

CYCLICALITY OF THE DANISH GOVERNMENT BUDGET

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1. Introduction

The government budget generally depends on economic activity. The sensitivity with respect to economic activity concerns both revenue and expenditure items. Hence, any assessment of the current stance of fiscal policy and of the sustainability of public finances in the longer term should take into account the cyclical position. Furthermore, the government budget also depends on e.g. the wage- and price development, as different expenditure- and revenue components are indexed differently.

Inspired by OECD, EU and IMF the Danish Ministry of Finance¹ has estimated a structural budget balance, based on an output gap derived from model simulations. Still, the most common way in Denmark to assess fiscal policy is by means of the so-called fiscal effect, which was introduced by the Ministry of Finance and is published regularly in the monitoring of the fiscal policy. It measures the GDP-effect of fiscal policy and depends *inter alia* on the model used. Danmarks Nationalbank regularly uses its own model and forecasts for an internal evaluation of the fiscal effect.

In this paper we concentrate on the structural budget balance and the impact of economic activity on government finances. The purpose of

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¹ See the Finansredegørelse by the Ministry of Finance, various years.

the paper is double. In the first place the cyclicality of the Danish government budget is investigated by looking at the dynamic responses of the most cyclically dependent revenue and expenditure components to different demand shocks. This enables one to see to which degree the cyclicality of the government budget depends on the cause for the change in the activity, e.g. shocks to private consumption versus export shocks.

Second, a structural budget balance is calculated. The focus is on the definition of a meaningful measure of the output-gap in a fixed-exchange-rate regime and on fiscal policy in the most recent years. In a small open economy with fixed exchange rates wages cannot deviate in the longer run from the wage trend in the anchor economy. Hence, the structural rate of unemployment is defined in terms of the wage differential to Germany. The determination of the output gap and hence the structural budget balance is generally subject to substantial uncertainty and should be interpreted with caution. A simpler and more transparent method based solely on changes in the unemployment rate is therefore proposed as an alternative. This method allows only for an assessment of the underlying changes in the cyclically adjusted budget balance and gives no measure of the level of the structural budget.

In the next section follows some model simulations to shed light on the sensitivity of public finances with respect to economic activity. Then follows an attempt to evaluate the public finances adjusted for cyclical swings. This involves the estimation of an output gap, which serves to calculate the cyclical component of the budget. In section 4 the connection between the structural budget and the fiscal effects is addressed. A simpler measure, which is based on changes in the unemployment rate, but requires no model calculations, is presented in section 5. The final section contains conclusions.

2. The sensitivity of public finances with respect to activity

In this section the sensitivity of public finances with respect to economic activity is investigated by looking at multiplier effects to the most cyclically dependent budget components from different aggregate demand shocks. To this end we use Danmarks Nationalbank's quarterly model, Mona. Positive shocks to private consumption and exports, respectively, and a fall in interest rates, all corresponding to a 1 per-cent increase in private sector value added after 1-2 years, and a shock to

public consumption, corresponding to a 1 per-cent increase in GDP, are considered. For comparison we also show a non-model-based calculation based on simple proportionality between employment and output, and stylised assumptions concerning the demand side.

2.1 *The reaction in public finances to growth in private consumption*

In the first model simulation we look at the reaction in public finances to an exogenous, permanent shock to private consumption, which after 1-2 years raises private sector value added by 1 per cent². Car purchases rises more quickly than the other parts of private consumption, corresponding to an elasticity of 2 relative to total private consumption. In percentage terms real GDP increases more than private sector value added. This follows from the derived increase indirect taxes contained in GDP, which more than outweighs the dead-weight loss from the public sector.

Scenario with growth in private consumption

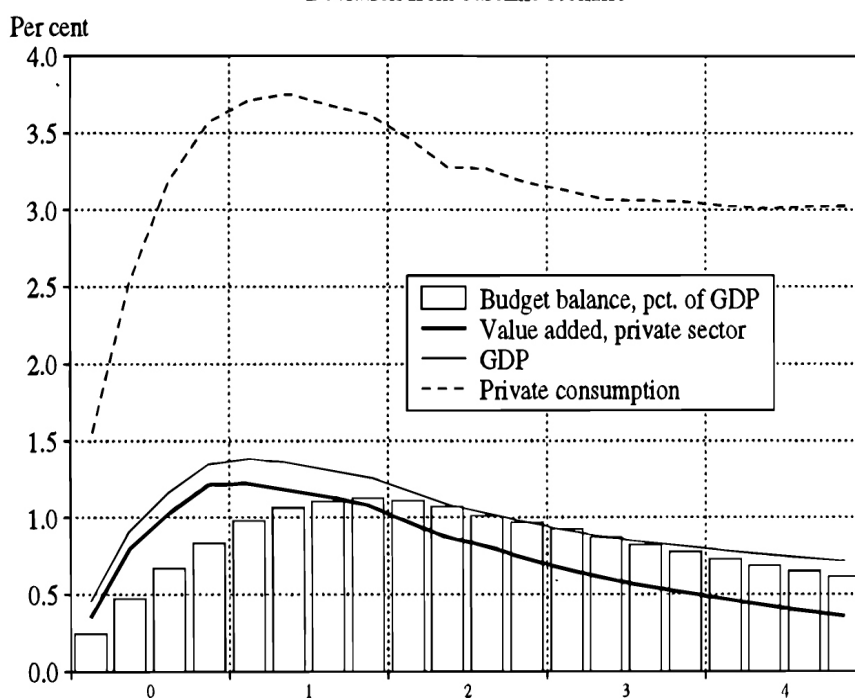
The government budget improves with increased activity, although with a certain lag. This follows from a general time lag in taxation, e.g. a one-year lag in corporate taxes relative to firms' earnings, but also because incomes and employment, which determine the two most important budget items, namely income taxes and unemployment benefits, follow production with a certain lag. The effect on public finances reaches a peak after few years, and the total effect in the 2nd and 3rd year amounts to 1,05 per cent of GDP.

The improvement of the public finances concerns both direct taxes, indirect taxes, and benefits. Relative to the other model experiments, cf. section b-d, which give rise to similar changes in activity, namely export growth, growth in public consumption and a fall in interest rates, respectively, the strong increase in indirect taxes is significant. This of course is due to the fact that indirect taxes relate directly to consumption.

