitivity of the Norwegian economy to changes in oil prices, through their effect on the current account and investment activity in the petroleum sector. The effect of oil prices on government petroleum revenues can also influence fiscal policy. The two latter relationships are, however, not clearly identified, and we have not attempted to model them using KVARTS. The effects of cyclical impulses from petroleum investment and fiscal policy are thus treated as separate impulses. Model deficiencies also make it necessary to estimate impulses from enterprises' inventory changes, from production and investment that have to be exogenously determined in the model, as well as impulses from the model's unexplained residuals.

All in all, 11 partial calculations have been made, which have been grouped into six main categories, see box 1, where we provide a brief explanation of the changes in certain variables. Chart 4a-1 shows actual and trend developments for a selection of these variables (or for weighted aggregates of variables or other attempts at measuring variables that are unchanged).

After calculating the effects for each group of impulses separately, the combined effects of all the impulses are estimated⁶ so that the contributions from non-specified cyclical impulses, including the dynamic effects of impulses that occurred before the simulation period, can be estimated residually. We can then decompose the actual cyclical deviations into partial contributions from a number of different, specified impul-

6 This is carried out in a separate calculation. As the model is non-linear, the contribution from all the impulses combined may be different from the sum of the contributions from each individual impulse.

Box 1 The various estimations**Impulses from international product markets**

The calculations show the effect when export market growth and foreign product prices do not follow their trend paths.

Impulses from money and foreign exchange markets

Since the impulses from international prices are dealt with in the calculations above, changes in real interest rates are the relevant issue here. Norway has sought to maintain a stable exchange rate against the currencies of some countries (for most of the period this means against the ECU/euro rates). In addition to changes in real interest rates in these countries and changes in the exchange rate, changes in Norwegian money market rates may reflect shifting confidence in the Norwegian exchange rate. Even though the model generally reproduces movements in Norwegian money market rates satisfactorily, it does not manage to capture the most pronounced, short-term effects, as witnessed, for example, in the autumn of 1992; these effects have therefore to some extent fed through to the model relationships' residuals. In order to include the full effect of these events, we have therefore allowed the residuals to follow their trend path (i.e. the residuals are set at zero throughout the period), on a par with the exchange rate and international real interest rates.

Impulses from oil prices and petroleum investment

The calculations show the effect when the oil price and petroleum investment do not follow trend movements in the period.

The reason for focusing on petroleum investment instead of directly on, for example, petroleum production, is that it is investment that generates strong impulses to mainland activity.

Impulses from fiscal policy

Fiscal policy is used here to mean general government revenues and expenditure. The concept is thus not confined to the revenues and expenditure over the central government budget, and which, for example, represent the basis for the Ministry of Finance's fiscal policy indicator (the non-oil, cyclically adjusted budget surplus net of interest payments). Our definition includes, for example, investment costs linked to the start of the primary school reform as part of fiscal policy. The Storting gave municipalities responsibility for

the school reform, with the underlying assumption that it would be debtfinanced. In the fiscal policy indicator, this is only reflected gradually as municipalities are compensated for the costs of servicing loans through higher transfers.

In the concept fiscal policy we have also included expenditure as a result of Storting resolutions concerning entities that are owned by the state but are not included as part of the central government sector. In the period analyzed, this particularly applies to investment in connection with Gardermoen airport and the Gardermoen railway, which are formally organized as limited companies.

For taxes, excise duties and various transfers for which resolutions refer to rates, the rates' deviations from trend are used as a basis. For example, this means that impulses from the tax reform of 1992 are calculated in relation to a path where tax rates are changed gradually. The same is true for changes in VAT and other indirect taxes.

Impulses from inventory investment, etc.

Given the way the KVARTS model is constructed today, it does not include relationships for enterprises' inventories. The cyclical contribution from inventories is therefore calculated directly by comparing actual movements with a path with trend movements in inventory investment. In the model, production or investment in some mainland industries is also exogenous. The contributions from these sectors to cyclical deviations for mainland GDP are estimated separately based on the deviation between actual series and trend, but proved to have very small cyclical effects. In the following they have therefore been combined with the contributions from inventory investment.

Model residuals – impulses that by definition cannot be explained

In addition to contributions from identifiable shocks to the Norwegian economy through the variables discussed above, we have also calculated the effects of setting residuals in the model (i.e. the residuals that must be used so that each econometric model relationship attains its actual value) at zero. These are "cyclical impulses" which the model by definition is not able to explain.

ses in addition to an unexplained contribution. In order to render such a decomposition meaningful, none of the partial estimations must be overlapping. This means that an impulse can only be dealt with in one of the partial calculations even though it may have interacted with impulses placed in another calculation. For example, impulses from oil prices, which are placed in the same group as petroleum investment, could also have been seen in connection with foreign price impulses.

Main features of the estimated results

The results of the calculations are shown in figure 5 and table 2. Figure 5a-f shows the actual cyclical deviations for mainland GDP (see figure 2) and the counter-factual deviations from the various calculations, i.e. what the cyclical deviation would have been if the different impulse variables had followed their trend

paths. The difference between them – the contribution from the various cyclical impulses to mainland GDP – are portrayed as bars.

