Seeking a Premier League Economy: the Role of Privatisation*

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Abstract

We review (a) the history of UK privatisation (b) its likely theoretical effects on efficiency and (c) its effects on productivity. As for history, we argue that Mrs Thatcher's privatisation programme was a real break from past policies, although many of the privatised firms had been in private ownership before the Second World War. On productivity, we assemble a new company-level data for some of the major companies privatised in the 1980s and show improvements in performance in advance of privatisation. We also investigate the sources of these improvements using a new plant-level data set and show that much of the improvement came from closure of existing plants.

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"Taken together, the privatisation program in Britain probably marked the largest transfer of power and property since the dissolution of the monasteries under Henry VIII" (Pirie, 1988).

1. Introduction and summary

In 1979, when Mrs. Thatcher came to power, publicly owned companies produced roughly 12 % of UK GDP. By the time of the election of the Labour Government in 1997 this figure had fallen to 2%. At least in the UK, public ownership seems to have been discredited. The Labour party, which had initially met the privatisation programme with the policy of re-nationalisation without compensation, is now running privatisations of its own. In the meantime, the opinion and experience of UK privatisation practitioners and regulators is sought throughout the world. In the UK, the debate has now shifted from the sales of publicly owned assets to the issues of franchise design for public services, public/private partnerships, and internal markets in state organisations.[1]

In this paper we try to answer some of the following questions. First, what were the origins of privatisation? Was the policy the natural outcome of Conservative thinking or was it a decisive break from the past? Second, why has privatisation proved so enduring? Why is re-nationalisation off the agenda? Third, and importantly in the context of diagnosing Britain's failure to reach the premier league of output per head over the last 20 years, did privatisation raise productivity in the companies concerned? If it did not, what future steps concerning privatisation or the privatised companies can be taken that might improve performance?

Our purpose in the paper is partly to survey existing evidence and partly to bring new evidence to bear on these questions. The following summarises our argument. We start in the next section with an overview of the history of public ownership levels in the UK and other countries. Before WWII, industries such as steel, coal and transportation were mostly privately owned, with a few exceptions (the BBC and British Overseas Airways Corporation). Utilities (gas, electricity and water) were a mix of private and municipally-owned, with some regulation (a position similar to the US today). The major wave of nationalisation occurred during the post-war Labour government (gas, electricity, steel, coal, and rail), aligning the UK with other European countries. Subsequent pre-Thatcher Conservative administrations privatised some industries (steel in 1953 for example) but equally nationalised some (Rolls-Royce, in 1971) and

[1] Following Kay and Thompson (1986) we think of privatisation as a term covering various means of changing the relationships between government-provided economic activity and the private sector. The main areas of government activity are (or were) in (a) various industries (e.g. utilities, steel, cars), (b) infrastructure (e.g. roads, railways) (c) social services (e.g. pensions, health and schools).

attempted no major privatisation of the utilities for example. Thus privatisation was in no sense inevitable; the Thatcher programme was a decisive break from the past.

Although Mrs. Thatcher came into office with a pro-market philosophy, the word privatisation does not appear anywhere in the 1979 Conservative Party manifesto.[2] Privatisation, at least on a large scale, was in fact something of an accident. During the early 1980s, it became apparent that the state-owned telephone monopoly, British Telecommunications, would have to undertake huge investment, in part because of previous unwise decisions on which technology to adopt (Galal et al, 1994). By Treasury accounting rules, such investment would count as public spending, which the Government was committed to reduce, and all schemes to finance this public investment off the public balance sheet failed. The government decided to sell the company, ensuring that its investment would take place in the private sector, discovered that the sale was very popular with its supporters, and extended the policy.

What effect is privatisation likely to have? As we discuss in section, 3, economists have naturally focussed on the possible efficiency gains from privatisation but these were not uppermost in politicians' minds at the time. Rather, as section 4 and 5 set out, privatisation was a way of meeting a number of economic and political objectives, such as reducing the power of public sector Trade Unions. Management remained more or less the same, as did market structure (at least until the later privatisations of electricity and the railways). A number of steps were taken to try to make privatisation irreversible, such as making shareholding widespread enough so that the opposition Labour Party's then stance of re-nationalisation without compensation (later dropped) would potentially harm a large pool of shareholders.

Section 6 studies efficiency. Most studies of the major industries and utilities in the 1979 public sector start from the observation that the biggest improvements in productivity came before much of the sector was privatised. This suggests that restructuring and competition are more important in raising productivity rather than ownership *per se*. Studies of contracting out reach a similar conclusion. In refuse collection for example it is possible to compare costs when collection remains in the public sector without competition (i.e. the service being tendered), when it remains in the public sector with competition, and when it passes to the private sector. Evidence suggests that savings are similar whether collection is public or private as long as there is competition (i.e. tendering) for the service.

[2] There were commitments to return a few companies to the private sector, but the term "privatisation" is not used.

After all this, it seems appropriate to ask: did the UK economy need privatisation? To the extent that competition matters, and not ownership, privatisation would seem to be irrelevant. Thus the imperative question is to devise appropriate regulation mechanisms and introduce competition, and these design issues are important in developing the next phase of privatisation, namely the Private Finance Initiative (PFI) and other public-private partnerships.

But to the extent that pre-privatisation restructuring matters, the effect of privatisation is rather subtle (and would not be picked up in conventional regression analysis of company performance). Restructuring of public sector firms needs tough decisions (to close down plants for example). That may come from a strong ministerial personality, but this is all too rare. But may also come from the threat (or promise) of privatisation in the future. Thus privatisation is perhaps seen as a credible signal of public sector toughness that politicians cannot otherwise give. Furthermore, the fact that privatisation has been carried out confers an advantage to ministers on the left of the political spectrum: they can now credibly commit not to have to intervene in many formerly public sector decisions. This might explain why re-nationalisation has vanished from the UK Labour government's agenda, although it has intervened selectively from time to time.[3]

2. Public Ownership in the UK

In 1979, government-owned firms produced approximately 12% of GDP. Public ownership predominated in the utilities, transport, and the "heavy industries" of coal, steel, and shipbuilding, although there were state-owned companies in other sectors. Table 1 shows how the pattern of public ownership in the UK developed over time. Since there is a longer history of public ownership in the utilities, we begin with these.

Utility public ownership began at the level of local, not national, government. Clean water supplies, and later gas for lighting, were provided by local councils in some areas, and by the private sector in others. Joseph Chamberlain's "gas and water socialism", which gave Birmingham improved services in the 1870s, was perhaps the most famous example, but there were many others. In the last two decades of the century, when the electricity supply industry began to emerge, some areas were served by privately owned companies, and others by

[3] This paper is predominantly a survey, but does offer two original pieces of research. First, we extend previous work by Haskel and Szymanski (1992) and look at newly assembled data on TFP for a series of previously public companies. Second, we use plant-level data for an industry which had a mix of public and private plants in 1979 (confidentiality precludes us from revealing the plants concerned) and look at their relative productivities, and at the contributions of plant closure to to productivity growth.

municipal undertakings. The 1882 Electric Lighting Act allowed the local authorities to buy out the private companies (at their written-down asset value) after 21 years, later extended to 42 years. Unfortunately, this fragmented ownership structure made it almost impossible to gain economies of scale, since municipal undertakings could not expand beyond their boundaries, and the private companies, potentially larger, were in practice smaller (Hannah, 1979).

Telephone services were initially also fragmented, but the Post Office became a near-national monopoly from 1912 onwards.[4] At that time, the Post Office was a government department headed by a Minister, but it eventually became a conventional nationalised industry, a "public corporation", in 1969. The possibility of greater state control of the electricity industry, to solve the problems caused by its fragmentation, was discussed soon after the First World War, but rejected. In 1926, however, the government set up the Central Electricity Board to construct a national transmission grid and allow the industry to gain economies of scale through better co-ordination of (still independent) generating stations.

Nationalisation on a large scale followed the Second World War, and the election of the first majority Labour government. The private electricity companies were bought out, and the municipal undertakings transferred to central government ownership, in 1947. The gas industry was nationalised in a similar manner the following year. The water industry remained a mixture of local authority water boards and regulated private companies until 1973, when the local authority undertakings in England and Wales were reorganised into ten Regional Water Authorities. The private companies, which supplied about a quarter of the consumers in England and Wales with water, were not affected by this reorganisation.

The post-war Labour government also nationalised a number of non-utility industries. The "commanding heights" of coal and steel were nationalised in 1946 and 1949, although the steel industry was to be sold back to the private sector by the next Conservative government. Similarly, much of the long-distance road freight industry was nationalised in 1948, and most of it privatised again in the early 1950s. The railways, losing traffic to roads, and starved of investment during the war, were nationalised in 1948. The British Overseas Airways Corporation, including most of the country's fledgling airlines, had been nationalised in 1939. The steel industry was re-nationalised in 1967, and shipbuilding and aerospace were nationalised in1977.

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[4] Kingston-Upon-Hull City Council continued to provide its own telephone services. The first author used to assume that the Civil Service had simply forgotten the city when planning the reorganisation. He now knows that the decision was taken because the people of Hull deserve a better service than the rest of the country.

These latter nationalisations were bitterly opposed by the Conservative Party, even though the previous Conservative government had effectively nationalised Rolls-Royce (aircraft engines). The company, rescued from bankruptcy, did not become a public corporation, but remained a limited company with the government as the major shareholder, as did the vehicle firm British Leyland, rescued a couple of years later. They were not the only private companies with substantial government shareholdings – the government had taken a strategic stake in British Petroleum before the First World War, and later acquired Cable and Wireless, which provided telecommunications services in a number of (then) British colonies.

In 1979, therefore, Britain had a much higher degree of public ownership in industry than the United States, but was not far out of line with the pattern in many other European countries. Public ownership of gas and electricity was common in Europe (sometimes in the hands of local government, sometimes central), while government ownership in the United States was much more limited (to municipal distribution bodies and the New Deal era generating boards, such as the Tennessee Valley Authority). Telecommunications was usually public in Europe (as in the UK), and private in the US. Public railways and "flag carrier" airlines (with smaller private competitors) were common in Europe, but not in the US. The UK had a mixture of public and private water suppliers. In the US, water is predominantly municipal. In France, however, although municipalities own the water assets in their districts, operation is usually contracted out to private companies. The UK was relatively unusual in the number of "industrial" companies in the public sector, including coal, steel, shipbuilding and car manufacturing – most companies in these sectors were in the private sector in Europe and the US. However, some industrial companies in Europe were state-owned, and the Mitterand government in France was to embark on a large programme of nationalisation in the early 1980s, after privatisation had started in the UK.

How in practice did the government control its nationalised industries? Most were organised as public corporations, a type of organisation invented for the British Broadcasting Corporation, nationalised in 1927. A public corporation is established by an Act of Parliament, and governed by a board responsible to a minister. The corporation is financially independent of government, although any borrowing had to be approved by the Treasury. The Act laid down the board's duties, and although ministers are allowed to give the board general directions, they are meant to keep away from detailed decision-making.[5] Herbert Morrison had summed up the

[5] In practice, ministers almost never gave general directions of the kind envisaged in the Acts, but intervened far too frequently in matters of detail, even though Morrison (1933) had feared that a "mischievous and not too competent minister could easily ruin any business undertaking if that were permitted" (p.171).

attitude sought of board members when he called upon them to regard themselves as "the high custodians of the public interest" (1933, p157).