² In concrete terms the experiment involves some iterations continuing until the exogenous impulse stimulates private sector value added on average for the 2nd and 3rd year after the impulse by exactly 1 per cent relative to the baseline scenario.

Activity and government budget

Deviation from baseline scenario



The total expenditures contribute to a deterioration of the government budget despite the positive contribution from unemployment benefits. This is mainly due to the high degree of indexation of public expenditures to price- and wage developments, which will accelerate when activity picks up. This effect is clearly illustrated by the last three columns, where the automatic wage reaction is switched off in the model. The difference is particularly pronounced for the public expenditures, but also concerns direct and indirect taxes. Public expenditures (pensions, consumption, etc.) are generally more indexed than revenues, and take off in the model after 3-4 years in parallel with price and wage increases.

In the model other transfers than unemployment benefits simply follow the development in wages in the private sector. In reality one could imagine a certain dependence on the business cycle also for these items. It might well be that the sensitivity with respect to the business cycle is underestimated.

Reaction in selected budget items¹⁾ to an increase in private consumption corresponding to a 1 per cent increase in private sector value added in the 2nd and 3rd year

	1 st year	2 nd and 3 rd year			2 nd and 3 rd year (exog wages)		
	Per cent	Per cent	Bill.kr.	Per cent of GDP	Per cent	Bill.kr.	Per cent of GDP
Public revenues	0.95	1.77	10.31	0.99	1.38	8.02	0.77
Direct taxes	0.38	1.25	4.15	0.40	0.82	2.74	0.26
Income tax	0.42	1.13	2.69	0.26	0.67	1.61	0.15
Gross tax	0.63	1.87	0.83	0.08	1.13	0.50	0.05
Corporate tax	0.00	2.31	0.63	0.06	2.30	0.63	0.06
Indirect taxes	2.24	3.11	6.04	0.58	2.69	5.22	0.50
VAT	2.08	3.05	3.24	0.31	2.57	2.74	0.26
Car duties	5.15	7.07	1.20	0.12	6.15	1.04	0.10
Excise duties	2.51	3.16	1.56	0.15	2.84	1.40	0.13
Public expenditures	0.03	-0.06	-0.32	-0.03	0.14	0.78	0.07
Unemployment benefits	2.36	7.09	1.75	0.17	6.87	1.69	0.16
Interest revenues, net	-0.39	-3.51	1.00	0.10	-2.98	0.85	0.08
Public finances, total			10.99	1.05		9.65	0.93
Real GDP	0.97	1.19			1.14		
Total employment ²⁾	0.51	1.02	26.3		0.98	25.2	
Unemployment ²⁾	0.24	0.58	16.9		0.55	15.9	

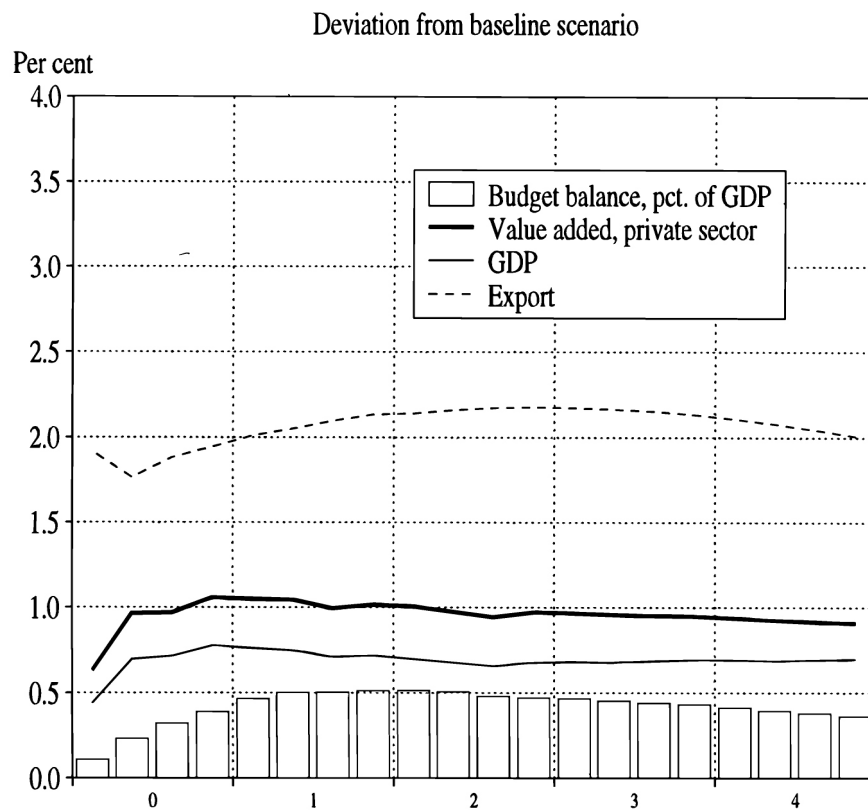
1) The different sub items to both revenues and expenditures are not exhaustive. The table is normalised such that every positive number corresponds to an improvement of the public finances.

2) For total employment and unemployment the 3rd and 6th columns indicate changes in 1,000 persons. For unemployment the 1st, 2nd and 5th columns indicate the fall in percentage points.

2.2 *The reaction in public finances to export growth*

An export led growth in the economy improves the public finances clearly less than an increase in consumption. The difference concerns mainly the indirect taxes, which are not imposed on exports, whereas direct taxes and unemployment benefits are affected to about the same extent. As before the effect on public expenditures, and to some extent revenues, depends heavily on the wage response.

