TURNING POINT: THE END OF THE GROWTH PARADIGM

by

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96/49/EPS

This working paper was published in the context of INSEAD's Centre for the Management of Environmental Resources, an R&D partnership sponsored by Ciba-Geigy, Danfoss, Otto Group and Royal Dutch/Shell and Sandoz AG.

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Printed at INSEAD, Fontainebleau, France.

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THE END OF THE GROWTH PARADIGM[1]

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CMER/INSEAD

July 1996

Introduction

The title of this paper is obviously intended to raise questions. What do I mean by "the end of the growth paradigm? Is the paper about the end of growth? (As in "the end of history"). Is it about "limits to growth"? Is it saying that small is beautiful? Or is it, perhaps, about economic theory? Probably some readers will assume that this is another neo-Malthusian anti-growth tract. It is not. Quite the contrary, I believe that economic growth is both possible and important. Indeed, economic growth is necessary for social and political reasons if no other. It is very well to consider the nature of a hypothetical "no growth" or "steady state" society, and some of the implications of such a society. But, to understand the implications of "no-growth" is not my purpose either.

Having said that, I must add some *caveats*. The first is that, in my view, the growth "engine", as it operates today, is running amok. Economic growth in the Western World is so inequitable that an increasing part of the population — and *most* of the population in many parts of the world — is being left out in the cold with little prospect of benefit, either now or in the foreseeable future. The benefits of growth in most countries are being almost entirely appropriated by those who are already rich or well-connected, or by corrupt military officers. Growth, even where it is more than keeping up with population, is not producing comparable increases in social welfare. In short, the present pattern of growth is socially unsustainable.

The second *caveat* is that the present pattern of economic growth, which is based on increasing labor productivity by substituting physical capital based on fossil resources for human workers, is also ecologically and environmentally unsustainable. In fact, there are limits to growth as it is occurring today. However, while the earth's stock of fossil fuels and metal ores is finite and exhaustible, the immediate limits are not imposed by natural resource scarcity, at least for the next generation. The most binding limits are environmental. Growth in the future must be technology driven, but the technologies that are needed will have to substitute renewable resources — including waste assimilative capacity — for non-renewable resources. Of course, the most renewable resource of all is human intelligence, which is the main source of our prospects for long-term survival as a species.

The third *caveat* is that voter-pleasing politicians in all the countries of the West, but especially in continental Europe, have seriously compromised the renewal of this one essential resource. They have sharply limited the possibility of investment in the needed education and scientific research by committing future "growth dividends" to current consumption by and subsidies to all sorts of politically well-connected groups. The R&D and investment deficit is slowing growth when and where it is most needed. A day of reckoning is fast approaching.

To return to the title of the book, then, it is not economic growth itself that must end.

1. This article is drawn from my forthcoming book, *Turning Point: The End of the Growth Paradigm*, to be published by Earthscan, London, 1997.

Indeed, it must not end! But the existing patterns of growth and the government policies, economic incentives and institutional mechanisms that now drive economic growth along unsustainable and ever more harmful paths. These policies, inconsistent as they are, are based partly on history and partly on theory. The history is relevant to where we are, but it will not help us make the U-turn that is necessary. The economic theory that supports present policies is faulty and misleading in several ways. The standard economic models and their underlying assumptions must, therefore, be challenged and reconsidered, insofar as they apply to economic growth. In short, the growth *paradigm* must change.

The Coming Crisis

The vast majority of professional macro-economists today are obsessed with trade, savings, investment, productivity, "competitiveness", and "global markets". They do not concern themselves with equity, environment or technology. Equity is considered irrelevant to growth. Trade is universally supposed to be a primary cause of prosperity; environment is everywhere considered to be a "free good" (except by a few Greens with socialist inclinations). Welfare is assumed to be just another word for GNP per capita. Technology, once widely condemned, is now considered to be the generally beneficial driver of economic growth. It is no longer fashionable to worry about negative consequences of technology or the fact that some technologies may have far more potential for harm than good. In fact technology is everywhere assumed to be "manna from heaven". These assumptions are all so far off the mark that, in my opinion, the future of our civilization is at risk.

The problem of increasing inequity is near the core of the current problem. Growth producing benefits only for the elite, the well-educated, the property-owners, is socially intolerable and certainly unsustainable (*Figure 1*). Unemployment, especially of the youngest, less-skilled, less educated and minority groups (and men), is a spreading blight in the industrial world, particularly Europe. The unemployed consume social services. Increasingly, insecure, marginalized, and (in the case of minorities) "ghettoized", some of them resort to crime. In any case they drive up social costs for all.

Health services and pension costs are also increasing inexorably. Rising health costs reflect the fact that health service costs have long been rising faster than GDP. This is fundamentally because, on the one hand, new and expensive forms of therapy are constantly being discovered and, on the other hand, productivity is not increasing significantly in the service sector. Rising pension and social security costs per worker are due to the aging of the population, the fact that fewer people of working age are supporting ever more people no longer in the work force (*Figures 2,3*).

Rising social costs, both in Europe, the US and Japan have already outrun normal increases in government revenues due to the "growth dividend". (The latter has been spent many times over). Yet these costs — being "entitlements" must be financed somehow. This can only be done by increasing taxes on those presently employed, or by adding to government budget deficits (which must be financed by future taxes). Either of these alternatives reduces funds available for job-creating investment and, thus, cuts economic growth as compared to what it would otherwise be.

The statistical growth of GNP that has occurred in recent years is partly due to the monetization of activities (like child care and housecleaning) that were formerly not counted because they were not carried out by wage earners, partly due to increasing needs for "defensive expenditures" such as personal security, transportation to and from work, health insurance, accident insurance, legal costs and environmental protection costs. These

expenditures add nothing to real welfare. They merely compensate or protect from threats to personal and environmental security and well-being that are consequences of urbanization and economic activity itself. When defensive expenditures are subtracted from total GNP, growth is much less than it appears to be (*Figures 4,5,6*).

Moreover, governments in all of the industrialized countries, including Japan, are facing rising unemployment trends (notwithstanding periodic but ever-weaker "cyclic recoveries") and ever-growing budget deficits due to past commitments — so-called "entitlements" — that were expected to be financed out of a perpetual "growth dividend" that has been overspent (*Figures 7,8*).

Unless the problems of ever-growing budget deficits and growing unemployment are solved by a miraculous resurgence of real job-creating economic growth — which is what I want to talk about subsequently — there are just three choices facing all Western governments. The first of them is to cut the entitlements sharply, and soon. The second is put off the evil day ("not on my watch") until hyperinflation solves the debt problem, as in Germany (1921-22) and Hungary (1948). The third choice, which is really not an option open to a democratic regime, is to simply repudiate past debts (as many monarchies have done in the past, and as Bolsheviks did in Russia in 1917).

It is an unpalatable menu. From my perspective there is a choice to be made between the interests of the younger generation (and future generations to follow) *vis a vis* the older generation in our society. To raise social security or value-added taxes on labor means raising the direct cost of employment, hence of job creation. On the other hand, taxes on corporate income are direct subtractions from funds available for investment. Either will increase immediate unemployment. The effect of such tax increases falls most harshly on the young, especially those who have never held a job.

But if the entitlement problem is not solved soon the only alternative left to governments will be to "print money" to pay the bills that will grow year by year. This can only be done by selling ever more government bonds, thus competing with private-sector credit needs. This will simultaneously drive up nominal interest rates and expand the money supply. Of course taxes will *also* have to rise, eventually, if only to pay the cost of debt service.

The result of the second choice would be an accelerating monetary inflation. As inflation eventually takes hold, all savings and unsecured "faith and credit" government debt would be devalued in time, by virtue of paying interest at a rate lower than the current cost of money. When inflation reaches 15% p.a., bonds paying 7.5% would only be worth half of their face value. At an inflation rate of 30% p.a. bonds paying 7.5% are only worth 25% of their face value. At inflation rates above 100% p.a. bonds paying 7.5% become essentially worthless.

Inevitably, the financial institutions who own the bonds, and the pensioners (not to mention widows and orphans) who depend upon the interest payments on those bonds for their incomes would be impoverished. Tangible physical wealth would be left untouched, of course. Land, forests, mines, factories infrastructure, houses and cars would remain. *But if all unsecured debts were wiped out by inflation, banks would go bust, credit would dry up, all businesses based on credit would collapse, and most financial wealth would be lost in the debacle.* Incidentally, the retired folks who refuse to accept even a small cut in their entitlements now would eventually be hurt even worse by a runaway inflation.

The Bankruptcy of Current Policy

Sadly, neither the political left nor the political right has a plausible answer to offer. Marxism is quite properly out of the picture. But the Social-Democratic left in Europe, and the liberal wing of the Democratic party in America, continue to support Keynesian policies of creating jobs by creating demand through spending on welfare and public works. The Clinton Democrats in the US have hopes of increased growth based on encouraging new technology and "education and training". But, although the underlying idea has some merit, the Democrats lack both the clarity of vision and the financial means to implement these policies. The Conservative right in Europe and the Republicans in America generally support such things as privatization, increased competition, more flexible labor markets, spending and, in the US case, tax cuts (to encourage saving and, hopefully, investment). But, faced with massive strikes and protests, the European Conservative parties have been unable, thus far at least, to implement any significant budgetary savings and thus cannot afford a tax cut. They are left with no effective policy at all.

Will the globalization of trade produce the accelerated economic growth that might save the entitlements and avoid the looming financial crisis of the industrial countries? Unless there is a major change — a U-turn — in government policy, the answer is almost certainly "no". The reasons for optimism confidence that have been given by financial writers and trade theorists simply aren't convincing. These people have already been proven decisively wrong with regard to the widely advertised economic benefits of eliminating all barriers to trade within Europe, with regard to the economic impact of NAFTA and, finally, with regard to the impact of the last round of GATT negotiations and the creation of the World Trade Organization (WTO).

To be sure, trade liberalization has been good for the multinational firms and the financial sector (which supports it), but the uncomfortable truth is that liberalization has already moved millions of manufacturing jobs from Europe and North America to east Asia, east Europe (and Mexico), with more and more such transfers to come. But there is simply no evidence of compensating job growth in Europe or America. The trade theorists who formerly trumpeted huge but hypothetical gains are now reduced to claiming that the job losses due to trade liberalization are "lost in the noise" of other macro-economic effects.

In theory, no country can have a negative (positive) balance of trade and a negative (positive) balance of capital flows at the same time, except for temporary lags and "inventory adjustments". This is an accounting identity, not a theory. Curiously, however China, boasts a positive balance in both accounts (according to published statistics) while the US is apparently negative in both trade accounts and direct investment flows! In the case of China, one suspects that either the trade surplus or the capital influx are overstated being balanced by "black" goods influxes or capital outflows. If the statistics are this bad, China must be a much riskier place to invest than most people think. In the case of the US dollar, which is a bit special being the world's principal reserve currency, not all the money outflow come back, for various reasons I will mention below.

One effect of increased job exports, however, has been a major factor in increasing returns to capital (i.e. profits) and reducing returns to labor (wages) in the industrial world (*Figure 9*). In ordinary language, trade liberalization definitely has made the rich richer and too many of the others — especially the young and unskilled — unemployed. To paraphrase a recent cynical comment: trade liberalization effectively means that the poor in the rich countries are subsidizing the rich in the poor countries.