The first line in Table 2 shows the average actual cyclical deviation for mainland GDP for each year in the period analyzed and for the period as whole. The rest of the table shows how impulses from the different variables have contributed to these cyclical deviations (see bars in figure 5). We see that for the period as whole the average cyclical deviation was -0.9 , which illustrates that the deep recession at the beginning of the period dominates the subsequent boom. Furthermore, we see that the average contributions from the various impulse variables for the period as a whole are consistently small (with the exception of the contribution from fiscal policy of 0.7 and the model residuals of -0.5), i.e. that they have little impact on the

Figure 4. Business cycle impulses from a selection of variables (or indicators of several variables)

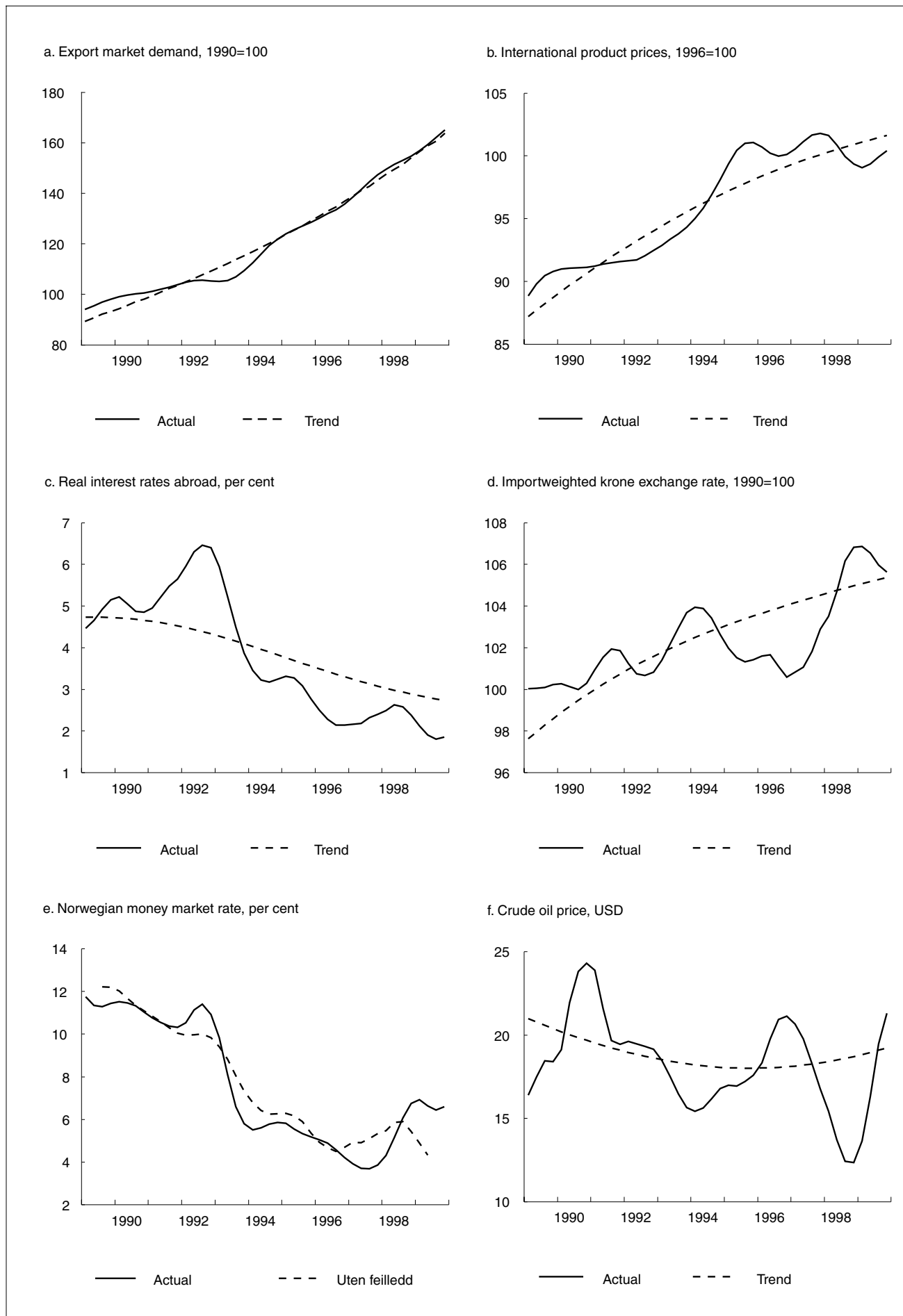


Figure 4 cont. Business cycle impulses from a selection of variables (or indicators of several variables)