Activity and government budget Simulation with export growth



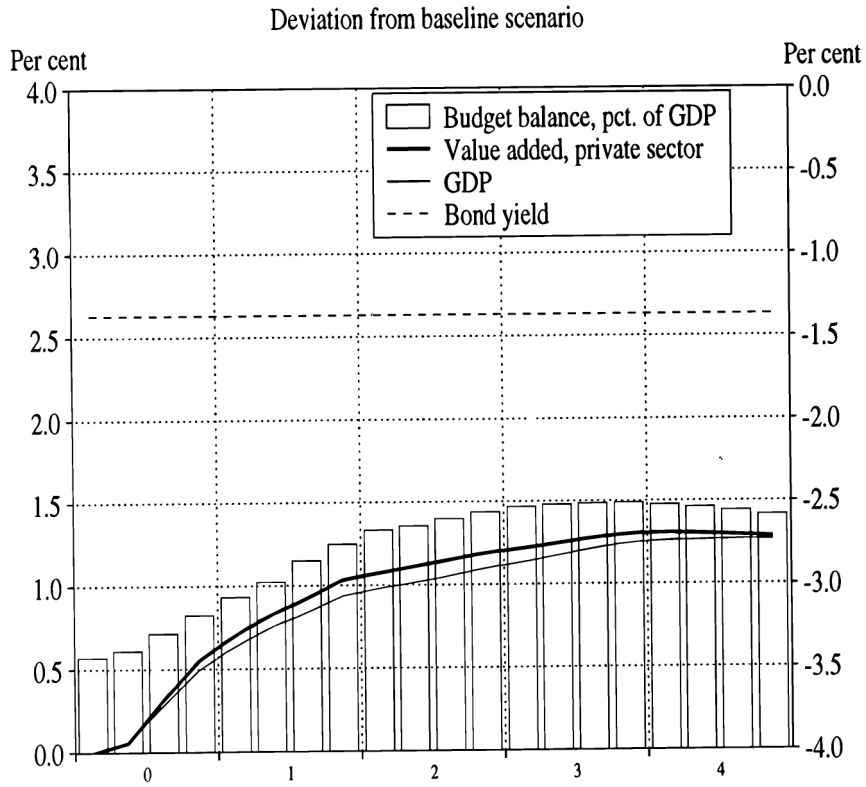
**Reaction in selected budget items to an increase in exports
corresponding to a 1 per cent increase in private sector value added
in the 2nd and 3rd year**

	1 st year	2 nd and 3 rd year			2 nd and 3 rd year (exog wages)		
	Per cent	Per cent	Bill.kr.	Per cent of GDP	Per cent	Bill.kr.	Per cent of GDP
Public revenues	0.40	0.82	4.81	0.46	0.58	3.39	0.33
Direct taxes	0.39	1.00	3.33	0.32	0.63	2.09	0.20
Income tax	0.42	0.97	2.32	0.22	0.55	1.32	0.13
Gross tax	0.72	1.81	0.80	0.08	1.11	0.49	0.05
Corporate tax	0.00	0.75	0.21	0.02	0.99	0.27	0.03
Indirect taxes	0.52	0.71	1.37	0.13	0.64	1.24	0.12
VAT	0.49	0.80	0.85	0.08	0.66	0.71	0.07
Car duties	0.75	0.94	0.16	0.02	0.94	0.16	0.02
Excise duties	0.65	0.64	0.32	0.03	0.68	0.34	0.03
Public expenditures	0.07	-0.02	-0.12	-0.01	0.17	0.97	0.09
Unemployment benefits	2.70	6.90	1.70	0.16	6.76	1.66	0.16
Interest revenues, net	-0.18	-1.64	0.47	0.04	-1.42	0.40	0.04
Public finances, total			5.15	0.49		4.76	0.46
Real GDP	0.66	0.71			0.72		
Total employment	0.57	0.99	25.5		0.96	24.6	
Unemployment	0.28	0.56	16.4		0.54	15.7	

2.3 The reaction in public finances to a fall in interest rates

A fall in interest rates, which in terms of the change in activity is equivalent to the above scenarios, improve the public finances clearly more, especially due to a more favourable debt service.

Activity and government budget Simulation with general fall in interest rates



On the other hand, the primary budget evolves less favourably, mainly because investments, which are generally less subject to taxation than consumption, contribute relatively much, and also the interest revenues of private sector are reduced³.

³ Besides, the pension fund tax, which depends on an imputed real interest rate, is exogenous in the model. This contributes to an underestimation of the budgetary effect.

**Reaction in selected budget items to a fall in interest rates
corresponding to a 1 per cent increase
in the private sector value added in the 2nd and 3rd year**

	1 st year	2 nd and 3 rd year			2 nd and 3 rd year (exog)		
	Per cent	Per cent	Bill. kr.	Per cent of GDP	Per cent	Bill. kr.	Per cent of GDP
Public revenues	0.09	0.91	5.29	0.51	0.78	4.56	0.44
Direct taxes	-0.04	0.67	2.23	0.21	0.50	1.68	0.16
Income tax	-0.07	0.53	1.26	0.12	0.35	0.84	0.08
Gross tax	0.13	1.21	0.54	0.05	0.89	0.39	0.04
Corporate tax	0.00	1.60	0.44	0.04	1.61	0.44	0.04
Indirect taxes	0.33	1.55	3.00	0.29	1.47	2.85	0.27
VAT	0.39	1.78	1.90	0.18	1.66	1.77	0.17
Car duties	0.55	2.75	0.47	0.04	2.65	0.45	0.04
Excise duties	0.25	1.20	0.59	0.06	1.20	0.59	0.06
Public expenditures	0.00	0.03	0.16	0.02	0.10	0.54	0.05
Unemployment benefits	0.49	5.00	1.23	0.12	4.99	1.23	0.12
Interest revenues, net	-20.63	-26.07	7.46	0.72	-24.34	6.96	0.67
Public finances, total			12.91	1.24		12.06	1.16
Real GDP	0.21	0.92			0.91		
Total employment	0.11	0.76	19.5		0.75	19.4	
Unemployment	0.05	0.41	11.7		0.40	11.6	

