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ON THE RECENT SLOWDOWN IN PRODUCTIVITY  
GROWTH IN ADVANCED ECONOMIES

by

Herbert Giersch and Frank Wolter

July 1982

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On the Recent Slowdown in Productivity Growth in  
Advanced Economies

by

Herbert Giersch and Frank Wolter\*

I

Facts and Hypotheses

1. After two and a half decades of prosperous postwar development, western industrialised countries recently experienced a slowdown of economic growth and productivity advance together with an increase in the rates of inflation and unemployment. The deep recession of 1974/75 has uncovered fundamental structural weaknesses; since then, the advanced economies have not regained the momentum of the 1960s. In this paper, we shall attempt to contribute to a better understanding of this malaise. But as our comparative advantage is not in growth-accounting and as we do not believe that we can single out one or two specific "causes", we shall merely aim at forming an idea (perhaps only a rather vague one) which might be further developed into a paradigm or research programme (in Lakatos' sense)<sup>1</sup>.

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\*Paper presented at the 1982 Conference of the Royal Economic Society "Reasons for the Recent Productivity Slow-Down in Advanced Economies", London, July 22<sup>nd</sup>. This working paper is the basis for an abbreviated version to be published in the Economic Journal. We would like to thank colleagues at the Institut für Weltwirtschaft, in particular Klaus-Werner Schatz and Frank Weiss, for helpful comments on an earlier draft.

1

The methodology of scientific research programmes has been developed by Lakatos (1968; 1970) for analyses in the natural sciences. An adaptation of this methodology for social sciences is due to Latsis (1976).

In a more positive sense, we are looking for a kind of diagnosis that could help us to identify early indicators of a turnaround or a few policy variables which could be included in a programme for faster growth and productivity advance. Although we shall focus on what can be measured, complying with the standards of the guild<sup>1</sup>, we shall not refrain from considering complex relationships which can be grasped only intuitively, even if they include phenomena which lie beyond the limits of official statistics<sup>2</sup>. The outcome may be "soft economics", but we find some consolation in the dictum that it is better to be vaguely right than to be precisely wrong.

2. Productivity growth - the development of real output per unit of all or of specific inputs - is hard to measure accurately. Inputs as well as outputs are subject to qualitative and quantitative changes and there are serious difficulties in defining what the "real" magnitudes are when relative prices greatly vary over a longer period of time. This caveat holds for the growth of total factor productivity as well as for the relatively simple concept of single factor productivity, notably labour productivity, to which this paper is limited for lack of a comprehensive set of data on capital stocks available to us.
3. The empirical basis covers the experience of 14 OECD-countries from the early 1960s to the late 1970s at the level of country aggregates and for major sectors. To eliminate or at least deemphasize cyclical changes (labour hoarding in mild recessions

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For a critical view see Barbash (1982).

2

This comes close to Hayek's notion of the limits of measurement in the analysis of 'phenomena of organized complexity'. See Hayek (1964; 1975).

and better utilisation of the stock of employed labour in upswings), we measure average productivity advance from peak to peak. The countryspecific benchmark years are enumerated in the Annex.

4. From this statistical information (Table 1) we can immediately draw two factual inferences<sup>1</sup>:
- (1) In all countries, except Norway, the growth of labour productivity significantly declined from the early to the late seventies. Even in Norway the productivity performance deteriorated relative to the 1960s.
  - (2) The productivity slowdown, measured as the percentage shortfall of the average growth rate of labour productivity in the late 1970s (from 1973/74 to 1979/80) relative to the performance before, was great in Canada, Sweden and the United States and small in Norway and Germany.

Hence the productivity slowdown appears to be a phenomenon common to all advanced countries. They all were apparently subject to a similar disease or shock although some countries fared better than others in the new circumstances. What is the explanation?

5. This productivity puzzle has provoked a plethora of empirical research, albeit mainly concentrated on the United States. The most comprehensive efforts employ a growth accounting framework. Among these, the recent contributions of Denison (1979) and Kendrick and Grossman (1980) stand out. Denison concludes from his study for the United States that the mystery basically remains unresolved. In fact, one may

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The figures in Table 1 include government services whose output and hence productivity is extremely difficult to measure. In many countries, the growth of labour productivity in the public sector is implicitly assumed to be zero by estimating output of government services as a linear function of labour input. In other countries like Germany, the growth of productivity in the public sector is arbitrarily determined by the statistical authorities (in the German case slightly above 1 per cent annually for recent years). The general picture presented in Table 1, however, holds also for aggregates excluding the public sector. See below.

Table 1 - The Growth of Labour Productivity<sup>a</sup> in Selected OECD-Countries, 1960-1980 (peak to peak<sup>b</sup>, p.c.)

C o u n t r y	Total Economy				
	Late 50s	Early 60s	Late 60s	Early 70s	Late 70s
United States	1.8	3.0	1.0	1.4	0.3
Canada	1.7	2.5	2.0	2.8	0.2
United Kingdom	2.2	3.1	2.8	3.1	1.1
Sweden	n.a.	4.5	3.1	2.0	0.4
Denmark	5.2	3.7	3.3	2.8	1.3
Norway	3.8	4.5	3.5	1.5	2.5
Finland	3.6	4.7	5.1	4.7	2.5
Netherlands	4.0	3.1	4.4	4.4	1.9
Belgium	2.5	5.2	3.9	4.4	2.4
Germany	4.6	4.9	4.6	4.1	3.2
Austria	5.0	4.6	6.4	5.2	2.8
France	4.3	5.0	4.5	4.7	2.9
Italy	4.6	5.0	6.2	4.2	1.7
Japan	8.4	12.5	8.6	6.3	3.0

<sup>a</sup>Gross domestic product in constant prices per employee. -  
<sup>b</sup>For countryspecific benchmark years see Annex.

Source: Calculated from OECD, National Accounts Statistics, Paris, var. iss. - OECD, Labour Force Statistics, Paris, var. iss. - IMF, International Financial Statistics, Yearbook 1981, Washington, 1981. - Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, Mut zur Stabilisierung, Jahresgutachten 1973/74, Stuttgart und Mainz: Kohlhammer, 1973. - Economic Report of the President. Transmitted to the Congress February 1982, Washington, 1982. - ILO, Yearbook of Labour Statistics, 1965.



question whether growth accounting, even if conducted most thoroughly as it has been, will ever lead to an adequate solution. As Nelson (1981) has explained in his stock-taking of the state of the art in productivity analysis, growth accounting cannot adequately cope with

- the issue of complementarity among the factors of production (long recognized as the imputation problem in the history of economic analysis);
- the influence of variables not incorporated in the underlying theoretical model, and
- the nature of economic growth as a disequilibrium process.

We have the feeling that Nelson is essentially right and have come to believe that the disequilibrium point is most relevant in the present context.

6. For properly understanding the factors behind the recent productivity performance it seems necessary to recall that the slowdown occurred after a long phase of rapid economic development in North America, Western Europe, and Japan alike. This suggests as a central hypothesis that the recent slack in the growth of labour productivity reflects the erosion of many of the favourable conditions which contributed to the long spurt of economic development in the West after World War II. To specify this idea we proceed to submit a tentative list of possible explanations, simply based on casual empiricism or theoretical considerations<sup>2</sup>.

- (1) From the increasing concern about the underground economy we infer that output statistics may underestimate the real performance of advanced economies. The main explanation for the productivity slowdown, as we measure it, may thus well be statistical under-reporting (Hypothesis I).

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See Mayer (1921/22).

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The items on the list are, of course, not mutually exclusive.

- (2) There is also reason to think that manufacturing was and still is the leading factor in productivity growth and that the productivity slowdown is related to the development towards a post-industrial society (Hypothesis II).
- (3) Productivity advance in manufacturing, construction, and elsewhere can have slowed down because workers reduced their effort in order to increase it in leisure activities, including activities which are close substitutes for household expenditures on goods and services (Hypothesis III).
- (4) As the slowdown in productivity advance goes hand in hand with a slowdown in income growth per capita we must also consider whether what we observe is not a slowdown in the demand for income in terms of effort<sup>1</sup>. After having experienced such a fast rise in their consumption levels workers may feel saturated for a while and may increasingly prefer job security instead of income growth (Hypothesis IV).
- (5) In a more general way, the income elasticity of demand for security may have become high in the period of growth acceleration, perhaps based on illusions about the real dynamic costs of social security (Hypothesis V).
- (6) Similarly, when rapid growth was taken for granted, almost as a kind of public good, societies developed an increasing demand for equity and equality<sup>2</sup>, without fully realizing its costs in terms of economic efficiency and growth performance later on (Hypothesis VI).
- (7) Had the productivity slowdown occurred only in Europe and Japan we would place the major emphasis on the presumption that it marked the end of a technological catching up process (Hypothesis VII).

1

This concept goes back to Robbins (1930) and the literature quoted on p. 123 *ibid.* which includes passages from Dalton, Robertson and Wicksteed.

2

See Okun (1975).

- (8) However, as the productivity slowdown also occurred in North America we must add a question about technological advance at the best practice frontier: Have firms in the U.S. suffered so much from the loss of their technological monopoly positions that they feel no longer sufficiently strong to take innovative risks at the previous rate, while firms in Europe and Japan were not yet ready to assume the role of technological pioneers, so that the world is faced with a technological stalemate (Hypothesis VIII)?
- (9) As the productivity slowdown in the West came after a spurt it may merely indicate a return to normality, perhaps combined with some overshooting on the low side. The question then is what produced the acceleration in the first place? Apart from post-war reconstruction, the major candidate is the policy innovation of demand management, successfully applied in the U.S. in the 1960s (Hypothesis IX).
- (10) The advance of labour productivity slowed down more than the growth of the capital/labour ratio<sup>1</sup>. This raises the question why the gross additions to the capital stock became less efficient in all countries under observation for more reasons than those covered by Hypotheses VII to IX. One possibility would be capital waste due to inflation and an inflation induced decline in the real rate of interest (Hypothesis X).
- (11) A further explanation for the decline in capital efficiency could be the drastic changes in relative prices which occurred in the wake of rapid growth in the early 1970s - higher costs for the environment, exhaustible resources and energy, including oil (Hypothesis XI).
- (12) Capital productivity may have also suffered from a systematic misallocation of investment in the sense that some firms and some forms of investment proved to be too attractive because governments intervened more and showed a bias in favour of large firms when it came to promotion measures and of less efficient industries when it came to import protection (Hypothesis XII).

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<sup>1</sup>  
For evidence see OECD (1980, p. 48).

