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**Danmarks Nationalbank's operating
costs and number of employees in
an international comparison**

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Danmarks Nationalbank's operating costs and number of employees in an international comparison

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Abstract

The paper benchmarks Danmarks Nationalbank against a number of other central banks with respect to operating costs and the number of employees. The management of Danmarks Nationalbank historically has in general taken action at an early stage in the effort to optimise the organisation of the Bank. This has resulted in relative low costs and a lean organisation by international comparison, but it also implies that the scope for further cost reductions probably is smaller than in many other central banks. Staff costs, i.e. mainly salaries, are among the lowest for the central banks included in the assessment, and the lowest among the Nordic countries.

Key words: Central bank costs, central bank efficiency.

JEL Classification: E58.

Resumé

Dette papir sammenholder drifts- og personaleomkostningerne i Danmarks Nationalbank med en række andre centralbanker. Ledelsen i Nationalbanken har løbende søgt at optimere resurseindsatsen, hvilket har betydet et relativt lavt omkostningsniveau sammenholdt med andre centralbanker, men samtidig mindsket potentialet for yderligere omkostningsreduktioner. Niveauet for personaleomkostningerne, hvoraf hovedparten er lønninger, er blandt de laveste for de centralbanker, der er medtaget i analysen, og de laveste i Norden.

1. Introduktion

Central banking has certain features that make it quite different from the operations of private firms and most public sector institutions as well. Typically central banks have several goals some of which are broader in nature, whereas private firms pursue clear objectives as profit maximization. While some central bank goals are easy to measure, others do not readily lend themselves to quantification. This resembles some public bodies but apart from these, a further characteristic of central banks are, that they are monopolies and operate under soft budget constraints. Thus, the normal outside pressure for efficiency does not apply directly to central banks, cf. Blix et al. (2003)¹. However, there has in recent years been increased public focus of the way central banks perform their tasks and on the size of the operating costs involved. In an international comparison one should have in mind that the array of tasks is not totally identical across central banks.

The fact that many central banks output do not lend themselves to quantitative measurement and are not competing on market terms, makes it difficult to measure central bank efficiency directly.² Often one has to rely on more indirect assessments of whether the central bank in question performs the tasks assigned to it in a satisfactory way. Recently some central banks have, however, gone further and have begun to apply complementary approaches, typically benchmarking against best practice, using balanced score cards, employing external evaluation of for example research activities etc.

This paper does not attempt to measure central bank efficiency, i.e. producing services at minimum costs, nor will it attempt to answer whether central bank activity is socially efficient, i.e. minimizing the costs born by society for a given level of central bank "output". The more modest aim is to look at the financial and human resource inputs, which have been devoted to meet the central bank's responsibilities and objectives, whatever these may be. Focus will thus be on central bank operating costs, staff numbers and staff costs. Although less ambitious this is much more tractable. The aim is to assess Danmarks Nationalbank's use of resources in fulfilling its tasks compared to other central banks.

It is not trivial to compare central bank activities across countries. The banks have different philosophies and mandates, and different accounting principles are used. Nevertheless it is instructive to compare central bank costs as a first preliminary step in assessing central bank performance in an international context.

2. Danmarks Nationalbank's tasks

The Danmarks Nationalbank Act states that the objective of Danmarks Nationalbank is to maintain a safe and secure currency system, and to facilitate and regulate the traffic in money and the extension of credit. More precisely the main tasks of Danmarks Nationalbank are to:

¹ Blix, Märten, Sonja Daltung and Lars Heikensten (2003), On central bank efficiency, *Penning- och Valutapolitik*, Riksbanken, 3/2003.

² In May 2003 the Swedish central bank, Riksbanken, hosted a conference devoted to the measurement of central bank efficiency.