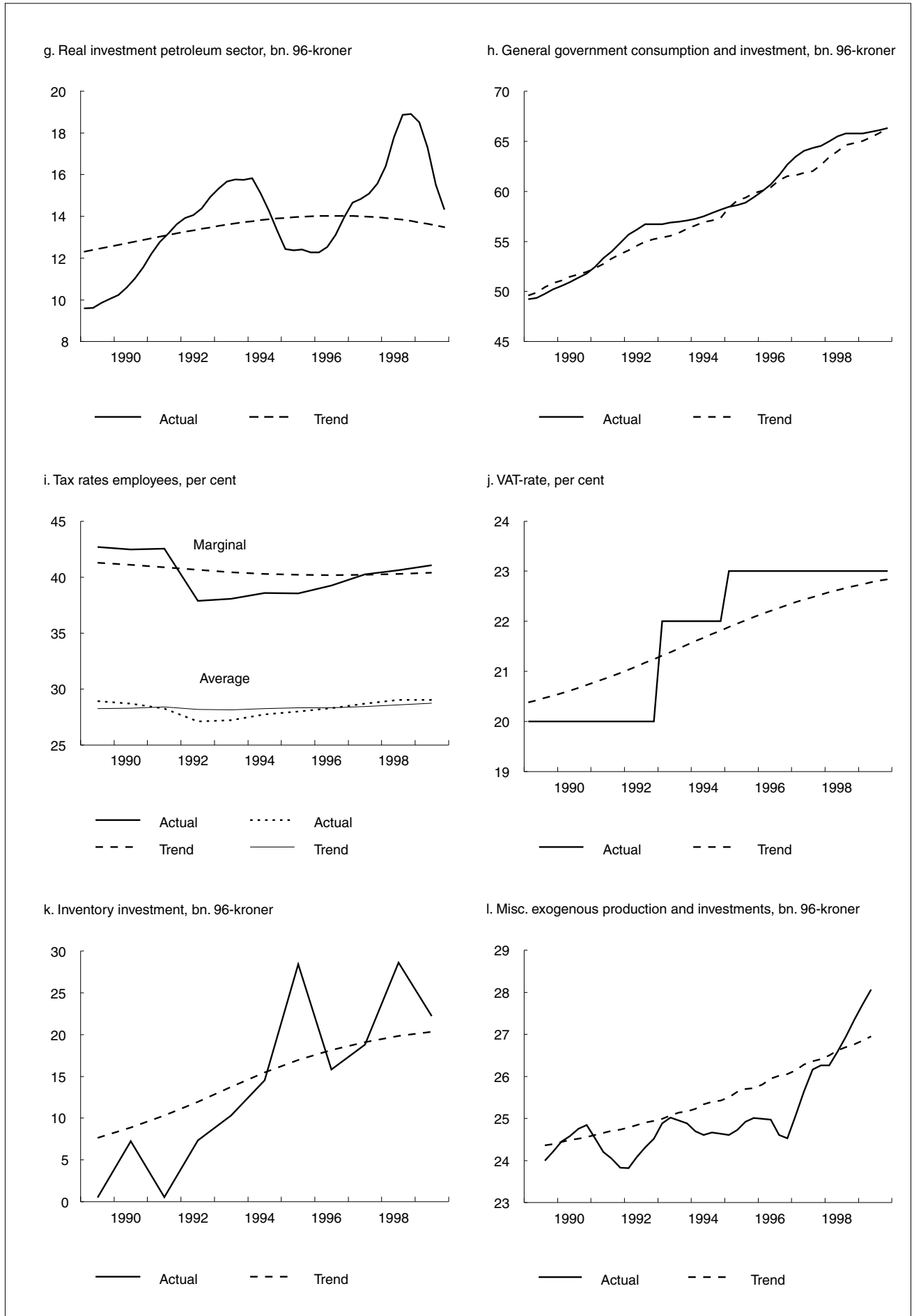


Figure 5. Actual and counter-factual cyclical deviations for GDP Mainland Norway. As a percentage of estimated trend