- (13) With regard to labour we have to look for similar inefficiencies: Has the quality of labour deteriorated, perhaps because of declining educational standards or of a massive increase of the share of inexperienced labour in total employment (Hypothesis XIII)?
- (14) All this may not account for the significant international differences in the slowdown of labour productivity which are evident from Table 1. Could these differences be related to differences in wage behaviour and concomittant changes in the level and structure of employment (Hypothesis XIV)?

## II

### Evidence and Evaluation

7. Evidence for the drastic change of the conditions governing the growth of labour productivity since the early 1970s is presented in Table 2<sup>1</sup>. Whether we relate the growth of labour productivity per employed person - on Cobb-Douglas account - to the growth of the capital-labour ratio or - on Verdoorn account - to the growth of real output, a fit which is highly satisfactory for the period from 1960 to 1973<sup>2</sup>, fails to be so for 1973 to 1979. The correlation with the capital-labour ratio even ceases to be statistically significant.

<sup>1</sup>

Irrespective of whether labour productivity was measured in terms of the number of persons employed or of the number of hours worked, we obtained similar results from corresponding calculations for the non-farm business sector, performed on data given in OECD (1980) for samples of up to 12 countries.

<sup>2</sup>

In case of the Cobb-Douglas function, the estimated coefficient obviously reflects the influence of more factors than capital. Therefore, from the above regressions one can only conclude that the set of all forces which is proxied by the growth of the capital-labour ratio has lost its influence in the late 1970s.

Table 2 - The Growth of Labour Productivity in Industry Related to the Growth of the Capital Labour Ratio and Real Output in Industry<sup>a,b</sup>, International Cross Section<sup>c</sup>, 1960-1979

Period	Industry <sup>a</sup>	n	$\bar{R}^2$	F
1960-73	$\Pi E = 1.520 + 0.810 CL$ (0.150)*	10 <sup>d</sup>	0.76	29.30
1973-78	$\Pi E = 0.675 + 0.435 CL$ (0.255)	10 <sup>d</sup>	0.17	2.91
1960-73	$\Pi E = 1.338 + 0.649 OUT$ (0.140)*	14	0.61	21.33
1973-79	$\Pi E = 1.638 + 0.548 OUT$ (0.253)*	14	0.22	4.70

\*Significant at 5 p.c. level; standard errors in parantheses.

<sup>a</sup>Mining and quarrying; manufacturing; electricity, gas and water; construction. - <sup>b</sup>Symbols:  $\Pi E$  = real output per employee; CL = capital labour ratio (non-farm business sector); OUT = real output. All variables are expressed as average rates of growth over the period under inspection. - <sup>c</sup>Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Sweden, United Kingdom, United States. - <sup>d</sup>Except Austria, Denmark, Netherlands, Norway.

Source: Calculated from OECD, National Accounts Statistics Paris, var. iss.; OECD, Labour Force Statistics, Paris, var. iss.; OECD, 1980.

8. What is known about the underground economy (Hypothesis I) seems to contribute little to explaining this puzzle, although there are empirical studies suggesting that these activities have grown over time, particularly during the 1970s, and may be now quite significant<sup>1</sup>. In most official national income calculations underground activities are ignored, except in Italy and a few other countries where underground output has been estimated. Apart from this, such output estimates do not help if we still lack the corresponding input estimates. Against this one could argue that unrecorded output was based on unrecorded input so that the effects on measured productivity should cancel out. Not quite so, however, in a period when increasing tax burdens (Table 3) - particularly in Sweden, Norway, the Netherlands, and Belgium, less so in North America - create more and more incentives to divert inputs which still remain recorded to producing unrecorded output<sup>2</sup>. For the same reason, overstating of expenses may have become more common over time<sup>3</sup>. Finally, the productivity performance of labour employed in the observed economy is likely to suffer once a second job is taken up. But as the underground economy is still so much beyond the limits of

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According to Langfeldt (1982), in Germany the (monetary) unobserved sector seems to have grown from roughly 2 per cent of gross national product in the early 1960s to roughly 14 per cent in the late 1960s and 27 per cent in 1980. Feige's (1980) estimates for the United States reveal similar magnitudes. See also Tanzi (1980); Contini (1981); Isachen, Kloveland, Strøm (1981); Kirchgässner (1981); Frey, Weck, Pommerehne (1982).

2

There is evidence that marginal tax rates increased more rapidly than the tax burdens shown in Table 3. For details see the individual country studies in Walker and Block (forthcom.).

3

Evidence on the decline in tax moral in Germany and the United States is presented in Frey et al. (1982, pp. 11-2).

Table 3 - Taxes and Social Security Contributions in p.c. of Gross Domestic Product in Selected Industrial Countries, 1965-1979 (p.c.)

Country	1965 <sup>a</sup>	1970 <sup>a</sup>	1973 <sup>a</sup>	1979
United States	27.1	30.5	30.2	31.1 <sup>b</sup>
Canada	27.0	30.9	31.4	30.2
United Kingdom	28.6	34.3	32.5	35.7
Sweden	35.0	41.0	42.5	50.2
Norway	34.9	41.1	46.1	48.5
Finland	28.4	31.4	34.0	34.6
Netherlands	33.1	39.8	44.8	47.6
Belgium	29.1	33.5	36.3	42.8
Germany	32.8	35.3	38.0	39.3
Austria	34.0	36.0	38.0	39.0 <sup>c</sup>
France	34.8	36.1	35.2	39.8
Italy	28.0	27.3	27.5	32.2
Japan	18.7 <sup>d</sup>	19.6	21.1	24.7

<sup>a</sup> Countryspecific peak year around 1965 and 1970, respectively; see Annex. - <sup>b</sup>1978. - <sup>c</sup>1977. - <sup>d</sup>1965 (peak year: 1964).

Source: OECD, National Accounts of OECD-Countries, var. iss.

reliable estimates and as we know even less about its impact on measured productivity, we have to put Hypothesis I aside. This does not exclude the possibility that some of the factors behind the underground economy may also have contributed to the productivity slowdown. These factors will come up in connection with other hypotheses.

9. Shifts in the intersectoral composition of output and employment (Hypothesis II) are likely to be a significant factor in the explanation of the productivity slowdown for the following reasons:

- (a) In the 1950s and 1960s, in the advanced economies of the West the industrial sector had developed rapidly and had attracted resources from agriculture. This had raised overall productivity as there is a high differential between the levels of productivity in agriculture and in manufacturing (Table 4). In addition, agriculture itself had been forced to concentrate on mechanisation and other measures to raise the productivity of land and labour. In the 1970s, these stimuli for productivity growth weakened. The rate of displacement of labour from agriculture decreased markedly; at the same time, except for Finland and Austria, the scope for rapid productivity advances in this sector obviously narrowed down (Table 5).
- (b) The 1970s witnessed an acceleration in the growth of employment in government services. As government services exhibit a distinctly below average level of productivity in all countries investigated this development had a negative impact on measured productivity growth.
- (c) When in the course of the 1960s the relative growth of manufacturing came to an end, private and public services turned out to be the only<sup>1</sup> sectors which were to expand their share in employment<sup>1</sup>. Measured productivity growth

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<sup>1</sup>

Due to a variety of factors, productivity measurement in services is much less reliable than in manufacturing. For details on these and other difficulties in measuring productivity see e.g. Mark (1981).



Table 4 - Relative Labour Productivity and Share of Employment of Major Economic Sectors in Selected Industrial Economies

Country	Output per employed in				Share in total employment											
	Agri- culture	Manufac- turing	Private Services	Govern- ment	Agriculture			Manufacturing			Private Services			Government		
	as a proportion of output per employed for total economy				1960	1970	1977	1960	1970	1977	1960	1970	1977	1960	1970	1977
	in 1970															
United States	0.65	1.20	1.04	0.78	7.5	4.5	4	23.5	22.5	20.5	43.5	42.5	46.5	16	18	17
Canada	0.54 <sup>a</sup>	1.10 <sup>a</sup>	0.90 <sup>a</sup>	.	13	7.5	6	24	23	19.5	37.5	42.5	45.5	17	18.5	20
United Kingdom	0.93	0.88	1.11	0.82	4.5 <sup>e</sup>	3	2.5	35.5 <sup>e</sup>	34	30	34 <sup>e</sup>	34.5	36	15 <sup>e</sup>	18	22
Sweden	0.57	1.17	0.77	0.89	13.5 <sup>f</sup>	8.5	6	28.5 <sup>f</sup>	26.5	24	33.5 <sup>f</sup>	34	32.5	14.5 <sup>f</sup>	20.5	27.5
Norway	0.55	1.06	1.11	0.85	18.5 <sup>g</sup>	12.5	8.5	24	24.5	23.5	33.5 <sup>g</sup>	35	36.5	13.5 <sup>g</sup>	17	20.5
Finland	0.72	1.22	0.87	1.14	31	20.5	13.5	23	26	27.5	25.5	29.5	33	9	12	15
Netherlands <sup>a</sup>	0.78	1.28 <sup>b</sup>	0.87	.	12.5	8	7	35 <sup>b</sup>	29.5 <sup>b</sup>	25 <sup>b</sup>	41	49	55.5	.	.	.
Belgium	0.80	1.07	0.99	0.79	8.5	4.5	3.5	31.5	30.5	27	36	40	44	12	14	16
Germany	0.42	1.10	0.99	0.87	13.5	8.5	6.5	37	38.5	36.5	30	31.5	34	8	11	14.5
France	0.56	1.16	1.02	0.75 <sup>c</sup>	21	13	9.5	25.5	26.5	26	27.5	33	37	13	13	14
Italy	0.50	1.12 <sup>b</sup>	1.13	0.97	29.5 <sup>e</sup>	18.5	14.5	24 <sup>b,e</sup>	28 <sup>b</sup>	28 <sup>b</sup>	28 <sup>e</sup>	32	35.5	8 <sup>e</sup>	10.5	12.5
Japan	0.35	1.32	0.97	1.08 <sup>d</sup>	32.5	17.5	12	21.5	27	25	36.5	43.5	49	3 <sup>d</sup>	3 <sup>d</sup>	3.5 <sup>d</sup>

<sup>a</sup>Related to the private business sector. - <sup>b</sup>Including mining. - <sup>c</sup>Including community services. - <sup>d</sup>Public administration and defense. - <sup>e</sup>1961. - <sup>f</sup>1963. - <sup>g</sup>1962. -

Source: OECD (1980, Tables 8 and 10).

Table 5 - The Growth of Labour Productivity<sup>a</sup> in Selected OECD-Countries by Major Sector, 1960-1980 (peak to peak<sup>b</sup>; p.c.)