The funds that flow out of Europe and America as direct foreign investment or to pay for manufactured goods made in east Asia need not, and do not (for the most part), return as

job creating investments in America or Europe. They can be retained abroad as official (or unofficial) monetary reserves, or they can return in one of several other non job-creating ways. The first is through purchases of government bonds to finance the government budget deficits (and, incidentally, prevent currency devaluations that might help to rectify the trade balance). Or, they return as speculative investments in land, buildings or the booming stock market.

The stock markets began rising in the 1980s, partly due to increasing company profits thanks to "downsizing" and lower wage bills. But, recently there have been signs of the "bubble" phenomenon in the stock markets. The tell-tale "Q" ratio of market values to replacement costs has risen from its historical norm of 0.7 (0.4-1.0) to an unprecedented level of 1.8 (*Figure 10*). Prices of stocks have been rising, to some extent, simply because funds keep pouring in seeking profitable investments. In recent years the most profitable investments have been in the stock market itself. (Bubbles always burst, eventually. But I need not go into that here).

This brings me to the last and hardest question. Will technological progress create the needed burst of job-creation? In the first century and a half of the Industrial Revolution technological change generally created more jobs than it cost. New industries were created, to produce new products and services. These new industries employed millions of workers. Even though technological change made labor more productive, the increased output of goods and services more than compensated, by forcing prices down and thus stimulating increased consumption.

Economists have always tended to assume that this synergy between technological innovation and job creation is automatic and "built-in". In the past, however, it was assumed that all new technologies were subject to the rule of declining returns, so that each "burst" of technological progress was self-limiting. However, the most active debate among economic growth theorists in the last decade has been whether, or not, information technology is an exception to the rule of declining returns. In other words, it is claimed by some that information technology has the capability of accelerating economic growth indefinitely by virtue of the (assumed) fact that it is characterized by "increasing returns" to scale. The (presumed) reason is that the cost of production of an information product (such as software) is insignificant in relation to the cost of R&D. It follows that profits increase faster than sales. Profits can, of course, be invested in more R&D, thus accelerating the technology race.[2]

It is true that the pace of technological progress in the IT sector appears (by some measures) to have accelerated since the 1970s. While this is open to challenge, since there are no objective measures of technological progress *per se*, I am inclined to accept it for purposes of argument. But this fact (if it is a fact) does not prove that diminishing returns no longer apply in other sectors, or that economic growth overall can be accelerated indefinitely.

Recent indications from other sectors are discouraging. Technological improvements and declining costs in information technology have undoubtedly caused prices of information services to fall and demand for them to rise. In this respect the classical mechanism has operated according to classical economic theory. But, unfortunately, unlike previous technological revolutions, *information technology has not resulted in significant new services*

2. There is another aspect of the problem that interests economic theorists, namely the fact that increasing returns promote oligopoly (because the market leader continues to gain on its competitors) and thus destroy competition. The rapid oligopolization of the software industry, with MicroSoft far in the lead, appears to support this contention, and thus (indirectly) to support the increasing returns hypothesis. However, it must be recalled that the entire telecommunications sector, as well as the movie industry, have always been characterized by increasing returns for similar reasons. In fact, the same can be said of any industry in which advertising is extremely important.

to final consumers, except perhaps for PCs and computer games, for which consumers are willing to pay a lot more money. Instead, it has displaced enormous numbers of jobs in other industries, both in manufacturing and in services. Thus, technological change, for the first time in history, has become a major contributor to unemployment.

This point deserves emphasis. When steam engines displaced sails on ships, they did not eliminate sailors. When steam railroads were introduced, steam engines displaced horses, not humans, while sharply cutting transportation costs. (To be sure, carriage drivers and stable boys were replaced by engine drivers and mechanics, but the numbers were comparable). The large scale use of iron as an industrial material displaced wood and masonry to a minor extent, but it made possible many new machines and structures, and whole industries to produce them. Mechanization in agriculture did displace many agricultural laborers, but they were quickly put to work in city factories making textiles, kitchenware, clothing and other consumer goods. Electric motors displaced steam engines in factories, but few workers. The introduction of electric lighting and electrical household appliances (such as washing machines) displaced some laundrymaids but few other workers. Automobiles and trucks displaced horses, trams and railways, but employment in the auto-manufacturing and auto service sectors quickly compensated for the losses.

By contrast, the impact of information technology (computers, telecommunications) on other industries has been pervasive. The number of jobs created by the information technology industry and its satellites (e.g. the software sector) is not negligible. The software industry employs about 2 million people in the US, a similar number in western Europe, and 1 million in Japan. But software products for final consumers — mainly games and PC software — account for only a small fraction of this total. Most software is used by business, mainly to operate computer systems that have been installed to increase productivity i.e. to cut employment. Labor-saving technology, formerly confined to the factory floor, has now reached the service sector and the managerial suite with a vengeance. Computers are now replacing literally millions of "paper-shuffling" and "communications" jobs in the industrialized world, while millions more are at risk.

In fact, computers and "infotech" are reducing the market value of human capital by making many skills obsolete. Already, huge numbers of clerical workers and stenographers have been displaced by computers. Those jobs are disappearing. Data entry of all kinds is being automated. Telephone and switchboard operators are fast being replaced by "voice mail". Programmable machines have eliminated large numbers of machine operators across the whole spectrum of manufacturing. Draftsmen have been replaced by computer graphics. Bank tellers have been displaced in large numbers by cash machines. Optical scanners have sharply reduced the need for retail checkout clerks. Whole layers of middle management are now being eliminated as information is being passed back and forth between functions (e.g. sales, finance, manufacturing, purchasing) with less and less need for human interfaces (*Figure 11*). Only the fact that lower *costs* of information processing have sharply increased the *demand* for information keeps the employment picture from being much worse than it is.

In short, technological progress, especially in computers and telecommunications, in recent decades has made life better for many, but it has also cost a lot of jobs. Computerization and trade liberalization have been good for the stockholders of multinational corporations (MNCs) and the financial community, but they offer little benefit to the workers. The new jobs now being created, mainly in the service sector, are not good ones capable of supporting families at a decent standard of living. Mostly they are in retail sales or personal services.

In summary, I suggest that there are several strong reasons to expect that "real" economic growth in the West will not accelerate. It will probably slow down. It may even become negative in the near future. I have already mentioned most of the key points (*Figure 12*).

(1) Entitlements in most Western countries are clearly out of control. To finance them by taxation soaks up potential savings directly. To finance them by deficit spending also soaks up potential investment capital that might otherwise sustain growth. In this context, R&D spending and education should both be considered as forms of investment. And these types of investments, having very distant payoffs, are particularly vulnerable to cuts by short sighted vote-counting politicians.

(2) Economic growth in the past two centuries has been driven, at least partly, by economies of scale in manufacturing. But economies of scale in manufacturing depend on economies of scale in capital equipment. Bigger is more efficient. Thus, economic growth is strongly linked to increasing capital intensity. The more capital-intensive the economy, the more capital is needed to replace that which depreciates. Replacing depreciated fixed capital investments (including infrastructure) soaks up funds that might otherwise finance new projects. Depreciation is one of the causes of declining marginal productivity of capital.

(3) Technological progress in information technologies tends to *increase* the rate of depreciation of both fixed and "human" capital through obsolescence, in some sectors at least. The need to replace obsolescent human capital (e.g. obsolescent skills) obviously diverts capital away from new investment.

(4) Fossil energy has been a form of "natural capital" that could be easily substituted for human labor, either directly as "prime movers" or indirectly via electrification. For the past two hundred years, the price of fossil energy in usable form has consistently declined, partly as a consequence of technological progress, and partly thanks to discoveries. The role of discoveries is almost certain to decline in the future, and environmental constraints are bound to restrict future growth of fossil fuel use. Technological progress may continue, but it is unlikely to continue to drive energy prices down. In short, fossil energy will become increasingly scarcer and more costly as the best and cheapest deposits are used up and the fast growing but energy-poor economies of East Asia compete for limited supplies in world markets. No immediate supply crisis is foreseen by most experts, but the role of cheap fossil energy as a driver of economic growth is near its end.

(5) Even the GDP growth that is measured by the statisticians is mostly illusory, at least in the West. It doesn't reflect people being better off, merely greater monetization, more intensive trading activity and more "defensive" expenditure to compensate for or protect against hazards that did not exist in a non-industrialized world.

Notice that I did not even mention the export of capital from the rich industrial countries to countries with cheap labor. In this case, the loss of potential growth in one area of the world is presumably compensated by faster growth among poorer countries. Nevertheless, this trend to export capital to places with cheap labor exacerbates unemployment in Europe and America and the accompanying social problems.

The old link between economic growth and human welfare is nearly broken. Each percent growth in GDP now yields only one tenth of a percent increase in employment. In recent decades, the size of the US economy has grown modestly, but the social welfare of most citizens has not. The rich — the top few percent — are indeed getting richer. But condition of the middle class is stagnant and the poor, especially the inner city residents, are worse off year by year, not only in economic terms of discretionary purchasing power, but in terms of stress related illness, job insecurity, divorce, crime, political extremism and other measures of societal malaise. In all the so-called rich countries the "social safety net" is fraying and decaying, partly because governments are broke and taxpayers are overloaded, and partly because the "social contract" now appears to be a victim of globalization and the obsession with "competitiveness".

If the social safety net breaks decisively, and if western democratic institutions prove

incapable of responding adequately, the consequences will be catastrophic. I can think of no other suitable word. When poverty, unemployment, hopelessness and despair reaches a certain point, which cannot be predicted with precision, the result is chaos. Africa is the precursor. I deeply fear the rise of a new generation of political extremists in both Europe and the US (and Japan) and a re-run of the 1930s and 1940s — but with modern nuclear, chemical and biological weapons. In the immortal words of Mme Pompadour: "Après nous, le deluge". There will be no safe havens from the next flood, if it occurs.

It is difficult to say when, or how, the current economic growth "system" will collapse; it has proved more resilient than many would have predicted. But, unless *job-creating* growth can be sharply accelerated the choice facing governments is stark: either there will be very sharp and painful cuts in entitlements and social welfare or there will be a financial crisis, probably sudden (like the onset of the Great Depression) and probably within twenty years. The traditional Keynesian job creation mechanisms are ineffective or inapplicable, while trade liberalization and "globalization" are making the unemployment problem worse, not better. Western democracies are, like the passengers on the Titanic, heading "full steam ahead" into extremely dangerous waters. Icy reality lies dead ahead, already dimly visible through the fog. Collision is inevitable, unless we change course sharply.

The Way Out: Eco-restructuring

I see only one way to escape the coming cataclysm (*Figure 13*). I say "coming" because it will surely come unless we take preventive action — that "U-turn" I spoke of earlier — soon. Whereas labor-saving technology has contributed to our socio-economic difficulties, new technology of another kind — resource saving rather than labor-saving — offers a possible way out of the economic troubles we now face. In fact, I think that the only possible long-term strategy for global economic revival in the next two decades or so is what has been called "eco-efficiency" or "eco-restructuring".

