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From Growth Theory to Technology Policy - Coordination Problems in Theory and Practice

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**Table 1. Expenditure within the «National Program for Information Technology 1987-90»
broken down by field and year. Million NOK**

	1987	1988	1989	1990	Total
Education	306	373	426	427	1 532
Research	138	132	135	130	534
Product development	134	151	239	221	745
Applications	329	369	398	474	1 570
Total	907	1 025	1 197	1 252	4 381

Source: Harlem et al. (1990).

Table 2. The effect of R&D subsidies on firm performance

	Growth in manhours	Growth in sales	Return on assets	Return on sales	Labour productivity	Total factor productivity	Investment Intensity	Inten. in priv. finan. R&D
A: OLS estimates								
Dum. for R&D sub. share >0.05	-0.007 (0.018)	-0.021 (0.030)	0.049 (0.051)	0.033 (0.035)	-0.027 (0.022)	0.001 (0.010)	0.0027 (0.0036)	0.029 (0.030)
Dum. for R&D sub. share >0.25	0.044 (0.030)	0.083 (0.060)	0.049 (0.094)	-0.045 (0.041)	0.017 (0.031)	-0.0003 (0.013)	0.0025 (0.0061)	-0.026 (0.036)
Dum. for reporting R&D	-0.041*** (0.011)	-0.019 (0.020)	-0.11 (0.12)	0.024*** (0.007)	0.083*** (0.012)	0.061*** (0.006)	-0.0032 (0.0027)	
No. of observations	5622	5622	6020	6041	6041	5874	6041	1958
R-squared	0.03	0.02	0.004	0.03	0.12	0.13	0.01	0.11
Root mean square error	0.40	0.61	7.11	0.28	42.5	0.17	0.09	0.37
B: Fixed effects estimates								
Dum. for R&D sub. share >0.05	-0.019 (0.020)	-0.063* (0.034)	-0.075 (0.012)	0.011 (0.031)	-0.063*** (0.022)	-0.023** (0.009)	0.0013 (0.049)	0.021 (0.030)
Dum. for R&D sub. share >0.25	0.018 (0.037)	0.094 (0.070)	0.017 (0.013)	-0.063 (0.067)	0.005 (0.030)	0.013 (0.012)	-0.0037 (0.0071)	-0.049 (0.069)
Dum. for reporting R&D	-0.023 (0.020)	0.011 (0.034)	0.035 (0.17)	0.023*** (0.009)	0.029* (0.016)	0.030*** (0.008)	-0.0051 (0.0043)	
No. of observations	5622	5622	6020	6041	6041	5874	6041	1958
Root mean square error	0.40	0.61	7.11	0.28	42.5	0.17	0.09	0.37

OLS estimates based on yearly data from ISIC 382, 383 and 385 in 1982-1995. The sample is moderately trimmed, cf. the data appendix. Robust standard errors in parenthesis. Time dummies are included in all regressions. Industry dummies at the five digit SIC level. are included in the OLS regression. The R&D subsidy share is the sum of deflated R&D subsidies over the three years prior to the year of observation divided by the corresponding sum of total R&D investments. If only one or two years prior to the year of observation is available, the subsidy share is based on this information alone. The R&D dummy is one if the firm has reported R&D in one of the the three years prior to the year of observation.

*** Significant at the 1% level
 ** Significant at the 5% level
 * Significant at the 10% level

Table 3. The aggregate development for R&D firms established in ISIC 382, 383 or 385 not later than 1985

	R&D firms with R&D subsidy share less than 5%			R&D firms with R&D subsidy share greater than or equal to 5%		
	1985	1995	Growth	1985	1995	Growth
Private R&D investments	990	850	-14%	810	660	-18%
-average	8.8	10.5	19%	8.4	9.9	17%
R&D intensity	4.1%	4.8%	15%	8.1%	6.7%	-17%
Employment	22280	14940	-33%	16480	9400	-43%
-average	199	184	-8%	172	140	-19%
Sales	14530	18080	24%	10380	12370	19%
-average	130	223	72%	108	185	71%
Labor productivity	151	253	68%	146	253	74%
Capital intensity	0.46	0.66	44%	0.61	0.97	60%
Return on assets	19.1%	24.7%	30%	12.4%	18.0%	45%
Return on sales	13.4%	13.5%	0.5%	11.9%	13.2%	11%
No. of plants	112	81	-28%	96	67	-30%

The subsidy share is the part of the firm's deflated R&D investments in 1985-1993 which was financed by public grants.