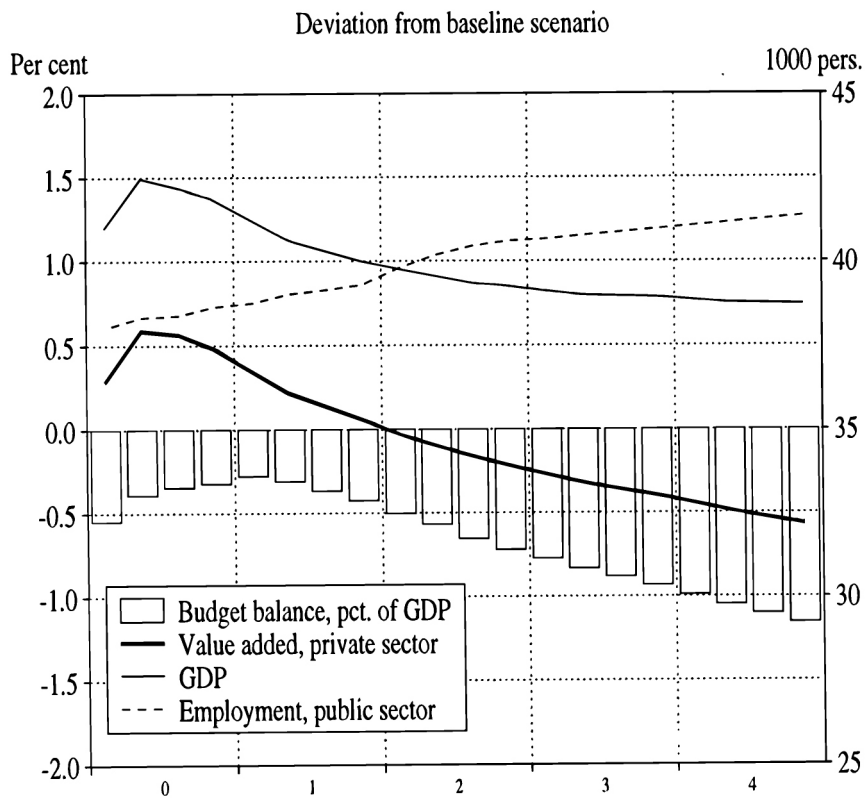
2.4 *The reaction in public finances to growth in public consumption*

An increase in public consumption, equally distributed on goods purchases and employment, of course deteriorates the public finances. If the direct effect on expenditures is disregarded, one gets positive derived effects on the public finances, which are slightly smaller than the effects from an increase in private consumption. It is difficult, due to crowding out, to raise private sector value added over the chosen time horizon in this scenario. Instead we look at a 1 per cent increase in total GDP.

Relative to the other scenarios indirect taxes weigh less heavily. Goods purchases by the public sector are subject to almost the same

VAT as the private sector, but only account for half of the expansion in public consumption. Income taxes and unemployment benefits are important here. The employment content of this scenario is particularly big and the fall in unemployment correspondingly large, which influences the income tax and unemployment benefits. For the same reason the difference between endogenous and exogenous wages is relatively large in this scenario, as the Phillips-curve effect is more important due to the large change in employment.

Activity and government Budget Scenario with growth in public consumption



2.5 *The effect on public finances of an 1 per cent increase in GDP - "back-of-an-envelope" calculations*

Based on some simple, stylised relationships we attempt to assess the effect on public finances from an increase in employment of 29,000 persons⁴. The calculation is meant to apply to the long run, and we use ratios based on 1998-figures, i.e. an average view rather than a marginal view⁵.

The increase in employment in the private sector implies an increase in wages of 7.4 bill.kr. The participation rate is assumed to be constant in the longer run, and the unemployment hence falls by 29,000 persons as well, implying a fall in benefits of 3.1 bill.kr. Productivity and mark-up are also assumed to be exogenous. The factor income in the private sector therefore increases by 11.6 bill.kr., and profits residually by 4.2 bill.kr.

The point of reference for the experiments is a given change in employment and production, which together determine direct taxes and transfers. The total demand effect (less imports) is also given, but not its composition. This composition is decisive for indirect taxes. In the below table, which reports the effect on public finances and on the most cyclically dependent sub-components, three possibilities for the distribution on demand components of the increase in production are allowed for.

⁴ The increase in employment corresponds to around 1.8 per cent of employment in the private sector. In the longer run this probably corresponds to a similar percentage increase in production, i.e. the production function is homogenous of degree 1 in the long run. It corresponds further to an increase in total GDP of 1.0 per cent

⁵ The most important ratio/relationships are the following:

wages pr. employee	0.255	VAT imposition factor	0.75	VAT	0.25
benefits per unemployed	0.108	excise duties (several rates)	0.1	car duties	0.98
average income tax	0.359	car purchases rel to cons.	0.06	corporate tax	0.15
depreciation rel. to profits	0.6	factor income rel. to empl.	0.4		

**Reaction in selected budget items at growth in public consumption
corresponding to an increase in private sector value added on 1 per
cent for 2nd and 3rd year**

	1 st year	2 nd and 3 rd year			2 nd and 3 rd year (exog wages)		
	Per cent	Per cent	Bill. kr.	Per cent of GDP	Per cent	Bill. kr.	Per cent of GDP
Public revenues	1.06	1.47	8.59	0.82	0.80	4.68	0.45
Direct taxes	1.10	1.86	6.20	0.60	0.88	2.92	0.28
Income tax	1.14	1.93	4.61	0.44	0.80	1.91	0.18
Gross tax	2.19	3.41	1.52	0.15	1.61	0.71	0.07
Corporate tax	0.00	0.30	0.08	0.01	1.07	0.29	0.03
Indirect taxes	1.30	1.17	2.28	0.22	0.90	1.75	0.17
VAT	1.59	1.71	1.82	0.17	1.17	1.24	0.12
Car duties	1.97	1.39	0.24	0.02	1.24	0.21	0.02
Excise duties	0.97	0.43	0.21	0.02	0.58	0.29	0.03
Public expenditures	-1.79	-2.35	-13.14	-1.26	-1.24	-6.93	-0.67
Do., excl. public cons.	0.78	0.38	1.12	0.11	0.83	2.47	0.24
Unemployment benefits	8.74	12.27	3.02	0.29	11.18	2.75	0.26
Interest revenues, net	0.45	1.68	-0.48	-0.05	1.22	-0.35	-0.03
Public finances, total			-5.03	-0.48		-2.60	-0.25
Do., excl. public cons.			9.23	0.89		6.81	0.65
Real GDP	1.37	1.00			1.00		
Total employment	1.83	1.68	43.2		1.50	38.7	
Unemployment	0.89	1.01	29.8		0.89	26.0	

In the first case, [1], the increase in private consumption is assumed to equal the increase in disposable income of 3.2 bill.kr., i.e. the sum of salary and profit incomes after tax payments, corresponding to an unchanged consumption ratio. The rest of the increase in production is supposed to be matched by increased exports, corresponding to a normal long-term reaction to an increased labour supply⁶. The increase in employment corresponding to a 1 per cent increase in GDP improves the government budget by 0.59 per cent of GDP in this case.