- ◆ produce and distribute Danish banknotes and coins
- ◆ conduct monetary and foreign-exchange policies to ensure the stability of the krone vis-à-vis the euro
- ◆ manage the foreign-exchange reserve
- ◆ be banker to the banks and mortgage-credit institutes and to the central government
- ◆ handle overall tasks in relation to payment systems
- ◆ analyse financial stability
- ◆ collect, collate and publish financial statistics
- ◆ make analysis of current development, research and economic projections
- ◆ represent Denmark internationally in a number of areas

Danmarks Nationalbank's portfolio of tasks thus does not differ materially from most other central banks', although a number of these have a somewhat broader array of assignments.

The major difference in resource terms, however, is that Danmarks Nationalbank has no branches contrary the case for the central bank in most major European countries. The existence of a net of branches is mainly historically determined. Previously, Danmarks Nationalbank also had branches but these were closed gradually, the last being closed in 1989.

Danmarks Nationalbank is not involved in banking supervision, neither directly nor indirectly. This constitutes a major difference to many central banks.

A major goal of Danmarks Nationalbank is to ensure the stability of the krone vis-à-vis the euro. Most other central banks have inflation targeting as their prime strategy. Inflation targeting is undoubtedly a more labour intensive strategy than exchange rate targeting.

Historically Danmarks Nationalbank has given less priority to theoretical monetary research than many other central banks. It does thus not harbour a specific research department, but supports a few Ph.D programs in collaboration with Danish universities. The research and analysis done in the Bank are mostly of a more hands-on nature. The consequence of this choice is a relatively low score in international comparisons of research activity in central banks.³

Danmarks Nationalbank has a few tasks not found in most other central banks. Firstly, mint production costs in the Royal Mint are included in total operating costs, whereas in other countries mint production takes place in financially separate bodies. The Danish Royal Mint also generates income to Nationalbanken, but in the analysis here gross costs are used. Secondly, the government debt is managed by Danmarks Nationalbank, which acts as agent to the Ministry of Finance in the area of central-government borrowing. This is a unique Danish construction. The total number of staff used to fulfil this assignment is around 25. This is less than in most other countries. For example in Sweden the government

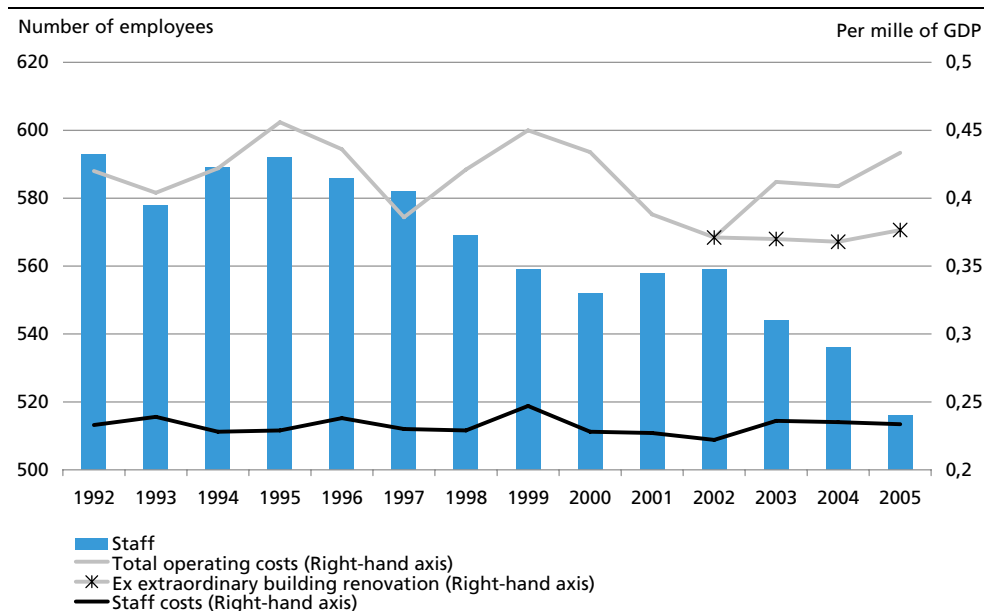
³ For discussion and further references see: Bank of Canada (2005), "Quantity, Quality, and Relevance: Central Bank Research, 1990-2003", Working Paper 2005-37.

debt office, Riksgäldskontoret, has around 140 employees, but with a somewhat broader remit than in the Danish case.