Country	Early 60s	Late 60s	Early 70s	Late 70s	Early 60s	Late 60s	Early 70s	Late 70s	Early 60s	Late 60s	Early 70s	Late 70s
	Agriculture				Industry <sup>c</sup>				Private and public services			
United States	4.1	5.3	3.6	2.2	2.8	1.2	4.1	0.4	2.6	0.4	0.9	0.1
Canada	8.9	-0.1	4.3	1.5	3.2	4.2	1.9	1.4	0.8	0.9	2.0	0.0
United Kingdom	2.6	6.0	7.2	2.5	4.4	3.8	3.6	2.0	1.8	1.7	2.3	0.3
Sweden	6.3	7.7	6.6	-1.0	5.3	6.4	3.1	1.4	3.0	-0.4	0.6	-0.1
Denmark	3.8	4.6	3.9	2.1	4.6	3.3	6.4	2.9	2.3	2.3	0.3	1.2
Norway <sup>d</sup>	4.1	1.5	7.8	1.5	4.1	3.8	4.2	4.3	3.7	2.7	-1.7	0.8
Finland	4.6	7.6	6.6	6.7	5.1	4.8	4.6	3.1	2.1	2.8	2.4	0.8
Netherlands	3.9	7.6	7.5	4.4	3.8	7.1	7.2	2.8	2.2	2.0	2.3	1.2
Belgium	4.7	5.3	8.4	2.3	7.6	5.0	7.0	4.7	2.8	2.4	2.1	0.8
Germany	3.0	8.2	8.8	4.1	5.5	5.1	4.4	3.3	3.5	3.1	2.9	2.9
Austria	5.4	5.1	3.9	9.7	5.0	7.6	5.7	2.6	2.8	4.7	3.4	1.1
France	4.8	5.6	9.0	4.4	5.3	6.1	4.8	3.8	3.6	2.0	2.6	1.7
Italy	7.5	6.1	3.5	4.4	8.0	5.8	4.7	2.1	0.0	4.2	2.9	0.1
Japan <sup>e</sup>	5.6	6.3	13.5	1.6	10.5	9.9	6.9	4.6	9.2	6.1	2.9	1.6

<sup>a</sup>Value added in constant prices per employee. - <sup>b</sup>For countryspecific benchmark years see Annex Y. -  
<sup>c</sup>Mining and quarrying; manufacturing; energy, gas and water; construction. - <sup>d</sup>Late 1970s: 1974-1979.-  
<sup>e</sup>Late 1970s: 1973-1979.

Source: Calculated from OECD, National Accounts Statistics, Paris, var. iss.; OECD, Labour Force Statistics, Paris, var. iss.; IMF, International Financial Statistics, Yearbook 1981, Washington, 1981.

in these sectors always fell short of that in industry or agriculture<sup>1</sup>. Hence, the increasing weight of services in the employment structure must have had a negative effect on measured overall productivity growth.

The structural shifts among agriculture, industry and services have thus indeed contributed to the decline of measured productivity advance in western countries. However, they are far from being capable of explaining the entire post-1973 productivity development<sup>2</sup> as we conclude from shift and share analyses (OECD, 1980, pp. 33-44; Fels, Schmidt, 1981, pp. 109-111) and from the observation that the productivity slowdown is a phenomenon common to all sectors (Table 5).

10. Hypotheses III through VI have the common feature that they attribute the slowdown of productivity to shifts in preferences. If these shifts could be taken as an expression of

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This may well be a statistical illusion due to estimating real output in various services from input indices or constructing the real output series as Laspeyres indices. But it is also true that larger parts of the service sector are sheltered from international competition and, therefore, under less pressure for reducing costs and improving productivity. Furthermore, many services in fields like health, insurance, banking or transport, which exhibit features of cartelization, partly due to guild ethics and partly to public regulation, and services in the public sector, which are not exposed to the penalties and the rewards of the market, have grown particularly fast. On the other hand, new technologies based on microelectronics make the notion questionable that productivity advance in services is by necessity weak because of the technological structure of these activities (Baumol, 1967; Baumol and Oates, 1975, Chapters 16, 17).

2

This levelling off does not exclude that structural change among and within firms has levelled off as a driving force as well. It could well be the case in times of increasing protection for activities which exhibit a relatively low level of productivity.

the unconstrained will of people to work less or less hard, to have more 'leisure on the job', to be content with their level of (present and future) consumption, or to build up a comprehensive system of security against individual economic risks, the productivity slowdown would have to be taken as a revealed preference, perhaps a natural development in a mature economy: nothing to bother about. However, there are some observations which make us hesitate to submitting a "natural rate hypothesis" in this context. First, the very emergence of the underground economy is an indication that there is little driving force behind the move towards a leisure society, once the wedge between the marginal product and the private income earned for it disappears. Second, the notion that people in advanced countries are now fairly saturated with regard to their consumption targets finds as little supporting evidence as Keynes' famous psychological law in past decades. With regard to specific consumer goods, evidence on saturation refers to quantities rather than qualities, and the permanent flow of product innovation makes saturation a shaky concept<sup>1</sup>. Third, we still observe trade unions pressing hard for higher incomes. Fourth, there are reasons to believe that the increasing redistribution (which is reflected in the fact that the 'income elasticities' of the transfer system exceed unity in all countries under inspection (Table 6)) may just as well result from a supply push if one considers that the Keynesian emphasis on overall demand, on the danger of oversaving and on government spending greatly widened the scope for politicians to offer transfer benefits in their competition for votes in the political market.

11. It is true that the rise of the welfare state could also be interpreted as revealing a collective preference for more

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See Schmidt (1977).

Table 6 - The Growth of Public Transfers in Selected Industrial Countries, Mid 1960s<sup>a</sup> to 1979

Country	Public Transfers in p.c. of GDP			'Income Elasticity' <sup>b</sup> of Public Transfers
	1965 <sup>a</sup>	1973	1979	
United States	6.6	9.8	11.2 <sup>c</sup>	1.47
Canada	7.3	10.1	11.8	1.34
United Kingdom	9.7	12.4	15.7	1.27
Sweden	10.9	15.4	25.2	1.59
Norway	13.6	19.7	23.2	1.35
Finland	11.0	11.5	15.4	1.19
Netherlands	18.5 <sup>d</sup>	24.4	33.0	1.49
Belgium	12.1	17.7	22.9	1.38
Germany	14.4	15.8	19.1	1.27
Austria	17.0	17.4	20.6 <sup>e</sup>	1.11
France	19.1	20.8	25.7	1.17
Italy	15.5	18.1	19.2	1.11
Japan	5.6 <sup>f</sup>	6.4	11.7	1.42

a Country-specific peak-year; see Annex. - b Derived from logarithmic time series regressions between public transfers and gross domestic product in current prices for the period from the mid 1960s (country-specific peak year or earliest year for which data are available) to 1979. - c 1978. - d 1968. - e 1977. - f 1965.

Source: Calculated from OECD, National Accounts for OECD-Countries, var. iss.

security or more equality at the expense of faster income growth<sup>1</sup>; but did people know in advance, or correctly assess, what an extensive transfer system would cost them in terms of reduced performance motivation and hence productivity advance, given human nature and its propensity to make the best use of whatever opportunities a system offers to its individual participants?<sup>2</sup> The question is not as far beside the point as it may appear at first sight, since the quest for social equality and security may well have been the natural outgrowth of the rapid advances achieved in the 1960s<sup>3</sup> built upon the double illusion (i) that its static costs would be negligible and (ii) that it would not have a negative effect on productivity advance. A collective venture, initiated in a period of accelerated growth which looks like a miracle in retrospect, may after a while produce a fundamental shift in people's mentality<sup>4</sup> as if the miraculous conditions could be simply taken for granted. This is a disequilibrium hypothesis with an implicit warning against extrapolating favourable developments or conditions with a high rent content, such as the growth stimuli of demand

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1 We note in this context a (social) policy catching up process: The 'income elasticities' of the transfer system tend to be the higher the lower the initial ratio of public transfers to gross domestic product (Spearman coefficient of rank correlation: - 0.71; in this correlation the Netherlands are excluded because in their case the period of observation is not comparable to that for the other countries).

2 For an elaboration of the costs of transfer systems see Grubel (1982).

3 See Boltho (1982, p. 149).

4 Maddison (1982, p. 13) reports that "sickness absenteeism represents 10 per cent of working time in the Netherlands where benefits are generous, but only 2.5 per cent in the U.S.A. where they are much smaller". See also Grubel (1982, p. 25) on Germany and Sweden.

management, the integration of international markets (Giersch, 1970, pp. 11-2 ) or the sudden availability of an exhaustible resource. In a society which takes a positive-sum-game for granted, a negative-sum-game is likely to be played after a zero-sum-mentality (Thurow, 1980) has had time to develop<sup>1</sup>.

12. The disincentives associated with such a negative-sum-game would tend to impair the advance of labour productivity mainly by discouraging investment. Indeed, investment performance in the late 1970s was worse than in the previous period, except for Canada, the United Kingdom and Norway, the nouveaux riches de l'énergie among the advanced countries (Table 7). Nonetheless, this alone can hardly be taken to fully explain the productivity slowdown<sup>2</sup>. Yet the quality of the additions to the capital stock may have declined, perhaps due to a slowdown in the flow of product or process innovations resulting from a depletion of technological

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While social consensus is an economic resource in a democratic society, the struggle over the income distribution is - like war - a negative factor in economic development. Fast growth is good for social consensus since it makes people on the lower income strata feel sure that it will take them only a short time to catch up with what higher income ranks earn today; but when income growth slows down, the catching-up time can become hopelessly long. Then envy will find an outlet in hate rather than in competitive effort, and the consensus may break down unless governments can redirect emotions towards other collective goals.

2

This is not controversial in the literature on the productivity slowdown; it is also evident from the calculations presented in Table 2 which show that after 1973 international differences in the growth rates of labour productivity are not susceptible to explanation by international differences in the growth of capital-labour ratios.

Table 7 - Gross Fixed Capital Formation Related to Gross Domestic Product and the Growth of the Capital Stock in the Non-Farm Business Sector, Selected Industrial Countries, 1960 - 1980 (p.c.)