What do I mean by eco-restructuring? I mean shifting, on a massive scale, away from production of *goods* to production of *services*. I mean de-emphasizing the use of labor-saving but resource-intensive technology shifting to resource-saving technology, and "dematerialization". I mean gradually closing the materials cycle, to reduce and finally eliminate the need for non-renewable extractive resources — especially fossil fuels — and focus instead on redesign to facilitate repair, re-use, renovation, re-manufacturing and recycling (*Figure 14*). This shift is necessary, in any case, for long-term environmental sustainability. But, even if that were not the case, *it is the only way to combine economic growth with increasing employment opportunity.*

Why do I say that? It is really elementary economics, although perhaps not so obvious to people with standard textbook training. The starting point is to view economic output of goods and services, in the aggregate, as a function of certain inputs, known as "factors of production". These are usually identified as labor, capital and "resources", usually interpreted as energy (i.e. fossil fuels, nuclear power, etc.) Economic growth implies increased output of goods *and services*. This can result from increases in the factor inputs themselves, or it can result from increases in the "productivity" (output per unit input) of those factors.

Most economic growth in the past two centuries has been due to increased labor productivity, resulting from extensive substitutions of physical capital and fossil fuel energy for human labor (*Figures 15,16*). To get economic growth *without* further increases in labor productivity, two things are needed. First, either capital or resources or both must become more productive. Second, new industries must be created to utilize human labor without

utilizing more natural resources. Increasing labor productivity generated economic growth in the late 19th and early 20th centuries because it released labor to work in the new industries that were being created at the time: autos, electrical goods, household appliances, aircraft, and so on.

But increased labor productivity is no longer increasing employment, as I have said. This is partly because the major established manufacturing industries of today, which were mainly established over a century ago, are now mature. They are good at making gradual improvements in existing products but they introduce no radically new and different products or services. Nor will they ever do so. They seek to grow in emerging markets such as Asia. To secure footholds on those markets, they understandably export capital and jobs. But, meanwhile, very few new jobs are being created in the west, even by newly created businesses (of which there are very few in Europe or Japan). This is partly because — apart from retail sales and health services — new businesses at the moment are mostly being created in two areas, information technology and biotechnology, either of which is very labor intensive. But, more important is the fact that information technology, in particular, tends to substitute for labor in other sectors. I have already listed some examples.

From the perspective of the private sector, dematerialization in the long run means converting "products" into services. After all, products are consumed because of the services they provide. But a company that sells its products must keep its factories as busy as possible. This is the way to maximize profits. The profit motive works to maximize production of goods. Even though manufacturers have incentives to manufacture efficiently and thus minimize material and energy inputs *per unit output*, they also have incentives to make and sell as much as they can. Because goods embody material resources, this — in turn — tends to maximize the use of natural resources. But materials used do not vanish; they are merely converted into wastes at some stage (*Figure 17*). Thus, the profit motive also tends to maximize the generation of pollution and waste, which eventually degrades the environment.

The way out of this *cul de sac* is for companies *to sell the services of products rather than selling the products themselves.* If the manufacturer continues to be the owner (or must take the product back at the end of its useful life), the profit motive works differently. Then, profits are maximized when material inputs are minimized. The incentives are to conserve, not to waste.

Needless to say, this massive transformation will not occur of its own accord, at least not soon enough. There are too many powerful industries heavily invested in the *status quo.* Government intervention of a very forceful kind will be needed to help new "sunrise industries" to compete with the established "sunset" industries. The key policy levers we have available, as far as I can see, are (1) new technology and (2) "green" resource/pollution tax policy. The latter is mainly a tool to accelerate the introduction of the former. (A more radical social redistribution policy based on exchangeable consumption permits or quotas is also potentially very interesting). Yet, I do not advocate "industrial policy" — sometimes disparagingly called "picking winners" — coordinated from a government department (like MITI in Japan) as a means of creating and sustaining new businesses. In practice, I doubt that it could work for long. If industrial policy were institutionalized it would soon be captured by the very interests it should be helping to displace.

What then? The most effective way to achieve the desired result, in my view, would be to eliminate large existing subsidies on budgetary grounds. (This is beginning to happen). I would seek to shift the existing tax burden away from labor and capital — which are both far too heavily taxed — and onto non-renewable or over-used resources, especially fossil fuels, minerals and metals, and tropical forest products. The snag in this plan is that it would make manufactured products produced in resource poor countries less competitive. Industry

and resource exporting countries are united, at present, in opposing even a small carbon tax on fossil fuels. They have a point that should be addressed.

To address this point, I would seek to introduce non-tax mechanisms both for reducing international traffic in non-renewable resources and for reducing the tax burden on labor, insofar as it is a tool for domestic income redistribution. The scheme I would advocate is the use of exchangeable "quotas", or "rights" to non-renewable (and environmental) resource use that would be distributed to nations on the basis of adult population in some reference year.

This strategy could be applied initially with respect to dealing with specific global problems such as ozone depletion, acidification and climate warming. The first step, of course, would be to negotiate international agreement on national emission quotas for ozone depleting substances like CFCs, acidifying effluents (SO_2 and NO_x) and substances contributing to climate warming (CO_2, methane, N_2O, CFCs, etc). This negotiation would be no easy task, since it involves fundamental ethical issues. But the objective would be for industrial countries contributing more heavily to these problems to pay the less developed countries for their under-used emission quotas.

In due course, the use of exchangeable emission quotas could be extended to include consumption quotas for all non-renewable resources, beginning with fossil fuels (to limit carbon and sulfur emissions) and toxic heavy metals like arsenic, cadmium, copper, lead, chromium and zinc. This would be a great challenge for diplomacy. But if it could be achieved, the result would combine significant environmental protection with an automatic and relatively "painless" form of international economic development assistance. Resource exporters would produce less, but in most cases they would receive compensatory payment for unused consumption rights.

Similarly, I would advocate internal distribution of resource consumption rights equally to all adult citizens within a country. These rights would be exchangeable through a virtual market (possibly on Internet). All firms operating within the country, in my ideal world, would have to buy their rights to consume resources via this market. They would, of course, pass on the costs in the prices of their products. But they would have powerful incentives to minimize resource use in order to minimize their costs, and their prices. They would, over time, find ways of retaining ownership and control over material and energy resources and selling only final services rather than material products.

Similarly, individual citizens who want to "consume" more resources than their share would have to pay for the rights to do so. People who consume less resources than their share would be able to sell the rights for money. It is true that the "rich" could, effectively buy the "right to pollute", in this way, but that is nothing new. Under present conditions, the rich simply pollute without paying. Thus, exchangeable rights would also constitute an effective means of non-tax income redistribution that would provide an income "floor" for underconsumers, such as the unemployed, the disabled and the elderly.

The above scheme would largely eliminate the institutional barriers that stand in the way of closing the materials cycle. It would also go some way toward "internalizing" the costs of environmental pollution. At the very least it would put upper limits on certain kinds of pollution, including carbon dioxide, sulfur oxides, and heavy metals. It would reduce (but not totally eliminate) the need for environmental regulation and the resulting administrative burden.

Under these conditions, I think entrepreneurialism would flourish as never before, and truly sustainable economic development would follow.

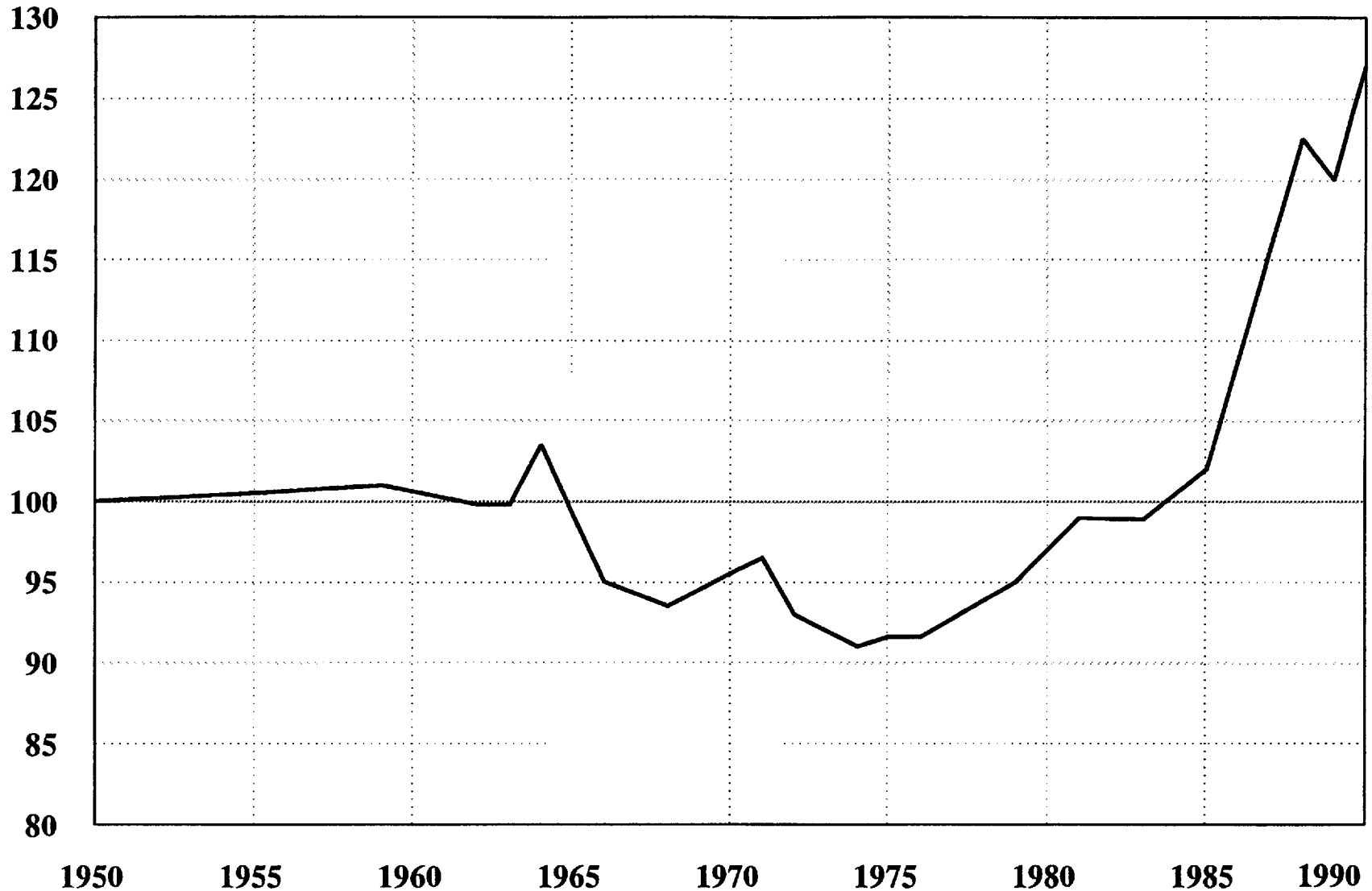


Figure 1. Index of inequality: income distribution in the UK
Source [Jackson & Marks 1994]