3. Danmarks Nationalbank's use of financial and human resources

Danmark Nationalbank's staff has been declining over the past ten years, cf. Chart 1. This is also the case in a longer run perspective than shown in the figure. This development is partly due to outsourcing, but probably also to increase in productivity, although this is hard to measure directly. The number of publications and the amount of statistical data published has increased considerably over the years. More emphasis has been placed on analyses of financial stability, a payment systems department has been established and in-house production of IT services has risen. In general the analytical capacity of the Bank has increased. Also note printing has experienced increase in productivity reducing the cost per note printed.

DANMARKS NATIONALBANK'S USE OF FINANCIAL AND HUMAN RESOURCES Chart 1



Note: "Staff" is the number of employees converted to full-time positions. "Staff costs" include salaries, remuneration and pension contributions. Both "Staff costs" and "Total operating costs" are exclusive extraordinary contribution in 2001 and 2005 to Danmarks Nationalbank's Pension Fund subject to winding-up.

Source: Danmarks Nationalbank, *Report and accounts*.

No major tasks have been discontinued in the period regarded, but some outsourcing has taken place particularly in cash handling, which to a higher degree has been left to commercial banks. In 1996 the Royal Mint discontinued the production of coin blanks, and in 1998 printing of the Nationalbank's publications was outsourced. Service and maintenance staff has been reduced considerably. Also a small number of service tasks, such as window cleaning and major building renovation, have been outsourced. Many service tasks are, however, still in-house.

Despite a smaller number of employees, staff costs as per mille of GDP have not fallen to the same extent. This is mainly due to the fact that the number of employees with a university degree has risen strongly and these groups get a

higher salary. Today one third of total staff has a university degree, equivalent to some 170 persons, cf. Table 1. Of these around 10 have a Ph.D.

	2001		2002		2003		2004		2005	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Ultimo										
Academic staff	130	23	149	27	153	28	165	31	173	33
Bank staff	128	23	122	22	116	21	104	19	96	19
IT/clerical staff	114	21	111	20	104	19	98	18	92	18
Service staff	92	16	90	16	86	16	86	16	84	16
Craftsmen/technicians	94	17	87	15	85	16	83	16	71	14
Total staff	558	100	559	100	544	100	536	100	516	100

Note.: Number of employees converted to full-time positions.

Total operating costs as per mille of GDP have declined marginally, but have in the last couple of years been influenced by costs to a major renovation of the building. These costs are only temporary and corrected for these, there has been a more flat development in total costs as per mille of GDP.

The fact that outsourcing takes place to a varying degree in central banks makes the number of employees a poor measure of the resources used by a central bank to fulfil its tasks. Increased reliance on out-of-house production may reduce staff, but instead the central bank incurs costs when it has to buy the service from outside. Total expenses per mille of GDP are thus a better measure when comparing central banks use of resources. Nevertheless, we start out by taking a look of the staff size in central banks.

4. Number of employees in central banks – a comparison

A priori one would expect economies of scale in central banking. Looking alone on the number of employees this is, however, difficult to detect in general in the case of Europe, cf. Table 2 and Chart 2. For very small countries, like Iceland and Luxembourg, the size of central bank staff relative to total population is relatively high, but for medium and large countries no economies of scale is apparent. This conclusion does not change if the numbers are adjusted for banking supervision.

