PUBLIC ENTERPRISE IN THE MODERN WESTERN WORLD
AN HISTORICAL ANALYSIS

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ABSTRACT

The aim of this paper is to explain the pattern of public enterprise in Western Europe, Japan and USA in the late 20th century, just before the onset of privatisation. It is argued that this requires an understanding of the origins which date from the early 19th century. The task then becomes one of explaining differences over time and across countries. The focus is on those enterprises levying prices and required to break even financially. A common misconception is that the establishment of such public enterprises at both the state and municipal level was a device for overcoming problems of natural monopoly and/or a socialist instrument for mitigating worker exploitation. It is argued that the former was mainly dealt with by arms’ length regulation and that socialist forces were limited. The key questions that have to be answered and around which the paper is organised are: why was public enterprise common in grid networks; why were state owned enterprises in manufacturing more common in Germany, Spain, Italy; why were USA and UK (up to 1939) different; was municipal and state socialism important; what does the privatisation experience tell us about public enterprise; what do performance studies reveal? The answer is that public enterprise was often an instrument for promoting social and political unification, securing national defence and related strategic considerations, increasingly in the 20th century for promoting economic growth, with regulatory failures and socialist pressures playing a more subsidiary and/or occasional role.

Keywords

State enterprise, economic development, municipalities, political unification, defence, political geography, universal services, fair prices, natural monopoly, regulatory regimes, socialism.

JEL categories

N00, N01, N30, N40, N70, N80
1) Introduction

It is not uncommon for social scientists and historians to attribute the existence of public ownership mainly to the control of monopolies and the pursuit of socialism (for example Cairncross 1985, Falkus 1977, Mckay 1976, Parker 2009, Megginson and Netter 2001). Natural monopoly conditions in network utilities, so the story goes, required some form of government intervention and public ownership was chosen. In so far as a strong socialist agenda involved common ownership of the means of production, nationalisation of major sectors would go some way, it was argued, to that end. Indeed in the 1930s and 1940s, work by economists such as Oscar Lange (1936) and Abba Lerner (1944) lead to models of market socialism with enterprises setting prices at marginal cost and the state supplying capital and subsidies. Such a rationale for public enterprise would fail to account for the incidence of public enterprise in Continental Western Europe, Britain, Japan and USA 1830-2000, which is the period covered in this paper. To fully understand late 20\textsuperscript{th} century public ownership it is necessary too look at its origins which date from the early 19\textsuperscript{th} century. In that long term perspective, public ownership was not the prime instrument for dealing with natural monopolies and related dimensions of market failure (for which arms’ length regulation was the most common instrument); nor can its occurrence be found in government policies to avoid worker exploitation. To state my argument in very broad terms, public enterprise was often an instrument for promoting social and political unification, securing national defence and related strategic considerations, in some instances for promoting economic growth, with regulatory failures and socialist pressures playing a more subsidiary and/or occasional role. This does mean that in evaluating the performance of public enterprises, it is important to test whether they achieved the target objectives not some other objectives dreamed up by the researcher.

Much of the historical literature on public enterprise is country-based with very few cross country analyses. Editors often try to draw the pieces together but such collections are dominated by the differentiated country chapters (Foreman-Peck and Mueller 1988, Dienel and Lyth 1998, Toninelli 2001, Zamagni 1987). One very good reason for this is that there were actually strong differences between countries. One need only compare Italy with Britain. By the second half of the 20\textsuperscript{th} century, state owned enterprises (SOEs), like IRI, ENI, ETIM (see appendix for list of acronyms), through their complex shareholdings, were pervasive elements of all sectors of the Italian economy, including manufacturing and finance whilst in Britain SOEs were concentrated in the infrastructure industries: energy, telecoms and transport. The origins of public enterprise in Italy are to be found in problems of finance and entrepreneurship which emerged in the 1930s. The pattern in Britain was a complex product of the difficulties of merging local into national utility networks in the inter war period, national reconstruction after WWII and strong dose of socialism in the coal industry. Such differences are not surprising since public enterprise is but one facet of the business/state interface which itself is a product of some fundamental economic and strategic factors.
2) The Pattern of Public Enterprise and the Key Questions