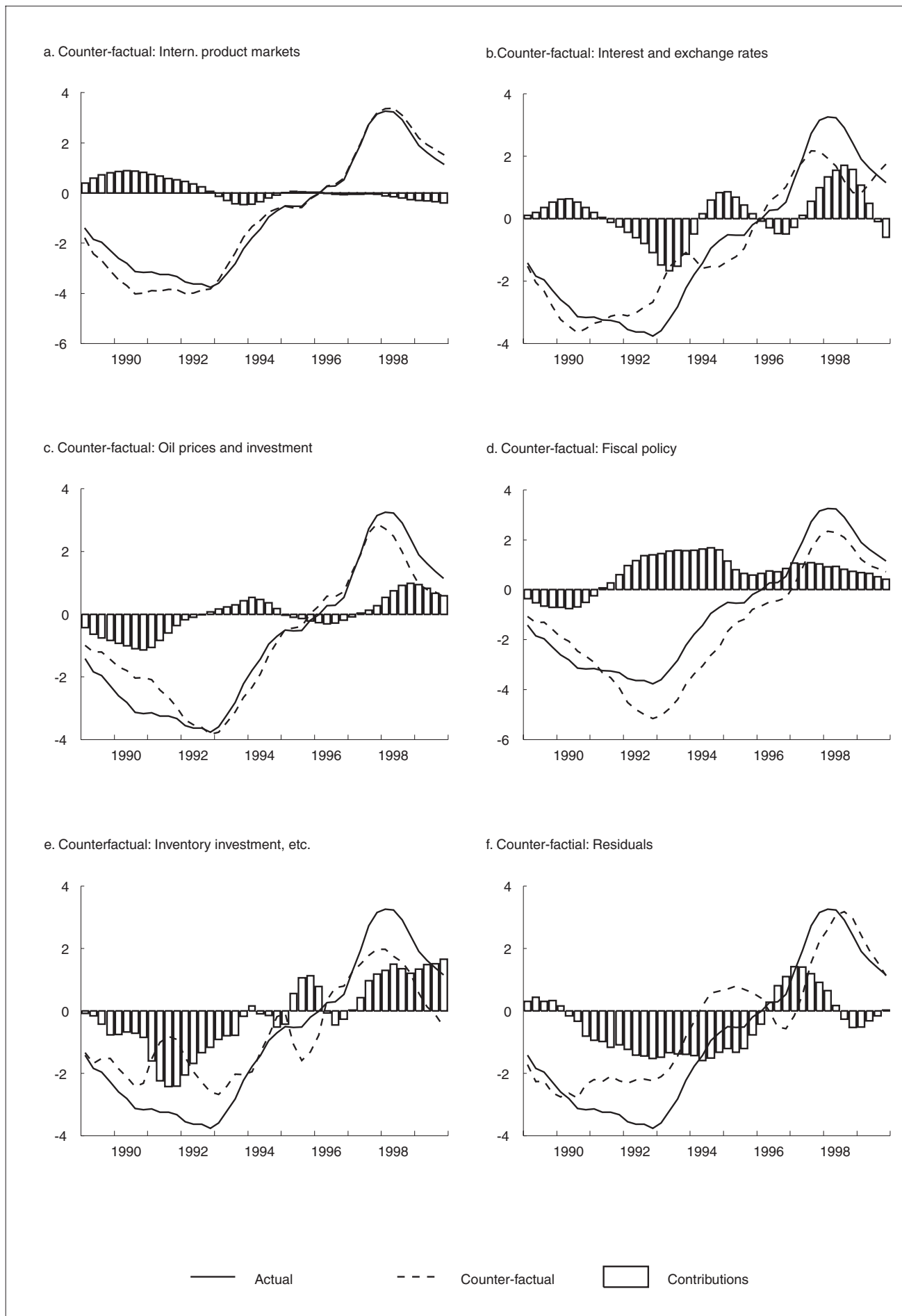


Table 2. Cyclical devtions for mainland GDP 1989-1999

As percentage of estimated trend	Recession							Boom				Average 1998-99
	Downturn				Upturn			Downturn				
	Contraction				Catch-up			Overheating		Cooling		
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	
Actual cyclical deviation	-1,9	-2,9	-3,2	-3,6	-3,0	-1,2	-0,4	0,3	2,3	3,0	1,5	-0,9
Contribution to the deviation from:												
Unexplained contributions	-1,9	-1,8	-0,3	-1,6	-1,2	-1,9	-1,2	-0,3	-0,9	-1,1	-0,5	-1,1
Estimated total contributions	0,0	-1,2	-3,0	-2,1	-1,8	0,6	0,8	0,5	3,1	4,0	2,0	0,3
International product markets	0,6	0,9	0,6	0,3	-0,3	-0,3	0,0	-0,0	-0,1	-0,2	-0,3	0,1
Interest and exchange rates	0,3	0,5	-0,0	-0,7	-1,5	0,3	0,5	-0,3	0,3	1,5	0,2	0,1
Oil prices and investment	-0,7	-1,1	-0,7	-0,1	0,3	0,4	-0,1	-0,3	0,1	0,8	0,8	-0,1
Fiscal policy	-0,6	-0,7	0,2	1,2	1,5	1,6	0,8	0,8	1,1	0,9	0,6	0,7
Inventory investment, etc	-0,4	-0,8	-2,2	-1,6	-0,7	-0,2	0,6	0,0	0,6	1,3	1,5	-0,2
Residuals	0,3	-0,3	-1,0	-1,4	-1,4	-1,5	-1,1	0,4	1,2	0,0	-0,2	-0,5

Table 3. Average absolute value of cyclical deviations for GDP Mainland Norway

As percentage of estimated trend	Recession 1989-95	Boom 1996-99	Whole period 1989-99
Actual cyclical deviation	2,3	1,8	2,1
Contribution to the deviation from:			
Unexplained contributions	1,4	0,7	1,1
Estimated total contributions	0,9	1,1	1,0
International product markets	-0,3	-0,2	-0,2
Interest and exchange rates	0,1	0,4	0,2
Oil prices and investment	0,3	0,4	0,3
Fiscal policy	-0,6	0,6	-0,2
Inventory investment, etc	0,7	0,7	0,7
Residuals	0,6	0,2	0,5

Table 4. Average absolute value of deviations from trend growth for GDP Mainland Norway

Annual percentage change in cyclical deviation	Cyclical downturn 1989-92	Cyclical upturn 1993-97	Cyclical downturn 1998-99
Actual cyclical deviation	1,3	1,2	1,0
Contribution to the deviation from:			
Unexplained contributions	1,5	0,7	0,4
Estimated total contributions	-0,3	0,6	0,6
International product markets	-0,1	-0,1	0,0
Interest and exchange rates	-0,1	0,2	0,7
Oil prices and investment	0,0	0,0	0,3
Fiscal policy	-0,3	-0,1	0,1
Inventory investment, etc	-0,2	0,4	0,3
Residuals	0,1	0,2	-0,5

level of mainland GDP through the period as a whole, even though they may have contributed to changing the cyclical path.

The line illustrating unexplained contributions is calculated as the share of actual deviation that is not explained by the estimated contributions combined. As discussed later, we assume that the unexplained contributions are primarily attributable to cyclical impulses that occurred before the period analyzed. The unexplained contributions have then also decreased over time.