The populations of the euro area and the United States are of about the same size. Nevertheless, The European System of Central Banks (ESCB) consisting of the European Central Bank (ECB) in Frankfurt and the national central banks in the member states employs almost two and a half times the number of employees in the Federal Reserve System (FED) in the United States. This reflects partly a difference in geography and in historical development of the two central bank systems, and is partly due to the fact that the net of local and regional entities in the major euro area countries is much tighter than in the United States. This is also historically determined. However, several central banks in the euro area are in a process of restructuring and downsizing. Bank of France has thus cut staff by 2,600 from 2004 to 2006 and the German Bundesbank set in 2002 a target to reduce staff by 30 per cent by 2007 equivalent to 4,000 jobs.

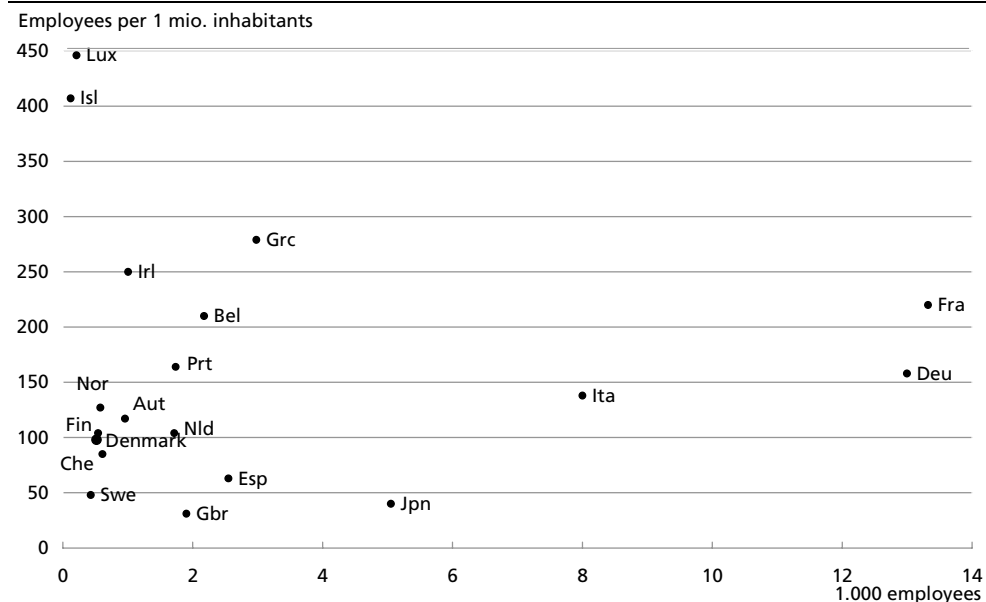
THE NUMBER OF CENTRAL BANK EMPLOYEES RELATIVE TO TOTAL POPULATION Table 2

2005-figures	Number of employees	Employees per 1 mio. inhabitants
Denmark^N	518	98
Sweden ^N	430	48
Norway ^N	577	127
Iceland ^N	120	407
European Central Bank (ECB) ^N	1,370	...
France ^Y	13,323	220
Germany ^P	12,998	158
Italy ^Y	8,000	138
Greece ^Y	2,980	279
Spain ^Y	2,550	63
Belgium ^N	2,174	210
Netherlands ^Y	1,714	104
Portugal ^Y	1,736	164
Ireland ^Y	1,005	250
Austria ^N	957	117
Finland ^Y	542	104
Luxembourg ^N	209	446
European System of Central Banks (ESCB).....	49,559	161
UK ^N	1,901	31
Switzerland ^N	611	85
USA ^P	20,217	68
Japan ^P	5,052	40

Note: Top note indicate whether the central bank is responsible for banking supervision: Y = Yes, N = No, P = Partly.

Source: *The Central Bank Directory, 2006* and *IMF Financial Statistics*.

RELATIVE AND ABSOLUTE NUMBER OF EMPLOYEES IN CENTRAL BANKS Chart 2



Note.: USA is not included in the Chart.

Source Central banks Annual Accounts and IMF Financial Statistics.