In the two other cases the entire increase in production goes to private consumption, [2], or the private consumption is unchanged, [3]. The difference in the effect on public finances concerns indirect taxes. The improvement of public finances in those cases amounts to 0.82 per cent of GDP and 0.50 per cent of GDP, respectively. An improvement of the budget of 0.82 per cent of GDP in the case of a consumption-driven increase in GDP is no upper limit. The increase in consumption might well be even larger than the increase in GDP, as imports are likely to rise and exports to fall.

The reaction of public finances to a 1 per cent increase in GDP

Direct taxes	Bill.kr.	Ind. taxes, bill.kr.	[1]	[2]	[3]	Expendit.	ill.kr.	Publ. Fin. Total	Bill.kr.	% of GDP
Income tax	1.30	VAT	0.60	2.18	0	Benefits	-3.13			
Gross tax	0.65	Car duties	0.10	0.34	0			[1]	6.72	0.59
Corporate tax	0.63	Excise duties	0.32	1.16	0			[2]	9.39	0.82
Total	2.58	Total	1.02	3.68	0	Total	-3.13	[3]	5.71	0.50

Note: [1] Change in private consumption equals change in disposable income.
 [2] Change in private consumption equals the change in production.
 [3] Unchanged private consumption.

⁶ See e.g. Niels L. Hansen, Wage flexibility and macroeconomic stability – an analysis of long-term multipliers in *Mona*, Nationaløkonomisk Tidsskrift, 136, pp. 212-223, 1998.

Improvement of public finances in all the above experiments
The improvement of the budget is compared
to changes in different variables

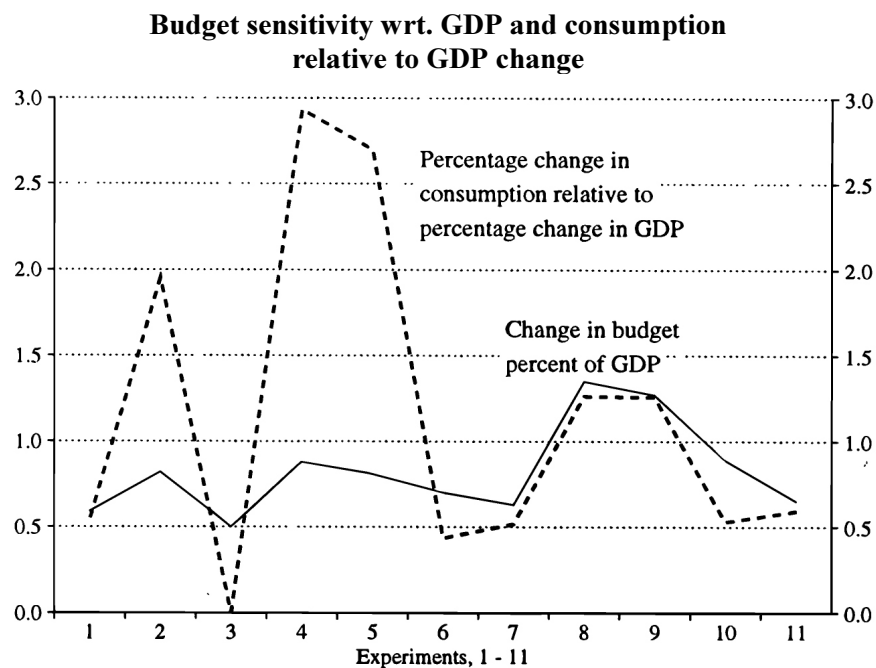
Improvement of public finances (per cent of GDP) relative to...		... 1 % increase in GDP	... 1 % growth in private consumption	... 10,000 pers. growth in employment	... 1 % point fall in unemployment
Stylised long-term calculation	[1]	0.59	1.10	0.20	0.62
	[2]	0.82	0.42	0.28	0.86
	[3]	0.50	∞	0.17	0.52
Growth, priv. Consumption	Endogenous wage	0.88	0.30	0.40	1.82
	Exogenous wage	0.81	0.30	0.37	1.69
Export growth	Endogenous wage	0.70	1.61	0.19	0.88
	Exogenous wage	0.63	1.22	0.19	0.85
Interest rate fall	Endogenous wage	1.35	1.07	0.63	3.06
	Exogenous wage	1.27	1.01	0.60	2.89
Growth, public consumption	Endogenous wage	0.89	1.68	0.21	0.87
	Exogenous wage	0.65	1.10	0.17	0.74

[1] Change in private consumption equals change in disposable income. [2] Change in private consumption equals the change in production. [3] Unchanged private consumption. In the public-consumption-growth scenario the direct effect on expenditures is disregarded.

2.6 Comparison of the above scenarios

In general the improvement of the budget in the experiments is more correlated with changes in real GDP than with changes in private consumption, employment or unemployment, cf. the table on the previous page.

This points to GDP as the best common indicator for the cyclically sensitive determinants of the government budget, including for total incomes, which determines direct taxes, and for unemployment, which determines the benefits. The connection between the improvement of the budget and the change in GDP is far from perfect, and the composition of total demand plays a crucial role. The larger the content of consumption in the expansion, the more the budget improves. A combination of GDP and private consumption could in principle be a better total indicator for public finances, cf. figure.



3. A structural budget balance for Denmark

Adjusting the actual budget balance for cyclical swings involves three steps. *First* the output gap, i.e. the gap between actual and potential GDP, is derived. *Second* the sensitivity of the individual components of the government budget with respect to output is estimated. We here use the ones estimated by the Ministry of Finance, cf. Finansredegørelse 1996, which are broadly consistent with the above simulations. *Third* the cyclical component of the government budget is calculated by multiplying the output gap with output elasticities. The structural budget is the actual budget balance minus the cyclical component.