The main question to be addressed is how to account for the differential incidence of public enterprise, across sectors, countries and over time. More specifically we shall attempt to answer the following questions, roughly in the order given below:

a) Why was public enterprise common in the grid networks of communications and energy supply c.1830-2000?

b) Why were SOEs in manufacturing much more common in Germany, Italy and Spain than elsewhere?

c) Why were Britain and USA so different from Continental Europe and Japan c.1820-1939?

d) How far were local, and later national, public enterprises in 19th and later 20th century Europe a product of municipal, and later, state socialism?

e) What does the privatisation process from the 1980s tell us about the nature of public enterprise?

f) What do performance studies of public and private ownership reveal?

The coverage will be the enterprises owned by nation states and their local governments which were selling goods and services under the broad constraint to break even financially. Health, education and related services are therefore excluded. The sectors in question can usefully be grouped as:

i) the network utilities in energy, water supply, telecoms and transport, ii) oil, coal and airlines, iii) manufacturing and construction, iv) banks, insurance and other finance.

A distinct pattern can be discerned. Excluding war periods, private enterprise dominated the manufacture of consumer goods and distributive trades. At the other extreme, the main trunk lines and national grids of the network utilities (railways, telecoms, post, electricity, natural gas) in Continental Western Europe and Japan have been state owned for most of our period. These governments have also, up to the 1990s, had significant share ownership in oil, coal and airlines. For local network utilities (throughout the Western World for most of the period), the picture is more mixed with public ownership higher in water supply than in gas, electricity and transport. Turning to sectors more amenable to competition, in manufacturing and construction public ownership was usually found in intermediate goods like steel, chemicals, engineering, shipbuilding, highway construction and housing in the period 1920-80 and more in Germany, Italy and Spain than elsewhere. Whilst central banks were invariably state-owned or very closely controlled, the state's involvement with the rest of the financial sector has been patchy, strongest in Italy, France, Germany, Spain, Japan.

In striking contrast to the above were Britain and USA. In the latter, state owned enterprises (SOEs) have been limited to post, Federal public land allocations and water supply; regulation and legal control dominated over public ownership. In the 19th and first half of the 20th century, all Britain’s major industries (including coal and railways, but excluding P&T) were in the private sector. Neither central nor local government had significant shareholdings in companies. SOEs were important 1940-80 and involved...
several rescue acts for manufacturing firms but mainly it involved the nationalisation of
c coal, steel, airlines and the network utilities.

Two final features of the pattern relate to privatisation. Everywhere in the Western
World, from 1980, the trend to privatisation was strongest in manufacturing,
construction, finance, oil, coal, airlines and the non-grid parts of the network utilities
(electricity generation and retailing, train operations, parts of telecoms, road transport,
shipping, ports). In Western Continental Europe the state retained some share ownership
in companies in many of these sectors and their grid networks remained largely state
owned (see Köthenbürger, Sinn and Whalley 2006). Secondly, a major after-effect of
privatisation has been the installation of regulatory regimes which for some (certainly for
‘Austrian’ economists) constituted hardly any diminution of state involvement.

3) Communications Networks in the 19th and early 20th Centuries

That public ownership of communications has often been seen, wrongly, as a way of
correcting market failure, has no doubt sprung from the fact that communications
networks have at least two technical features. One is natural monopoly and the other is
their role in defence and national unification. From early days the monopoly elements in
railways and tramways, gas, electricity and water supply stemming from their basic
technology and grants of rights of way were subject to arms’ length regulation which
included the promotion of multiple bids for track contracts and close scrutiny of the
companies. Control over prices and profits emerged through state action such as the 1838
Prussian Railway Law, British Parliamentary Acts for each utility and the setting of the
cahiers de charges by the Ministry of Public Works in the concession contracts for French
railway companies. These regulatory instruments applied to all enterprises whether they
were privately or publicly owned. Arms’ length regulation was of course pervasive in
USA, initially at state level, but from the 1880s by bodies like the Inter-State Commerce
Commission and the Federal Communications Commission.