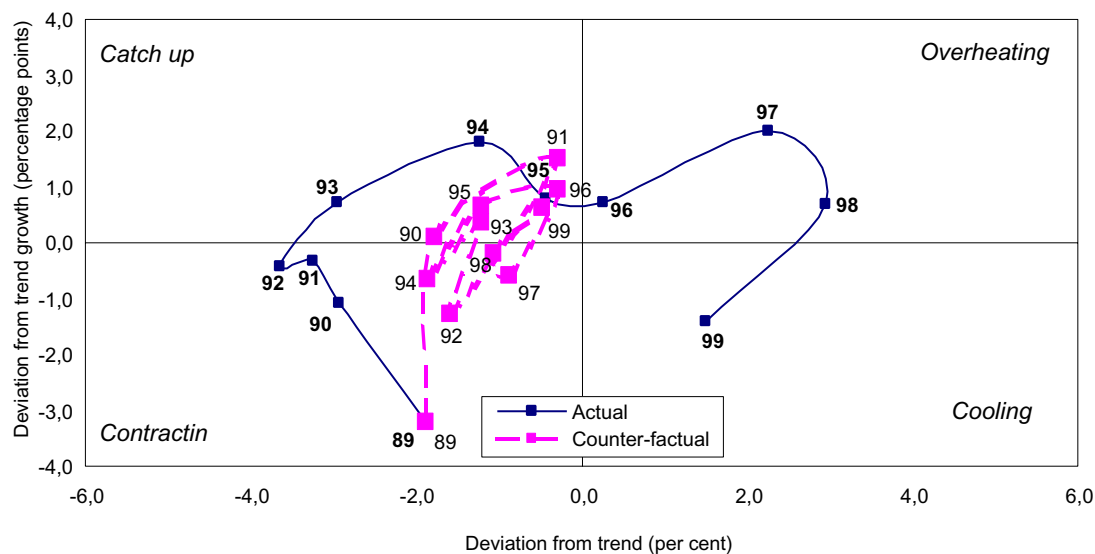
As a measure of average cyclical deviation over a period, we can use the mean absolute value of the cyclical deviations. The first line in Table 3 shows the mean absolute deviation for the actual GDP series for the period 1989-1999 as whole, and for the two periods of recession and boom, respectively. We see that the average cyclical impact during the recession in the period 1989-1995 (2.3 per cent) was somewhat stronger than during the boom in 1996-1999 (1.8 per cent). The other lines in the table show whether the various impulses contributed to increasing or redu-

cing the absolute deviation, i.e. amplifying or dampening the cyclical impact on mainland GDP.

Impulses from international product markets had a counter-cyclical impact during both the recession and the boom, while interest and exchange rates and oil prices and investment had a pro-cyclical effect in both periods. Fiscal policy made a counter-cyclical contribution in the period as a whole, but had a pro-cyclical impact during the boom.

The table shows that the largest contributions in the calculations have come from inventory investment, etc. and the residuals. Besides these contributions, however, the largest (pro-cyclical) contributions for the period as a whole come from oil prices and investment. If inventory investment had been modelled, the contributions from this variable would have been distributed on the other impulses. This would probably have reduced the counter-cyclical contributions from international product markets, and further amplified the pro-cyclical contributions from oil prices and investment.

Figure 6. Business cycles – actual and counter-factual – all impulses combined



In the same way that table 3 sheds light on the contributions to the absolute value of the cyclical deviations during the period of recession and the boom, Table 4 shows the estimated contributions⁷ to the absolute value of the growth in the cyclical deviations during the cyclical upturn and the downturns.⁸

The first line shows that growth through all three cyclical phases was a good 1 percentage point below or above trend growth (and trend growth in this period – as noted above – rose from a little less than 2 per cent a year to close to 2.5 per cent). Inasmuch as the years that are grouped together in each of the phases are all either below trend growth or above trend growth, growth during the cyclical downturn in 1989-1992 and 1998-1999 was a good 1 percentage point below trend growth, while during the period of expansion in 1993-1997 growth was a good 1 percentage point above trend growth.

The unexplained contribution to deviations from trend growth has been considerable, albeit declining over time. On the other hand, the total estimated contribution to deviations from trend growth has risen

over time. Of the various shifts, the variables that have contributed to increasing the deviation from trend growth include interest rates/exchange rates and oil prices/investment, in addition to the contributions from inventory investment. In particular, the change in interest rates and exchange rates contributed to amplifying the deviation from trend growth in 1998-1999.⁹

In addition to the various shifts, we have calculated the total contribution from all impulses. Table 3 shows that this helps us to explain 1 percentage point of the actual mean absolute cyclical deviation of a good 2 per cent. This may not sound very impressive, but a phase diagram for this calculation shows that if all the variables analyzed had followed their trend movements, the cyclical impact on mainland GDP would have been considerably smaller (see figure 6). The solid line corresponds to the curve in figure 3 above (but now based on the annual average and not quarterly data), i.e. it shows the combination of the actual level and growth for mainland GDP, both measured as deviations from trend. The dashed line shows what developments would have been if all

7 Whereas table 3 was based on the average for quarterly figures, table 4 is based on the average for annual figures.

8 A special reason for showing the absolute values of the deviations from trend growth in table 4 is that the growth contributions in the counter-factual calculations are so strong in some years that a counter-factual path would have resulted in different periods with cyclical upturns and downturns. In using the time period shown at the top of the table, the average for the counter-factual deviation from trend growth will include years with both upturns and downturns, i.e. the average deviation will be smaller than if we had estimated years with an upturn and downturn separately. We would have underestimated the positive growth deviation in cyclical upturns, and underestimated the negative growth deviation during downturns. We would then have overestimated the contributions from the different impulses to the deviation from trend. This problem is avoided by, instead, looking at the absolute value of the growth deviations. Growth in the cyclical deviation is the same as the deviation from trend growth.