Country	Share of gross fixed capital formation in GDP				Average annual growth rate of the capital stock in the non-farm business sector	
	Early 1960s <sup>a</sup>	Late 1960s <sup>a</sup>	Early 1970s <sup>a</sup>	Late 1970s <sup>a</sup>	1960- 73	1973-78
United States	18.3	18.0	18.0	17.5	4.0	3.4
Canada	22.8	22.0	21.8	23.0	5.3	5.2
United Kingdom	17.3	18.6	18.7	18.7	3.9	2.9
Sweden	23.7	23.3	21.8	20.4	4.8	4.1
Denmark	29.0	23.4	24.9	22.7	.	.
Norway	28.4	27.2	28.9	31.2	.	.
Finland	25.9	24.5	28.0	26.0	7.5	5.3
Netherlands	24.6	25.7	23.4	20.9	.	.
Belgium	21.2	27.6	30.5	21.4	5.4	3.3
Germany	26.1	23.6	25.6	21.4	6.7	4.4
Austria	26.1	26.3	28.5	26.0	.	.
France	21.9	23.5	23.6	22.4	5.3	4.9
Italy	19.9	20.9	20.3	19.8	6.0	3.9
Japan	32.0	33.2	35.1	31.8	12.6	7.0

<sup>a</sup> Weighted average over the business cycle; for countryspecific cycles see Annex.

Source: OECD, National Accounts Statistics, Paris, var. iss. - OECD (1980, Table 15).



possibilities (Hypothesis VII and VIII)<sup>1</sup>. This notion brings us back to the stagnationists of the 1930s who believed that the dearth of major new industries was one of the main reasons for the economic malaise of their time (Hansen, 1941)<sup>2</sup> and presumed a theory of the mature economy which was completely refuted by the fast economic growth of the 1950s and 1960s. Nevertheless, there are certain indications to back the hypothesis of a technological stalemate for the 1970s.

- (a) In the early 1970s, the technological gap between North America and Western Europe (as well as Japan) had been largely closed (Christensen, Cummings, and Jorgenson, 1980). Competition in high-technology commodities on domestic and world markets became fierce. For Western Europe (and Japan) the end of the catching-up meant that the import and adaptation of best practice technology dried up as a source of economic growth and productivity advance (Table 8)<sup>3</sup>. For North America the fact that other countries had caught up must have implied a partial erosion of quasi rents derived from superior technology and organization, notably in the markets for capital intensive and skill intensive manufactures.

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The depletion hypothesis has been emphasized in a recent study by Nordhaus (1981). In addition to technological depletion, Nordhaus stresses the depletion of energy resources, the depletion of investment opportunities in the tradeables sector, the phasing out of structural changes from agriculture to manufacturing, the slowdown of world trade. While he attributes two thirds of the productivity slowdown to these factors, he also casts some doubt on this estimate (*ibid.*, p. 24).

2

In addition to technology, the stagnationists stressed two more factors: the decline of the rate of population growth in the United States and the dwindling of investment opportunities because of the (alleged) passing of the economic frontier. In today's open world economy, these arguments are still less convincing than in the 1930s, if only for the high population growth and the severe capital shortage in developing countries. For a criticism of the stagnationists see Terborgh (1945) and the literature cited therein (*ibid.*, p.9).

3

For a similar conclusion see Kendrick (1981, pp. 156-66).

Table 8 - The Technology Gap Hypothesis<sup>a</sup>, International Cross Section<sup>b</sup>,  
1964 - 1973 and 1973 - 1979<sup>c</sup>

Sector	Period	Equation	n	R <sup>2</sup>
Total economy	1964-73	$\Pi E = 31.122 - 6.564 \ln \text{GAP } 64$ (1.047)*	13	0.78
Total economy	1973-79	$\Pi E = 9.491 - 1.779 \ln \text{GAP } 73$ (1.714)	13	0.09
Industry <sup>d</sup>	1964-73	$\Pi E = 25.330 - 4.868 \ln \text{GAP } 64$ (1.692)*	13	0.43
Industry <sup>d</sup>	1973-79	$\Pi E = 3.004 - 0.019 \ln \text{GAP } 73$ (2.244)	13	0.00

\*Significant at 5 p.c. level; standard errors in parantheses.

<sup>a</sup>Symbols:  $\Pi E$  = Average annual growth rate of real output per employee over the period under inspection;  $\ln$  = natural logarithm; GAP 64 or 73 = Per capita income of individual sample country in p.c. of per capita income of the United States in 1964 or 1973 (countryspecific peak year; see Annex) valued at purchasing power parities. - <sup>b</sup>Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Sweden, United Kingdom. - <sup>c</sup>Countryspecific peak years; see Annex. - <sup>d</sup>Mining and quarrying; manufacturing; electricity, gas and water; construction.

Source: Calculated from OECD, National Accounts Statistics, var. iss. - OECD, Labour Force Statistics, var. iss. - R. Summers, I.B. Kravis, A. Heston, International Comparison of Real Product and its Composition: 1950 - 1977, The Review of Income and Wealth, Series 26, No.1, March 1980.

- (b) At the same time, the speed at which the technological frontier is shifting outward may have declined as is suggested by the following observations: Over the first three quarters of this century, the U.S. economy had an average productivity advance (per employee) of 1.6 per cent, but after 1973 an average of only 0.2 per cent (Table 9), a figure which is lower than that for any other U.S. business cycle after World War II. The presumption for a technological explanation finds support (i) in Table 10 which shows that between the 1960s and the 1970s, RandD expenditures in the United States decreased and did so even more than in other countries<sup>1</sup>, and (ii) in empirical studies which conclude that the productivity of these expenditures declined recently (Griliches, 1980).
- (c) According to Table 10 some countries like Japan, Germany and Sweden are in a process of catching-up also with regard to RandD expenditures. But this has not yet been sufficient to stem the decline for the West as a whole. Moreover, there is evidence that the relative growth of RandD expenditures in Germany has not been possible without a decline in its productivity (Fels, Schmidt, 1981, Chapter III, part B).

13. On the other hand, casual evidence suggests that we are far from being in the midst of a technological impasse. Micro-electronics, biotechnology, new industrial materials (graphite, polymere, ceramics etc.), among others, have opened up new wide avenues for technological development and are continuing to do so. Griliches (1980, p. 347) maintains that "all substantial surveys of new technologies and new technological possibilities seem to contradict the notion that we have exhausted our innovation possibilities". Empirically, Griliches could not detect a major impact of recent RandD performance on the productivity slowdown in the U.S. His conclusion that RandD performance was a consequence rather than a cause of the worsening of the growth climate is quite plausible to us. It supports an acceleration-deceleration hypothesis.

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It need not be stressed that this ratio is a weak indicator for innovativeness as the efficiency of RandD outlays as well as the lag between input and output may widely vary over time.

Table 9 - The Growth of Labour Productivity and of Employment in the United States, 1900-1981 (average annual rates of change)

Sector Period	Total economy		Private business		Non-farm business		
	Productivity/ Employment Indicator	GDP per employee	Employees	Output per hour of all persons	Hours of all persons	Output per hour of all persons	Hours of all persons
1900-1981		1.5	1.7	.	.	.	.
1900-1929		1.6	1.9	.	.	.	.
1929-1951		1.6	1.3	.	.	.	.
1951-1973		1.9	1.6	2.8	0.8	2.4	1.3
1973-1981		0.2	2.1	0.7	1.4	0.6	1.6
1951-1955		2.3	0.9	3.0	0.4	2.3	1.1
1955-1962		1.8	1.0	2.6	-0.1	2.1	0.5
1962-1966		3.0	2.2	3.7	0.9	3.2	1.2
1966-1969		1.1	2.2	1.9	1.4	1.6	1.8
1969-1973		1.3	2.2	2.6	1.1	2.5	1.4
1973-1979		0.2	2.5	0.8	1.8	0.7	2.0
1979-1980		- 0.8	0.5	- 0.2	- 0.6	- 0.3	- 0.6
1980-1981		1.0	1.1	1.1	0.9	0.9	0.9

Source: U.S. Government, Economic Report of the President, 1982. - U.S. Department of Commerce, Bureau of the Census, Historical Statistics of the United States - Colonial Times to 1970, Part 1, Washington, D.C. 1975.

Table 10 - R&D Performance of Selected Industrial Countries, 1964-1979

Country	Gross Domestic Expenditure on R&D in p.c. of GDP		
	1964	1973	1979
United States	3.14	2.50	2.41
Canada	1.07	0.99	0.94
United Kingdom	2.32	2.13 <sup>a</sup>	2.20 <sup>b</sup>
Sweden	1.20	1.60	1.89
Netherlands	2.03	2.01	1.98
Belgium	1.05 <sup>c</sup>	1.43	1.40
Germany	1.41	2.09	2.27
France	1.84	1.78	1.82
Italy	0.67 <sup>c</sup>	0.88	0.84
Japan	1.47	1.87	2.04
All ten countries	2.40	2.12	2.08

<sup>a</sup>1972. - <sup>b</sup>1978. - <sup>c</sup>1965.

Source: OECD, Science and Technology Indicators, Basic Statistical Series, Volume B, Gross National Expenditure on RandD (GERD) 1963-1979, Paris, 1982.

14. This carries the discussion to the question whether the productivity slowdown cannot be best explained by the exhaustion of a policy potential (Hypothesis IX) rather than a technological potential. What is at stake is the assertion that the poor performance of the 1970s must be seen against the background of a policy-induced acceleration of economic growth and productivity advance in the 1960s, and may be the deferred price for it.
15. The productivity advance which the U.S. economy exhibited between 1962 and 1966 was very rapid by past standards (Table 9). We attribute it to the implementation of the Keynesian policy programme. With the claim that the economy is manageable the Kennedy administration generated optimistic expectations for the returns on investment. This worked well for several years, supported by elements of mutual causation (positive feedback). These elements include
- the favourable influence of investment on overall demand, capacity utilisation, profits and profit expectations,
  - the favourable influence of investment on the age structure and the productivity of the capital stock,
  - the favourable influence of (fast relatively) productivity advance on unit labour costs, given adaptive expectations in wage negotiations (a wage lag);
  - the favourable influence of a high effective demand for labour on attitudes towards technical progress, the inter-industry and intra-industry division of labour in the world economy, the degree of specialisation among firms in general, and the exploitation of other potential sources of productivity growth.

When efforts to repress price inflation failed and price inflation accelerated under the impact of the Vietnam war the scope for an accelerated productivity advance was exhausted and mutual causation with a negative sign (vicious circle) seems to have reduced productivity advance below the long run trend (Table 9).