It soon became apparent that merely requiring corporations to break even, taking one year with another, as most of the nationalisation statutes did, would lead to an inadequate financial performance. The first step towards greater control was taken in a 1961 White Paper that set out financial targets, in terms of a target rate of return. A 1967 White Paper, perhaps the high point of economic analysis in the control of nationalised industries, required corporations to base their prices on "costs at the margin", and to use a test discount rate of 8% (in real terms) in all investment appraisals. Financial targets were intended to be compatible with these economic rules. In the early 1970s, however, many corporations were required to hold down their prices to combat inflation, producing heavy losses. Two more White Papers were produced, in 1975 and 1978, concentrating on the financial objectives of safeguarding cash flow and restoring profitability.

The 1978 White Paper also required ministers to set a range of performance targets for the nationalised industries, including measures such as productivity and service standards. This was due to the gradual recognition that the industries had not been performing well – their productivity was typically well below that of comparable foreign enterprises, and growing too slowly. Labour relations at British Leyland became a national joke during the 1970s, and other industries had similar problems. Possible reasons for these problems are discussed in the next section.

3 The rationale for privatisation

To the extent that privatisation is a change in ownership, the private and public sectors differ because the public sector has different *objectives* to the private (i.e. broader objectives than profit maximisation) and different *incentives*. The different incentives arise because a public sector firm is not vulnerable to takeover or bankruptcy and has a different information relationship with its owners.[6]

The textbook argument for privatisation centres on differences in objectives between private and public firms. Profit-maximising firms with market power will produce inefficiently low levels of output relative to welfare maximising firms (assuming that costs are independent of ownership). Furthermore, many utilities have increasing returns and so market power. The rationale for public ownership is then clear, namely a change in objectives to increases social

[6] Owners of public firms are voters /ministers whereas owners of private firms are shareholders /managers.

welfare, although the rationale for public ownership of industries without market power is less clear.

There are at least two problems with this view. First, it is not clear that ownership is necessary to obtain a socially optimal output level, for a regulator could simply require firms to produce at that necessary level. The problem is of course that regulators are unlikely to know what the socially efficient output level is, but then neither will government. Second, the apparent inefficiency in public firms (Pryke, 1982) suggests relaxing the assumption that public and private firms have similar costs. Both these arguments suggest examining productive efficiency in public and private firms.

There are two main approaches to this. The ***agency*** approach to privatisation focuses on the principal/agent relationship between the owner and a manager (public sector) and government and manager (private sector). Assuming that the private sector is more effective at monitoring managerial activity than the public sector, privatisation improves productive efficiency by ensuring that managers supply effort and keep down costs (Bos, 1990, Rees, 1988). This is therefore primarily an argument about the effect of incentives on productive efficiency.

The ***delegation*** approach is primarily about the effect of objectives on efficiency. It begins with the observation that worker effort is frequently bargained over between managers and workers.[7] Furthermore, private firms are assumed to maximise profits, whereas the objectives of public sector organisations are a combination of profits, consumer surplus and the welfare of public sector employees.[8] Under various conditions (Haskel and Sanchis, 1997) it can be shown that the effect of changing objectives toward profit maximisation is to raise effort. The intuition for this result is straightforward. Privatisation can then be viewed as a way of committing the government to not pay high wages and/or accept low effort. It is a method of delegating authority over wage and effort bargaining for a government which is unable to commit itself to bargaining at arms' length with the workforce. A union bargaining with a private firm faces, at the margin, a firm unwilling to concede to demands for high wages and low effort.[9]

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[7] Millward and Stevens (1986, table 9.19) report that, in 1984, 87% of nationalised industries negotiated with trade unions over working conditions, and 77% over manning levels.

[8] John Moore MP, quoted in Martin and Parker (1997, p.3), "… the priorities of elected politicians are different from and often in conflict with the priorities of effective business managers. Yet in state-owned industries politicians are in charge, which means that whenever politicians cannot resist getting involved in what should be management decisions, political priorities take precedence over commercial ones. Politicians may overrule commercial judgements in other to build a new factory in an area where voters need jobs, or they may refuse to close an uneconomical plant. They can become involved in polices affecting the hiring and the size of the workforce".

[9] The complication here is that the result depends on the functional form of the utility function. If workers care a good deal about effort but not wages, they may agree to wage cuts after privatisation. If such cuts are deep enough, then effort can even fall. See Haskel and Sanchis (1996) for discussion.

Both models would predict relatively high employment and low effort before privatisation.[10] Similarly, any liberalisation of markets raises effort. Note too, that whilst privatisation shifts the objectives of the public sector firms toward profit maximisation, this process may take place before private ownership is instituted. This may be important empirically in the UK case, since typically in the UK more commercially orientated managers were brought in whilst firms were still in the public sector.

Privatisation of natural monopolies will usually require regulation. Cost of capital regulation, common in the US for example, is likely to lead to over capitalisation (Averch and Johnson, 1967). The regulation of prices faces a fundamental trade-off: profit regulation gives firms little incentive to reduce costs but may keep prices more aligned with marginal costs, whereas price cap regulation gives ample incentives for cost reduction at the cost of a possible wedge between prices and marginal costs. Furthermore, dynamic price cap regulation faces the problem of resetting the price cap. As we document below, proponents of the first UK price cap scheme believed this problem to be of academic interest only since they expected that competition would arrive before the price cap had to be reset. In reality if resetting the price cap involves looking at profits then price cap regulation becomes de facto profit regulation (Beesley and Littlechild, 1988).

It is often argued that competition is infeasible in natural monopolies. It is worth noting however that first, such arguments generally refer to competition within the market, but competition for the market, such as rail franchises (or more generally contracting out) is often feasible. Second, on close examination, natural monopolies often consist of parts where competition is indeed not feasible (transmission of electricity, railway lines) and others where it is (generation of electricity and energy retailing) and the privatisation and restructuring process can take account of this. Third, with technical change, the technology that causes natural monopoly can cease to be of such great importance (the development of mobile phones for example). Finally, competition can become part of regulation. Yardstick competition (Shleifer, 1985) regulates a firm by making prices (in a firm with the monopoly of a particular region for example) dependent on other region's costs, thus providing good incentives for cost reduction.[11]

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[10] The agency model is usually cast in terms of managerial effort and the effect on employment is seldom derived. The delegation model obtains specific predictions on over-employment and under-effort, see Haskel and Szymanski (1992) and Haskel and Sanchis (1997).

[11] Whilst competition might improve productive efficiency a more difficult question is whether this by itself improves welfare. No-one disputes that if competition aligns prices closer to marginal costs welfare improves, but if it simply reduces costs then this does not necessarily raise welfare since it may just be a transfer of welfare from managers (who have to work harder say) to consumers (who get lower prices). Yardstick competition is a case where welfare is increased since splitting a firm into many units expands

Finally, the regulation of quality of service has become an important factor in the UK debate. Such an issue amply illustrates the information problems confronting the regulator. Since it is impossible for the regulator to write complete contracts specifying all dimensions of quality firms can neglect on non-regulated quality dimensions.

4. Privatisation in the United Kingdom since 1979

In 1975, Margaret Thatcher became leader of the Conservative Party. The party had supported the corporatist consensus of the 1950s and 1960s, and had expanded the state's role in industry by taking over Rolls-Royce and British Leyland. Mrs Thatcher and her advisors gradually became determined to move away from this consensus, which they saw as responsible for the country's relative decline. They planned to introduce "free-market" policies that would reduce the role of the state in the economy. Private enterprise was not only believed to be more efficient than state provision; many thought it was morally superior.

The Conservatives also sought to reduce trade union power, which was strongest in the nationalised industries. In 1974, the National Union of Mineworkers, working for the dominant state-owned mining industry called a national strike for better pay. The resulting power cuts caused the then Conservative Prime Minister, Edward Heath, to call an election under the slogan "who governs Britain?" He lost the election, and later the leadership of his party. Whilst in opposition, the Conservatives published the Ridley Report (1978) which argued that where industries "have the nation by the jugular vein the only feasible option is to pay up". John Moore, who later became Financial Secretary to the Treasury, was to say that "Public Sector trade unions have been extraordinarily successful in gaining advantages for themselves in the pay hierarchy by exploiting their monopoly collective bargaining position ... . Privatisation ... makes it possible to link pay to success and to provide appropriate rewards " (John Moore MP., quoted in Kay et al., 1986).

In the light of subsequent developments, it is interesting to note that the word "privatisation" does not appear in the Conservative Manifesto for the 1979 Election. The party pledged to sell the National Freight Corporation (the rump of the road haulage industry that had not been denationalised in the 1950s) and some of the companies owned by the National Enterprise Board (a Labour creation designed to provide finance for industrial investment). During the election, the party also proposed the sale of British Airways. The most eye-catching commitment, however, was to allow council house tenants to buy their own homes, with

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the information base upon which to write contracts. Auctions are also likely to be welfare-improving since they reveal what was private information. On all this see Vickers (1996).

discounts reflecting the length of time they had been living there. This was to prove a very popular policy, with more than 1.5 million homes sold to date, or roughly 25% of the 1979 stock of 6.5 million council houses. The arguments for this policy were not primarily economic, however, and its effect on economic efficiency is likely to be limited (cross-reference to other papers in this volume?).

With no plans for large-scale privatisations, the government began in the early 1980s to sell shares in the private companies that it owned. The 1980 Civil Aviation Act allowed the government to turn British Airways from a public corporation into a limited company, suitable for privatisation, but it started to make huge losses due to the recession in the airline industry, and a sale was clearly inappropriate.[12] The National Freight Corporation was also suffering from a recession, but it was bought by a consortium of managers, employees and pensioners who believed that the company was about to turn around. Helped by selling some of its surplus property, it did so. Nevertheless, privatisation was proceeding on a small scale, and was not a major political issue.[13]

This was to change with the privatisation of British Telecommunications. During the 1970s, BT had built up a backlog of investment, in part due to previous misguided decisions on the right technology to adopt (Galal et al, 1994). The main reason, however, was the tight external financing limit that governed the amount that BT could borrow from the government. In the early 1980s, macroeconomic policy was based upon the medium term financial strategy, which depended upon reductions in the Public Sector Borrowing Requirement to reduce the money supply and hence inflation. Under Treasury accounting rules BT's investment would add directly to the PSBR. Various attempts were made to finance the investment outside the PSBR, all falling foul of the "Ryrie rules" which determined whether a transaction should be counted as public spending. In the end, privatising BT seemed the only way to finance the investment within the government's self-imposed macroeconomic constraints.

The privatisation of 51.2% of BT would be the largest share sale ever seen on the London Stock Exchange, however. The government's advisors doubted that the financial sector would be able to absorb the new shares. The only possibility seemed to be to offer shares to the general public, in the hope that they could mop up the excess. A new kind of advertising

[12] British Airways became profitable a few years later, but its privatisation was delayed by legal action concerning the demise of Laker Airways, which went bankrupt during the recession.

[13] The sale of Amersham International, in February 1982, attracted some controversy when the shares rose by 32% on the first day of trading, giving large profits to some investors, but most voters probably remained blissfully unaware of this.

campaign was designed,[14] and the shares were sold in November 1984. The advertising proved extremely successful, the issue was greatly oversubscribed, and when trading started on December 3, the shares closed at a premium of 33% to the offer price.[15]

From this time onwards, a large part of the electorate saw privatisation as an easy way to make money, and the policy acquired a large number of supporters. It soon seemed as if the only obstacle to privatising a company was finding a place in the queue, since the government had to leave an interval after each major sale in order to allow investors to find money for their next purchase. As the recession of the early 1980s receded, state-owned companies that had been making huge losses became sufficiently profitable for privatisation. Table 2 shows the major events affecting a selection of these companies, while table 3 records the more important sales. By May 1997, when the Conservatives lost power, very few firms remained in public ownership, and some of those are now candidates for privatisation under Labour.