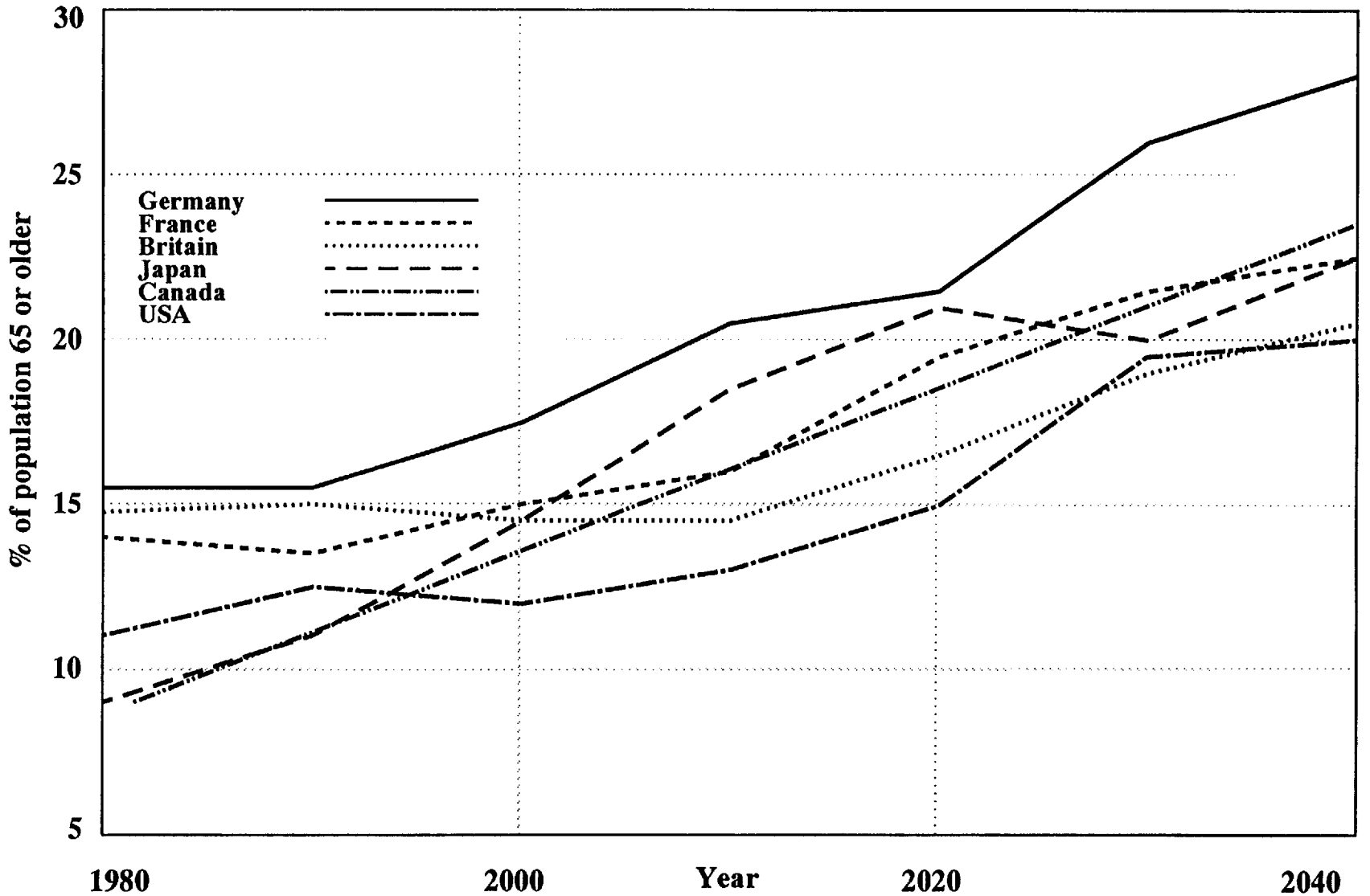


Figure 2. Soaring demand for pensions
Data source: OECD

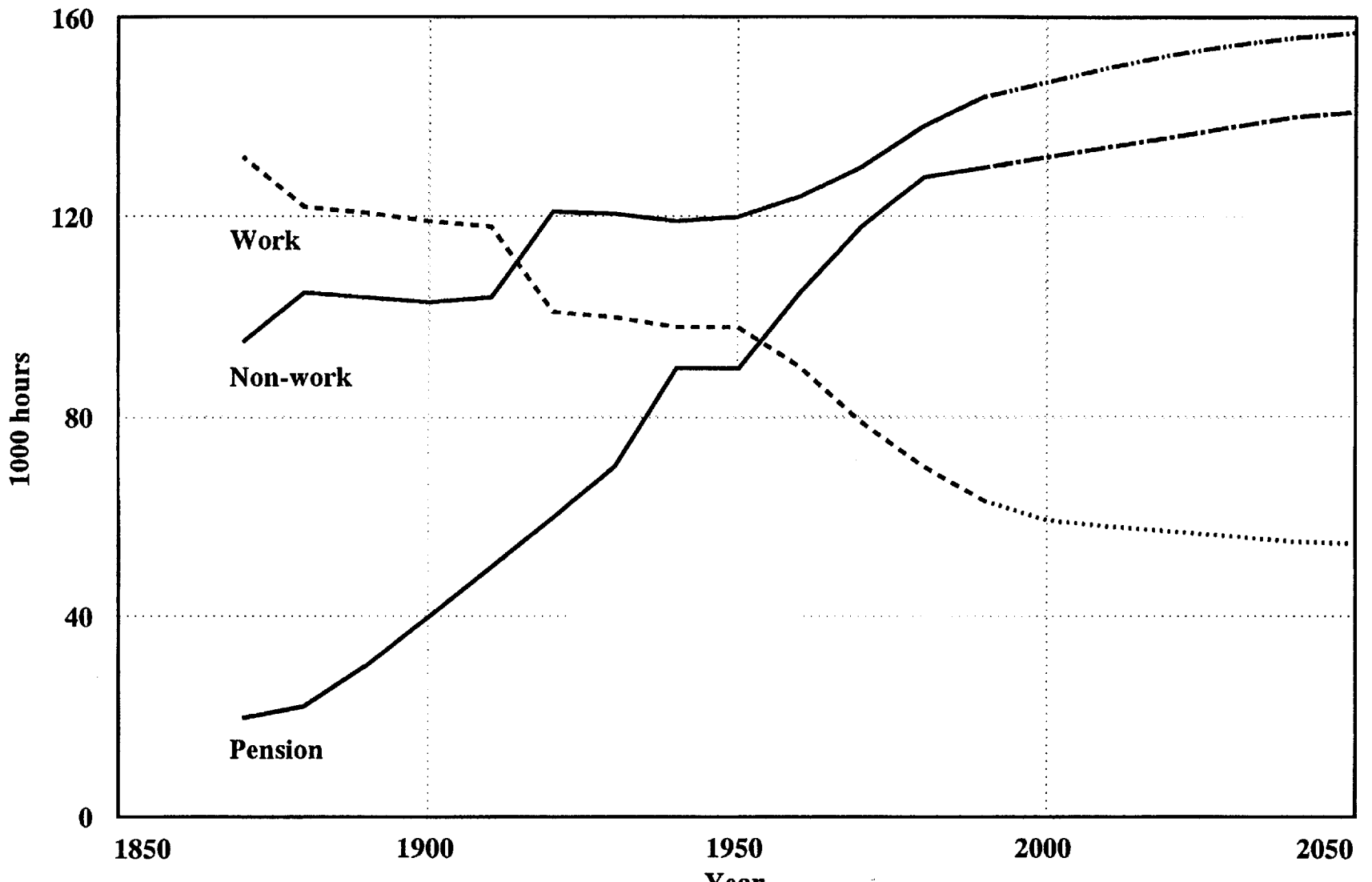


Figure 3. UK average lifetime hours (excluding time for eating and sleeping)
Data source: IIASA