9 Since the peak was passed in the first quarter of 1998 (see table 1), we have chosen to consider 1998 a year of contraction. However, growth through the end of 1997 and into 1998 was so strong that annualized growth from 1997 to 1998 was higher than trend growth. This implies that 1998 could just as well been considered a year of expansion. This has particular relevance to the calculations of growth contributions from interest rates and exchange rates. The calculations show that these impulses contributed markedly to the sharp growth at the end of the upturn (c.f. the low level of interest rates in 1997) and hence to annual growth in 1998, and also made a marked contribution to the subsequent downturn (c.f. the increase in interest rates later in 1998). Conversely, fiscal policy, in particular, contributed to reducing the deviation from trend growth, primarily because of the marked shift to a more expansionary policy towards the end of the downturn in 1991-1992.

impulse variables had followed trend. The contribution from the variables is seen by comparing points for the same year (the years are indicated by figures). We see that both the recession early in the period and the boom at the end of the period would have been considerably more moderate.

The dashed, grey curve in figure 6 summarizes the cyclical effects – in terms of level and growth – which we are not able to explain with the help of our calculations. They are not ascribable to the “proper” cyclical impulses that we have studied or model residuals (impulses which the model by definition cannot explain). They may be due to other variables that we have not studied, although we have basically included all variables that we felt could be expected to make substantial contributions in this period. We are then left with contributions from impulses that existed before the model-based calculations start in 1989.

We see that these contributions are located clearly to the left in the diagram for all years in the period analyzed. This is exactly what we would have expected in view of the particularly strong cyclical downturn through 1988. The negative, dynamic factors that existed at the end of 1988 were virtually countless: Oil prices had fallen sharply, real after-tax interest rates rose and debt-equity ratios in the private sector were high, there was excess capacity in many industries, house prices had collapsed, fiscal policy had started to make strong negative contributions and the Income Regulation Act was introduced, just to mention a few. If our calculations had started an earlier year (e.g. in 1973 as in the project referred to earlier), these events – and their after-effects – could have been explained by the same type of impulses that we have studied for the period 1989-1999 (in addition, naturally, to the impulses from deregulations in the 1980s, which are also included as explanatory variables in the model).

A period of eleven years is too limited to maintain that a pattern exists. However, the same conclusions were reached by the earlier project studying the history of Norwegian business cycles in the 1980s: Contributions from international product markets had a counter-cyclical impact, petroleum investment had a pro-cyclical effect and fiscal policy was generally counter-cyclical, but pro-cyclical for a shorter period during the overheating phase, i.e. we can now substantiate this pattern based on the experience of almost twenty years. Whereas the earlier project confirmed that the deregulation of financial and housing markets in the 1980s made the strongest cyclical contributions, we are left in this analysis with a large, albeit declining, unexplained residual with negative cyclical contributions, which it seems natural to assume is due to impulses that arose prior to the period studied, such as the after-effects of deregulation.

Among the new impulses analyzed in this study, the impulses from interest rates and exchange rates appear to have contributed to amplifying cyclical fluctuations in the Norwegian economy from 1991, irrespective of whether we consider cyclical movements in terms of level or growth. It is important to bear in mind, however, that here we are discussing the effects on the business cycle for mainland GDP and not the question of stabilizing other macroeconomic variables.

In the period analyzed there have been no clear signs that cyclical impulses via international product markets have been offset by impulses via financial markets, as might have been hoped. Admittedly, cyclical impulses via international real interest rates and international prices have to some extent offset each other, but this effect is cancelled when we also include contributions from international market growth (and from particular factors that have influenced exchange and interest rate movements in Norway). This may be because international interest rate impulses actually lag the cyclical fluctuations in international product markets (delays in the implementation and transmission mean that monetary policy does not have a counter-cyclical effect), or it may be due to various lags in the impact of these impulses in the Norwegian economy. Not least, it may be because the cyclical impulses via international product and capital markets do not actually originate from the same economic area: As a result of Norway's decision in October 1990 to adopt an exchange rate target against the ECU/euro, Norwegian interest rates are primarily influenced by interest rates in the ECU/euro area, whereas volume and price indicators for product markets reflect a broader trade-weighted set of countries where, among other things, developments in Sweden, the UK and the US are important.

Contributions from fiscal policy

In contrast to the first half of the 1980s, when there appeared to be a deliberate policy to refrain from using fiscal policy for stabilization purposes (see Cappelen, Johansen and Moum, 1993), and when fiscal policy in periods functioned pro-cyclically, the intention since 1986 has been to use fiscal policy to curb cyclical fluctuations in the economy. With the report presented by the last Employment Commission (NOU, 1992), this became one of the pillars of the “Solidarity Alternative”. Measured by the Ministry of Finance's budget indicator (annual change in the non-oil, cyclically adjusted surplus net of interest payments measured as a percentage of mainland GDP), policy largely achieved this: fiscal policy was expansionary in the years 1989-1993 and contractionary in the years 1994-1999. The budget indicator, however, has some shortcomings as a measure of policy effects. First, it does not take into account that different parts of the budget have varying effects on the Norwegian economy. Second, it only shows the effects of resolutions that relate to the central government sector,

whereas resolutions that only have a bearing on the local government sector or state-owned limited companies are excluded. Third, it shows impulses, and not effects, i.e. the indicator disregards the fact that it takes time before the effects of the policy are felt and that the speed at which various policy elements take effect varies. Fourth, it must be taken into account that it only shows annual changes, which means that policy in the sense of level may be contractionary even if the budget becomes more expansionary (or more precisely: less contractionary). This would be acceptable if we wanted to evaluate the impulses to cyclical fluctuations in terms of growth. However, as we have argued earlier, it is probably the level of the cyclical deviation that has macroeconomic effects rather than a deviation of the growth rate from trend.