In most cases, privatisation has meant the end of specific state involvement in the formerly nationalised firms. Some, in ailing industries such as coal and shipbuilding, have continued to receive state aid, although this is restricted by European Union rules (Besley and Seabright, 2000). Rover Group, formerly British Leyland, has changed hands twice since it was sold to British Aerospace, and narrowly escaped near-closure in 2000, causing a major political row. The government and its agents have continued to play a major role in the development of one group of the privatised industries, however. These are the utilities, and we now turn to consider them.

5. The privatised utilities

The 1979 Conservative manifesto had not suggested that any utilities would be privatised, but once BT's privatisation had proved a political success, the government started to look upon the other utilities as possible candidates for privatisation. In April 1985, the government announced that British Gas would be sold, and the company became the second privatised utility in December 1986. The water industry followed in 1989. None of these privatisations involved significant restructuring of the firms to be sold. The government had hoped that competition would develop in gas and telecommunications, but the process was very slow in the face of dominant, unrestructured, incumbents. Not until 1990 did the privatisation process involve the significant restructuring of an

[14] Only an investment advisor can legally recommend that someone should buy a particular share, so the campaign could do no more than tell people that the sale was taking place – while also introducing many of them to the whole concept of share ownership.

industry in order to promote effective competition, when the electricity industry was reorganised. The railways were also restructured, in a more complicated process, and were privatised between 1994 and 1997.

The government recognised that it would be inappropriate to privatise the utilities as unregulated monopolies. The telecommunications industry had been opened up to competition in 1982, when the government gave Mercury a licence to build its own network, in competition with BT. The hope was that this competition would soon be sufficient protection for consumers, but in the short term some regulation was needed. Thus the first question was to devise an appropriate regulatory system to restrain the company's behaviour until competition became effective. At the same time, the government was conscious that the opposition Labour Party was deeply opposed to privatisation. Thus the second matter was to ensure that a future Labour government could not interfere with the regulatory system to disadvantage the company.

To cope with the second issue, the government therefore established an independent regulator, the Director General of Telecommunications, with statutory duties that required the regulator to ensure that the company could finance its activities. The details of the company's regulation were enshrined in its licence, a contract that could only be revoked with 25 years' notice. Under English Law, contracts cannot be changed unilaterally. The regulator would be allowed to impose a change against the wishes of the company, however, if the matter was referred to the Monopolies and Mergers Commission (the UK's competition authority, now the Competition Commission), and the MMC supported the change. The regulator was also subject to judicial review of his decision-making. If the company felt that the regulator had not followed the proper procedures, or that the decision taken was manifestly unreasonable,[16] it could ask a court to review the matter. This system of checks and balances was designed to protect the company's interests, while ensuring that the regulator could still control its behaviour (Levy and Spiller, 1994).

What was this independent regulator expected to regulate while waiting for effective competition? At first, the Treasury had suggested a modified version of US-style rate of return regulation, which would set a maximum rate of return, but no minimum. This was intended to give the company stronger incentives for cost efficiency than a pure rate of return scheme, under which the company could appeal for higher prices if its costs rose and depressed its rate of return. When a Department of Trade and Industry advisor suggested an alternative, namely an output-related levy

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[15] Small shareholders who bought with the intention of selling their shares quickly made an even greater profit, for the offer price was payable in three instalments, and the rise represented 86% of the first instalment. The phrase "stagging" soon entered the national vocabulary.

[16] Note that judicial review does not ask whether a decision was actually right or wrong, but whether it was unreasonable, which is less of a constraint on the regulator.

on profits (designed to give the company an incentive to keep prices low, since the levy rate would fall as output rose), Stephen Littlechild was commissioned to decide between the two schemes. He came up with a third, a local tariff reduction scheme, under which a basket of BT's prices (in the markets with the least competition) would have to fall by a pre-set amount in real terms each year. In nominal terms, they could rise by (RPI-X)%, where RPI was the change in the retail price index, and X the pre-set real reduction, and this soon became the nickname for the scheme. Littlechild (1983) saw the scheme as a temporary expedient until competition became effective in holding prices down, because if it was needed for a permanent control, it would be necessary to reset the level of X from time to time. This could not sensibly be done without looking at the company's costs and profits, which would blur the distinction between his scheme and rate of return regulation. In practice RPI-X, or price-cap, regulation was later adopted for every other utility privatisation, including those in which there was little prospect of competition (table 2).

RPI-X regulation limits price increases for a basket of goods to X% below the rise in the retail price index, with X being set by the regulator for a period of 4 or 5 years at a time. This system does away with the nationalised industry policy of tying prices to marginal costs in favour of providing strong incentives for cost reduction, since firms can keep any profits they make as long as they do not exceed the price cap. Theoretically then, RPI-X should promote productivity improvement. In practice, a number of problems have emerged with the system. The first issue relates to the rebalancing of relative prices. If the company faces competition for some regulated services, it will have an incentive to reduce their prices. Doing so will relax the constraint on its other prices, and thereby weaken the regulator's control of its activities as a monopolist. In the case of BT, an explicit constraint on domestic line rentals was introduced to limit the scope for this rebalancing, but other industries have not faced such constraints. The second point relates to quality. For BT for example there were initially no quality controls and it was widely perceived that quality had deteriorated. Explicit quality targets have now been introduced. Finally, Beesley and Littlechild (1989) characterise the initial choice of X as the outcome of a bargain between incumbent managers and government. Managers were in a position to hold up the privatisation process that politicians were anxious to speed along, and often obtained favourable values of X as a result. Since then in reviews regulation has been set more toughly, but if X is to be chosen in the light of observed previous profit rates then RPI-X regulation is in danger of becoming like rate of return regulation with all the attendant incentive problems.

Some of these problems can be reduced by using yardstick regulation (Shleifer, 1985). In its pure form, this suggests that the price allowed for one company is based on the average of its

rivals' costs, breaking the link between the company's price and its own costs, while still allowing it to offset industry-wide movements in costs. The existing regional structure of the water industry and of electricity distribution allowed the adoption of yardstick competition, but in a slightly different form. In practice, the UK regulators use yardstick comparisons to assess the efficiency of each company in their industry, and hence to predict the cost savings which each company might make over the next four or five years. The company's price control is based on the regulator's forecast of the company's costs (Waddams Price, 1999). As well as predicting operating costs, however, in practice regulators also have to predict the company's investment needs. Since the amount of investment needed depends on the state of each company's infrastructure, which is private information, regulators are compelled to rely on the company's own reports. This reintroduces scope for opportunistic behaviour and bargaining between the regulator and the company.

The water regulator has placed the greatest stress upon yardstick techniques, asking the Monopolies and Mergers Commission to block mergers that would have reduced the number of water and sewerage companies to compare.[17] Despite this, a large number of the smaller water-only companies have been acquired, either by water and sewerage companies, or by international groups. The electricity regulator has placed rather less stress on yardstick comparisons, in part because the 14 companies in the industry did not allow much scope for formal statistical analysis. So far, mergers between electricity distribution networks (three to date) have not been blocked.

Figure 1 shows the development of prices in the main regulated utilities. In each case, the price level at privatisation is taken as 100. BT was the first company to be privatised with an "RPI-X" constraint – in this case, X was set at 3 for five years. When he wrote the report proposing RPI-X, Littlechild (1983) seems to have envisaged that competition would develop so rapidly that regulation would not be needed after this initial period. That hope proved too optimistic, and the price control has so far been reset four times, with larger "X" values each time.[18] British Gas was the second company to be privatised, and the price cap for gas transportation has also declined continuously since privatisation. The cost of gas, which also fell dramatically in the years after privatisation, was a separate pass-through element in the cap

[17] The MMC (1994) estimated that losing one water company through a merger would cause losses, due to the increased difficulty in making comparisons, with a present discounted value of between £50m and £250m.

[18] Strictly speaking, when X was reset in 1996, the value chosen was lower than before, but it applied to a smaller bundle of services, with prices that had been rising in relative terms. The regulator claimed that the headline cap of RPI-4.5 would have the same effect on those prices as a cap of RPI-8.5, applied to the company as a whole, and then subjected to the same degree of rebalancing.

and is not shown in the figure. Both companies have been able to reduce their costs at least as rapidly as their price caps required, and have been highly profitable.

The first price caps implied real price reductions, but the price caps for the National Grid Company (NGC) implied constant prices, while most of the Regional Electricity Companies (RECs) were allowed small real increases for several years. NGC's cap was first reset roughly two years after privatisation, and was only tightened to a small extent, but by the time the RECs' price caps were reset, in 1994, the companies had reduced their costs significantly and were very profitable. When BT's profits were above the level the regulator thought necessary, he had tightened the company's price control to reduce profits in a gradual manner, allowing the company to keep the benefits of its extra productivity for a longer period, and maintaining incentives for future reductions. The electricity regulator, in contrast, believed that the RECs' profits were so exceptional that a one-off price cut could be justified, without affecting their incentives for future price reductions. The regulator proposed a one-off price reduction averaging 14%, but had to follow it with a further 11% the next year, amid widespread criticism of his leniency. The most recent REC price control review has imposed a further one-off cut, implying that the companies continued to cut costs by more than the regulator had expected in 1995. Over time, regulators have come to release far more information during the process of reviewing a price control, including predictions of the companies' costs (on which the control will be based), in part to ensure that the companies and commentators do not comment adversely because they are surprised by the level chosen.

The water industry has been allowed significant real price increases since its privatisation. This is largely because of the need to finance new investment in higher quality; indeed, the desire to keep this investment away from the Public Sector Borrowing Requirement was one of the motives for the privatisation. While the steadily rising prices might imply that there have been few efficiency gains, the regulator pointed out that efficiency improvements actually halved the price increases which would otherwise have been required between 1995 and 2000. In fact, the companies did better than the regulator expected, and so the latest price control, to start in 2000, starts with a one-off cut, before the prices rise again to finance additional investment. Thus figure 1 is consistent with improvements in efficiency in all of these industries.

Competition. An alternative to regulation is competition, although it is increasingly felt desirable to introduce competition as part of regulation (Schmalensee, 1989). Restructuring was strongly resisted by the incumbent management and so little restructuring occurred in the initial utility

privatisations. Before electricity generation and the railways were privatised, however, they were restructured to introduce competition.

In the case of electricity generation, the Central Electricity Generating Board was split into a transmission company and three generating companies. Two of these generators were privatised in 1991, while nuclear power remained in state ownership until 1996, when the newer stations were privatised. The generators competed to sell power to electricity suppliers (and thence to consumers) in a wholesale market organised around the Electricity Pool, which took daily price bids from every power station and selected the cheapest ones. The two largest generators controlled 70% of the industry's capacity in 1990, however, and clearly had the ability to raise prices above competitive levels (Green and Newbery, 1997). One response to this was entry by new stations, mostly gas-fired, which hastened the decline of the coal industry. A second was pressure from the regulator to keep prices down, which eventually led the major generators to divest some of their plant. Taken together, entry and the divestitures have created a more balanced market structure, but the limited amount of competition in the initial market structure meant that prices were higher than they need have been for several years. The privatisation did introduce rules for separating the distribution of electricity from its retail sale (supply), which allowed customers to choose their supplier. The incumbents rapidly lost market share amongst larger customers, bringing the margins on serving them down to competitive levels.