Instead the driving force in state ownership of communications lay in geo-political
factors, that is, in political geography, resource endowments and political structures and
their effect on internal social and political unification, internal security and external
defence. The choice of public enterprise over regulation and subsidy to private operators
appears to have been due to a desire to speed up the initial construction process and/or
avoid very high implausible subsidy levels and/or ensure tight control of security.
Shortage of capital may, in some instances as in Sweden and France, have been a cause
of private company failure or delay, leading to government takeovers or guarantee of
loans but the driving force in such government involvement often stemmed from strategic
concerns. These considerations largely explain the classic features of communications in
Continental Europe and Japan. The latter emerged from the Meiji revolution geo-
politically exposed. It is an island economy poorly endowed with raw materials and coal
and, in mid 19th century, with no navy or mercantile fleet of substance and committed to
exploiting the Chinese mainland. Initial private railway development was weak. Massive
subsidies were arranged to support shipbuilding and in the early 1900s major railway
companies were taken over by the state and, together with those in Manchuria, were
operated from the Prime Minister’s office. In 1888 “.. the government decided that the Ministry of Communications should have a telephone monopoly just like the telegraph monopoly …. because, for military and administrative reasons, they did not want a foreign company to dominate the market” (though the manufacture of electrical equipment was left to joint ventures with Western Electric; cf. Anchordoguy 2001, pp.510-11). This was the origin of that public enterprise which was, from 1952, the Nippon Telegraph and Telephone Company.

In Europe, by the early years of the 20th century, all telegraph and telephone had been taken over and run from government departments, fearful as they were of security leakages. Trunk lines for railways, telegraph and telephones were initially developed by the state to speed up social and political unification in Belgium and Scandinavia (cf Rawson 1839, Soderland 1963, Hedin 1967, Anderson–Skog 2000) and, in 1905, in order to finally secure a unifying network, the new Italian state completed the nationalisation of its railways (Fenoaltea 1983). The systems in several German states were nationalised and, most important, in Prussia in 1879, largely for strategic reasons, faced as they were by hostile Russian and French neighbours on key borders (Clapham 1921 p.155; Fremdling and Knieps 1993). The French government took over the Paris-Orleans and Western networks in 1906, explicitly because they were unprofitable but of military value and of course the French network was from the beginning a planned network with private train companies on tight concessions (LeFranc 1929, Dunham 1941 and Doukas 1945).

None of the above developments in the 19th and early 20th century touched Britain and USA. Why were they different? Was it simply an adherence to strict laissez-faire principles? Neither proved completely ardent pro-marketeers when it came to tariff policy for manufactures. Again, geo-political factors were dominant. A central issue was the absence of hostile contiguous nation states. This was clearly the case in USA after the 1860s. Earlier public enterprise in canal and railway development (cf. the Erie Canal) was a product of city and state competition for business. From the 1870s for the first time, most investments in railways were private sector (Dowd and Dobbin 2001 p.66). Britain had enemies nearer to hand in France and Germany, and, in its far flung empire from others like Russia. It was an island economy but had a mercantile fleet which was totally dominant, supported as it was by an immense coal and pig iron industry (cf Table 1). The tonnage of its warships exceeded the combined weight of all the other major powers. It was the first railway nation and had in place, by 1850, a complete trunk network and a geographical coverage clearly superior to the other powers. It had no need for government action to secure rail lines to the borders, as in France and Germany, and its only concern seems to have been the potential bottleneck on the London Southampton route (Stevenson 1999).