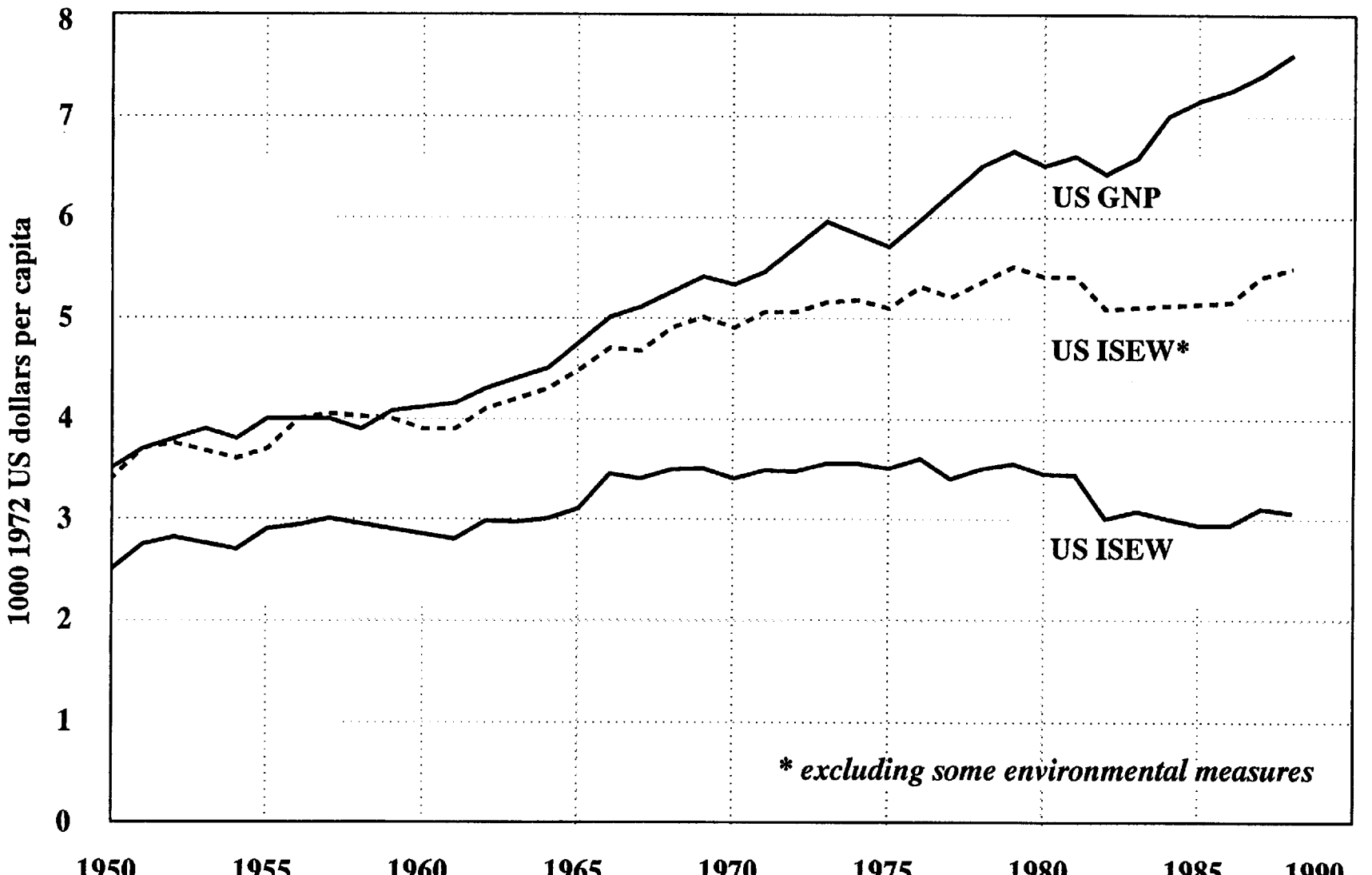


Figure 4. GNP vs. ISEW: USA
Source: Stockholm Environment Institute, 1994

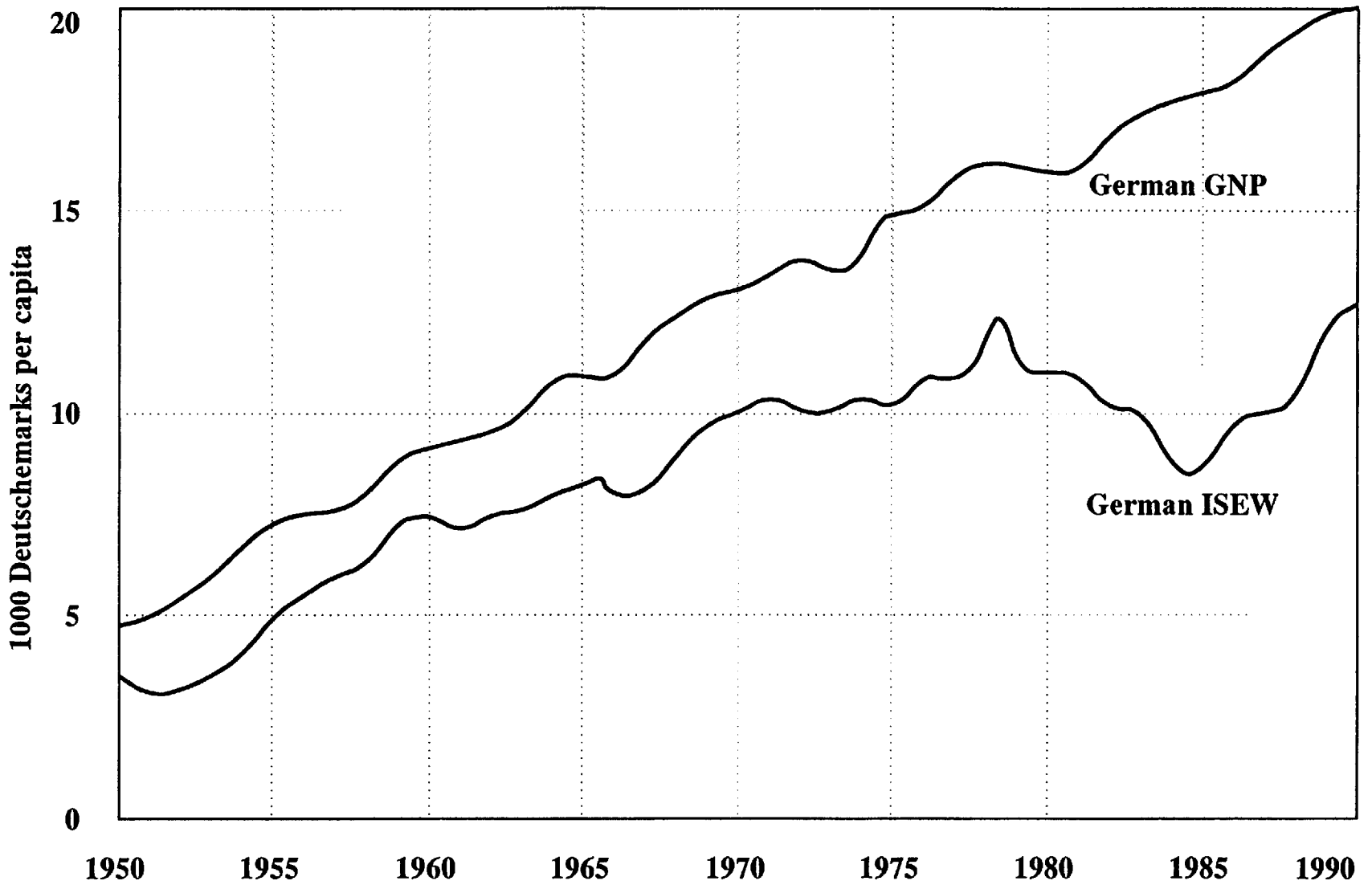


Figure 5. GNP vs. ISEW: Germany
Source: [von Wieszäcker et al, 1995]