The railways were split into even more pieces before their privatisation. Railtrack, which was floated in May 1996, owned the track network and most stations, but did not run any services. Instead, the services were split up into more than 20 franchises, which were let out for periods of between 7 and 15 years by the Franchising Director. Some franchisees required subsidies from the government (typically declining over time) while others (particularly the inter-city routes) were able to pay for their franchises. It is difficult to replace a franchisee who owns a large amount of sunk capital, and so three rolling stock companies were created, which lease trains to the franchisees for the duration of their franchises. In practice, however, the rolling stock companies have been reluctant to invest without commitments from the train operating companies. Negotiations to renew some of the first franchises have now started, and the new contracts are likely to last longer. This should allow for more investment, but may reduce the competitive pressure on the franchisees.

It is also possible to introduce competition without restructuring an industry, although this is often less effective, since it may leave the incumbent in a position to harm entrants. Perhaps the earliest example of this type of liberalisation was the deregulation of inter-urban coaching in 1980 (Thompson and Whitfield, 1995). Up to 1980 the sole licensed operator was National Express.

The 1980 Transport Act allowed entry subject only to quality standards and large-scale entry took place, with substantial price reductions (see below). However the wave of new entrants did not survive long and by 1983 National Express was practically the sole operator on the English and Welsh routes (competition remained on the Scottish routes). UK and EU air routes have also been deregulated, following initiatives from the UK government and Brussels, see Abbot and Thompson (1989), McGowan and Seabright (1989). There has been some entry here, but again the incumbents appear mainly to have held their own.

Another example of the failure of competition to develop unaided was the gas industry. At privatisation, rival suppliers where given permission to enter the market. However, they would need to buy gas from North Sea operators who sold most of their output to British Gas (and were presumably reluctant to upset their major customer), and then ship it through British Gas' pipes, at charges set by British Gas, to gas consumers with individual, confidential, contracts. Practically no entry occurred, presumably because rival suppliers feared that while they were negotiating transportation charges with British Gas, that company would make selective price reductions to their chosen customers. In 1988, the Monopolies and Mergers Commission ordered British Gas to provide more information on transportation charges, to sell to all its consumers on published tariffs, and to buy no more than 90% of any new gas field, thus allowing rivals access to gas, and to the information they would need to compete with the company. Even these measures, however, only allowed a very gradual development of competition. It was not until the early 1990s, when British Gas negotiated specific (and rapidly declining) targets for its market share, and took several steps to help rival suppliers, that competition really took off. Eventually, following a second reference to the Monopolies and Mergers Commission, the government decided to allow all gas consumers to choose their supplier. Roughly a quarter of domestic gas consumers now buy from another company (very often their local electricity company), in part because the regulator allowed British Gas to set prices which recover most of the costs of past gas purchases at what are now above-market prices, while new suppliers base their prices on the lower prices now ruling.[19]

The main question regarding competition is whether new firms constitute a sufficient threat to incumbents and so force price reductions and quality improvements. In the industries considered here, this requires them to have access to essential facilities that were previously controlled by the incumbents, given the sunk costs of recreating these facilities. In the case of gas, the pipeline network is (literally) the sunk cost. In the UK coaching market, the physical facilities of the Central London coach terminal owned by the incumbent might have been recreated at

[19] The electricity regulator returned the favour, allowing entrants to undercut the incumbents in electricity as well. The largest entrant is British Gas.

moderate cost, but not the network benefits of being able to change between so many routes at one place. To obtain these benefits, an entrant denied access to the terminal might have had to set up a national route network, making small-scale entry impossible (Thompson and Whitfield, 1995). British Airways, which has "grand-fathered" rights to many of the choice Heathrow Airport landing and take-off "slots", also gains from network externalities. Low-cost entrants, operating from other airports, have been able to compete for passengers who do not wish to change planes at a busy hub, and policy-makers have been considering ways of reducing BA's dominance at Heathrow (such as US-style slot auctions). Experience suggests, however, that the success of liberalisation depends crucially on not endowing the incumbent public firm with advantages on access to essential facilities.

6. The Effect of Privatisation

What are the likely effects on efficiency of privatisation? The ideal experiment would presumably be to privatise randomly a set of firms and observe the difference in their efficiency after privatisation in comparison with a control group. In practice one cannot do this and so the following issues arise.

First, what is a good measure of efficiency? Labour productivity is one widely-used measure, but is by no means ideal especially in the light of widespread falls in labour input following privatisation and hence substitution to capital (Haskel and Szymanski, 1992). Total factor productivity is preferable although factor shares may not reflect output elasticities if firms have market power, so that if market power changes with privatisation then TFP may change for reasons not to do with efficiency. One method is to regress real output changes on input changes, although sufficient time series is required to avoid imposing the same output elasticities across firms. In practice however most studies look at TFP.

Second, privatisation is likely to be endogenous, especially since many firms were explicitly restructured in order to be privatised. Thus one must at least examine pre-privatisation performance. Whether this restructuring is due to privatisation is a difficult issue, since one might argue that it was only the threat of privatisation that provided a credible commitment to restructure. Third, many privatisations, like that of British Gas, are of the whole industry and thus one has no suitable control group. International comparisons are potentially valuable here and also if, for example, regional accounts are available pre- and post-privatisation. Privatisation unfortunately frequently tends to render regional accounts commercially sensitive and so confidential, and thus rather few publicly available studies have in practice been undertaken.

All this suggests looking at a variety of national and international evidence, some of which is set out in table 4, which shows multi-company and single company studies. Pryke's (1982) study, despite not being about privatisation, is included since it was one of the first authoritative studies to document low efficiency and productivity in public sector enterprises. Bishop and Kay (1988) was an early study that looked at TFP growth for a number of firms in the 1979 public sector. They did not explicitly study what happened to firms after privatisation but rather compared TFP growth between 1979-83 and 1983-88, observing strong TFP growth, particularly in Steel, Gas and Coal, in the second period. Note this was before Steel and Coal were privatised. Bishop and Thompson (1992) compared TFP 1970-80 and 1980-89 with similar findings. In an update to the study Bishop and Green (1995) found a strong TFP growth performance 1989-94 in BT and the Post Office, with slow growth in BAA, Gas, British Coal and British Rail. They attribute BT's strong growth to technical innovation and the Post Office (which is still publicly owned) to a combination of growth exploiting economies of scale and restructuring. All in all, both studies show productivity increases in advance of privatisation.

Haskel and Szymanski (1992) attempted to control for some of the different factors that might affect productivity. Using panel data on output and inputs for 12 UK firms that were publicly owned in 1979, they attempted to measure factors such as demand, union and market power etc. As well as identifying the date of privatisation and regulation, they also attempted to look at pre-privatisation effects. First, they tried to identify the dates of restructuring (new teams of managers being bought in, or the company being re-orientated towards more profitable goals). Second, they identified the dates when it was first announced that the company would be privatised. There were four main findings. First, privatisation itself was not strongly associated with rises in TFP. Second, pre-privatisation restructuring was associated with rises in TFP. Third, market competition was associated with increased TFP, but since there had been comparatively small rises in competition over the period this did not contribute much to the actual TFP rise. Finally, most of the rise labour productivity was due to fast labour-shedding. Their study did however stop in 1989, which is again somewhat early in the privatisation process and does not cover periods when regulatory targets are being tightened.

Martin and Parker (1997) also looked a range of firms that were publicly owned in the 1970s in a study going up to 1995. One innovation was to look at TFP in companies relative to whole economy (they also looked at post-announcement and post-sale figures as well). Their figures confirm the very high TFP growth in British Steel post-announcement but pre-privatisation, which was also seen in BT and British Gas. Their data show a slowdown in TFP

growth post-privatisation for British Steel, British Gas and British Telecom, but a speed-up for British Airways.

O'Mahony (1999) calculates labour productivity in gas, electricity, and water in the G5 countries, see figure 2. These data are of interest since they provide an international productivity comparison. The UK has the lowest level of productivity throughout the 1970s and 1980s, and it is hard to identify any change in trend between 1973 and 1989. (The downward blip in 1984 is likely to be related to the miners' strike in that year). From 1990 onwards, however, labour productivity growth does appear to accelerate, so that the UK overtakes France, and closes the gap with the other countries in the sample. Productivity in those other countries seems to follow the trend of the 1980s into the 1990s, and so an exogenous technical change is unlikely to be responsible for the acceleration in the UK. This would appear to provide evidence of an effect from privatisation and tightened regulation but since the dates of privatisation of gas, electricity and water vary one cannot be conclusive whether it is privatisation, pre-privatisation restructuring or regulation.[20]

Table 5 presents our own estimates for total factor productivity growth in six formerly nationalised industries. The firms have been chosen on the basis of data availability, and so industries that underwent major restructuring as they were privatised had to be excluded. Most data are taken from company accounts. Labour inputs are represented by the "headline" total from the accounts, and gross capital inputs are derived using a perpetual inventory method. Given the capital stock in year t, we estimate the capital stock in year t+1 by adding that year's investment, and subtracting the assets that the company disposed of.[21] All the companies published some current cost accounting information, including the gross replacement cost of their assets in current prices, during the 1980s, and we based our estimates upon these figures. We estimated earlier values of the capital stock by subtracting investment and adding disposals. The user cost of capital was the sum of the industry's depreciation rate and the public sector test discount rate. The costs of other inputs were taken from the accounts, and deflated by the producer price index for manufacturing inputs of fuel and materials, or a more appropriate index where one existed (such as the PPI for the steel industry, used for British Steel). In most cases, physical output data is available, but for British Steel, the company's turnover was deflated by

[20] It is worth pointing out, however, that the reduction in employment in the industries may not be matched by a reduction in the labour input, because the companies are now contracting out many tasks previously performed in-house. To get a more complete picture, we should look at total costs or total factor productivity including services purchased.

[21] When working with historic cost accounts, we must estimate the age of the assets being retired, in order to perform all the calculations with prices reflated to a single year. With current cost accounts, this reflating was done by the company.

the producer price index for the steel industry's output. We used this data to produce year-by-year Tornqvist indices of the changes in tfp, and took geometric averages over several years. Our first year, 1972/3, was in the middle of a cyclical upswing, and most of the other years we compare with it were at similar points in the cycle.

We find that the performance in the 1970s was generally weak, although British Gas saw high total factor productivity growth as it completed the country's conversion to natural gas. In the 1980s, most firms improved, although British Coal continued to show stagnant total factor productivity in the few years before the miners' strike of 1984/5.[22] After that strike, however, British Coal's productivity rose rapidly, while still in the public sector. Four of our firms were privatised within our sample period, and three of these saw slight declines in tfp growth – only British Airways improved its performance after privatisation. The one industry that has not been a serious candidate for privatisation, the Post Office, had the lowest tfp growth over the period, although this may reflect the limited technological opportunities facing its delivery operations. Overall, it is probably fair to characterise our results as showing that firms tended to improve their productivity significantly in the run-up to privatisation, but giving little evidence that the faster growth rate was sustained after privatisation. In other words, there is a catch-up rather than a permanent change of pace.