TABLE 1

The same can be said about that other major mid 19th century innovation in communications, the international telegraph, which, especially in the secure form of submarine cables, proved a vital tool for armies, navies, diplomats, newspapers and stock exchanges. Britain’s coal, iron, technological lead and mercantile strength allowed it to
completely dominate submarine cables (Table 1), leaving other countries strategically exposed (Headrick 1991, 2001). Even though monopoly elements were present, in the form of the (largely British owned) Eastern Company, as clearly were strategic factors, the British government hardly intervened. It had no need until the 1920s when, with cable enterprises developing strongly in France, Germany and USA, the government supported international communications, via Cable and Wireless which became by 1950 a SOE monopoly.

This pattern was repeated as airlines came on the scene. Both airspace and airlines had strategic value and for those European countries with colonies (France, Belgium, Britain, Belgium and Italy) airlines were seen as a vital link. Hence the period 1918-50 saw each country asserting its rights to sovereign air space and to subsidising and eventually nationalising its airline industry (Air France, Sabena, Lufthansa, Alitalia). Britain was no different; its own flagship public enterprises were BOAC and BEA established in the early 1940s. Again the USA could stay out of this shift to the public sector. Indeed its natural advantages for air travel across a huge domestic airspace quickly made it the industry leader. It agreed to the establishment of IATA in 1945 which effectively provided protection for the high cost European flagship airlines but gave good terms for USA in cross Atlantic crossings.

4) State Enterprise in Manufacturing

The significance of the manufacturing sector for the nation states of the 19th and early 20th century was not market failure nor any concern about internal and political unification. Rather it was that economic strength in that period was closely linked to industrial strength which, perhaps even more important for 19th century minds, was a key element in military strength –classically realised by Russia after defeats by the Western Powers in the Crimea in the 1850s and by Japan in the early 1900s. For naval vessels, armaments and later aircraft and tanks, the need was for robust development of domestic coal, iron, steel, chemical and engineering industries. How far the state intervened was a product of how it perceived the private sector was developing. At the limit this argument suggests there need be no SOEs if (as in Britain) the private sector was expanding healthily and there were no obvious security issues. There is a case for arguing also that, from the 1930s, explicit attempts were increasingly made to support living standards and economic growth, reflected in Italy’s extensive range of SOEs c.1930-90 and the unwillingness everywhere in Europe in the 1960s and 1970s to let domestic manufacturing industries lose out to competition from the Far East, taking the form of rescue acts for failing firms in for example motor car production and shipbuilding.

In the 19th and early 20th century it was Germany, Italy and Spain which saw the emergence of SOEs in manufacturing, largely a product of concern to attain the economic and military strength demanded by their leaders and faster than their private sectors seemed able to achieve. In the early 19th century Germany was Europe’s melting pot – a hotchpotch of states and principalities recovering from and ever mindful of Napoleonic France, with an apparently strong stable Russia to the East and facing the British everywhere at sea. The Prussian state took the lead in the creation of the German Empire
by 1870 but even by that date, although blessed with good coal and iron ore, its warship and merchant fleet were no more than 15% of the British, rail spread and coal only 50% and in international cables had barely a presence (Table 1). The desire to catch up is a strong theme in the historical literature. Even in the 18th century, Frederick the Great of Prussia was concerned to develop the coal, iron, silver, lead and zinc industries. Royal shipyards were built at Stettin and a multi purpose SOE called Seehandlung (an Overseas Trading Corporation) was established as early as 1772 to raise loans for industry and promote exports. By the early 19th century two key border areas, Silesia and the Saar, had well developed SOEs in coal, pig iron and armaments. A modern historian of Prussia suggests: “Anything that did not contribute to the military power of the state would be given a low priority or rejected” (Tipton 2003, p.115). Although the Ruhr mines were less geographically exposed and were developed under private enterprise, it was a concession system with strong supervision and tutelage from the Prussian state. By the mid century that state produced 20% of Germany’s coal output and was the biggest mineowner in Germany by the end of the century (Borchardt 1991; Henderson1958). The willingness of the state to intervene in manufacturing continued in the Weimar Republic but especially under the Nazi governments in the 1930s when the emphasis was not simply economic and military strength but plain autarky. Whether there was any depth to fascist economic policy has been a matter of some debate. Most commentators now argue that there was no strong commitment of principle for or against private ownership. Rather it was a matter of establishing control. At one level the emphasis was on autarky with firms naturalised in Spain (that is, passed to indigenous owners) and pressures everywhere to use domestic resources. The reluctance of German steel barons to use German iron ore lead to the establishment of the Herman Goering works (BERG) in 1936. The reluctance of car manufacturers to produce the beetle lead to the state owned Volkswagen factory. The development of import substitutes and other autarkic policies were implemented in Germany by state holding companies like VIAG and VEBA (established in 1923 and 1929) and which had extensive interests in electricity, coal, tin, lead and oil, as well as by big private firms like the chemical giant IG Farben (Wengenroth 2000; Oeftering 1953). Arm's length regulation was sufficient to secure state influence in some of the fascist states because it was backed by violence. In the case of Spain, although Franco's government, in the period 1941-8, acquired a wide range of financial holdings in the infrastructure and manufacturing, its direct ownership and administration was limited to the railways, the telephone system and tobacco (Tabacalera). The rest consisted in part of the interests which the state holding company (INI) had in enterprises which, initially, accounted for relatively modest shares of total activity in electricity supply (ENDESA and ENHER), maritime transport, shipbuilding, engineering and in aluminium. In other cases INI held shares jointly with other companies (like HispanoAviac and Marconi) in engineering enterprises, chemical firms and in the fledgling Iberia airline (Carreras et al 2000).