16. Europe's productivity growth in the 1960s strongly benefited - as we observed above - from the possibilities of cheaply importing U.S. technology (Table 8). What is relevant here is that the technological catching-up was accelerated (i) by the high import demand in the U.S. economy which in Europe induced an export-led growth process, supported by the increasing undervaluation of European currencies vis à vis the US-\$, and (ii) that this undervaluation induced a flow of direct investment from the U.S. to Europe. It was in this way and in this period that a transatlantic disequilibrium built up (Giersch, 1979).
17. Accelerated economic development on both sides of the Atlantic boosted the demand for raw materials, energy, including oil, and labour throughout the 1960s. Imports from other countries expanded rapidly, and bottlenecks in European labour markets were temporarily widened by massive immigration from the Mediterranean region. In the course of time, strong upward pressures on prices in the bottleneck areas - limits to growth - made themselves felt.
18. These tensions and disproportionalities were to explode in a variety of shocks during the business cycle which began in the late 1960s and ended with the worldwide boom of 1973. The system of fixed exchange rates - the very pillar around which the post-war western economic system had been built - proved to be unsustainable. Excessive balance of trade surpluses in Europe and the concomitant import of inflation put strain on the exchange rate system. Also, trade unions in Germany, hitherto the major source of stability in the system, gave up their policy of wage restraint and pushed into the scope given by the balance of payments situation. As a consequence of the demand induced growth process in the United States and Europe, which helped to bring about the productivity acceleration, the western world saw itself faced with (i) high and volatile rates of inflation, (ii)

depressed real rates of interest, (iii) a quadrupling of oil prices, (iv) a burst of raw material prices, (v) a massive decline of employment in Germany and elsewhere in Europe, (vi) a reversal of the acceleration in the growth of real wages, i.e. a deceleration, or even a decline, in the development of real wages in the U.S. and Germany (Tables 9 and 11), and elsewhere in Europe.

19. The acceleration of inflation which started in the late 1960s and which was further fueled by efforts to accommodate the drastic oil price rise through monetary and fiscal expansion is likely to have depressed productivity growth in various ways. First, despite occasional adjustment of the tax system, inflation pushed people into higher tax brackets. This must have impaired work incentives, just as it often led to the taxation of phantom profits. Second, with rising inflation, the private opportunity cost of holding money increased much beyond the social cost of supplying money, which is tantamount to taxing the use of money as a production factor and to inducing the substitution of other resources (such as time) for money. Third, the fact that inflation became more volatile must have further reduced the signal to noise ratio in the information processing system of the market. Finally, in the absence of index linked bonds, inflation diverted funds from productive investment to the production of assets which were thought to be a good hedge against inflation ("concrete gold", structures and real estate)<sup>1</sup>.

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<sup>1</sup>

See Giersch (1974 pp. 7-8); Feldstein (1982 pp. 8-13).



Table 11 - Employment, Wages, Productivity, Interest Rates, Consumer and Producer Prices, and Terms of Trade Effects in the United States and Germany, 1962-1981 (p.c.)

	Manufacturing						
	Hours <sup>a</sup>	Real hourly compensation <sup>a</sup>	Output per hour <sup>a</sup>	Rate of Inflation		Average real rate of interest <sup>b</sup>	Terms of trade effect <sup>a/c</sup>
				Consumer prices <sup>a</sup>	Wholesale prices <sup>a</sup>		
United States							
1962-1966	3.3	1.8	4.2	1.8	1.3	2.8	0.0
1966-1969	1.6	2.1	1.7	4.1	2.2	3.4	0.0
1969-1973	0.0	1.6	3.2	4.9	6.0	0.4	0.0
1973-1979	0.7	0.9	1.4	8.5	9.8	-1.7	-0.7
1973-1975	-4.6	1.2	0.0	10.0	14.0	-6.0	-2.0
1975-1979	3.5	0.7	2.1	7.8	7.7	0.5	0.0
1979-1981	-1.9	-2.9	1.3	11.9	11.7	0.7	-0.5
Germany							
1962-1965	0.8	4.7	6.2	2.8	1.3	5.1	-0.1
1965-1969	0.0	5.5	5.7	2.2	0.5	6.6	0.0
1969-1973	1.3	8.3	4.8	5.3	4.6	3.8	0.2
1973-1979	-2.1	5.6	5.3	4.6	5.0	2.4	-0.2
1973-1975	-4.7	7.5	5.4	6.5	9.0	0.3	-0.2
1975-1979	-0.8	4.3	5.2	3.7	3.1	3.4	-0.2
1979-1981	-0.8	-0.2	1.2	5.9	6.7	2.6	-1.3

<sup>a</sup>Average annual rates of growth. - <sup>b</sup>Geometric average of government bond yields deflated by wholesale prices (Germany: prices for industrial products). - <sup>c</sup>TTE =  $\left( \frac{1+GNI_r}{1+GDP_r} - 1 \right)$  where  $GNI_r$  = rate of growth of real gross national income (defined as gross domestic product in constant prices minus net exports in constant prices plus net exports in current prices deflated by implicit import prices);  $GDP_r$  = rate of growth of real gross domestic product (geometric average over yearly rates of growth over the period under inspection).

Source: U.S. Department of Labour, Handbook of Labour Statistics 1979. - U.S. Department of Labour, Monthly Labour Review, Vol. 103 (1980), No. 12, pp. 32-9. - IMF, International Financial Statistics, var. iss. - OECD, Main Economic Indicators, var. iss. - Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, Jahresgutachten 1979/80 and 1981/82. - U.S. Government, Economic Report of the President, February 1982.

20. Less noted in the context of the productivity slowdown but more important in our view were the effects which the inflationary monetary policy had on the level of real interest rates and hence on the ratio between real interest rates and real wages (Hypothesis X). Table 11 shows for the U.S. and West Germany that when inflation rates increased after 1969, real interest rates dropped by 2-3 percentage points. When the oil price shock was accommodated between 1973 and 1975 they further fell. Until the end of the 1970s they were markedly below what had been customary in the 1960s in both countries. While inflation was accelerating, expectations obviously were biased by the experience of a less inflationary past (adaptive expectations or a time lag on the capital market). This seems to have depressed real interest rates below their long-run equilibrium level which we conjecture must have risen under the impact of energy price induced obsolescence and uncertainty.
21. The opposite happened to real wages in Europe. Table 11 shows for Germany that real wages increased much faster than output per hour in the early seventies, even if the positive terms of trade effect is fully taken into account (as it has to be in an open economy to arrive at "distributable output"). Part of this can be taken to reflect the adjustment process that corrected the transatlantic disequilibrium of the 1960s mentioned above. But there was more to it: unit labour costs in real terms further increased from 1973 to 1975 when, in addition, the terms of trade effect became negative. At least for Germany and for some parts of Continental Europe, we can interpret this distortion of real wages and real interest rates and of the relation between them by advancing the following three interrelated propositions, each of which has a slightly different emphasis: (i) inflation, an accommodating monetary policy, and depressed real rates of interest limited the number of bankruptcies which were bound to occur under the pressure of rising unit labour costs; (ii) depressed

real rates of interest allowed real wages to rise faster and to stay higher than would have been possible without creating (even) more unemployment; (iii) with a given push of costs from labour, energy, and raw materials, an accomodating or inflationary monetary policy helped to prevent (more) unemployment by lowering the costs of capital.

22. A similar cushioning effect is not observable for the U.S. between 1969 and 1973 when the devaluation of the dollar and the Nixon wage-price controls programme ("I am also a Keynesian") led to an acceleration of productivity advance in manufacturing - and a lag of real wages behind it - that shows a striking similarity to the development under the Kennedy-Johnson Administration. The decline of the real rate of interest (by 3 percentage points as calculated in Table 11) must therefore have a connection with the rising prices of food and raw materials. In this sense it obviously cushioned a negative "supply shock" and contributed to the strong rise of corporate profits in U.S. manufacturing between 1970 and 1973<sup>1</sup>.
23. After the oil price hike - during the 1973-1975 period - the drop in the real rate of interest in the U.S. also helped to support real wages, which continued to rise although distributable output per hour absolutely declined. Over the whole period from 1973 to 1979 real wage rates rose slightly more than distributable output, while the real rate of interest was negative on the average and was lower in every subperiod than in the 1960s. If we consider only labour and capital, we find the balance between factor

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Corporate profits of manufacturing increased from 26.6 bill. US-\$ in 1970 to 45.5 bill. US-\$ in 1973 and the ratio of profits after income taxes to stockholders' equity from 9.3 per cent to 12.8 per cent. See Economic Report of the President, 1982, pp. 329 and 331.

prices distorted in favour of labour and against capital in the U.S. as well as in those parts of Europe for which Germany can be taken to be representative.

24. When price signals have time to work out their full effects on the supply side, such a distortion resulting from inflation (demand pull or accomodated cost push) must be considered to have several or all of the following side effects:
- a decline in the propensity to save;
  - a tendency of potential savers to accept and even support a policy of substituting social security for private capital accumulation (Hypothesis V);
  - a tendency of governments to run deficits which - in the absence of index linked bonds - can be financed by borrowing at low real rates of interest and a tendency among governments to spend too much even for infrastructure investments (Hypothesis X);
  - a tendency to invest savings in real assets rather than financial assets, but not in shares of companies which require much cooperation of - excessively expensive - complementary labour;
  - a tendency, therefore, to neglect capital formation for use in production processes, notably where much complementary labour is required, and hence a slowdown in the rate of growth of the productive capital stock;
  - a bias in favour of labour saving techniques to the extent that they offer a reduction of excessive unit labour costs without a corresponding increase in - artificially low - capital costs;
  - a tendency in RandD to pay excessive attention to labour saving inventions and innovations and to unduly neglect capital saving paths of technical progress.
25. Eventually, an accomodating monetary and fiscal policy designed to absorb negative supply shocks (amounting to a strong cost push) will loose its stimulating effect when money illusion disappears and inflation reaches its political tolerance level. In the process of bringing down inflation rates people still seem to have adaptive

inflationary expectations. But in this case they lead to excessive real rates of interest, at least in the absence of widespread financial indexation. Instead of positive money illusion the public evidently has the counterpart of it: distrust or negative money illusion.

26. In the early 1980s the industrial countries of the West appear to be - or are - faced with the following deficiencies

- an inadequate stock of physical capital in the productive sector;
- an inadequate number of jobs built into the capital stock and, hence,
- structural unemployment which must be identified as capital shortage unemployment due to a job gap<sup>1</sup>;
- a stock of knowledge which contains too many labour saving devices and has too little to offer to cut the costs of capital per unit of output, implying the danger (or existence) of technological unemployment;
- a reaction among the intellectuals, and also among the workers, against the capital using types of technical advance which often mean bigness ("small is beautiful") and against technical progress as such, and
- complaints about interest rates having risen too much due to wrong policies (restrictive monetary policy to fight inflation) and wrong policy mixes (too high public deficits).