Turning to some studies of individual firms, shown in the lower panel of Table 4, Waddams Price and Weyman-Jones (1996) compared British Gas' 12 operating regions, and found continuous improvements, although there was little sign that the less efficient regions were "catching up" with the better ones. Similarly, Tilley and Weyman-Jones (1999) found that there was no catching up among electricity distribution companies, although there was productivity growth from an outwards shift of the efficient frontier. Markou and Waddams Price (1999) looked labour productivity growth in water and found that it rose before privatisation but owing to confidentiality were unable to look at data by region.

Overall then, the table and most commentators (e.g. Pollitt, 1999, Waddams Price, 1999) seem to agree that pre-privatisation restructuring was an important source of productivity gains, as is increased competition. Privatisation itself does not seem to be correlated with productivity growth, and most studies stop before the effect of regulation can be estimated with any reliability. Whether the commitment to privatise is essential to getting the gains from pre-privatisation restructuring remains an open question that is unlikely to be econometrically testable.

[22] Our break point, 1986/7, is chosen to allow the industry to recover from the 1984/5 strike and preceding overtime ban.

The sources of productivity growth.

Even if such studies show improvements in TFP they do not isolate the sources of such improvements. There are at least two possible sources. First, there might be changes in work practices in given plants and second, there might be changes in the stock of such plants. As to the first, Sanchis (1997) uses the UK Workplace Industrial Relations Survey, which provides detailed survey information on working practices at a representative sample of UK plants, some of which have been privatised. Controlling for cyclical variables and union presence, she finds that privatisation is significantly linked with improvements in working practices on the shop floor.[23]

The second question of the contribution of plant closure is of course impossible to answer using the firm data in the studies in table 4 (since many firms there are multi-plant). We therefore turn to plant-level data drawn from the ARD database which is in turn based on the UK Census of Production (see Disney, Haskel and Heden, 2000, for details). We use here data on public and private owned plants in UK manufacturing industry, where the firm concerned was privatised in the late 1980s (confidentiality rules preclude us from naming the firm or industry).

Table 6 sets out some raw data. Consider the top row. Employment in the industry as a whole shrunk from just over 200,000 in 1980 to 95,821 at privatisation to 72,276 in 1992 (when our data ends).[24] In 1980, 102,672 employees worked in private plants, with 112,251 in public sector plants. At privatisation the figures were 41,246 and 54,565 respectively. By 1992 private plants employed 45,940 and ex-public plants 26,336. So, as the second panel shows, public plants went from accounting for over 50% of employment in 1980 to around 36% in 1992. As the third panel shows, there was also a considerable fall in the number of plants, with, interestingly, proportionately more closure in the private sector in the years before privatisation at least.

The last few rows of the table show labour productivity levels and growth[25]. The picture is clear. The public sector had similar labour productivity to the private sector but much

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[23] Privatisation is associated with changes in working practices that reduced job demarcation and increased work flexibility for example.

[24] The fall in employment (of about 8% per annum) dwarfing the economy-wide fall (between 1980 and 1992 UK manufacturing employment fell by 3% pa).

[25] The labour productivity (lnY/L) is real gross output per person hour, deflated by a four-digit industry output deflator. *Y* and *L* are available directly from the Census and the hours variables are two digit manual hours.. We calculate TFP as ln TFP = $\ln Y - \alpha_k \ln K - \alpha_L \ln L - \alpha_M \ln M$ where *Y* is real gross output, *K* real capital, *L* worker hours, and *M* real material use, the αs are shares of each factor in gross output and *i*

lower TFP.. But productivity growth was much higher in the public sector. This suggests that public plants substantially caught up to private plants over the period. Note that in the post-privatisation years there was negative TFP growth, which was during a recession. Although we have data on hours worked we may not measure short time working and so have negative TFP.

How did the productivity gains come about? If the 1980 public-sector inefficiency was widespread throughout plants, one would expect there to be plenty of scope for productivity improvement without closure. Alternatively, it could have been that the average was brought down by some very poor plants (kept open due to soft budget constraints in the public sector for example) in which case it could have been substantially raised by closure. To measure this we therefore decompose productivity growth as follows. Write industry-wide productivity in year t as $P_t = \Sigma\theta_{it}p_{it}$ where θ_i is the employment share of establishment i and P_t and p_{it} are productivity measures (labour productivity and TFP). The decomposition proposed by Foster, Haltiwanger and Krizan (1998) (FHK) relates to the change in industry-wide productivity between t-k and t, ΔP_t and is written

$$\Delta P_t = \sum_{i\in S}\theta_{it-k}\Delta p_{it} + \sum_{i\in S}\Delta\theta_{it}(p_{it-k} - P_{it-k}) + \sum_{i\in S}\Delta\theta_{it}\Delta p_{it} + \sum_{i\in N}\theta_{it}(p_{it} - P_{it-k}) - \sum_{i\in X}\theta_{it-k}(p_{it-k} - P_{it-k}) \qquad \textbf{(10)}$$

where S, N and X denotes the establishments that survive, enter and exit respectively between t and t-k. The first term in the decomposition shows the contribution to productivity growth of growth among the surviving establishments, or the "within" effect. The second term shows the contribution of changes in shares of the survivors weighted by the deviation of initial period productivity from the average (often termed the "between" effect). This is positive when market shares increase for those survivors with above-average base year productivity. The third term is a covariance term that is positive when market share increases for establishments with growing productivity or falls for establishments with falling productivity. The entry and exit

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denotes establishment. M is recorded directly from the ARD. Capital stock is estimated from establishment-level investment on in plant, vehicles and buildings, using perpetual inventory methods with the starting values and depreciation rates taken from O'Mahony and Oulton (1990). Labour input is person hours as above. Output, capital and materials are all deflated by the appropriate four-digit industry price deflator. Following Foster et al (1998), the factor shares are calculated at the four-digit industry level to minimise the effects of measurement error. We chose to work with the Solow measure, since it is relatively transparent and the empirical implementations of superlative index numbers in unbalanced panels raise a number of significant complications (Good et al, 1996).

terms are positive when there is entry (exit) of above- (below-) average productivity establishments.[26]

To get a picture of the overall period, table 7a sets out the decompositions for 1980-92. The top panel of the table shows the results for $\Delta\ln(Y/L)$ and the bottom panel for $\Delta\ln(TFP)$. Each panel shows the results for the industry as a whole and then for the public and private parts of it. Each cell shows the percentage of total growth accounted for by each component of the disaggregation. Consider first the results for $\Delta\ln(Y/L)$ in the top row of the top panel. The first column shows the contribution of the "within" effect and suggest that productivity growth in surviving plants accounted for about 53% of $\Delta\ln(Y/L)$ over the whole period for the whole industry. The second and third columns show that 2% and 16% of productivity growth was due to the between and cross effect. That both effects are positive suggests that the most productive plants were gaining market share (the between effect) and that plants whose productivity was growing were also gaining market share (the cross effect). The final term shows that net entry accounts for 29% of productivity growth i.e. that the opening and closure of plants accounted for 29% of industry productivity growth.

The next two rows split the data into public and private. For both labour productivity and TFP, most growth in the public sector is accounted for by productivity growth within surviving plants, whereas most productivity growth in the private sector is accounted for by the net exit of poorly performing plants. Taking the within results for labour productivity growth and TFP growth together, the table is consistent with the idea that the public sector plants in the 1970s were operating inefficiently and hence had plenty of scope for productivity improvements even without closure.

Table 7b looks at the pre-privatisation period.[27] The pre-privatisation picture is similar to that for 1980-92, with most public sector gains due to within plant improvements. It seems safe to conclude that the scope for internal productivity growth within the public company was greater than that for private companies. The decompositions also offer an interesting perspective on efficiency gains, for this industry at least. Rather than keeping open inefficient plants, it would seem that much of the inefficiency is due to inefficient work practices within existing plants.

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[26] There are a number of other decompositions in the literature which have different interpretations and vary in their robustness to measurement error, see Haltiwanger, (1997) Foster et al (1998) and Disney et al (2000) for discussion.

[27] The post-privatisation period has very small productivity growth and negative TFP growth and so is hard to interpret.

Quality of service

Whilst productivity is important, service quality clearly also affects welfare. Critics of privatisation have feared that it would lead to lower levels of quality. In competitive industries, this should not be a problem, but monopolies face different incentives, and a privatised firm might be able to raise its profits by reducing quality (especially if it can economise on quality in order to hit regulated target indicators). These fears were intensified in 1987, when BT's quality of service appeared to decline, hit by the effects of a strike. The word "appeared" was chosen deliberately – BT had published statistics on its quality when it was in the public sector, but stopped doing so on privatisation. As table 8 shows, at that time almost a quarter of BTs payphones were out of service.[28] Following pressure from the regulator, however, the company started to publish the figures again, and quality has generally risen since, helped by rapidly improving technology. To take a single example, in 1980, the average waiting time for a new phone was 71 days (Galal *et al*, 1994, table 4-5). By 1989, this had fallen to 15 days, although more than 1 million phones were installed in each year. Table 8 sets out these and some other relevant data and shows particular improvement in serviceable payphones.

The political fall-out from BT's quality problems encouraged the government to give a role on quality to the water and electricity regulators, and to introduce competition into the electricity supply industry. At first, the regulators were limited to publishing quality statistics, but the Competition and Service (Utilities) Act of 1992 gave customers the right to compensation for specific instances of bad service, such as power interruptions, or the failure to reply to correspondence. By the time that the railways were privatised, this had been extended, fining the companies if they failed to meet overall performance targets. There is always a danger that companies will respond to incentives of this kind by concentrating on the aspects of quality which are being monitored, while ignoring other aspects, but the data for the electricity industry imply a broad improvement since privatisation. For example, figure 3 below shows the number of minutes lost per customer in the electricity industry in Great Britain since 1989/90, the year before privatisation. The high values for the first two years are almost certainly weather-related, and should not used to define a trend, but there is a clear, if slight, downwards trend since 1991.

Quality is more hard to define in the gas industry, but a good deal of political controversy was caused by the seeming rise in the number of customers disconnected by British Gas after privatisation (the company cut off 0.28% of its credit customers in 1979, 0.31% in

[28] Pollitt (1999) notes that although BT had a statutory obligation to operate a payphone system it was not obliged to ensure that the payphones worked.

1987, and 0.40% in 1988; Rovizzi and Thompson (1991). The regulator asked BG to take steps to reduce disconnections and they did then fall, in part because the company installed pre-payment meters for many customers likely to get into debt.[29]

Quality has been more controversial in the rail industry. There has been a rapid expansion in demand since privatisation, without a corresponding increase in network capacity. Many travellers perceived an increase in delays and cancellations after privatisation, and while some companies were fined for these, some received bonus payments for other aspects of their operations which far exceeded the fines, creating political difficulties. Furthermore, three major accidents in four years (Southall, September 1997, 7 killed, Paddington, October 1998, 31 killed, and Hatfield, October 2000, 4 killed) led to a public crisis of confidence in rail safety. Table 9 sets out some data on SPADs (Signals Passed at Danger) which is a standard index of safety, along with the fraction of SPADs falling into various categories defined by their consequences. As the table shows, the number of SPADs on Railtrack's infrastructure has declined. There has been a small rise in SPADs at level 2 of seriousness. The level 8 measures reflect the Southall and Paddington crashes, and as such events are comparatively infrequent, it is hard to discern a trend. Although there is a perception that the industry has been reluctant to spend money on safety improvements which would save lives, the verdict on safety and quality in the railways is at worst "not proven". Rail travel remains far safer than road transport, of course.[30]

The wider impact of privatisation

Finally, having looked at the impact of privatisation on the various sectors concerned, one might ask what impact it had on the rest of the economy, and in particular on productivity growth. Since privatisation covered the energy sector, one possibility is that privatisation lowered energy prices below what they would otherwise have been. This raises the possibility that privatisation might have been a positive energy shock and hence may have affected productivity just as the negative energy shocks may have done so (Bruno and Sachs, 1985, Jorgenson, 1984). Leaving aside the question of whether privatisation affected energy prices relative to what they would have been, the effects of energy prices on TFP are likely to have been small. As

[29] Airports are one of the few industries where quality is not regulated. BAA have extensive quality surveys and the regulator seemed satisfied that no quality regulation was required (Rovizzi and Thompson 1991 report 1986 data for % of passengers satisfied with Heathrow cleanliness, catering, trolley availability, and staff helpfulness at 97.9, 75.7, 97.0 and 96.7, with corresponding data for 1990 as 98.6, 82.5, 99.4, 98.2.