It is interesting to note that two countries that host major banking centres, UK and Switzerland, both are characterized by very lean central banks. Also in both cases the central bank is not involved in banking supervision today.

Apart from Iceland, the Nordic countries are characterized by relatively small central banks in terms of the relative number of employees. Sweden stands out as the smallest in relative terms. This, however, illustrates very well the problems in comparing central banks' use of resources by means of the size of the staff. Riksbanken in Sweden and for example Danmarks Nationalbank have followed markedly different management strategies. While Riksbanken has pursued a policy of aggressive outsourcing, Danmarks Nationalbank has to a larger extent chosen to keep production in-house and optimised it there. Using total costs as per mille of GDP the two central banks' use of resources are very close, as shown below.

5. Operating costs in central banks – a comparison

Table 3 shows the historical development in operating cost as reported in annual accounts in per mille of GDP in a number of central banks. Such an international comparison is not without its problems. First of all, the assignments are broader for some central banks than for others, as previously mentioned. There may also be differences in the extent to which the central bank charges for some services, and it is not always possible to distinguish between gross and net costs in annual accounts. Annual accounts in central banks often lack details and breakdowns of the cost components. Despite of these shortcomings it may be instructive to calculate the costs of central banks in different countries as a first approximation to a benchmarking of these. An alternative would be to use staff costs as done by Brione (2005)⁴. A disadvantage of this approach is that it underestimates costs in central banks which to a large degree rely on outsourcing of tasks, and the measure thus has the same shortcomings as staff levels. In section 6 we compare staff costs.

It is important to note, that operating costs is a measure of input costs and not a measure of productivity. Such a measure is close to impossible to make for a central bank, as we lack a good measure of the value of output.

As shown, the operating costs of Danmarks Nationalbank are among the lowest in relative terms for the countries included in Table 3, but the rate of decline in the costs over time have been smaller than in most other central banks. Part of the explanation for this is - apart from some extraordinary costs in the last couple of years - that the management of Danmarks Nationalbank has acted proactively. It was for example among the first central banks to close down its branches and to slim the organisation in general. This left the bank with a relatively low level of operating cost, but diminishes at the same time the potential for further cost reductions.

⁴ Brione, Paul (2005), Central bank staff costs, Quarterly Journal of Central Banking, vol. XVI, No 2.

CENTRAL BANK OPERATING COSTS					Table 3
Per mille of GDP	1992	1997	2002	2004	Employees 2004
Denmark	0.42	0.38	0.36	0.41	536
Iceland	1.62	1.46	1.19	1.51	118
Sweden	0.34	0.31	0.36 ¹	0.38	455
Norway	0.89	0.72	0.91 ²	0.98 ²	577
Finland ^{3,4}	0.66	0.54	0.57	0.65	585
Switzerland	0.46	0.45	0.53	0.41	608
Austria ⁵ .....	...	...	1.01	0.83	951
Ireland ⁵	0.60	0.43	0.58	0.48	1,031
Netherlands ⁵	0.41	0.43	0.60	0.46	1,750
UK ³	0.26	0.24	0.14	0.13	1,908
Belgium	1.13	0.99	0.89	0.82	2,205
Spain ⁵	0.53	0.44	0.47	0.40	2,630
Italy ^{3,5}	1.15	0.78	0.81	0.73	8,085
Germany ^{3,4}	0.47	0.44	0.54	0.49	13,619
France ^{3,5}	1.10	1.07	0.92	0.72	15,628
Japan .....	...	...	0.04	0.05	5,069
USA .....	...	...	0.07	0.07	22,160

Note: Total operating cost include staff costs excluding payments to retire personnel plus administrative expenses plus cost of note production and in the case of Denmark also mint production. Depreciations are not included in total costs, but renovating costs are included. The inclusion of note printing cost may cause some volatility from year to year as the purchase of materials can vary quite a lot.

Source: Central Bank Annual Reports and OECDs Economic Outlook Databank.