Table 2 shows that in spite of the less contractionary policy in 1989 and 1990, fiscal policy continued to make a strong negative contribution to the cyclical deviation for mainland GDP, thereby contributing to amplifying the recession. It was primarily spending on goods and services that made a negative contribution. It was not until 1991 that a more expansionary policy made a positive cyclical contribution. After this time fiscal policy made an expansionary contribution to the Norwegian economy through the remainder of the period analyzed. Spending on goods and services (including the school reform for six-year olds and Gardermoen airport) made an expansionary contribution from 1992 and later, while taxes, excise duties and transfers made an expansionary contribution in the years 1991-1997. Since the latter part of the period was marked by a boom, it was thus only in the years 1991-1996 that fiscal policy contributed to reducing the cyclical deviation for mainland GDP, while it contributed to amplifying the deviation in the years 1989-1990 and 1997-1999. This means that in five out of eleven years fiscal policy made a pro-cyclical contribution to the cyclical deviation.

Despite five years with a pro-cyclical policy, the clear counter-cyclical contributions from fiscal policy in the years 1991-1996 helped to curb the mean absolute value of cyclical deviations for the period as a whole, albeit only slightly (-0.2 percentage point). However, since the counter-cyclical contributions consisted of an expansionary policy during the recession, and the pro-cyclical to some extent an expansionary policy during the boom, they contributed to increasing the average cyclical deviation for the period by 0.7 percentage point.

If we look at the change in the cyclical contribution, fiscal policy emerges as somewhat more counter-cyclical, generally in line with the budget indicator, which also indicates changes. The contribution from fiscal policy to growth in the Norwegian economy increased in the period 1991-1994, while the economy was still in deep recession and the upturn that began in 1993

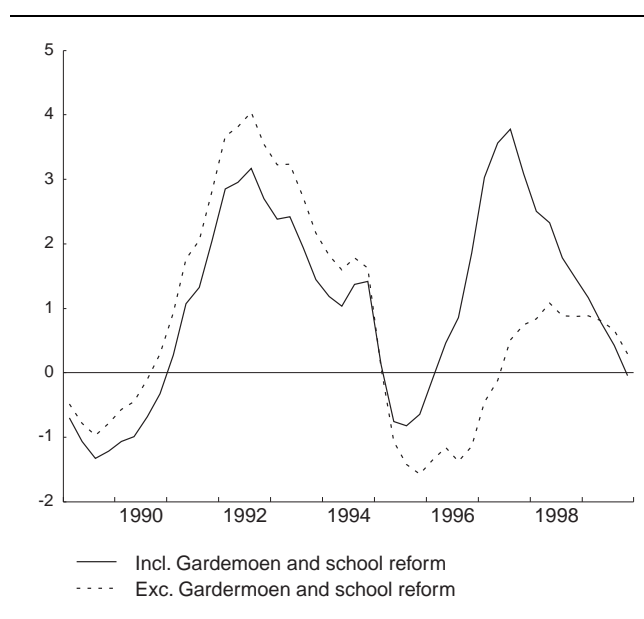
was still at an early stage. The contribution was reduced in 1995-1996, i.e. fiscal policy contributed to curbing growth when the cyclical upturn moved the economy from recession to a boom. Thereafter, however, the contribution increased in the boom year 1997 and then declined somewhat in 1998 and 1999.

Orienting fiscal policy in such a way that business cycles can be entirely avoided is impossible; it is often difficult enough to have the right sign. It takes time to obtain information about cyclical developments and it takes time to formulate and implement policy. It also takes time before the policy implemented affects the economy. In retrospect, it is easy to say that policy should have been revised in a more expansionary direction as early as 1988. It took a long time, however, to gain a good picture of the amplitude of the downturn at the end of the 1980s and the depth and duration of the subsequent recession. At the end of the 1980s, fiscal policy therefore faced particularly difficult challenges. For the years 1991-1996, however, the counter-cyclical policy can be characterized as unconditionally successful.

It is interesting to compare this with the years with the strongest pro-cyclical contributions in 1997-1998 (about 1 percentage point higher cyclical deviation), which came in particular at the end of the overheating phase, i.e. the diametrically opposite phase of the cycle compared with the years 1991-1992. Here, one might basically expect the possibilities for counter-cyclical tightening to be just as good as the possibilities for the counter-cyclical expansion that took place in the early 1990s.

The pro-cyclical dimension is particularly strong in 1997. It was the fifth consecutive year of the upturn, but it was only the second year of a boom. By way of comparison, 1991 (the year that fiscal policy contributions turned counter-cyclical) was the fourth year of a downturn and the third of a recession. It may also be relevant that 1996 was a year with a generally balanced situation in the Norwegian economy, where mainland GDP was close to trend, both in terms of level and growth. Policy may thus have been based on the assumption that the economy was now moving along a balanced path without sufficiently understanding that underlying cyclical developments required a continued policy shift in a contractionary direction if we were to avoid bringing the economy out of this balanced path. Another factor may have been that fiscal leeway appeared to be considerable as oil prices for a period around the end of 1996 were more than USD 20 per barrel for the first time since the Gulf war in 1990-1991. It is also worth noting that 1997 was characterized by so much disagreement about budgetary policy that it ended with a change in Government following the general election that autumn.