These complaints and phenomena vary in intensity from country to country, presumably depending on the permissiveness of the inflationary policies in the past and the toughness with which the policy shift is engineered. They also seem to vary with the country-specific rigidities in the system of relative prices, including real wages<sup>2</sup>.

<sup>1</sup>

See Giersch (1977, pp. V-VIII; 1979); Malinvaud (1982).

<sup>2</sup>

In addition, such rigidities, implanted by institutional inertia, may be the major cause for long cycles in economic development. See Glismann, Rodemer, Wolter (1978; 1980).

27. The capital shortage must, of course, also be directly related to the two oil price shocks and to the massive rise in raw material prices in the early 1970s (Hypothesis XI). When the real prices of apparently exhaustible resources suddenly increased the physical and human capital stock had to be revalued; part of it must have become economically obsolete at given real wages and interest rates, and only where these other factor prices did adjust appropriately can we presume that the data on the available capital stock do not overestimate the size of the stock, its capacity to produce, or its productivity. There are no data showing how much more of gross investment had to be devoted to maintaining capital intact in face of the new set of relative prices and values. We can only conjecture that the process of adjustment - and of learning how to adjust - must have been time-consuming and costly and that during this period of adjustment the effective flow of services from capital and labour, as we measure them, is likely to have become smaller than it would have been without the sudden and, therefore, unexpected changes in relative prices<sup>1</sup>. Had these changes been correctly anticipated the process of easy quantitative growth - at fairly constant relative prices - in the years before would probably have been shorter or less impressive<sup>2</sup>. In this sense, the productivity slowdown appears as a process of repair and repayment.

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In an empirical study for the United States, Baily (1981) comes to the conclusion that a decline in the services of capital was the dominant factor causing the productivity slowdown. This conclusion is based on the observation that for U.S. nonfinancial corporations and U.S. manufacturing Tobin's  $q$  significantly declined in the 1970s.

2

To use an analogy from driving: you may go very fast on a straight road (Turnpike) and suddenly reduce your speed when you have to turn right or left at the end of it; but you can also drive at a more even speed (and possibly more slowly on the average) if you anticipate the change well in advance.

28. The relevance of the oil and raw material price increases to the productivity slowdown in the advanced economies has been shown in empirical studies by Jorgenson (1978), Bruno (1981) and others. We can add the observation for North America and Europe that the slowdown was much more pronounced in heavy manufacturing than in light manufacturing where energy consumption per unit of output is significantly lower, and that in the U.S. the productivity of mining activities sharply decreased when the oil price shock offered incentives to re-open already exploited wells and to increase production from marginal oil, gas, and coal fields (Table 12)<sup>1</sup>.
29. Roughly at the same time, governments found themselves under increasing pressure to take measures protecting the environment and to improving health and safety standards in industry and construction. This clearly meant absorbing inputs without increasing measured output (Hypothesis XII)<sup>2</sup>, and as the professional discussion in the vast literature on the theory and practice of environmental control indicates<sup>3</sup>, the inputs

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In contrast to the United States, in Europe productivity in the production of crude petroleum and natural gas advanced faster after 1973 than before. Until recently, Western Europe had never been a major producer of these items. After 1973, increased production originated mainly from the development of (intramarginal) new fields, in particular in the North Sea.

2

In 1977, in German industry an average share of 4 per cent (manufacturing: 4.9 p.c.) of total investment was devoted to environmental protection. Of course, there is a wide spread among individual industries where clothing (0.6 p.c.) and mineral oil refineries (22.2 p.c.) mark the extremes.

3

Haveman and Christiansen (1981, p. 74) attribute 8 to 12 per cent of the slowdown in U.S. productivity to environmental regulations. See also Anderson et al. (1977); Tolley, Graves, Glenn (1981); Tietenberg (1982).

Table 12 - The Growth of Labour Productivity by Industry and Region, 1966 to 1979 (average annual rate of change; p.c.)

ISIC-No.	Branch of Activity	North America			EEC <sup>a</sup>			EFTA <sup>b</sup>		
		Percentage weight in 1975 <sup>c</sup>	Annual rates of change		Percentage weight in 1975 <sup>c</sup>	Annual rates of change		Percentage weight in 1975 <sup>c</sup>	Annual rates of change	
			1973/66	1979/73		1973/66	1979/73		1973/66	1979/73
210	Coal mining	1.7	- 0.4	- 3.0	2.1	2.1	- 0.1	0.1	3.0	- 2.6
220	Crude petroleum and natural gas	5.6	3.5	- 7.8	1.1	9.5	12.8	1.3	.	25.7
230	Metal ore mining	0.8	3.5	- 2.8	0.1	4.3	- 1.6	1.1	6.4	- 2.6
290	Other mining	0.8	.	1.0	1.0	.	3.0	0.7	.	2.0
2	Mining and quarrying	8.9	3.0	- 4.1	4.3	6.5	7.2	3.2	5.8	13.8
31	Food, beverages, tobacco	9.9	4.0	3.3	11.4	4.5	2.4	11.4	3.4	0.8
321	Textiles	2.8	4.4	2.3	4.4	4.2	5.9	3.7	5.1	2.2
322-324	Wearing apparel, leather and footwear	2.9	1.7	3.1	3.6	2.0	2.6	3.2	2.4	1.0
33	Wood products and furniture	2.7	3.0	0.7	3.3	6.4	1.4	6.6	5.1	1.8
34	Paper, printing and publishing	8.2	2.5	0.7	5.3	4.3	3.2	10.2	4.3	1.3
341	Paper and paper products	3.7	.	1.3	2.2	.	3.2	5.4	.	1.9
35	Chemical, petroleum, plastic products	12.8	6.1	3.9	13.7	7.5	2.0	10.5	6.6	2.7
353-354	Petroleum and coal products	1.9	.	- 0.1	2.0	.	.	0.8	.	.
355-356	Rubber and plastic products	2.5	.	3.9	2.9	.	2.7	2.1	.	2.1
36	Non-metallic mineral products	2.8	2.3	2.8	3.9	5.6	2.8	3.9	5.9	2.5
37	Basic metal industries	5.6	2.3	0.3	6.8	5.0	1.5	4.8	4.9	2.4
38	Metal products, machinery and equipment	33.5	2.8	1.2	35.2	5.1	2.4	32.8	4.8	1.5
383	Electrical machinery	6.6	.	1.8	8.0	.	.	5.2	.	.
384	Transport equipment	9.1	.	0.8	8.8	.	.	7.0	.	.
	Light manufacturing <sup>d</sup>	26.7	3.2	2.8	29.7	4.4	3.1	33.8	4.2	1.3
	Heavy manufacturing <sup>e</sup>	55.9	3.3	1.7	59.0	5.5	2.2	55.3	5.3	1.9
3	Manufacturing	82.6	3.4	2.0	88.7	5.2	2.5	89.1	4.6	1.8
4	Electricity, gas and water	8.5	5.4	0.6	7.0	8.9	3.1	7.7	3.8	2.1
2-4	All industry	100.0	3.1	1.8	100.0	5.6	3.0	100.0	5.2	2.2

<sup>a</sup>Data for the EEC include for the whole period covered Denmark, Ireland, and the United Kingdom. - <sup>b</sup>Pre 1973 data exclude Denmark, Ireland, and the United Kingdom. - <sup>c</sup>Production. - <sup>d</sup>ISIC-Nos. 31-33, 342, 355-56, 39. - <sup>e</sup>ISIC-Nos. 341, 351-54, 36-38.

Source: UN, Yearbook of Industrial Statistics, New York, 1980 and 1981.



were not as efficiently used as they could have been had governments not intervened with direct regulations but with close substitutes to market signals that would have allowed the full use of knowledge available on the spot and a careful balancing of costs and benefits in the great variety of given circumstances. What the public legitimately demanded after a period of fast quantitative growth was a new public good called "qualitative growth"<sup>1</sup>. Like every new good it was expensive; but as no price tag was attached to it it met with a high demand in the political market. Since it was and is not produced under competitive pressures its social cost must be presumed to be rather high. After a while, societies will have learned to produce it more cheaply and to redirect some of the resources from unmeasured to measured output.

30. A misallocation of investment resources may have resulted from other forms of government interference including measures to promote RandD and controls and subsidies to protect senile industries (Hypothesis XII). As to RandD activities it has been asserted that their social returns tend to exceed the private returns by a significant margin<sup>2</sup>, but it is impossible to determine what size, what structure and what evolution of public RandD promotion would be

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In retrospect it may be said that measured productivity advance in the 1960s was boosted by not accounting for environmental inputs or that the public had illusions about environmental costs just as it had illusions about other costs of quantitative economic growth.

2

See e.g. Mansfield et al. (1977).

appropriate. What the data show (Table 13) is that public funding of RandD expenditures in the business sector varies widely among industrial countries, but that countries with negligible (direct) government support (like Japan, Finland, the Netherlands, Belgium) do not necessarily suffer from a corresponding poor productivity performance. After all, governments can only give at other people's expense, and what they give to promote RandD may well reduce business funds which would otherwise be partly devoted to RandD at the source. Heavy government involvement seems to be particularly questionable where authorities have a strong bias in favour of single large firms. Such a bias is likely since bureaucracies prefer to deal with bureaucracies. For Germany we have evidence that public RandD promotion is heavily concentrated on a small number of companies which are known to be large ones (Table 14), although in recent years criticism against this has induced government to provide more RandD assistance to small- and medium-sized firms<sup>1</sup>. It is noteworthy that RandD assistance in general has come under increasing criticism by representatives of small firms who complain about the paperwork involved.

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How important it is for dynamic economic development to have a good climate for small firms and the creation of new ones can be inferred from a study by Birch (1981) who covered a sample of 5.6 million businesses in the U.S. He concludes for the period 1969 to 1976 (i) that regional differences in the growth of employment had been due to differences in the rate of creation of new jobs while the rate of loss of existing jobs was the same across all regions; (ii) that two thirds of the net new jobs created were established by firms with twenty or fewer employees; (iii) that about 80 per cent of the replacement jobs were created by establishment four years old or younger, and (iv) that almost 90 per cent of job replacers can be characterized as providers of services.

Table 13 - Government Funds for R and D in the Business Enterprise Sector in Selected Advanced Economies, 1980 and 1979 (p.c.)