R&D investments are deflated by a wage index and given in millions of 1995 NOK. Sales are given in nominal millions NOK.

Labor productivity is value added per manhour in nominal NOK. Capital intensity is assets per employee, given in nominal millions NOK.

The calculations are based on plant level data.

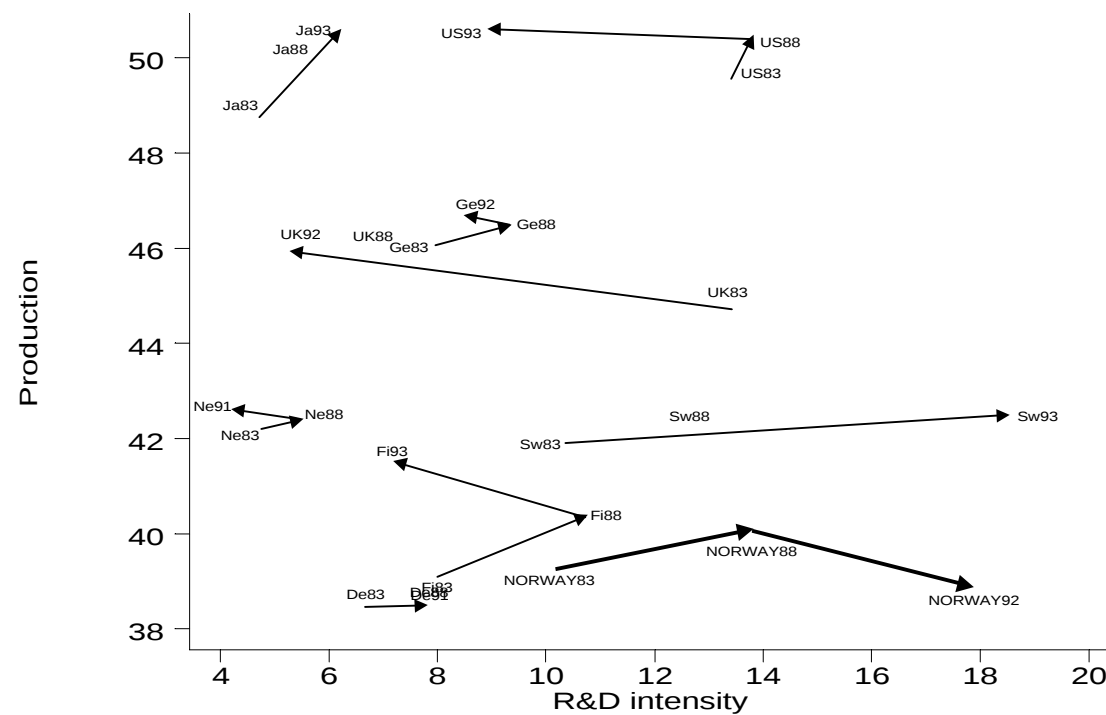
Table 4. The importance of high technology and IT relative to total manufacturing

	1983		1987		1991		1995	
	Norway	OECD	Norway	OECD	Norway	OECD	Norway	OECD
Employment	19%	24%	21%	25%	20%	25%	19%	-
Value added	19%	22%	20%	21%	19%	22%	19%	-
Total R&D including R&D institutes	54%	41%	54%	43%	47%	43%	-	-
Total intramural R&D	60%	37%	54%	40%	51%	40%	-	-
Total subsidy to intramural R&D	80%	48%	85%	34%	76%	39%	-	-
Subs. as share of tot. intramural R&D	12%	11%	20%	10%	15%	8%	-	-

ISIC 382, 383 and 385. The OECD columns give the aggregate of 13 major industrialized countries for which we have complete data. These are Norway, Sweden, Finland, Denmark, Germany, UK, France, Italy, Spain, USA, Canada, Australia and Japan. All variables, except subsidy as share of total intramural R&D, are measured in percent of all manufacturing industries.

Source: OECD, DSTI(STAN, ANBERD and BERD).

**Figure 1. R&D intensity and production in the IT industry (ISIC 3825 and 3832).
Norway compared to other OECD countries.**



Production is measured as the log of gross output in 1985 dollars. R&D intensity is R&D investments in percent of gross output.
Source: OECD, DSTI(STAN and ANBERD).