Figure 7. Cyclical deviations in public consumption and investments, with and without Gardermoen and school reform. As a percentage of estimated trend



Finally, it is natural to point to the shortcomings of the budget indicator, as mentioned earlier, which mean that this indicator does not provide an adequate picture of the total effect of all government spending resolutions in this period. We have attempted to shed light on this point in figure 7. This shows the trend deviation (i.e. the cyclical impulse) for general government consumption and investment when, as in the fiscal policy indicator, investment in connection with the school reform and Gardermoen airport is excluded (dashed line) and when investment expenditure for Gardermoen and the school reform is included as part of fiscal policy (solid line). We see that these two indicators provide a dramatically different description of the expansiveness of fiscal policy. *If we include Gardermoen and the school reform as part of fiscal policy, the impulse from the expenditure side was more expansionary in the years around 1997 than during the period of counter-cyclical policy in the early 1990s.*

Against this background, the question may be raised as to whether the school reform and the development of Gardermoen airport should have been dealt with in a different way in the fiscal policy indicator, possibly by supplementing this indicator with calculations showing the overall effect of the various fiscal policy measures. It is unfortunate that extensive public sector reforms and large public sector development projects are not subject to fiscal policy priorities for purely technical reasons and are not included in the fiscal policy indicator.

Even though these shortcomings in the fiscal policy indicator may have contributed to a somewhat distorted impression of the cyclical impulses from fiscal policy (in a broad sense) in the 1990s, it is interesting that the pro-cyclical fiscal policy in 1997 is part of a pattern: Fiscal policy has had a pro-cyclical effect at the end of all cyclical upturns after expectations of oil revenues became firmly entrenched in 1976. According to Bowitz and Hove (1996), fiscal policy thus made an expansionary contribution to the economy in the overheating phase in 1976, 1979 and 1985. Moreover, fiscal policy made a counter-cyclical contribution at the end of all subsequent recessions, i.e. in the catch-up phase. For the other two phases, the cooling and contraction phase, the experience of the 1970s and 1990s is somewhat mixed, with a tendency (2 versus 1) of a pro-cyclical policy in the cooling phase (i.e. as in 1998-1999) and a counter-cyclical policy in the recession phase. One possible conclusion is that Norway has the ability to conduct a counter-cyclical fiscal policy, particularly during (the last part of) recession, but never when the economy is booming. The sluice gate must then be opened, possibly to prevent the sluice itself from being carried away by the current.¹⁰

Conclusions

Up to the early 1980s business cycles in Norway were heavily influenced by international developments, with a certain lag. The cyclical effects were in general fairly limited and they were smaller in Norway than in many other countries.

Since the first half of the 1980s and up to the present time, this situation has changed markedly. Cyclical fluctuations have been considerably more pronounced and domestic factors have taken over as the dominant driving force behind cyclical movements. Developments in the international economy have generally contributed to curbing the cyclical effects to some extent.

The deregulation that was implemented for many areas of the Norwegian economy in the mid-1980s is probably the factor that has had the strongest influence on the business cycle, and this has most likely had substantial after-effects far into the 1990s.

Changes in petroleum investment have contributed to amplifying cyclical fluctuations in the 1990s. Interest and exchange rate movements have to some extent contributed to amplifying cyclical effects, but the picture here is not as clear-cut.

¹⁰ An important precondition for asserting that policy was pro-cyclical in the years 1997-1999 is a correct estimation of the trend at the end of the period. This trend depends on the forecasts by which the series are extended. These forecasts are based on the assumption of growth in general government expenditure of 2 per cent a year, considerably lower than the level seen in the years 1997-1999, an unchanged tax system and only inflation adjustments of transfer rates. If fiscal policy in the years ahead proves to be considerably more expansionary, policy in previous years – by definition – later emerges as less expansionary in cyclical terms.

In the 1990s, fiscal policy has generally curbed cyclical effects in the Norwegian economy, but not as much as could be expected. This is partly due to the development of Gardermoen airport and the school reform, which contributed to an overall expansionary fiscal policy in the latter part of the 1990s.

There are probably several reasons why cyclical fluctuations were considerably more pronounced in the 1980s and 1990s compared with earlier. One factor is that several markets have been deregulated and that the multiplier effects of various types of shock to which the economy is exposed have therefore increased. Another reason is the effects of the petroleum sector on the Norwegian economy. The economic policy conducted has largely managed to prevent fluctuations in petroleum revenues from resulting in more or less expansionary government budgets. On the other hand, it has not been possible to the same extent to prevent substantial fluctuations in petroleum investment. The persistent efforts to increase Norwegian enterprises' share of investment deliveries thus contributed to amplifying cyclical fluctuations in the Norwegian economy, and hence made Norwegian enterprises cyclically sensitive.

The importance of petroleum activities directly through investment in the sector and indirectly through government budgets is so great that we must assume that this will continue to have a considerable impact on business cycles in the period ahead. However, as petroleum activities gradually move into a "harvesting phase", this may change to some extent. In the long term, the relative importance of petroleum-related activities will decline. The Norwegian economy may then be expected to revert to a cyclical pattern where international developments are of greater importance, as was the situation up to the mid-1970s, and that domestic conditions will be of lesser importance. On the other hand, the new pattern is unlikely to be identical to the one experienced earlier because internationally exposed industries other than commodity sectors will become increasingly important, and the opening up of international capital markets has most likely changed the cyclical pattern internationally and the way in which impulses are transmitted to the Norwegian economy.

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