Country	Share of business enterprise sector in total R and D performance		Share of government funds in gross expenditure on R and D performed by the business enterprise sector	
	1970	1979	1970	1979
United States	66.4	67.6	43.1	32.8
Canada	38.9	44.2	15.4	14.5
United Kingdom	63.6 <sup>a</sup>	64.2 <sup>b</sup>	31.9 <sup>a</sup>	29.3 <sup>b</sup>
Sweden	70.1 <sup>c</sup>	69.7	18.7	12.8
Denmark	47.3	51.1	4.9	11.2
Norway	45.6	49.4	18.9	24.1
Finland	54.5 <sup>d</sup>	54.8	5.0 <sup>d</sup>	3.1
Netherlands	55.9	51.5 <sup>b</sup>	6.1	5.1 <sup>b</sup>
Belgium	54.9 <sup>e</sup>	69.6	8.4 <sup>e</sup>	4.9
Germany	63.7 <sup>d</sup>	65.1	18.2 <sup>d</sup>	21.2
Austria	54.6	50.8 <sup>f</sup>	8.1	9.3 <sup>f</sup>
France	55.6	59.5	32.4	21.7
Italy	54.5	57.6	4.6	6.3
Japan	60.7 <sup>g</sup>	57.8 <sup>h</sup>	1.3 <sup>g</sup>	1.4 <sup>h</sup>

<sup>a</sup>1969/70. - <sup>b</sup>1978/79. - <sup>c</sup>1969. - <sup>d</sup>1971. - <sup>e</sup>1973. - <sup>f</sup>1975. - <sup>g</sup>1970/71. - <sup>h</sup>1979/80.

Source: OECD, Science and Technology Indicators, Basic Statistical Series, Volume B, Paris, January 1982.

Table 14 - R and D Grants to Industry by the German Ministry of Research and Technology, by Number of Recipients, 1973, 1975, 1977 (p.c.)

Number of recipients by grant size	Share in total grants		
	1973	1975	1977
5 largest recipients	50.9	37.6	33.9
25 largest recipients	85.4	71.2	63.1
All other recipients <sup>a</sup>	14.6	28.8	36.9
Total	100	100	100

<sup>a</sup>1973: 241; 1975: 445; 1977: 674.

Source: Deutscher Bundestag, 8. Wahlperiode, Drucksache 8/3024, Bonn, 28.6.1979.

31. Since the late 1960s, all advanced economies have been under strong competitive pressure from newly industrializing countries in the field of labour intensive and raw material intensive manufactures. As a stimulus for productivity growth this pressure should have been welcomed. Western governments, however, tried to respond with increasing protection. In the 1970s new non-tariff trade barriers were erected to protect sectors like steel, shipbuilding, textiles, clothing, leather, shoes, or consumer electronics; subsidies were piled up, orderly marketing or export restraint arrangements agreed upon<sup>1</sup>. In this way governments and pressure groups from business and labour slowed down the flow of resources to more productive uses. Societies thus deliberately refrained from fully exploiting the productivity potential offered by international trade. This potential must have been an important factor in the prior period of fast productivity advance. In judging the change towards a lower degree of exploitation of the productivity potential arising from trade we must, of course, recognize that the economic integration of the world economy in the 1950s and 1960s had largely taken place among advanced countries. For Europe it had been a process of exploiting the scope for an intra-industry division of labour combined with a process of catching up vis à vis the U.S. The new competition in the subsequent period fell together with the end of the catching-up process. This competition originated in LDCs, including the NICs; therefore, an inter-industry rather than an intra-industry division of labour was called for. As inter-industry adjustment seems to impose much higher adjustment costs, this productivity potential was less readily exploited. The protection of senile industries became, of course, more acceptable with the emergence of structural or classical

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For details see Institut für Weltwirtschaft (1979).

unemployment<sup>1</sup>. While the 1960s were a period when wages in Europe were low enough to permit an excess demand for labour and when profit expectations were so high that enough entrepreneurs participated in the game of pulling labour into more productive uses, the 1970s showed the opposite characteristics. When labour is overvalued in the market workers observe a dearth of employment opportunities and they feel - and are - threatened not only by labour saving technologies but also by what may be called Stolper-Samuelson unemployment (Giersch, 1980) so that they (and their employers) call for protection to maintain employment at given (excessively high) real wages<sup>2</sup>.

32. Real wages became crucial where unit labour costs failed to react flexibly to the increase of unit energy costs and of costs for raw materials and the use of the environment, thus enforcing the accelerated economic obsolescence of capital mentioned above (para 27). In more general terms, negative supply shocks like those we have experienced at the beginning of the seventies can translate themselves either into lower productivity of both capital and labour or into capital obsolescence and unemployment (the latter implying labour obsolescence). This is the opposite of positive supply shocks - like falling real prices for oil, the technological rent captured in Europe's catching-up process, or the productivity potential exploited by trade liberalisation and European economic integration. If positive, such supply shocks raise employment when real wages do not sufficiently quickly adjust in collective bargaining; and higher employment makes the economy more flexible, perhaps in combination with

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This term was coined by Malinvaud (1977), but the phenomenon was already well-known in classical economics.

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See Stolper and Samuelson (1941).

a wage drift and the high upward flexibility of prices. This flexibility is a positive factor in productivity advance - at any given level of employment. If this is true, negative supply shocks translate themselves into less employment to the extent that the level of real wages is inflexible downwards. As a lower level of employment makes the economy less flexible in exploiting its productivity potential, productivity advance is likely to be slowed down the more the more negative supply shocks meet with real wage resistance. However, the productivity advance which we measure is the productivity advance not at a constant level of employment, but at a level which was more or less falling in Europe and which - in terms of numbers - increased in the U.S. Average labour productivity must be expected to increase (faster) when marginal labour (and capital) are eliminated from the production process; and in a similar vain, average productivity must be expected to fall (to increase less fast, to show a faster decline in its growth rate) when relatively much labour - notably unexperienced labour - is being added to the workforce. This hypothesis finds support in Table 11. It shows for the period 1973-1979

- that the U.S. had a low increase in distributable output per hour, much lower than in any period since 1960, combined with an increase in real wages not outpacing it; this went along with an increase in employment;
- that Germany had a much faster increase in distributable output, as fast an increase as in the early 1970s, but combined with an increase in real wages clearly outpacing it; this went along with a sharp decline in employment.

33. These observations can be interpreted in the following way.

- (a) Had there been no capital obsolescence or had the capital stock grown faster,
  - U.S. manufacturing could have had the same increase in employment as it did have, yet with labour productivity and real wages increasing as fast as they did in the early 1970s, and
  - West Germany could have had the same productivity advance which the figures actually show for the period 1973-1979, yet without paying for it with a fall of employment.

For the U.S. this formulation implies that the increase of employment itself had no impact on the quality of the labour services supplied or that such a deterioration would have been compensated for by the increase of the capital-labour ratio; for German manufacturing the formulation similarly implies that the additional capital stock would have been large enough or qualitatively good enough to compensate for any deficiency which the labour services that were actually eliminated had or would have had relative to the labour which remained employed (Hypothesis XIII)<sup>1</sup>.

- (b) With the growth in the capital stock as it actually took place in both countries
- the capital shortage in Germany would have translated itself more into a slowdown of the productivity advance, as we measure it, and less into a fall of employment if real wages had not outpaced the rise of distributable output (the lower rise, of course, that would have been achieved had employment been greater).
  - the capital shortage in U.S. manufacturing would have been felt more in the form of unemployment (massive job losses as in German manufacturing) had the rise of real wages been as fast as in previous periods.

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On the basis of a simulation analysis, Baily (1982, pp. 8-15) concludes that in the United States the impact of the decline in effective labour services relative to measured labour input on the productivity slowdown was of minor importance. On the other hand, Perlman (1978) stresses that the demographic changes in the labour force resulted in a considerable juvenation of foremen and craftsmen, and that less experienced foremen had a significant (negative) impact on productivity. The importance of intermediate grades of skill for the level and the growth of productivity has been demonstrated empirically in a recent analysis of the labour force in Britain and Germany by Prais (1981). Prais concludes that under present conditions market incentives (earning differentials) and formal vocational training may be more important to improve the quality of the labour force than on the job training (i.e. experience). See also Jones, Prais (1978).

These hypothetical statements, based on a partial analysis as they are, of course, are deficient in the sense that they disregard the transatlantic disequilibrium and its correction - or overcorrection - in the period under review.

34. Why the U.S. economy showed more real wage flexibility (Sachs, 1979; Branson and Rotenberg, 1980; Gordon, 1982) or less real wage resistance, or less inertia in the movement of real wages (whatever term may appear to be more appropriate) than the German economy is another question. The fundamental answer perhaps is that the U.S. labour market has a structure which is less oligopolistic and has more elements of (monopolistic) competition. Apart from this, one may speculate whether three year contracts with COLA provisions as they prevail in the U.S. are much worse for employment (or an inflationary employment policy) than the yearly wage rounds without indexation, as they prevail in Germany in an environment which is very sensitive to inflation, but still has adaptive expectations implying real wage inertia. A closer look at table 11 makes it clear that the supply shocks had little impact on the movement of real wages in Germany during the 1973-1975 period; this movement hardly slowed down compared with the fantastic annual increases of 8.3 per cent from 1969 to 1973. In the U.S. on the other hand, the movement of real wages had had its peak earlier i.e. in the 1966-1969 period, and the divergence from the increase in distributable output was not as great. Labour in the U.S. thus had already time to learn to adjust to a more moderate pace, when supply shocks contributed to a worsening of its terms of trade and of the productivity of labour and capital in North America.

35. The hypothesis for West Germany - wage movement inertia pushing up measured productivity at the expense of employment - has a number of implications which call for observations to support or contradict them. To shorten the reasoning, we



just state where our casual observations (which, of course, must be verified at a later stage) support the hypothesis. We believe to have observed

- that it was marginal (less efficient) labour which was either released or which remained unemployed because it was thought to be too expensive for what it did or could produce, a point which, however, may indicate that it was the overpricing of marginal labour rather than of labour as such which produced the effect (Hypothesis XIII);
- that it was often marginal firms not applying best practice techniques which were crowded out of production;
- that firms and workers who remained in the process felt more insecure under the impact of tiercer competition and made increasing efforts to restructure the production process with a view to reducing X-efficiency;
- that firms under heavy cost pressures and a profit squeeze concentrated on process innovations, perhaps at the expense of product innovations which appeared less urgent and more risky and more difficult to finance;
- that in making process innovations firms placed major emphasis on techniques which promised to reduce labour cost pressures, a practice criticized by union officials as investment for job killing ("Wegrationalisieren von Arbeitsplätzen");
- that Germany has not experienced the birth and survival of so many new firms - relative to the number of existing firms - as the U.S. did according to Birch (1981).