¹ Excluding write down on shares in associated firms (0.21 per mille of GDP in 2002).

² Adjusted for costs incurred as the administrator of the national oil fund (Petroleumfondene) by subtracting the fee received by Norges Bank from the national oil fund from total expenses the cost figures are 0.50 and 0.39 in 2002 and 2004 respectively.

³ Pensions to retired personnel are part of current expenses. These pension cost are subtracted before calculation of the expenses per mille.

⁴ The central bank is involved in banking supervision together with external body.

⁵ Including banking supervision.

As with staff levels it is not possible to identify economies of scale on a European level. Bank of England seems to be the only major European central bank which has fully reaped economies of scale, and the only which can match the central banks in the USA and Japan in relative cost terms.

6. Staff costs in central banks – a comparison

Table 4 compares the staff costs across central banks and relative to manufacturing. The manufacturing figures are calculated from a comparable hourly wage rate published by US Bureau of Labor and OECD figures over the number of hours worked per year. Preferably figures from the financial sector should be used, but internationally comparable statistics are here more difficult to find. Staff costs per employee in central banks are calculated by dividing staff costs as published in annual accounts by the number of full-time employees. These figures are more uncertain than figures for total expenses, as book keeping practices may differ between central banks with respect to what is included in staff costs relative to other administrative costs.

STAFF COSTS IN CENTRAL BANKS Table 4

2004	Annual wage in industry in Danish kroner (1)	Staff cost per employee per year in Danish kroner (2)	(2)/(1)	Relative price level	Staff costs per employee per year in Danish kroner, PPP-corrected	Index over PPP-corrected staff costs
Denmark	309,000	529,000	1.7	100	529,000	100
Sweden	277,000	536,000	1.9	89	602,000	114
Norway ¹	296,000	728,000	2.4	97	751,000	142
Finland	330,000	624,000	1.9	85	734,000	139
Iceland .....	...	654,000	...	94	696,000	132
Netherlands	255,000	541,000	2.1	81	668,000	126
Belgium	284,000	636,000	2.2	78	815,000	154
Ireland	221,000	376,000	1.7	89	422,000	80
Austria	315,000	768,000	2.4	79	972,000	184
Switzerland	284,000	786,000	2.7	98	802,000	152
UK	258,000	453,000	1.6	82	552,000	104
Germany	302,000	411,000	1.4	83	495,000	94
France	213,000	432,000	2.1	81	533,000	101
Italy	199,000	564,000	2.8	75	752,000	142
Spain	263,000	609,000	2.3	67	909,000	172
USA	263,000	471,000	1.8	71	663,000	125
Japan	238,000	518,000	2.2	88	589,000	111
ECB .....	...	923,000	...	79	1,168,000	221

Note: Annual wages in industry are calculated using figures of hourly earnings and the number of working hours per year. Annual staff costs in central banks are calculated from annual accounts. Bookkeeping practices are not harmonised between central banks. Social and pension contributions are included in the figures to the extent possible. The current exchange rate is used in converting the figures into Danish kroner in column 1 and 2. To correct for differences in price levels across countries purchasing power parity (PPP) exchange rates are used in the conversion into Danish kroner in column 5. This makes an international comparison possible. The figures in column 3 are also internationally comparable. The number of holidays may differ between industry and the central bank. No correction has been made for this.

Source: Own calculations based on data from OECD, US Bureau of Labor, central bank Annual Accounts and Statistics Denmark.