In Italy, the state intervention from the 1930s was complex. It was more closely linked to state concern about the economic strength of all sectors, and not just autarkic dimensions which may have been present at the start. Italy had a significant industrial spurt in the late 19th and early 20th century but by the early 1930s was in the middle of a banking crisis
which lead to the establishment of the state holding company IRI, and later ENI (mainly linked to oil) and EFIM (engineering). The trunk railways and telephone lines had been nationalised 1905-7, as noted earlier, in a pattern similar to other countries in Continental Europe but what happened in the 1930s was quite different. Most historians now see the state leading the way in the inter-war period to fill the gaps in finance and entrepreneurship. State holding companies like IRI held shares in other companies such as Finmare which itself controlled companies in shipbuilding and shipping. ENI held shares in companies like AGIP which held shares in companies producing methane products and piping. This injection of government funds might have been pursued by direct subsidies to private firms but it seems the fascist government pushed for a strong state lead and presence (Amatori and Toninelli 2011). In recent research of a sample of over 5000 Italian firms, Giannetti, Toninelli and Vasta (2006, 2011) have shown how extensive was the role of the state. In 1936 IRI had a direct shareholding in 137 operating companies as well as shares in 6 financial holding companies and a mixed share of four others. These 147 companies were spread all over the economy including mining, agriculture and manufacturing. By 1983 the IRI group plus ENI and EFIM had shares in 367 companies including 100 financial intermediaries and 157 in manufacturing but it was in utilities that these groups accounted for the largest proportion of the 5000 sample. On one calculation, by 1983, IRI, ENI and EFIM had direct or indirect control of 40% of the capital of the 5000 sample. Note that these figures exclude the public corporations for the electricity supply industry (ENEL) and the railway (AAFS) and trunk telephone (ASST) enterprises run from government departments.

Such was the apparent success of Italian SOEs (their expansion coinciding with Italy’s high growth rate) that in the 1960s and 1970s some other Western European countries like the Netherlands and Britain tried to copy. In Britain this took the form of developing ‘national champions’ and the introduction of a new state holding company, the Industrial Reorganisation Commission, to promote mergers and act as a state merchant bank (cf O’Hara 2011). There was much debate about whether civil servants knew more about these matters than British businessmen and the City and the whole venture fizzled out in the 1980s. The issue, in Europe, generally merged with the problems posed by growing competition from the Far East. Several European firms, often regionally concentrated, were losing out and the state stepped in to ease the process of transition. If the British experience is any guide, even strong pro-market adherents could not, in the early 1970s at least, face the disappearance of what were often seen as prestigious parts of the economy. Margaret Thatcher and Keith Joseph explicitly supported Prime Minister Heath in bailing out Rolls Royce, the Rover car group and British Shipbuilders (Parker 2009). By the 1980s when there was still no clear signs of recovery these SOEs were privatised and left largely to their own devices.