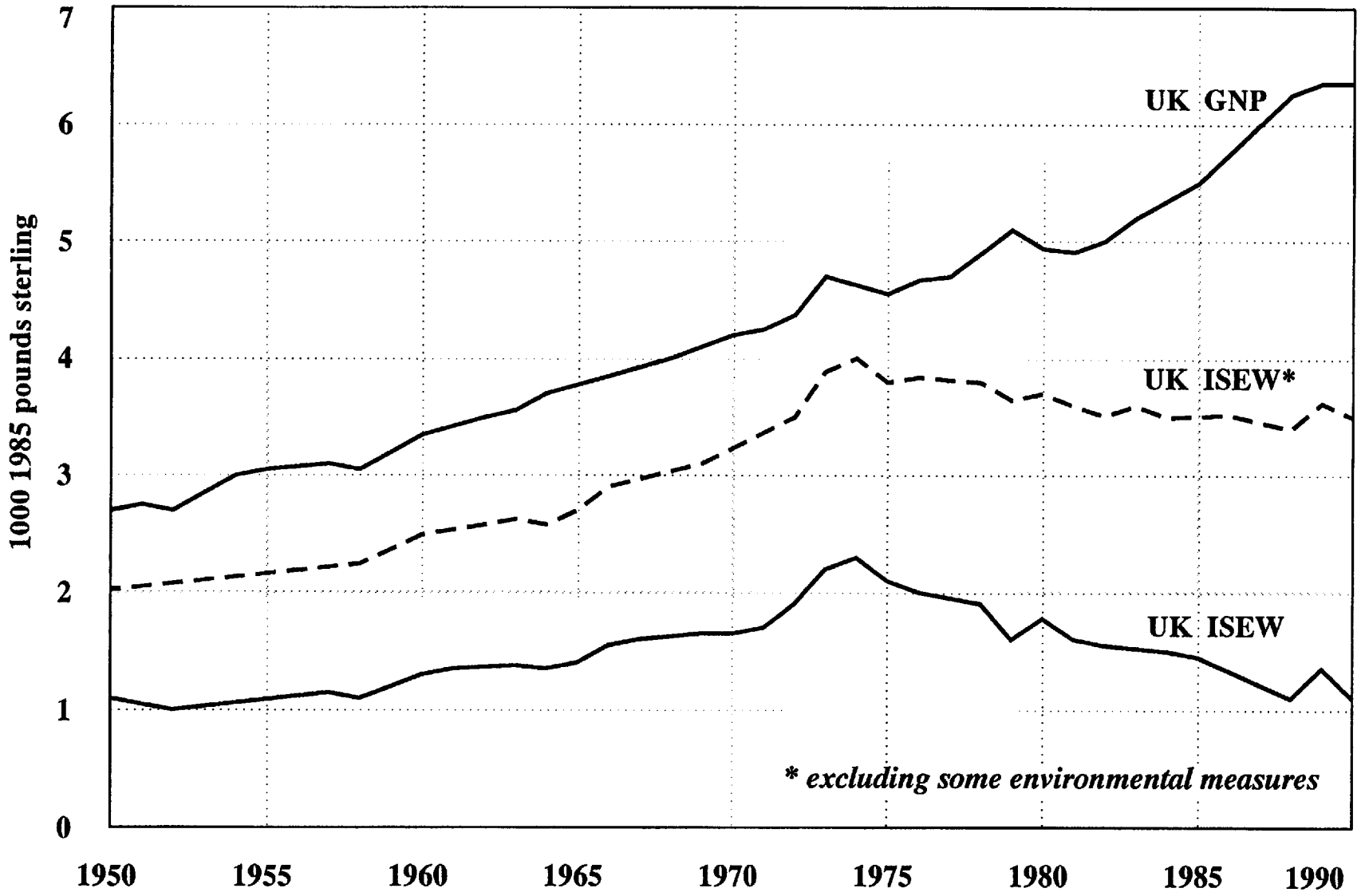


Figure 6. GNP vs. ISEW: UK
Source: Stockholm Environment Institute, 1994

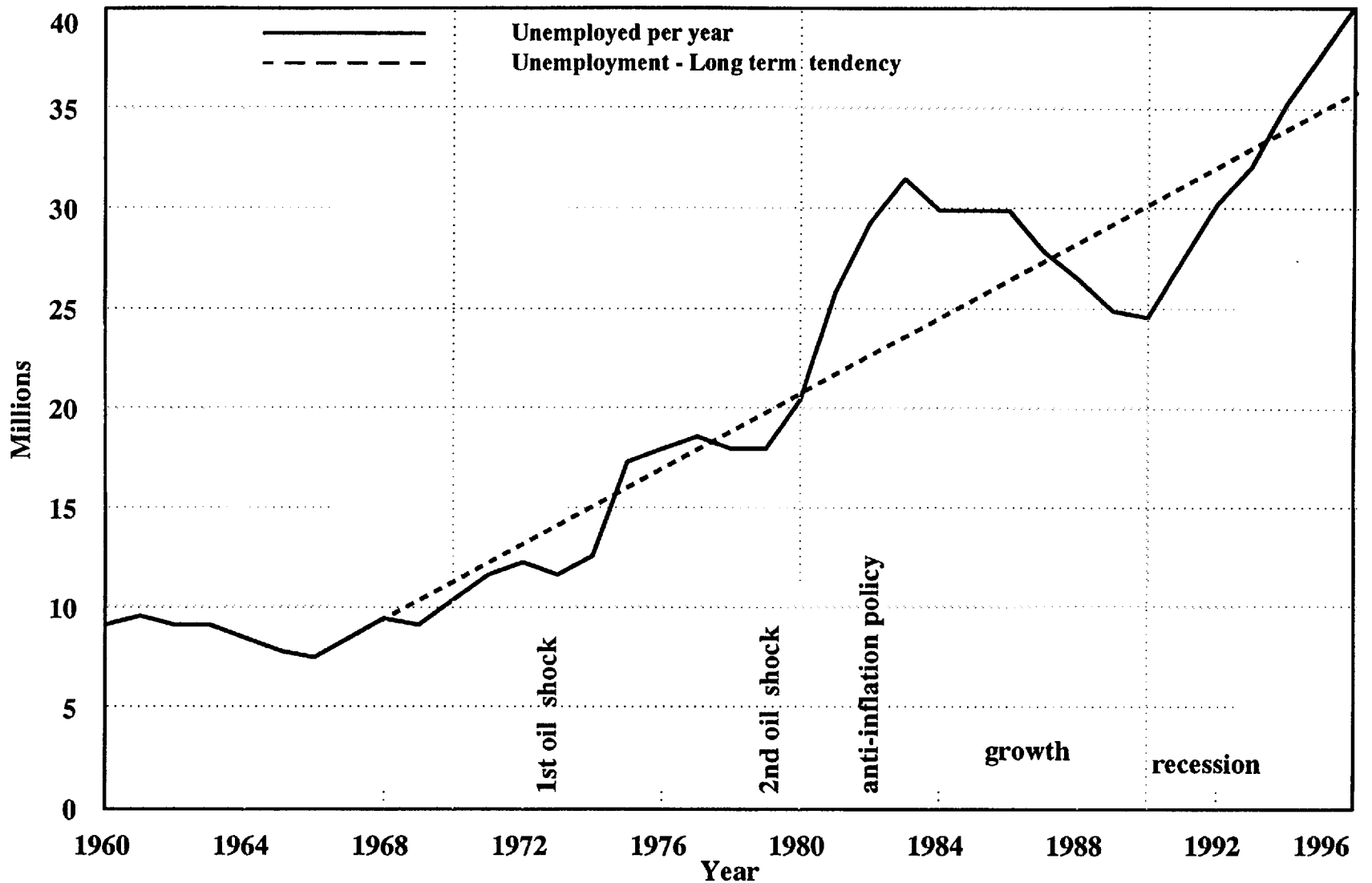
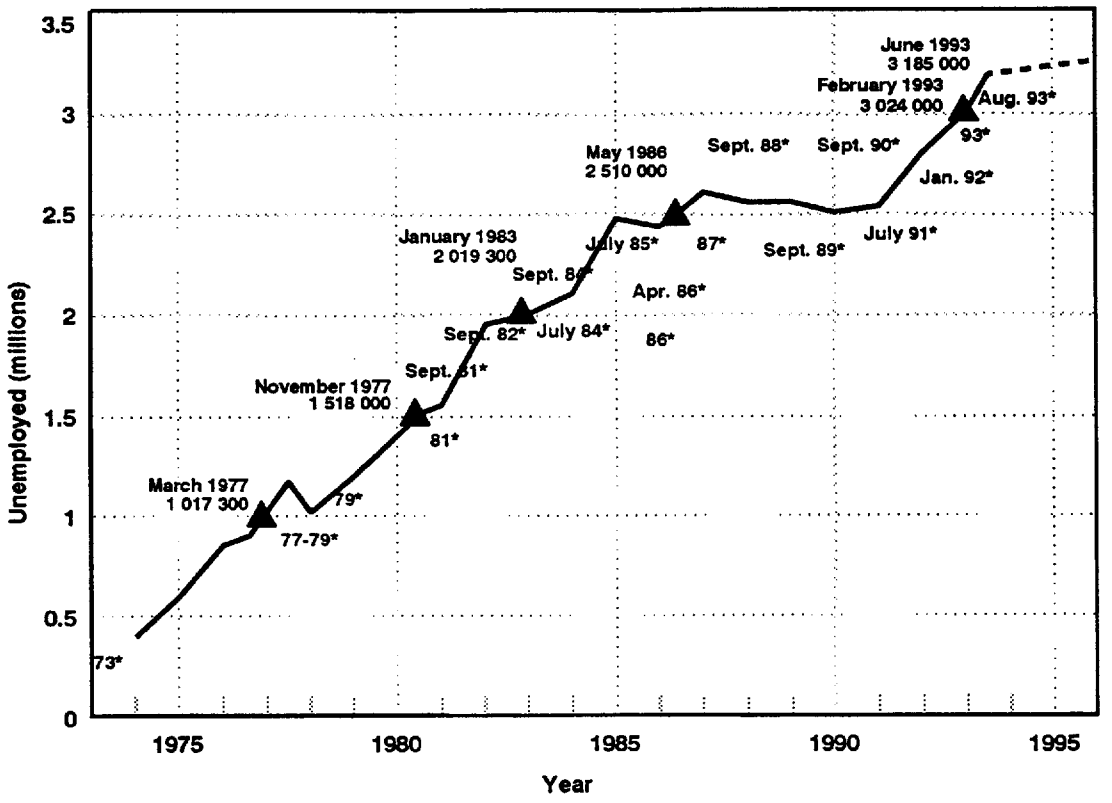


Figure 7. Unemployment in OECD countries, 1960–1993



73* 1st oil crisis (october)

77-79* Raymond Barre launches 3 national pacts:
1) Exemption of social security charges when under 25 is employed
2) Creation of a retraining fund
3) Exemption of social security charges for single women and for long-term unemployed

79* 2nd oil crisis

81* Election of François Mitterand

Sept. 81* Maurois plan
Contracts between state and firms
dvpt of employment pools, help to employ the young

Sept. 82* Launch of employment-training contracts

Sept. 84* TUC (Collective Utility Contracts)

July 84* Firm training for the young and integration help

July 85* Creation of retraining periods

86* Chirac Prime Minister

April 86* Chirac-Séguin plan: Exemption of social security charges for employing the young

87* PIL: Program for Local Integration (for long-term unemployed). More TUC

88* Re-election of François Mitterrand

Sept. 88* 1st Rocard plan
Recuction of firms' costs and of wealth tax, measures for local employment

Sept. 89* CES (Contract for Employment and Solidarity)
TUC becomes PIL
CRE (Contract to return to Employment) for long-term unemployed

Sept. 90* 3rd Rocard plan:
Exemption of costs for 1st employee
Loans to small firms...

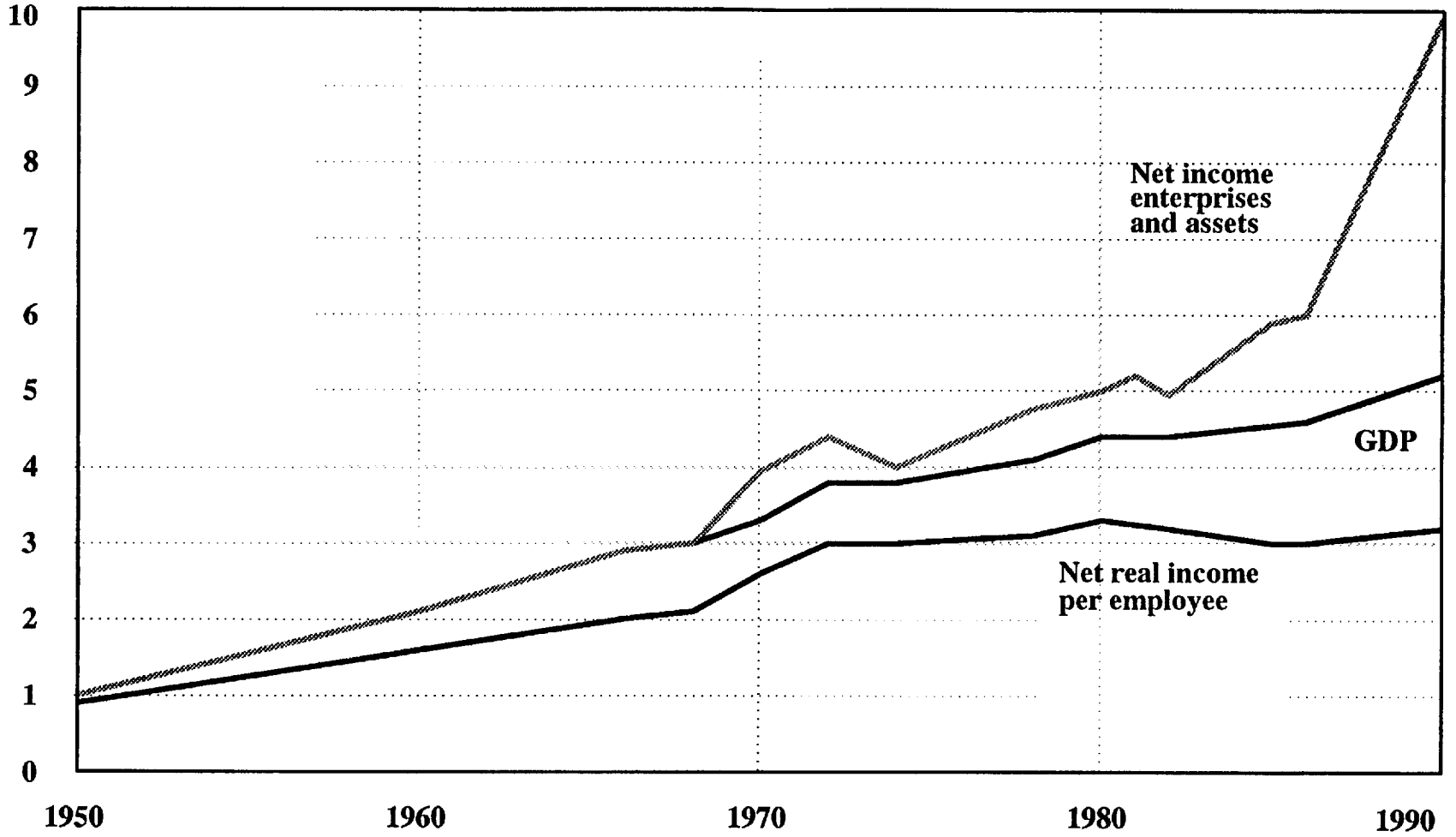
July 91* Cresson plan:
Reduction of costs, help to small firms, rise of help to partial unemployment, reduction of tax for employment in a family

Jan. 92* 2nd Cresson plan
the young, extended in April 92 by Bérégovoy.
Inclusive and permanent abatement of social constributions for employers on a part-time basis.

93* Balladur Prime Minister

Aug. 93* Balladur plan

Figure 8. Unemployment in France, 1974–1993
Data source: INSEE



Note: Until around 1980 income from both labor and capital grew more or less in parallel with GDP Growth. Since 1980 labor's share fell while the capital share grew sharply.