[30] Rail death rates have been falling steadily over time, rates per billion passenger km are 1981: 1.0, 1986: 0,9, 1991: 0,8, 1996: 0.3 (Social Trends, 1999, table 12.18).

Jorgenson (1984) points out, energy prices can affect TFP if technical progress is energy-using (i.e. biased towards the use of energy), since a fall in energy prices causes substitution towards energy and hence a rise in TFP growth. Jorgenson's estimates for US manufacturing however suggest that that biases are, in practice, very small, and hence even a halving of energy prices (which seems an overestimate of the effects of privatisation) would still lead to a rise in TFP growth of around 0.05 percentage points per annum.[31]

Finally, we review two other possible effects of privatisation. First in the light of the desire to reduce public sector union power, did the program succeed? Industrial relations studies of privatised industries argue a greater trend to "management assertiveness" in some industries (electricity, shipbuilding and water) although not all (Parry, Wadington and Crithcer, 1997). Quantifying this is difficult, however: evidence from successive waves of WIRS were unable to find evidence of union de-recognition in ex-public sector companies. Thus it is hard to argue the unions were weakened any more than unions were generally weakened by labour legislation and the macroeconomy.

Second, did privatisation change people's attitudes to the public sector? Table X sets out some findings from the British Social Attitudes Survey. The first row reports the proportion agreeing that nationalised industries are well run and shows a rise between 1983 and 1987. This could reflect the increased productivity in these industries or that people are referring to ex-nationalised industries.

Rows 4, 5 and 6 show attitudes to state ownership (with attitudes to wage and price control added for reference). The proportion favouring wage and price control has fallen steadily. The proportion favouring less state ownership has fallen a good deal, but since the state sector has fallen as well, this suggests decreasing support for *further* privatisation. The proportion favouring more state ownership has grown, but only somewhat. The proportion favouring about the same level of state ownership has grown substantially, and since the sector has shrunk, this is de facto approval of privatisation. Finally, the proportion favouring state control of the electricity industry shows no clear trend (privatisation was announced in 1987 and implemented in 1990/91). Overall however, the data suggest no strong support for re-nationalisation and increasing support for the privatisations that have occurred.

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[31] With a translog cost function, TFP growth is the sum of Hicks neutral technical change (α_0) and biased technical progress times the log of the price of the particular factor (Berndt and Wood, 1982) i.e. $\Delta \ln TFP_i = \alpha_O + \alpha_E \ln p_E + \alpha_Z \ln p_Z$ where E denotes energy and Z are other factors. As reported by Oulton and O'Mahony (1998), Jorgenson finds that α_E is on average 0.0007 for US manufacturing. Hence a halving of energy prices raises TFP growth by 0.0007*ln2*100=0.049 percentage points.

7. Contracting out.

In the 1970s, practically all central and local government services were provided directly, by government employees. In the early 1980s, however, some local councils began to "contract out" services such as refuse collection to private firms, while some hospitals obtained cleaning, catering and laundry services from the private sector. In an influential study, Domberger *et al.* (1986) modelled the refuse collection costs of 305 local authorities, accounting for collection method, population density etc. and whether the service had been contracted out and awarded to a private contractor, awarded to the in-house organisation after competition, or had not been the subject of competition. Thus this study is of particular interest since it provides a control group to contrast with private ownership. Relative to not being contracted out at all, costs were 22% lower when awarded to a private contractor, and 17% lower when contracted out but awarded in-house. These cost savings were insignificantly different from each other suggesting that it was the injection of competition from the contracting out process that was important for cost savings rather than whether the operator was public or private. In a study of contracting for domestic services in hospitals, Domberger *et al* 1987 also found savings of about 20 per cent (although there was some evidence that early contract awards had involved much lower prices than this, which they argued were unsustainable and reflected "winner's curse" effects).

Domberger and Jensen (1997) report a number of other studies, including a meta-analysis by the Australian Industry Commission, which produced a "rather wide" distribution of reported savings (from a cost *increase* of more than 10 per cent, to a saving of more than 50 per cent). The most frequently reported savings, however, were between 10 and 30 per cent, which "is entirely consistent with the conclusions based on UK data." Given these savings, and the government's desire to reduce the size of the public sector, compulsory competitive tendering was introduced from 1988. Central government also started to contract out services, and approximately £2 billion of white-collar services had been subjected to competitive tendering by 1995 (Domberger and Jensen, 1997).

There have been claims that most of these savings have come from reductions in quality, or in the terms and conditions offered to staff. Domberger and Jensen conclude, however, that most of these savings have come from "better management, more flexible working practices, more efficient use of capital and greater innovation spurred by competition" (p.74). Cubbin *et al* (1987) found that the technical efficiency of private refuse operators was 17 per cent higher than that of authorities that had not put their services out to tender. This would account for three-quarters of the savings identified by Domberger *et al* (1986). However,

where employees gained rents from technical inefficiency, increasing efficiency would destroy those rents, and reduce the employees' welfare. (For example, refuse workers might be able to serve an area in a shorter time than was allowed in their roster, and would take the difference as leisure. Preserving such rents is not necessarily a legitimate objective of public policy, however.)

Councils' "direct labour organisations" were allowed to bid against private firms. In the early studies, where these organisations won contracts, they were offering cost savings which were not significantly different from those under contracts awarded to the private sector, suggesting (yet again) that competition rather than ownership is the key to efficiency. After the introduction of compulsory competitive tendering, however, Szymanski (1996) found that local authorities which awarded contracts to their in-house teams were achieving significantly lower savings – 10 per cent rather than the 20 per cent reduction from private contractors. It is at least possible that some of these councils, which had resisted compulsory tendering, were favouring their in-house organisations when they awarded contracts. If the in-house teams appreciated this reduction in competition, they could rationally offer fewer cost savings when bidding. In other words, what appears to be a difference due to ownership could still be related to competition.

There were fears that quality would also be impaired when services were contracted out. In practice, however, service levels appear to be maintained or even enhanced, perhaps because contracting out has been associated with greater monitoring, and more explicit standards (Domberger and Jensen, 1997). In general, therefore, we conclude that efficiency gains from privatisation are not due to lower levels of quality.

8. The Private Finance Initiative

The last kind of privatisation that we consider is sometimes presented as a form of contracting out, in that the government is buying services from a private company. The difference is that the PFI involves investment, or the purchase of existing assets, which are used to provide the services required. The PFI has been used to finance roads, prisons, hospitals, and schools. The Channel Tunnel Rail Link was finally started as a PFI project, and the government is planning to finance much needed investment for the London Underground through the PFI. So far, the PFI has funded £15bn of investment, about 20% of the government capital budget per year. It is estimated for example that the PFI initiative for London Underground would need to raise £7bn;

the entire Department of Environment, Transport and the Regions (DETR) capital budget is £4bn.[32]

The administration of the PFI reflects a number of the principles the government has announced for it. First, there must be transfer of risk to the private sector. When a prison is built under the PFI, this means that the private company takes on the risk of building and operating it. When a road is funded in this way, a further risk transfer is achieved by making payments to the company conditional on the number of vehicles using the road. Second, the project must deliver value for money and third there must be open competition for the project.

The PFI has a number of potential advantages. Even if there are good reasons for the state to subsidise services, due to externalities for example (roads), this does not necessarily mean that the public sector should build the assets to deliver the services or, in some cases, provide the services itself. One particular advantage arises due to risk allocation. Some of the risks of building, say, a prison arise mainly from factors under the construction company's control, such as poor management. Traditional public procurement has often passed these risks back to the state, whereas PFI contracts for services may ensure that there is no payment to the private sector until the build is completed, therefore transferring risk to the private sector.[33] There would be no need for such a policy if the government and private sector could write complete contracts which could, for example, specify varying payments for late completion of an asset depending on all possible circumstances that could in turn be verified. [34] Once the prison is in service, risks are more likely to come from government policy, such as new legislation raising the prison population, and a more flexible contract may be appropriate. Another advantage claimed for the PFI is that it removes public sector investment from the PSBR. This is not just cosmetic, as the PSBR can be a binding constraint on governments, and moving investment outside the PSBR allows increased spending. The requirement to transfer risk is, in part, a way of ensuring that a PFI project is more than just a way of borrowing money without counting it towards the PSBR.

Against this, the PFI has some potential disadvantages. First, it can only work well if outputs and inputs can be measured and contracted over clearly. Second, PFI contracts can be inflexible: the government has to carry on with a project, even if it decides it does not wish to. Third, the PFI transfers costs to future generations, which may or may not be desirable.

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[32] For excellent reviews of the PFI see Grout (1997) and Pollit (2000).

[33] The NAO (1992) for example estimated the Department of Transport was paying an average of 28% more for roads than the price originally agreed.

A series of National Audit Office reports point to a mixed experience of the PFI. On the positive side, the NAO reports that a number of projects have gone ahead that simply would not have been financed were they to have come out of the public sector capital budgets (e.g. the Channel Tunnel Rail link and the Skye Bridge, NAO, 1997). On the negative side, bidding costs are high (estimated at £500m for all outstanding PFI contracts at 1998, (Kerr, 1998), which are then reflected in the final price) and delays can be long (up to two years). Furthermore some contracts have substantially overrun, with some contract terms requiring the government to withstand the costs (e.g. computerising Post Office payments). Finally, in practice private sector firms may have been adept at convincing government to withstand more of the risks than would be optimal.

Thus some PFI projects seem to have been successful and some not. The NAO judges the PFI prison contracts to have been well planned, offered good value for money and to have been completed in almost half the time relative to public prison projects. On the other hand, the wrong discount rate was used in the evaluation of the comparative costs of several road projects, potentially biasing the choice of financing method (Pollitt, 2000).

9. Conclusions

Did privatisation *itself* raise productivity? No. There seems to be very little evidence that the transfer of a public undertaking to a private one raise efficiency. British Gas is perhaps the classic example: a company that was transferred to the private sector with the same structure, same management and very light regulation. Other companies were allowed to use British Gas's pipes to carry gas, but at tariffs set by British Gas. No productivity gain occurred.

Did the *process* of privatisation raise productivity? The answer is a resounding yes; pre-privatisation restructuring, more competition and tighter regulation all raised efficiency. Real change in the gas industry, for example, started in the early 90s, once the competition authorities started to force open the industry. An open question is whether the commitment to privatisation was essential to obtaining these gains.