Finally this is probably the point to note that the whole question of SOEs in the financial sector is too big an issue for me to cover here and I am no expert in these matters, notwithstanding that they have much relevance in the current world financial crisis. Suffice to say that by 1950 most central banks were in government ownership as protection for the currency and the exchange rate. The history of public enterprise and/or state holdings in commercial banking, insurance and other financial intermediaries seems
to have been largely an attempt to bolster confidence in investment in these sectors by providing a form of government guarantee. Common in France, Italy, Japan and Spain, but significantly not in the UK nor USA with highly developed financial sectors.

5) Energy: From Local Networks to Global Supplies

Public enterprise in energy started with municipal ownership of gas and electricity supply in the 19th century, followed by state ownership of some of the national grids in the 20th century. The coal industries of France and Britain were nationalised in 1946 but whilst SOEs in coal in other parts of Europe emerged in one or two places in the 19th century, it was patchy and remained so, like oil and natural gas, in the 20th.

From the early 19th century, major energy inputs for industry, commerce and housing came from coal-fired gas and, later, electricity plants. Together with water supply and tramways they were the classic home of local networks. Some of them were municipally owned and, later, as national networks emerged, some were SOEs. The reasons are not straightforward. The local networks had no great strategic significance. Moreover, whilst the stories of municipal enterprise in Milan, Darmstadt, Bilbao, Glasgow and Leeds are well known they were many towns like the French and Belgian communes, London, Paris and Southampton which were served by private companies, as were many rural areas. Often municipal enterprises have been seen as a product of municipal socialism but the evidence does not support that. The main initial strong burst of municipal enterprise was 1850-80 for gas and water supply. Also electricity and gas municipal enterprises were concentrated in growing industrial towns. Since municipal socialism dates from the end rather than the middle of the 19th century, it cannot account for the initial burst. The explanation seems to lie in the profits which municipal enterprise earned which could be used to finance the public health programmes of the growing congested urban areas. Such transferred profits effectively acted as a tax on all users and therefore carried the support of the limited number of local payers of normal taxes and without the need for official electoral approval. Hence private enterprise remained in ports with good alternative income from dockland property and in rural areas lying outside the congestion and ill-health of 19th century urbanisation. City councils such as those of Paris and Copenhagen which were big enough to make good financial deals with large utility companies also stayed private in the 19th century. One has to add that municipal enterprises required efficient strong local institutions so that where the local government unit was very small like the French and Belgian communes or weak as in parts of Spain and Italy or was a mess of overlapping authorities as in London until the 1890s, private enterprise prevailed.

Water supply was a different story. For a start, the rate of municipalisation was higher than gas, tramways and electricity --- 75% in France in 1913 and only 2% for gas, 80% in Britain in 1900 (29% gas), Italy in the early 1900s probably about 90% water and 2% gas and even in USA in the period 1857-1900 water supply was 53% and gas 2%. It can hardly be argued that the interest of town councils was in revenues since water undertakings generally made financial losses when capital charges were properly assigned. It seems more likely that private companies suffered from the price ceilings imposed (binding, in a diminishing returns industry) at the same time that rising public
health standards demanded an ever higher quality of service in terms of water purity, pumped supplies and emergency access (Jacobson 2000, Millward 2007).

For technological reasons, these were all local networks in the 19th century but by the 1920s opportunities were arising for regional and national grids, especially in electricity supply as technical developments in transmission and generating plants pushed electricity to the front as the dynamic sector. This required the suppression of small, local enterprises and since municipal enterprises were often the most stubborn about change, strong action by central government was needed, taking the form of SOEs like the Vattenfall in Sweden, the Central Electricity Board in Britain and the Norwegian Elektricitet-Viert. Weak central government intervention in Spain, France and Italy was an element in their delayed development of fully integrated networks (Millward 2006).