Figure 9. Changing shares of labor & capital in Germany
Source: [Afhedt 1994, pp 4–5]

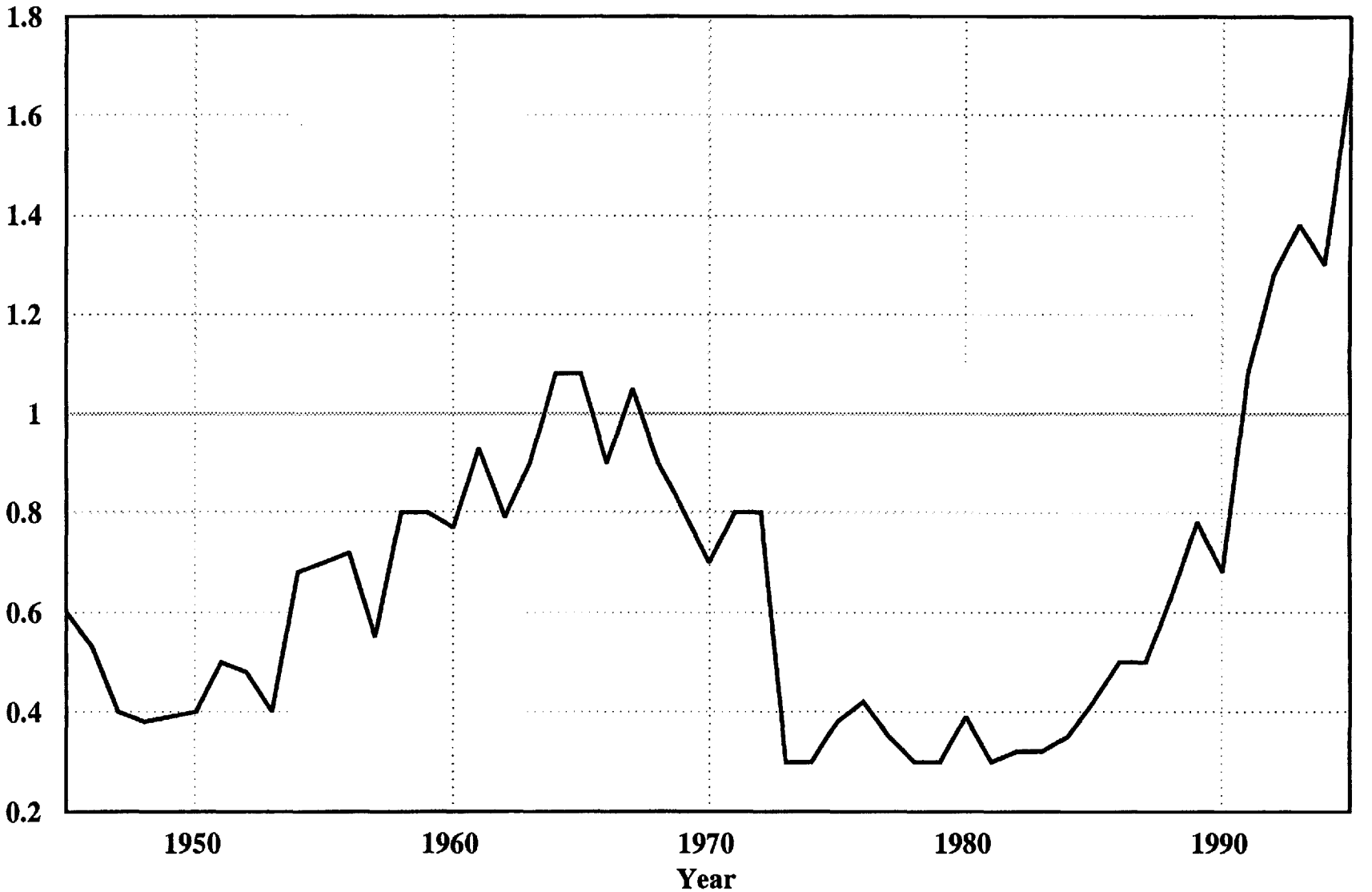


Figure 10. The Q-ratio: Market value to asset replacement cost
Source: International Herald Tribune, June 1996

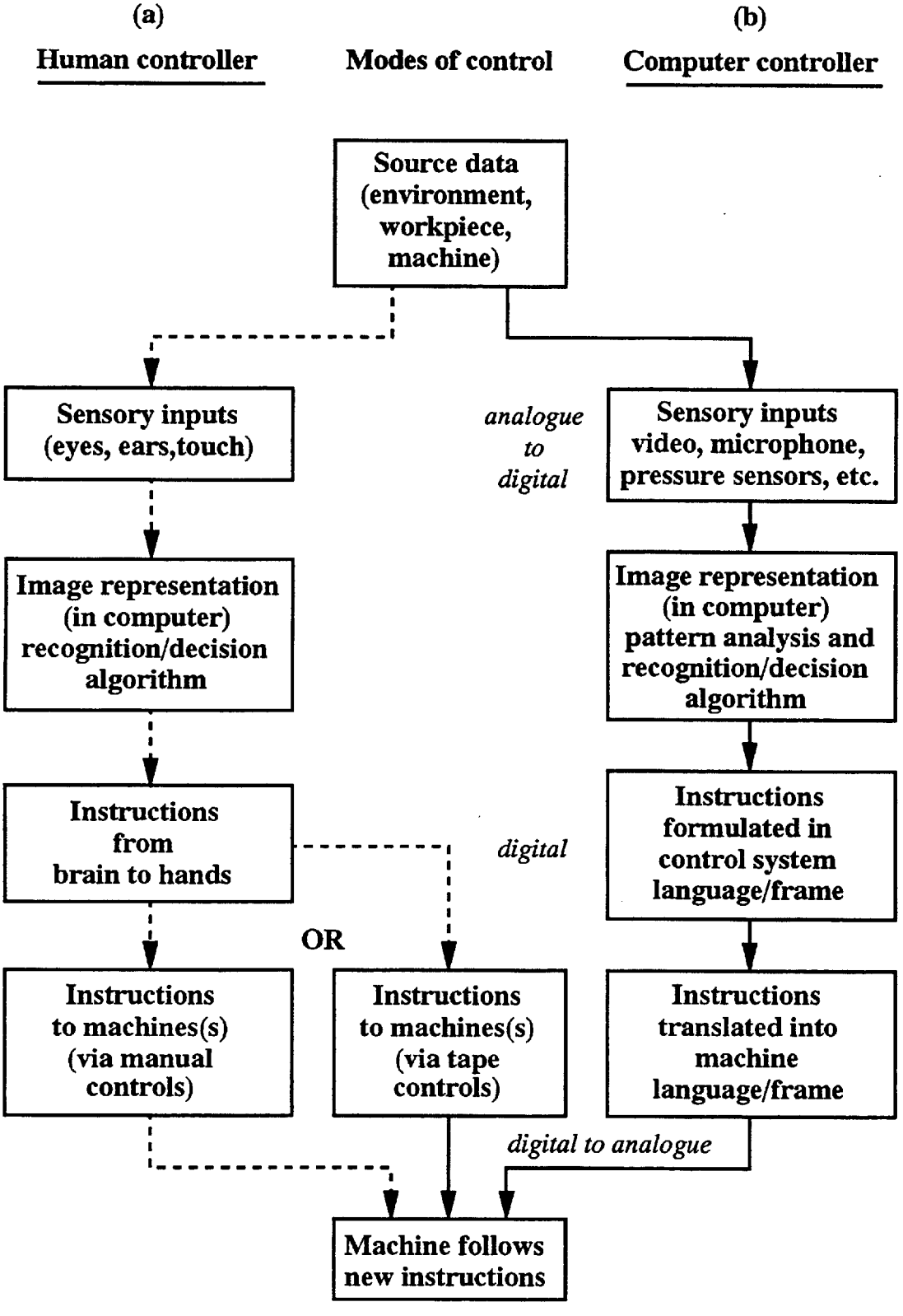


Figure 11. Unemployment in France, 1974–1993
Data source: INSEE

- Unfunded entitlements ⇨ growing debt
- Scale ⇨ capital intensity ⇨ depreciation
- Infotech eliminates jobs
- Fossil energy phase-out
- GDP/ISEW increasing
- Capital exports