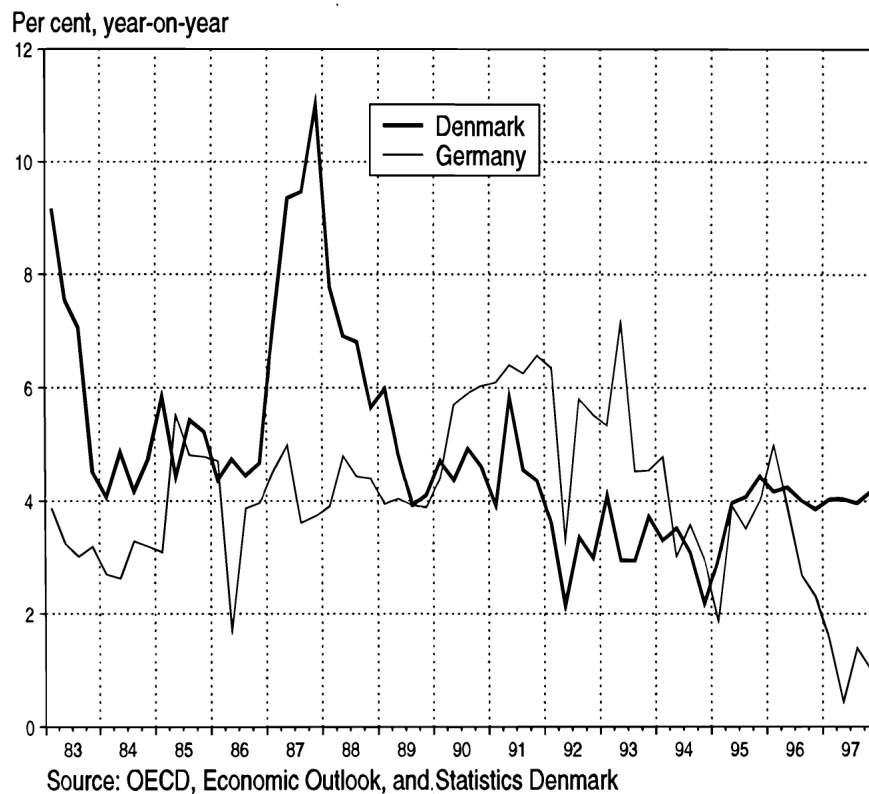
3.1 *The output gap*

In a small open economy with fixed exchange rates wages and prices cannot deviate in the longer term from the development in the anchor country. We hence assume that the Danish economy is in equilibrium, if the Danish rate of wage increases equals the German trend. Higher wage increases than in Germany indicates capacity problems in the economy and therefore that actual GDP exceeds potential GDP. The structural rate of unemployment corresponds to the unemployment rate, which according to the Phillips curve yields the same rate of wage increases as in Germany. From this the potential GDP and hence the output gap can be determined. The single year or quarter is not important in the assessment of excess wage increases and the output gap. A number of moving averages is therefore taken to uncover the underlying differences, which have characterised the different cyclical phases. One might also think of the “wage anchor” as a wage-growth target of the currency partner based on e.g. an inflation target plus a stable wage share.

Assume a simple Phillips curve, $\Delta w_{DK} = \alpha \cdot UR + \beta$, where Δw_{DK} is the Danish rate of wage increases, UR the unemployment rate, α the coefficient to the unemployment rate, and β a term possibly representing other relevant variables as well. It hence follows that the structural unemployment rate, UR_{STRUC} , is given by the expression $UR_{STRUC} = UR - (\Delta w_{DK} - \Delta w_{BRD})/\alpha$, where Δw_{BRD} is the rate of wage increases in Germany. For the private sector there exists a traditional production function, $f(\cdot)$, which determines actual production, Y , as a function of employment, N , capital input, K , and total factor productivity, TFP , i.e.

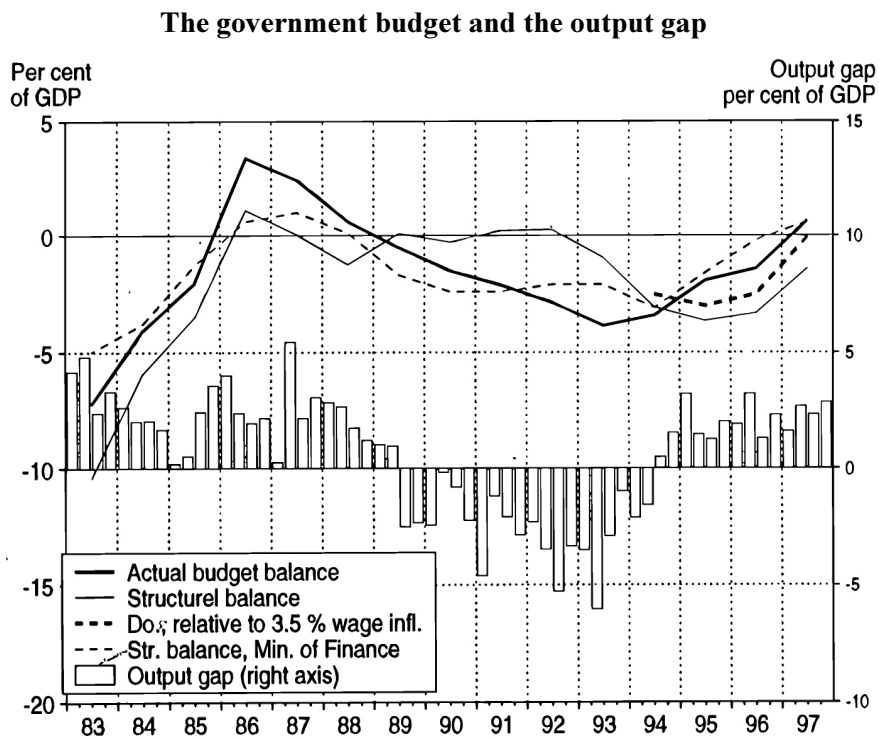
$Y=f(N, K, TFP)$. Potential output, Y_{POT} , is determined by the same function by inserting the potential employment in the private sector, N_{POT} , instead of the actual employment, i.e. $Y=f(N_{POT}, K, TFP)$, where $N_{POT} = \text{labour force} \cdot (1 - UR_{STRUC}) - N_{PUB}$. N_{PUB} is the employment in the public sector. More specifically, the calculation of potential output is based on smoothed series of total factor productivity and the participation rate. The latter, jointly with the total population in the active working ages, determines the labour force. However, we focus here on the important contribution to the output-gap from the structural unemployment. The output-gap is determined as $100 \cdot (Y - Y_{POT}) / Y$.