Privatisation in the sense of asset sales is now more or less finished in the UK, for the simple reason that there is little left to sell. Thus the key questions for the future are developing regulation and reshaping the PFI. It is also likely that future administrations will want to use the private sector more in delivering health and education services.

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[34] Such risks can be hard to predict, however. The Skye Bridge PFI project local public enquiry resulted in delays and design changes (in order to protect a local otter population) costing £3.8m out of a total cost of £39m.

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Table 1
Public Ownership in the UK

Industry	Pre-1914	Inter-war	1945-51	50s and 60s	1970s	1980s	1990s
Aerospace		P			N 1977	P 1981	
Airlines		P; N 1939				P 1987	
Airports		P,M		N 1965 (some)		P 1987	
Bank of England	P		N 1946				
British Petroleum	P; stake bought 1914				Shares sold	1977 – 1987	
Broadcasting (BBC)		P; N 1927		P stations added			
Cable & Wireless (telecoms)	P	N 1938 (Part)	N 1946			P 1981	
Coal	P		N 1947				P 1994
Electricity	P,M	N 1933 (Grid)	N 1948				P 1990
Gas	P,M		N 1948			P 1986	
Oil (N Sea exploration)				P	N 1975 (pt)	P 1982	
Ports						P 1983	
Post	Govt Dept			N 1969			
Railways	P		N 1948				P 1994-7
Road Freight	P		N 194	Mostly P		P 1982	
Rolls-Royce	P				N 1973	P 1987	
Shipbuilding	P				N 1977	P 1980s	
Steel	P		N 1949	P 1953; N 1967		P 1989	
Telecommunications	P,M; N 1912					P 1984	
Vehicles (British Leyland)	P				N 1975	P 1988	
Water	P,M				N 1973 (M)	P 1989	

Notes:
M = municipal ownership N date = nationalisation in that year
P = private ownership P date = privatisation in that year (the first sale for companies privatised in tranches)
Oil – Britoil was set up alongside private sector oil companies in 1975 – no companies were taken over
Post Office – the government department was transformed into a nationalised industry in 1969, but this was not a change of ownership
Water – only the municipal water undertakings were nationalised in 1973

Table 2
Events in key nationalised industries.

	Nationalised	Privatisation announced	Restructured while public?	Privatised	Subject to RPI-X?	Liberalised?	Post privatisation events
British Airports Authority	1965	1985		1987	Yes		
British Airways	1939	1979	1982	1987	No		88 Merger with British Caledonian 97 EU liberalisation ended
British Coal	1946	198	1985	1994	No		98 contracts with ESI ended
British Gas	1948	1985		1986	Partly	1986,1996	88 MMC report on large users 93 MMC report on entire industry 97 BG splits itself in two
British Rail	1948		1981,1993	1994-7	Yes		98 Strategic Rail Authority announced
British Steel	1967		1980	1988	No		
British Telecom	1912	1982	1981	1984	Partly	1984,1991	85 Interconnection determination 89 Price controls reviewed 91 Duopoly Review
Electricity	1948	1987	1983,1990	1990-1	Partly	1990/8	94 Generators' undertakings 94/5 REC price controls tightened, 95 first REC mergers
Water Authorities	1973	1986	1983,1988	1989	Yes	Slowly	94 price controls reviewed

Table 3
Major privatisations in the UK

Company	Float or Private Sale	Date	Proceeds £m (net of debt issue/cancellation)	
			Current prices	2000 prices
British Petroleum	F	1977-87	6226	
British Aerospace	F	1981-5	413	
Cable & Wireless	F	1981-5	1066	
National Freight Consortium	PS	1981	54	
Amersham International	F	1982	65	
Britoil	F	1982-5	1090	
Associated British Ports	F	1983-4	18	
Enterprise Oil	F	1984	392	
Jaguar	F	1984	0	
British Telecom	F	1984-93	13201	
British Gas	F	1986	7720	
British Airways	F	1987	900	
Royal Ordnance	PS	1987	186	
Rolls-Royce	F	1987	1080	
British Airports Authority	F	1987	1281	
Rover Group	PS	1988	150	
British Steel	F	1988	2425	
Water Authorities	F	1989	3740	
Regional Electricity Companies	F	1990	7907	
National Power & PowerGen	F	1991-5	6548	
Scottish Electricity Companies	F	1991	3481	
Northern Ireland Electricity	F	1993	362	
Rail stock leasing companies	PS	1996	1800	
Railtrack	F	1996	1950	
British Energy (nuclear)	F	1996	2108	

Source: Pollitt (1999)

Table 4

Studies of privatisation and regulation effects

Study	Measure of productivity	Controls	Companies studied	Years	Findings: productivity rises with				Remarks
					Privatisation		Regulation	Competition	
Multi-company studies					After	Before			
Pryke (1982)	TFP	None	BAA, BCoal, BGas, BRail, BSteel, BT, Electricity, PO	1960-79					Pre-privatisation study, found slow TFP growth relative to whole economy
Bishop and Kay (1988)	TFP growth	None	BAA, BCoal, BGas, BRail, BSteel, BT, Electricity, PO	1979-83, 1983-88	-	✓	×		No specific study of pre- and post privatisation, or regulation
Haskel and Szymanski (1992)	Y/L	K/L, Competition, hours, unions, privatisation, restructuring, regulatory dummies	BAA, BCoal, BGas, BRail, BSteel, BT, Electricity, PO, BA, Water, LRT, STG	1972-89	×	✓	×	✓	Little effect of privatisation and regulation
Bishop and Thompson (1992)	TFP growth	None	BAA, BCoal, BGas, BRail, Bsteel, BT, Electricity, PO	1970-80, 1980-90	-	✓	×		No specific study of pre- and post privatisation, or regulation
Bishop and Green (1995)	TFP growth	None	BAA, BCoal, BGas, BRail, Bsteel, BT, Electricity, PO	1979-83, 1983-88, 1989-94	-	✓	×		No specific study of pre- and post privatisation, or regulation

Study	Measure of productivity	Controls	Companies studied	Years	Findings: productivity rises with				Remarks
					Privatisation		Regulation	Competition	
Multi-company studies					After	Before			
Martin and Parker (1997)	TFP	Whole-economy TFP, privatisation, announcement dummies	BGas, BSteel, BT, BA			✓			Post privatisation slowdown in BGas, BSteel, BT, speed up in BA
O'Mahony (1999)	Y/L	Other countries	Sectors: Gas, Electricity, Water	1965-95	✓		✓	✓	Industry data , changes are after 1990 so no specific correlation with actual event e.g. regulation
Individual company studies									
Waddams Price and Weyman-Jones (1996)	TFP	None	Gas	1980-1992		✓			Comparison of different regions shows regions not catching up (BG privatised as a whole)
Markou and Waddams Price (1999)	Labour productivity	None	Water	1980-95		✓			Real turnover per hour (Water industry is confidential data)
Tilley and Weyman Jones (1999)	Frontier estimation	Inputs	Electricity		✓				No catching-up of regional firms

LRT: London Regional Transport STG: Scottish Transport Group PO: Post Office

Table 5
Total factor productivity in the UK public sector
(annual rate of increase, %)

Company				
	72/3-78/9	78/9-86/7	86/7-99/00	
British Airways	+3.0	+3.3	+4.2	Privatised 1987
	72/3-78/9	78/9-86/7	86/7-93/4	
British Coal	-2.8	+0.1	9.0	Privatised 1994
	72/3-78/9	78/9-86/7	86/7-94/5	
British Gas	+8.2	+2.0	+1.5	Privatised 1986
	72/3-78/9	78/9-88/9	88/9-97/8	
British Steel	-5.0	+3.8	+1.8	Privatised 1988
	72/3-78/9	78/9-84/5	84/5-94/5	
British Telecom	0.6	3.2	3.0	Privatised 1984
	72/3-78/9	78/9-88/9	88/9-98/9	
Post Office	1.6	1.8	1.6	Still Public

Table 6
Industry data relevant for the plant level study

	1980	Privatisation	1992
Employment	**214,923**	**95,821**	**72,276**
Private	102,672	41,256	45,940
Public (ex-public after pri)	112,251	54,565	26,336
% ind employment			
Private	0.48	0.43	0.64
Public (ex-public after pri)	0.52	0.57	0.36
Number of plants			
Private	1272	583	577
Public (ex-public after pri)	46	31	15
Labour prod (ind=100)	**100**	**139.5**	**139.7**
Private	96.8	121.9	127.3
Public (ex-public after pri)	102.6	156.1	158.8
Lab prod growth (% pa)	**-**	**4.9**	**0.04**
Private	-	3.2	1.1
Public (ex-public after pri)	-	6.5	0.43
TFP levels (industry=100)	**100**	**235.8**	**221.0**
Private	162.6	250.1	224.5
Public (ex-public after pri)	49.1	222.2	215.6
TFP growth (% pa)	**-**	**17.0**	**-1.6**
Private	-	6.7	-2.6
Public (ex-public after pri)	-	44.1	-0.7

Note: data for "public" in 1992 refers to those plants present in 1992 but who were publically owned before privatisation. Growth rates are percent per annum from 1980-privatisation (column 2) and privatisation-1992 (column 3).
Source: author's calculations from ARD.

Table 7a
Productivity decompositions, 1980-92
(see equations 2)

	Within	Between	Cross	Net entry
Δln(Y/L) (Average productivity growth 8.3% pa)				
Industry	53	2	16	29
Private	38	4	-7	65
Public	51	1	48	0
ΔlnTFP (Average productivity growth 5.0% pa)				
Industry	43	4	20	32
Private	20	8	11	61
Public	51	1	49	0

Note: public refers to plants publicly owned in 1980.

Table 7b
Productivity decompositions, 1980 to privatisation
(see equations 2)

	Within	Between	Cross	Net entry
Δln(Y/L) (Average productivity growth 8.57% pa)				
Industry	59	2	10	29
Private	61	3	1	35
Public	61	2	10	27
ΔlnTFP (Average productivity growth 5.38% pa)				
Industry	52	4	19	25
Private	27	16	20	37
Public	63	1	13	23

Table 8
Quality indicators in BT

	1979	1987	1990	1999
Average waiting time for a new phone	71 days		15 days+	
% of telephones installed within two weeks	25*	50	64	-
% faults cleared by next working day	50	72	-	-
% business orders completed in fewer than 6 working days		28.4	67.9	88.5
% faults cleared in fewer than 2 working days		74.3	90.1	-
% of operator calls answered within 15 seconds	84.2	83.5	87.7	85.8
% of payphones serviceable		77	95.0	96.5
Faults per line per annum		0.25	0.25	-

Notes: +data for 1989, * data for 1983.

Source: BT Company accounts and http://www.bt.com/quality_of_service/index.htm, Rovizzi and Thompson (1991).

Table 9
SPADs on Railtrack Controlled Infrastructure

Year	**Total**	**Level 1 severity**	**Level 2 severity**	**level 8 severity**	**Other**
1994/5	771	355 (46%)	239 (31%)	1 (0.1%)	176 (23%)
1995/6	729	299 (41%)	284 (39%)	0 (0.0%)	146 (20%)
1996/7	688	303 (44%)	227 (33%)	1 (0.1%)	157 (23%)
1997/8	640	282 (44%)	211 (33%)	1 (0.2%)	146 (23%)
1998/9	664	279 (42%)	232 (35%)	0 (0.0%)	153 (23%)
1999/0	551	215 (39%)	187 (34%)	1 (0.2%)	148 (27%)

Notes: Minimum severity: Overrun 0 - 25 yards, no damage. Level 2 severity: Overrun 26 - 200 yards, no damage, level 8 severity: Fatalities to staff or passengers. The absolute numbers by severity level in the table are derived from the percentage breakdowns, and therefore accurate only to +/-5 (apart from the figures for level 8).