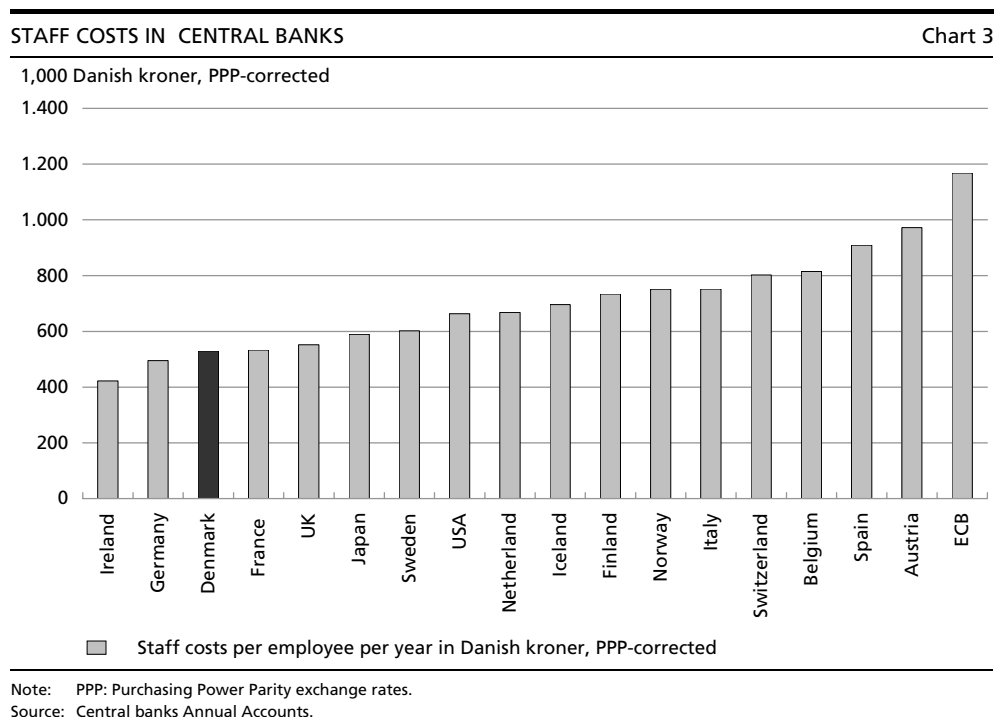
¹ Including the national oil fund (Petroleumsfonden).

Not surprisingly staff costs in central banks are higher than wage levels in manufacturing, as the whole white collar and management are excluded from the latter figures, but included in the former. Secondly, employees in central banks are on average better educated and many positions are of a specialist nature and therefore typically better paid. Thirdly, staff costs include more than just paid-out salaries and pension contributions, but also staff related costs. However, the extent to which staff costs exceeds wages in manufacturing may be of some interest. As shown in column three in the table staff costs in Danmarks Nationalbank relative to wages in manufacturing are among the lowest among the central banks included.

Comparing across countries one should have in mind that central bank staff composition differs a lot. Danmarks Nationalbank has by international standards a relative large proportion of staff with a university degree, almost one third as shown in table 1. This makes the figure for Denmark in column three the more surprising, but partly reflects the fact, that the income distribution is relatively even in Denmark, even on a before-tax basis.

To get an idea of the relative attractiveness of being a central bank employee annual staff costs across central banks have been calculated using purchasing power parity exchange rates. The staff costs in Danmarks Nationalbank are in the

low end of the range and the lowest among the Nordic countries. The main component of staff costs is paid-out salaries.



The relative low cost per employee in central banks with many branches as Germany and France properly partly reflects the fact that the functions in the branches are of a less specialist nature and thus not requires as highly an educated staff as many of the functions in the headquarter. Also, central banks which rely much on outsourcing may have relative higher staff cost per employee as it is normally low paid functions that is outsourced.

7. The time ahead

There is no doubt, that the process towards slimmer and more efficient central banks will continue in the years to come, particularly in some of the major European countries with a widespread net of local and regional branches.

In the Danish case a relevant question is how an eventual accession to the euro would influence on cost developments in the Danmarks Nationalbank. It is the assessment that the effects on total costs would be minimal. It is hard to see how introduction of the euro in itself should entail substantially lower costs. On the contrary, many of the analytic departments of the Bank would probably require more resources. This is the experience of the minor central banks in the euro area.