Hourly earnings in manufacturing, Germany and Denmark



3.2 The structural budget

The output gap and the corresponding structural budget are shown in the figure below, together with the structural budget as calculated by the Ministry of Finance in 1996⁷. The difference between the two structural budgets can be attributed to different measures of the output gap.



⁷ The Ministry of Finance has not calculated the structural budget since Finansredegørelse 1996 from December 1996. The latest years in the figure are hence based on a prognosis. The actual government budget in broad terms corresponds to the forecast in FR96.

The difference between the Ministry of Finance's structural budget balance and ours relates to different concepts of the structural unemployment. From the mid-1980s until end-1991 the Ministry of Finance's structural budget is worse than the actual budget, i.e. actual GDP exceeds potential GDP, whereas the opposite has been the case since 1992. Our calculations based on the wage differential between Denmark and Germany gives a different picture of the business cycle.

Our estimate of the structural budget balance shows that the structural budget deteriorated in 1993 and 1994, cf. the figure. This fiscal stimulus at the beginning of the current upswing is not yet withdrawn as originally promised by the new government⁸, and hence indicates a need for a fiscal tightening. The current excess wage increases in Denmark relative to Germany indicate a negative output gap, and there is a structural budget deficit in 1997 despite the actual surplus.

The German wage inflation has been very low since the middle of 1996, and German unemployment has been at a two-digit level in the same period. One might of course question whether this represents a state of equilibrium. Instead one could consider an average rate of wage increases consistent with the German inflation target, e.g. a 3½ per cent annual rate of increase corresponding to 1½ per cent price inflation and annual increase in productivity of 2 per cent. In this case the structural budget balance looks slightly better and a balanced budget is attained in 1997.

4. An alternative cyclical adjustment of the government budget

A key element of the cyclical adjustment of the government budget is the definition of an equilibrium path of the real economy, notably of GDP. The cyclically adjusted budget can be derived by controlling for

⁸ A new social-democratic-led government took office in the beginning 1993. It announced an overall economic plan, "Ny kurs mod bedre tider" ("A new course towards better times"), which included a fiscal expansion in 1993/94 - after seven years of very low growth - and a gradual tightening afterwards. The Danish economy has generally been growing faster than our trading partners since then.

deviation from this path, and would in other words materialise, were the economy on the equilibrium (reference) path. This reference path is often considered as the medium-term equilibrium of the economy, and is hence influenced by structural changes in the economy. In that sense, the cyclically adjusted budget balance is a function of both fiscal and structural policies. Obviously the concrete definition of the equilibrium path is crucial for the cyclical adjustment of the budget. Several different methods to calculate the equilibrium path exist, all of which subject to substantial uncertainty. This reflects the bare fact that it is generally hard to establish a precise view of the business cycle situation. In section 3 macroeconomic equilibrium in Denmark was defined as a wage development in parallel with Germany, the anchor economy of the European monetary system.

Instead of this medium-term perspective involving both fiscal policy and structural measures, one could apply a short-term approach focusing on a narrower concept of fiscal policy. In this section is presented a simpler measure of the fiscal stance, identifying discretionary changes in fiscal policy as those changes in the government which are not due to changes in the economic environment. The identification of these discretionary changes can be done in several ways. In the following the adjustment of the government budget for cyclical swings is based solely on changes in the unemployment rate⁹. In concrete terms, the cyclically adjusted budget balance is defined as the budget balance, which would have occurred if the unemployment rate had remained unchanged from the previous year. The adjusted budget balance is compared with the actual balance the year before. A reduction in the deficit is interpreted as a fiscal tightening, and *vice versa*.

In the first place, the change in the unemployment rate is translated into the change in private employment, which would have been required to keep unemployment unchanged¹⁰. Assuming a constant productivity we also have the necessary change in GDP. Furthermore, the components

⁹ Similar calculations are presented in Anders Møller Christensen (1993), *Finanspolitikken 1960-1990*, in Erik Hoffmeyer (ed.), *Pengepolitiske problemstillinger 1965-1990*, Danmarks Nationalbank, 1993.

¹⁰ In accordance with existing studies of the labour supply a change in unemployment of 1 person requires a change in employment of 1.67 persons.

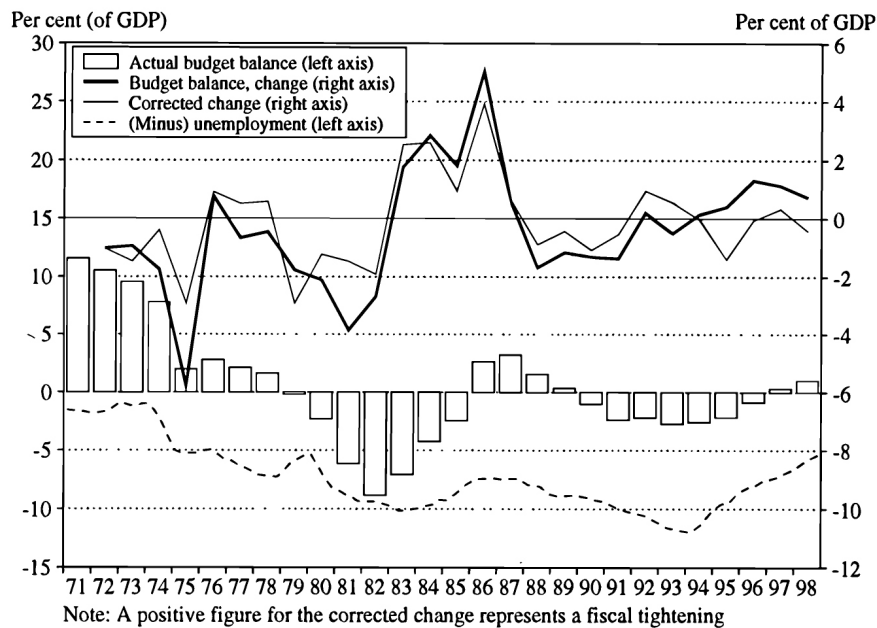
of private demand are assumed to shift proportionally to match the higher GDP. Under these assumptions the impact on unemployment transfers, income taxes and indirect taxes is calculated on the basis of the respective average rates¹¹.