Source: Health and Safetry Executive, http://www.hse.gov.uk/railway/spad/spadfeba.htm#Table 3

Table 10

Public attitudes to privatisation

	1983	1986	1987	1989	1990	1989
(% agreeing) "Are the nationalised industries well run?"	21	31	33			
% favouring						
Control of wages by law	48	40	34	28	30	33
Control of prices by law	70	61	58	56	56	60
Less state ownership of industry	49	30	30	24	24	-
More state ownership of industry	11	16	16	18		
About the same level of state ownership of industry as now	33	49	48	53		
% saying government should own the electricity industry	-	28	26	32	28	-

Sources: top row, Social Attitudes, 1988/9, other rows, Social attitudes, 1992/3.

Figure 1

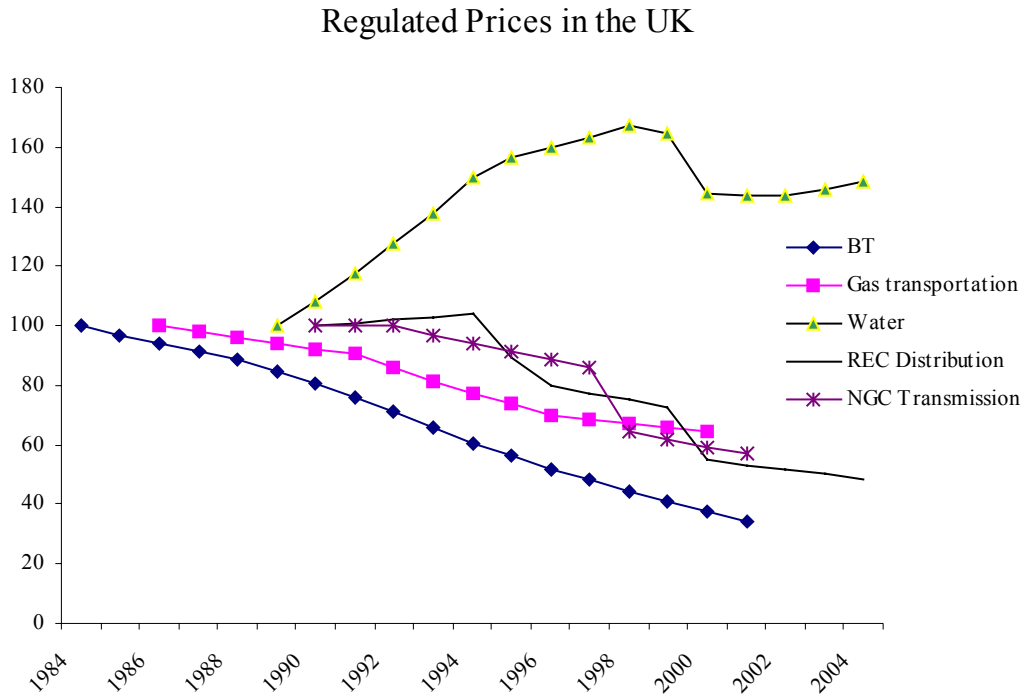
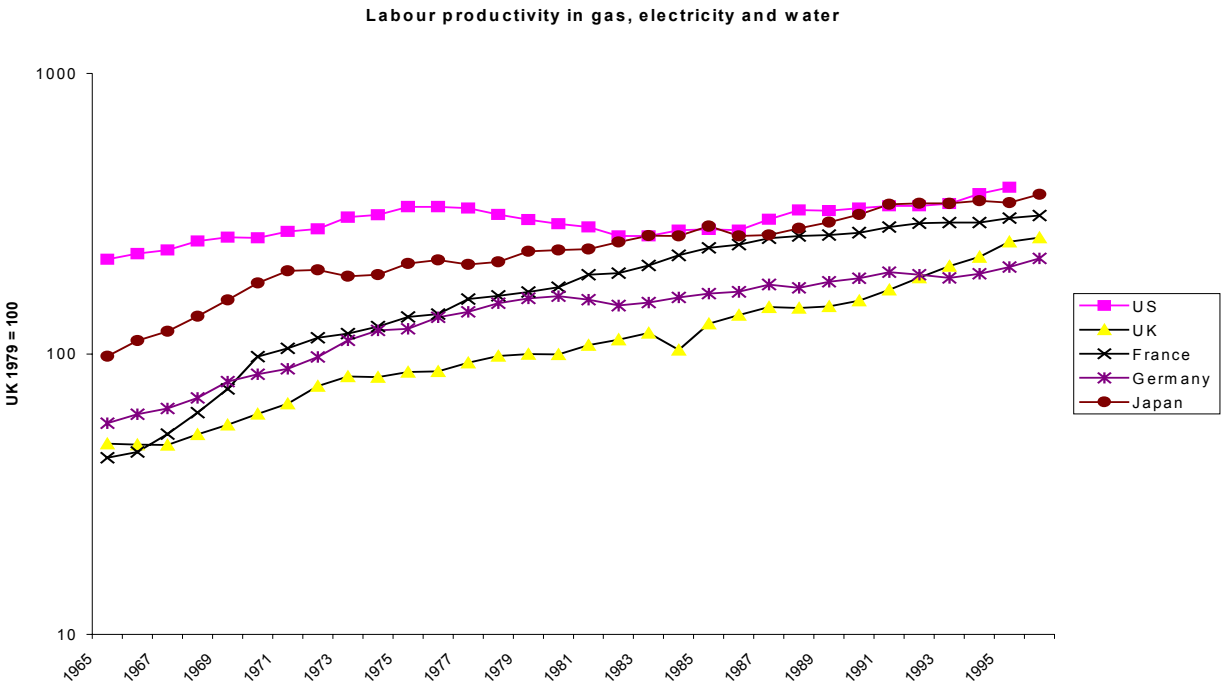
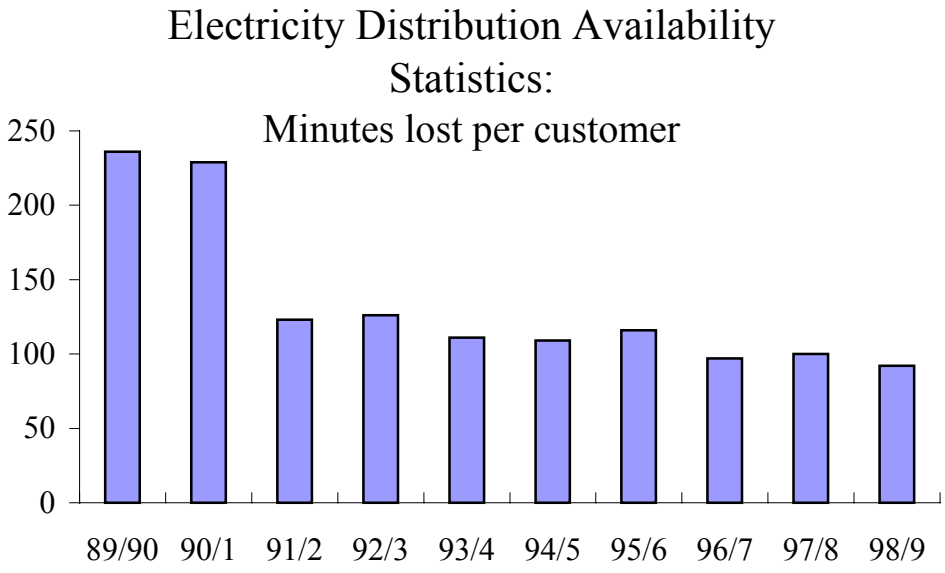

Regulated Prices in the UK
180
160
140
120
100
80
60
40
20
0
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
BT
Gas transportation
Water
REC Distribution
NGC Transmission

Figure 2
Comparative productivity in Gas, Electricity and Water Industries



Source: O'Mahony (199).

Figure 3
Quality indicators in electricity



Source: Ofgem

Appendix. A simple delegation model of privatisation.

A simple model to illustrate the delegation issue is as follows (see Haskel and Sanchis, 1996 and 2000). Assume the production function is

$$Y = F(N, e, K), \qquad \alpha = (\partial Y / \partial N)(N / Y), \beta = (\partial Y / \partial e)(e / Y) \qquad \textbf{(1)}$$

where N is employment, e is "effort", K any other factor, and α and β the output elasticities of employment and effort respectively. Effort, e, captures crewing levels, the pace of work, the inverse of the amount of restrictive practices and the like. Assume further that each firm is a monopolistic competitor facing a demand curve of the form P=P(Y) with demand elasticity $\mu/(1-\mu)$ where μ is the mark-up of prices over marginal cost. If μ rises demand becomes less elastic i.e. competition falls. Finally, assume workers are unionised and that union utility U is of the Stone-Geary form

$$U = (w - w^*)(e^* - e)N \qquad \textbf{(2)}$$

where w* and e* are the reservation effort and wage levels (for more general functions see Haskel and Sanchis (1996)).

To model bargained effort, we follow the right-to-manage model (see Ulph and Ulph, 1990) whereby firms first bargain with workers over effort and wages, and then set employment unilaterally.[35] In the private sector employment is chosen to maximise profits

$$\max_N \pi = PY - wN \qquad \textbf{(3)}$$

In the public sector employment is chosen to maximise welfare

$$\max_N W = \pi + \gamma_C CS + \gamma_U U \qquad \textbf{(4)}$$

where π and CS are producer and consumer surplus, respectively, and U is union utility and the γ_c and γ_u parameters are the weights given to consumers and workers relative to producers (see, e.g. Weingast, Shepsle and Johnsen, 1981). The bargain can be solved by the Nash bargaining solution which implies maximising the product of union and opposing sides' utility at optimal employment, N*. In the private sector this implies the maximisation with respect to e and w of $\Omega = U(e, w, N^*)^{\delta} \pi(e, w, N^*)^{1-\delta}$ at N* and in the public sector π is replaced with W. The condition for effort in the private sector is

$$e^{priv} = e^* \left(1 + \delta \left(\frac{\mu - \alpha}{\beta} \right) \right)^{-1} \qquad \textbf{(5)}$$

and in the public sector is

[35] Direct evidence from actual labour contracts in the US and UK suggests that employment is not normally the subject of the bargain (Oswald and Turnbull, 1985) and so we consider the right-to-manage model to be more appropriate.

$$e^{pub} = e^{*}\left(1+\delta\left(\frac{\mu-\alpha}{\beta-\kappa}\right)\right)^{-1} \qquad \textbf{(6)}$$

where $\beta<\kappa$, $\kappa>0$ and $\kappa= \eta_{w'e}[\delta(\mu-\alpha)+\alpha]$,where $\eta_{w'e}=[\partial w'/\partial e][(e/w')]>0$ where w' is the shadow wage faced by the public sector, $w'=w-\gamma_u(w- w^*)(e^*-e)$ and $(\mu-\alpha)>0$ from the second order conditions for employment. Since in the private sector $\kappa=0$, $e^{pub}<e^{priv}$, or a shift to more commercial objectives raises effort. Note that such a shift can be as result of privatisation, or pre-privatisation changes in managerial objectives. Note too that effort can change due to changes in bargaining power or competition, μ. Hence it is important to control for all these factors.