Figure 12. Why growth of ISEW lags

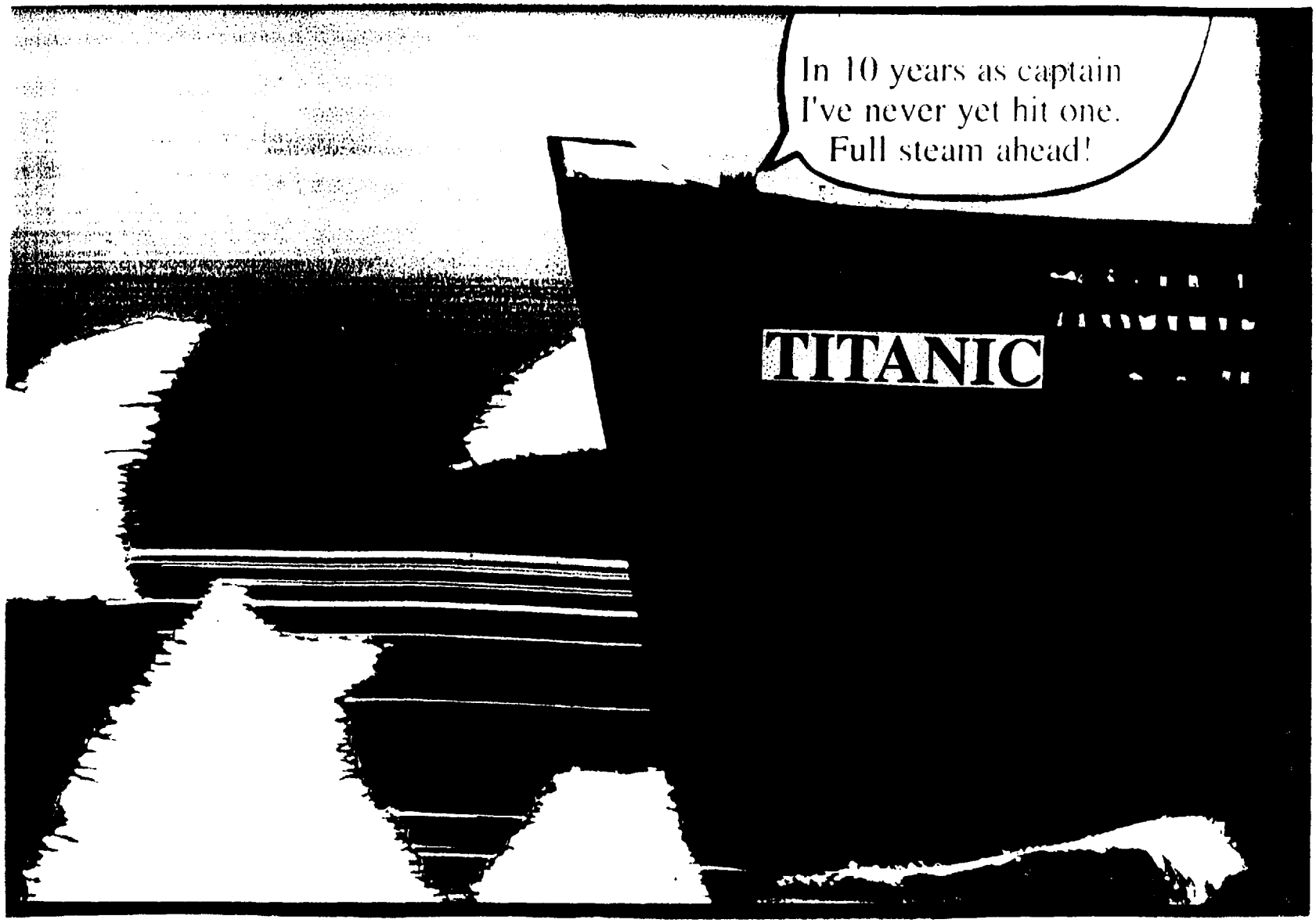


Figure 13. Ruminations on the deck of The Titanic

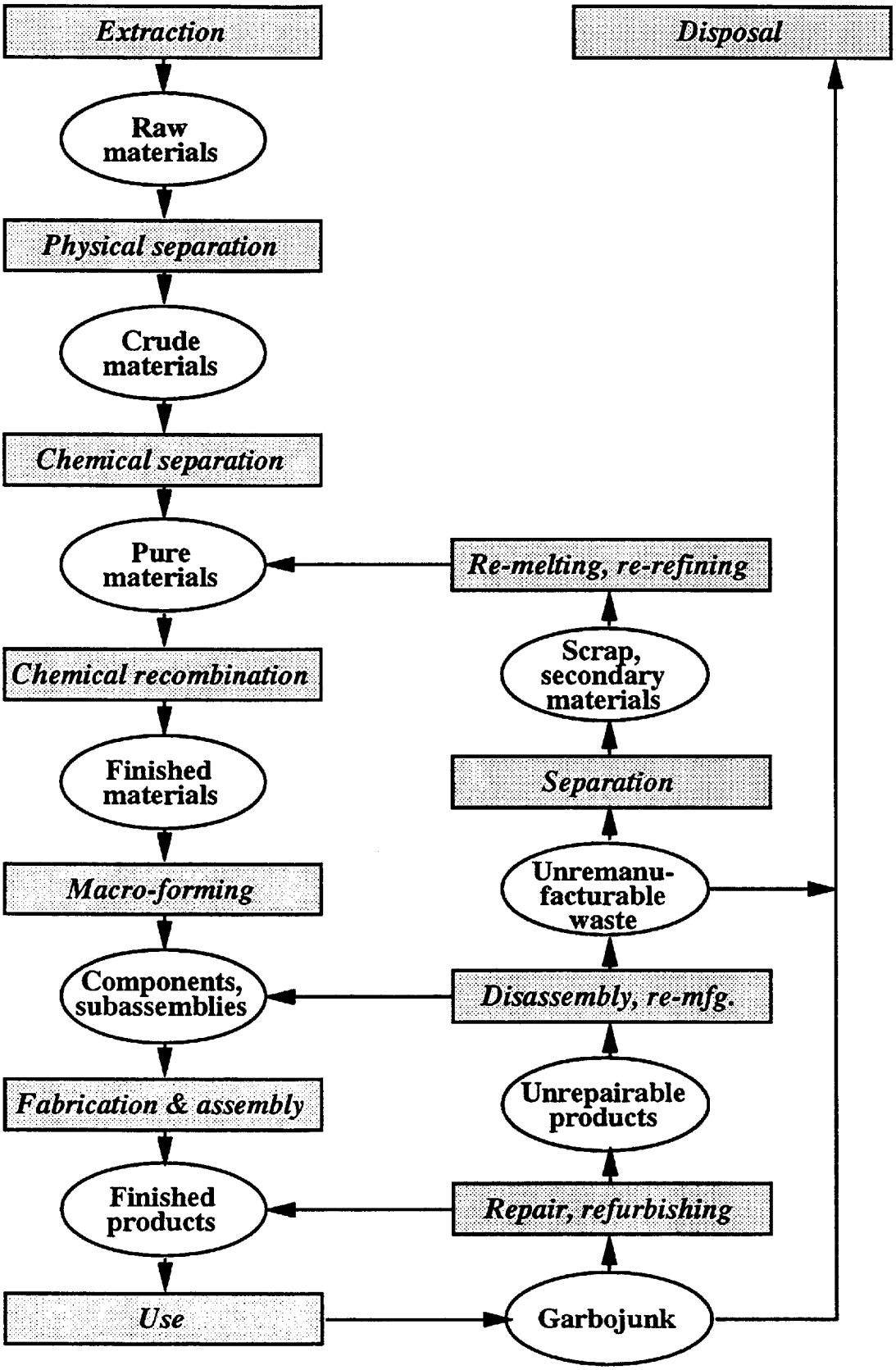


Figure 14. The materials cycle

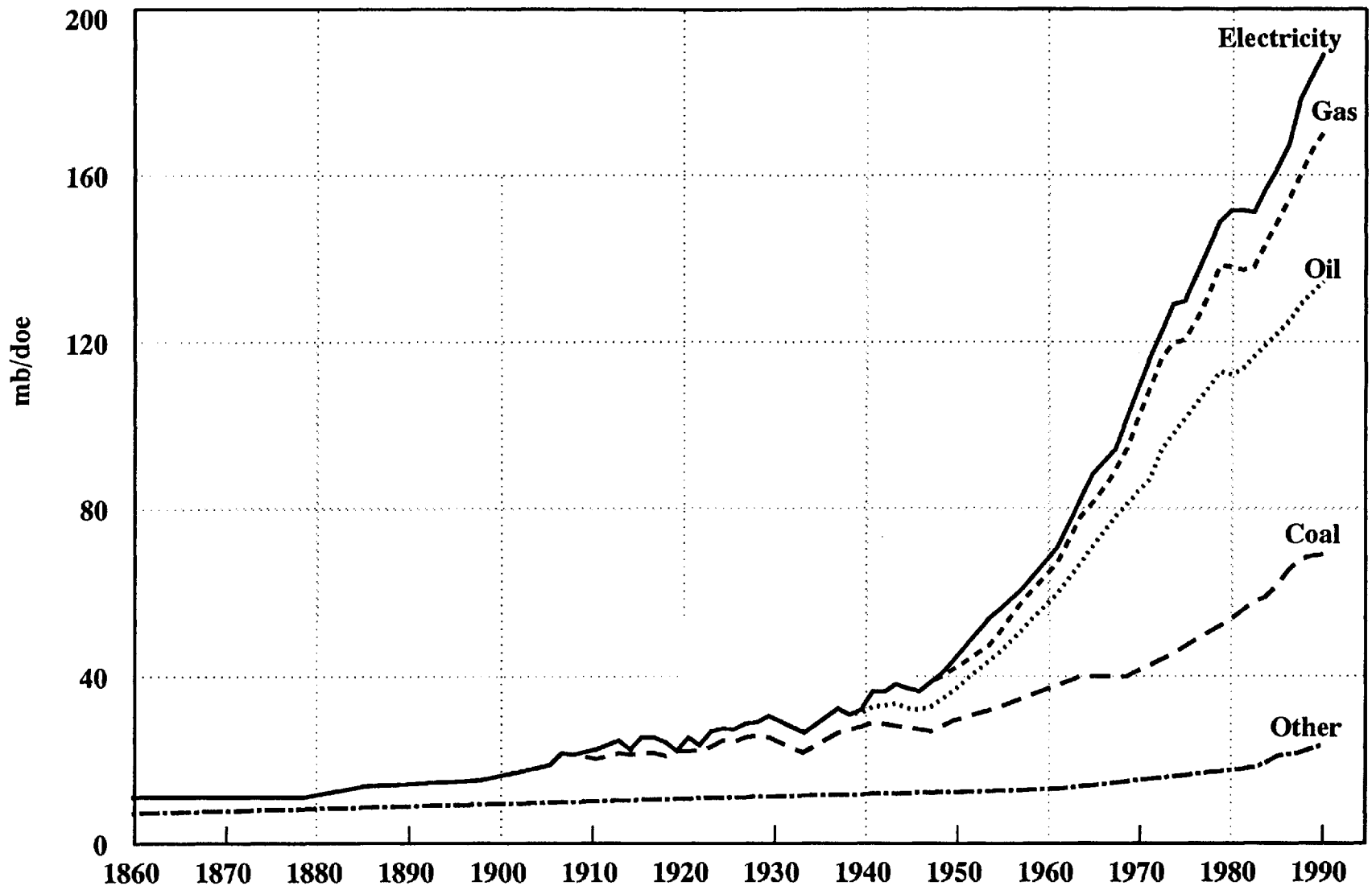


Figure 15. World primary energy consumption, 1860–1990

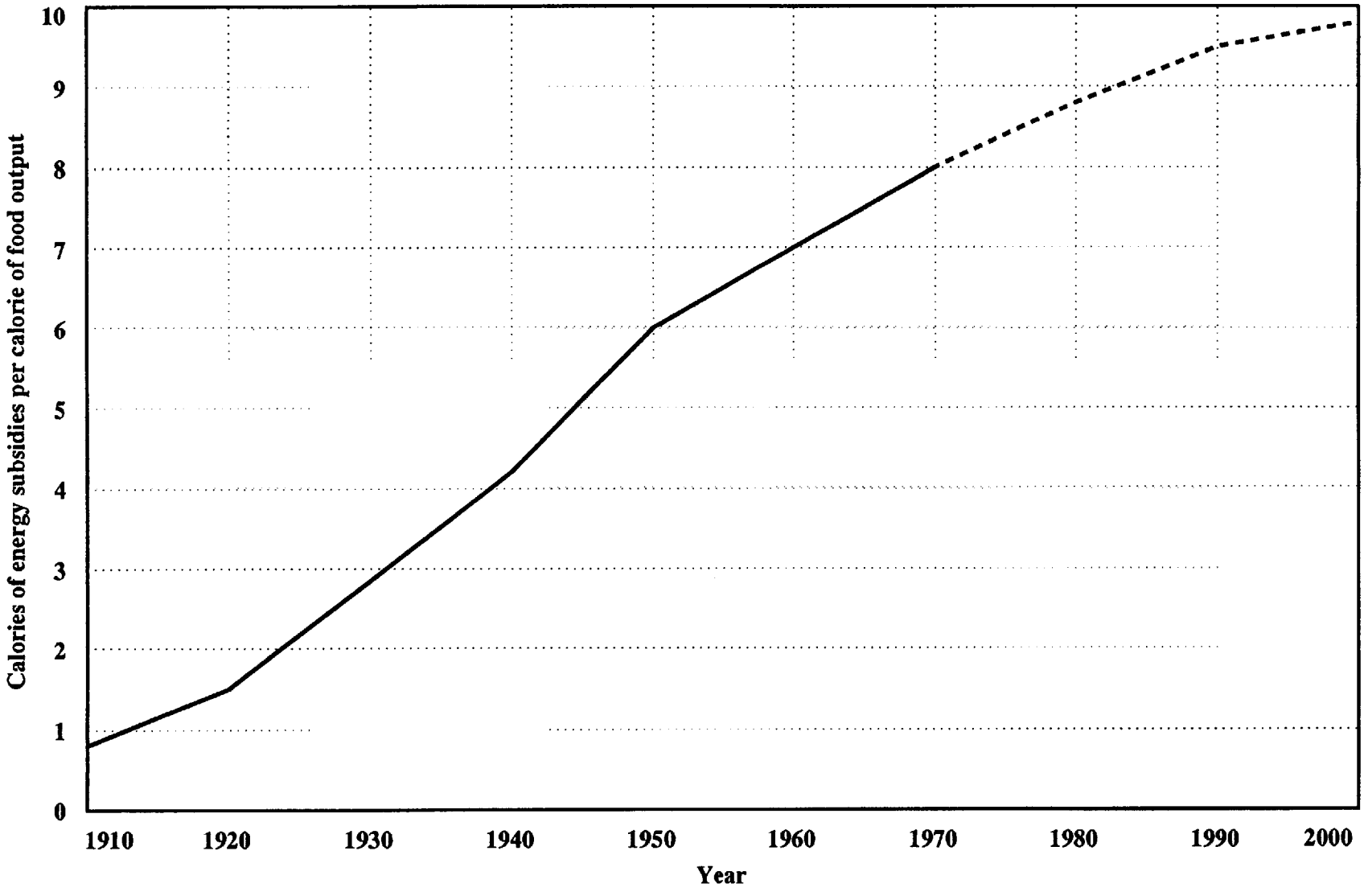


Figure 16. Energy history of the US food system
Source: [Steinhard & Steinhard]