The reference point in this calculation is the actual unemployment in the previous year, and not an equilibrium unemployment. The simplicity of this approach is hence obtained at the cost, that only the change and not the level of the underlying fiscal stance can be derived. In a political context this is not always an inconvenience, since discussions often refer to whether fiscal policy is tightened or loosened, and less often to the sustainability of public finances in the medium term.

Actual and corrected changes in the government budget are shown in the figure below. Public finances deteriorated markedly from the beginning of the 1970's to 1982. This development is partly explained by the increase in unemployment from 2 per cent before 1973 to almost 10 per cent in the beginning of the 1980's. However, a fiscal expansion in response to the two oil crises is visible as well and adds substantially to the deterioration of the budget. The improvement of the budget in the first half of the 1980's is mainly due to a fiscal tightening, whereas the rise in unemployment only explains a minor share. The deterioration of the budget during the period from 1986 to 1993 with subdued economic growth is the result of both a slight fiscal expansion and the increase in unemployment. The improvement of the budget under the recovery since 1993 is more than fully explained by the decline in unemployment, and the initial fiscal stimulus in the first part of the 1990's does not yet seem to be withdrawn. This picture confirms the evolution of the above structural budget balance as well, cf. section 3.

¹¹ A very similar approach to the fiscal stance was proposed in Olivier J. Blanchard (1990), *Suggestions for a new set of fiscal indicators*, OECD Working Paper No. 79. However, our analysis may be more efficient in the sense that it exploits information about the actual transfer and tax rates, instead of using estimates of elasticities. Another difference relates to the treatment of changes in interest payments, which by our method are considered as changes in fiscal policy. Blanchard disregards interest payments.

Actual and unemployment-adjusted changes in the government budget



5. The connection between the cyclically adjusted budget balance and fiscal effects

In Denmark, unlike in many other countries, the fiscal effect on GDP is more widely used than the cyclically adjusted budget balance, not least due to the government's intensive use of the concept in the economic-policy debate. The method consists in identifying the discretionary part of the fiscal policy. The instruments in the fiscal policy are scrutinised one-by-one by applying a fixed set of rules defining neutral or zero change, e.g. no change in public employment and public wage increases at the same level as in the private sector. The activity effect is found by inserting the discretionary changes in a macroeconomic model. In practice, identifying the discretionary part of the fiscal policy involves some arbitrariness, but the overall purpose is to isolate those elements, which require active political decisions. Nonetheless, the neutral development in e.g. public employment of no

change would clearly be perceived as a tightening by the public, and it demands difficult political decisions to deal with the allocation between old and new demands.

In broad terms the fiscal effect is built up from the microeconomic side of the economy where the Ministry of Finance focuses on the individual parts of fiscal policy at a detailed level. The cyclically adjusted budget balance is derived from the macroeconomic side, in the case of the above structural budget balance by use of a general measure of the output gap. Both methods are built on the principle that the government budget balance can be divided into a part, which relates to the business cycle, and a structural/discretionary part. This implies – at least in principle - that there is a connection between the two measures of fiscal policy.

If public finances are only influenced by the business cycle and fiscal policy, the revenue (positive or negative) from discretionary changes in policy, cf. the calculation of the fiscal effect, should correspond to the changes in the cyclically adjusted budget. Important disturbing elements preventing this simple connection to materialise, apart from noise, are changes in budget elements with no fiscal effect, as for instance interest payments and some capital transfers. The structural budget presented in section 3 is based on an output gap defined as the deviation from a medium-term equilibrium of the economy, and therefore represents both changes in the direction of fiscal policy as well changes in e.g. the structural rate of unemployment. Structural changes in the Danish and German labour markets hence form another wedge component between the two measures of fiscal policy.

6. Conclusion

The above analysis shows that cyclicalities of public finances is in no sense well defined. It depends largely on the cause for the change in activity. The magnitude of the accompanying effect on private consumption is e.g. decisive for indirect taxes. The resulting price- and wage development to changes in the cyclical position also determines the reaction of public finances. The analysis generally indicates that the important items with respect to the cyclicalities of the public finances are income taxes and unemployment benefits. Indirect taxes, in particular VAT and partly also car duties and excise duties, contributes as well,

especially of course in those situations, where output movements are driven by domestic consumption. A twist in the Danish demand towards net exports in order to secure a current-account surplus would lower the present surplus on the public budget.

Notwithstanding the dependency on the composition of demand, the Ministry of Finance's rule-of-thumb of an improvement of public finances in the order of 0.8-0.9 per cent of GDP when GDP increases by 1 per cent lies well in the range of resulting outcomes from the above scenarios.

In general the sensitivity of the Danish government budget is high relative to most other countries, and hence the more important the adjustment for cyclical swings for the assessment of the budget. Our estimate of the structural budget, which is based on a parallel wage development relative to the anchor economy, shows that the fiscal expansion at the beginning of the upswing in 1993/94 has not yet disappeared from the structural balance and hence underlines the need for a fiscal tightening. This picture seems to be confirmed by an alternative and simple Blanchard-type measure of the fiscal stance according to which the expansion in 1993/94 has not yet been redressed.

The calculation also shows that the concept for structural unemployment, and hence the output gap, is by no means innocuous in the assessment of the public finances. Our concept, which is sought to be in conformity with the fixed-exchange-rate policy, is based on the wage differential to Germany. However, in that sense the output gap need not only represent the Danish business cycle. As the reference wage trend eventually reflects the actual wage increases, a protracted German business cycle movements will influence the structural unemployment. By the same token, the structural unemployment can be reduced by Danish labour market policy, whereas German labour market policy in isolation will raise it. Alternatively, one could have chosen a fixed target for the German rate of wage increase congruent with the German inflation target.