Of course, we have to bear in mind, that in the absence of wage indexation real wages are not the subject of wage bargaining but the result of upward pressures on nominal wages and policies to constrain inflation. However, as can be seen from Table 11, nominal hourly compensation in the period 1973-1975 rose not less than in the period 1969-1973.

36. The proposition that there was a trade-off between a productivity slowdown and an increase of unemployment when the terms of trade of labour and capital deteriorated vis à vis the suppliers of energy (and the environment) can be generalised for the countries under review (Hypothesis XIV)<sup>1</sup>. As Table 15 indicates we find that the international differences in the productivity slowdown strongly correlate with corresponding differences in the increase of unemployment<sup>2</sup>. These differences were in our opinion also largely conditioned by the degrees of real wage rigidity or real wage inertia<sup>3</sup>.

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However, Austria, Denmark, Norway, and the Netherlands had to be excluded from the analysis for lack of data on the change in capital-labour ratios.

2

In the same way we tested the relationship between the increase of structural unemployment and the productivity slowdown also for other aggregates (non-farm business sector, manufacturing). The relationship turned out to be robust.

3

As to the policy implications we may quote from a published statement one of us made in 1977: "The clash between inflationary expectations on the one hand - nourished by recent experience, the oil price increase, and harvest failures - and anti-inflationary policies, on the other hand, would have been less severe, if stabilization policies had been credibly announced early enough in the framework of a "concerted action", if governments had encouraged contracts which make inflationary expectations irrelevant (index-linked bonds, etc.) and if wage earners had been induced to accept - for the sake of maintaining employment - the decline in the distributable productivity increase which was associated with the external shocks. The level of employment in any one country as in any region or firm will remain to depend essentially on whether or not real wages are in line with productivity". See Report of the McCracken Group (OECD, June 1977, pp. 247/8). The sentences quoted were submitted as a dissenting vote.

Table 15 - The Productivity Slowdown in Industry<sup>a</sup> Related to the Capital Labour Ratio and Unemployment<sup>b</sup>, International Cross Section<sup>c</sup>, 1973-1979 over 1964-1973<sup>d</sup>

	n	$\bar{R}^2$
Capital-Labour Ratio		
DIE = 0.280 + 0.245 DCL (0.186)	10	0.08
... and structural unemployment		
DIE = - 0.089 + 0.266 DCL + 0.176 DUE (0.119)* (0.049)*	10	0.62
*Significant at 5 p.c. level; standard errors in parentheses.		
<sup>a</sup> Mining and quarrying; manufacturing; electricity, gas and water; construction. - <sup>b</sup> Symbols: DIE= Ratio of productivity advance (real output per employee) 1973-1979 over 1964-1973; DCL = Ratio of growth of the capital-labour ratio 1973-1979 over 1964-1973; DUE = Ratio of (weighted) average unemployment in the periods 1973-1979 over 1964-1973. - <sup>c</sup> Belgium, Canada, Finland, France, Germany, Italy, Japan, Sweden, United Kingdom, United States. - <sup>d</sup> Countryspecific: peak to peak; for exact benchmark years see Annex.		

Source: Calculated from OECD, National Accounts Statistics, Paris, var. iss.; OECD, Labour Force Statistics, Paris, var. iss.; OECD, Economic Outlook, Paris, 12/1980; UN, Monthly Bulletin of Statistics, New York, var. iss.

### III. Conclusions

37. The 14 hypotheses which we reviewed in the light of available evidence suggest themselves for being consolidated into a medium term acceleration-deceleration theorem of the following type.

- (1) An accelerated productivity advance could be achieved in the sixties when long term business investment in plant and equipment - the leading factor in productivity advance - was boosted by an improvement in the relation between expected profits (the marginal efficiency of investment, the natural rate of interest) and the interest prevailing on financial markets (the money rate of interest), both corrected for expected inflation.
- (2) This improvement was due to
  - Keynesian demand management policies in the U.S. and, somewhat later, in Europe, which kept the money rate of interest in check, supported by adaptive inflationary expectations;
  - favourable supply conditions with regard to energy and exhaustible environmental resources, but also labour (in Europe: notably immigrant labour);
  - economic rents from the technological catching-up process (in Europe and Japan) and from an increasing intra-industry division of labour within Europe and among Europe, the U.S. and Japan;
  - a favourable attitude towards technical progress as it can be expected when labour is underpriced and scarce;
  - scale economies combined with low costs of structural change under conditions of straightforward quantitative growth.
- (3) Like a short term cyclical boom, this medium term acceleration of growth and productivity advance was unsustainable for the following reasons:
  - straightforward quantitative growth was bound to fall into disrepute after it had raised general welfare in some fields and could no longer hide its deficiencies and costs in other fields;

- for Europe and Japan the opportunities of a technological catching up were finite;
  - export-led growth in Europe and Japan had to come to an end as it was based on an overvaluation of North American resources and currencies that flooded the rest of the world with dollars;
  - supplies were limited and had to become less elastic at given relative prices in the fields of energy, exhaustible resources, and - for Europe - skilled manpower;
  - accelerating inflation, due to (futile efforts of) fine tuning and the fact that declining supply elasticities were accommodated by monetary policy rather than wage policy, had to be stopped at some point.
- (4) Elements of mutual causation which had positively affected the acceleration process turned negative:
- while straightforward quantitative growth - with scale economies and minor changes in relative prices - had boosted investors' confidence, qualitative growth - requiring more structural adjustment in response to greater changes in relative prices - made business uncertain and pessimistic;
  - after fast productivity advance had enabled a fast increase in real wages without impairing employment opportunities, organised labour held extrapolating (or adaptive) wage expectations when the transition to qualitative growth occurred; instead of accommodating the greater investment uncertainty, organised labour in large parts of Europe rejected taking into account the sharp deterioration of its full employment (or equilibrium) terms of trade vis à vis energy and the natural environment and started a fiercer struggle over the income distribution, which weakened the social consensus, induced governments to embark upon populist reform policies, strengthened protectionist attitudes, and led to more unemployment or to a lower productivity advance and possibly to both;
  - while monetary acceleration cum adaptive expectations on financial markets had kept real rates of interest in check during the 1960s and while it helped once more when it was used again to accommodate the higher level of energy prices after 1974/75, a stop of monetary

acceleration was bound to raise the real rate of interest to its long run equilibrium level, perhaps with some overshooting; and a monetary deceleration to bring down inflation rates - again cum adaptive expectations - finally produced the exotic real rates of interest we had in the recent past.

38. As to conditions on the labour market that would bring us back to satisfactory levels of employment we can state: if a norm for real wage increases in the future were to be established on the basis of past trends, the measured increase of labour productivity in the base period must not only be corrected for changes in the terms of trade and in the costs of other inputs, it must also be corrected for changes in employment. The equilibrium productivity advance, i.e. the advance consistent with constant employment, must be judged to have been lower (higher) than what is actually measured if employment has fallen under the pressure of excessive wage costs (if wages have been lagging behind the growth of distributable output). If the target for the future is not constant employment but rising employment, the wage norm has to be further reduced by a margin whose size will depend upon the speed at which employment is to be increased. A level of employment which was too low for too long a time is likely to have generated wage induced capital obsolescence and a corresponding job gap. In order to remedy such a structural disequilibrium, a long and strong lag of real wages may be necessary for sufficiently boosting profit expectations, profits, and investment. The wage lag also has the function of accomodating the high real rates of interest which are required for raising the propensity to save and for inducing investors to change their technological bias from labour saving to capital saving methods of production. This is what we consider to be the policy lesson for Europe in the 1980s.

39. Faster growth of the capital stock and a more efficient use of it will raise the number of jobs which are profitable at prevailing wages and may also lead us back to faster productivity growth, comparable - although perhaps not equal - to what Europe experienced in the 1960s when real wages were too low rather than too high and when the excess demand for labour promoted international economic integration, inter-firm specialisation (intra-industry trade, national and international) and technical progress. The road towards a reacceleration of productivity advance, however, may be very long and may lead us through a tough period of adjustment and relative stagnation, comparable to what the world experienced half a century ago. What can help to shorten this process is certainly not conflict, but
- a social consensus based on common insights,
  - a recognition that present wage restraint is a kind of investment into more employment in the short run and faster productivity growth in the medium run,
  - a more polypolistic system of wage setting or an institutional setup which makes the wage behaviour of organised labour more responsive to unemployment,
  - an increase in the effective supply of entrepreneurship, perhaps as a result of deregulation and a return to freer markets;
  - a credibly announced monetary policy conducive to lowering the real rate of interest (to the extent that participants in the capital market presently still refuse to acknowledge past achievements on the inflation front);
  - some miraculous technological breakthrough to promise higher returns from investment.
40. Would monetary acceleration help? Yes, it would in the short run to the extent that institutional conditions on the labour market prevent a quick upward adjustment of nominal wages and that participants in the capital market are not induced to expect higher inflation rates in the future. But sooner or later, monetary acceleration will again translate itself more and more into price effects and less and less into

volume effects. As soon as the public becomes again aware of inflationary dangers monetary acceleration will again have to be stopped, and its positive effects on productivity will quickly vanish. Once again, the advanced countries would then have to go through a painful process of disinflation and slow productivity advance, once again paying back what was obtained by monetary acceleration. What we predict is that supply shocks at the height of any future growth cycle will again aggravate the problem, which is tantamount to saying that we consider the supply shocks of the early 1970s not as purely exogenous events but to a larger extent as limits to quantitative growth and fast productivity advance which would have emerged sooner or later under conditions of a synchronised world wide boom and increasing fears of inflation.



Annex

If not otherwise stated, throughout the paper the following years have been used as benchmark years in the countries under investigation:

Austria:	1955; 1960; 1964; 1970; 1973; 1979
Belgium:	1955; 1961; 1964; 1969; 1973; 1979
Canada:	1955; 1962; 1966; 1969; 1973; 1979
Denmark:	1955; 1960; 1964; 1969; 1973; 1979
Finland:	1955; 1960; 1965; 1970; 1973; 1980
France:	1955; 1960; 1964; 1969; 1973; 1979
Germany:	1955; 1962; 1965; 1969; 1973; 1979
Italy:	1955; 1963; 1967; 1970; 1973; 1980
Japan:	1955; 1961; 1964; 1970; 1973; 1980
Netherlands:	1955; 1960; 1964; 1970; 1974; 1979
Norway:	1955; 1960; 1965; 1969; 1974; 1980
Sweden:	. ; 1961; 1965; 1970; 1974; 1979
United Kingdom:	1955; 1960; 1964; 1968; 1973; 1979
United States:	1955; 1962; 1966; 1969; 1973; 1979

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