Public enterprise in the primary energy sectors of coal and oil was much less common at least until the 1940s. In the 19th century, coal completely dominated energy supplies and its strategic significance arose from being a vital intermediary input for which there were few short term substitutes. Britain, Germany and USA were well endowed and for the others there were few options. In the short run a country would have to make alliances with one of the above three powers (as did Italy in both World Wars and as Portugal catastrophically did not, initially, in WWII). In the long run, there was a search for alternatives. France is the classic case, vulnerable with its modest coal deposits in the border north-eastern districts and hence very determined in the 20th century to pursue hydro-electricity (like Italy) and nuclear power. We have already noted the Prussian state’s public enterprise in coal. In 1903 it took part share ownership of the Hibernia company and 1905 saw a Prussian law ensuring that all unclaimed coal concessions were state property. By the 1950s also, 20% of the Ruhr coal output was in the hands of the Federal Government. By then the French and British coal industries had been nationalised. There were strategic elements present in that these were old coal mines with only modest productivity levels during WWII and in the late 1940s both countries were undergoing massive national reconstruction when control over this vital input seemed unavoidable. However there is little doubt that this industry was also the scene of many capital/labour clashes and a long standing demand from the trade unions for nationalisation. Miners’ work was dirty and dangerous and this was an industry notorious for violent fluctuations in prices and wages. The socialist element in the political representation of the mining areas was strong and the miners achieved their aims with establishment of Charbonnages de France in 1946 and the National Coal Board in 1947.

Finally there is the question of public ownership of enterprises in oil and natural gas. Indigenous reserves were not exploited in Western Europe until the post 1945 period. Prior to that, state involvement took the form of leverage via share participation in companies like Turkish Petroleum (later BP) and SOEs in the distribution systems in Europe itself (CAMPSA in Spain, AGIP in Italy etc.). The discovery of North Sea reserves saw SOEs established in the 1960s and 1970s in the form of the British National Oil Corporation, Statoil in Norway and Nederlands Aardolie Maatschappij jointly owned by the Netherlands’ state mining company Staatsmijnen, Shell and Esso. State involvement in part was to gain information about exploration possibilities and the size of
reserves. Perhaps even more important was the desire to establish sovereignty over parts of the Continental Shelf and secure good tax revenues. Neither really required SOEs and so later privatisation of some of these enterprises is perhaps not surprising.

6) Nationalisation and Privatisation*

The years from 1945 to 1980 were the halcyon days for public enterprise. We have already recorded how SOEs in manufacturing were extensive by 1950 in Italy and Spain and they continued so after 1950. In energy, telecom and transport, as we have seen, several SOEs had emerged throughout Western Europe and Japan before WWII, with a range of origins and objectives. By the 1950s public enterprise was dominant in these sectors. There had, after WWII, been no expansion in Germany since the role of the state was suspect (and monitored by the USA; see Hook 2002). The final element added in the late 1940s was concentrated in France and Britain which added some complications to the mix of motives.

To understand what happened in France and Britain and in some of the other countries, it is important to note two general problems experienced in the first half of the 20th century by all European infrastructure sectors:

i) structural: how to develop national networks (electricity, telephone) sometimes in the face of stubborn resistance from small scale municipal and private enterprises.

ii) many of the services of infrastructure industries came to be demanded by politicians, business and residential users as public services. There were pressures for ‘low’ and ‘fair’ prices. Often ‘universal prices’ emerged with similar rates per mile, per kwh, per gas therm etc., independent of location and cost. Services like railways with such price structures became very vulnerable to the advent of the new competition from road transport.

In principle these problems in Britain and France could have been solved by the establishment of national or regional monopolies, privately owned but regulated by government, as emerged under the Thatcher privatisations of the 1980/90s. In the event capitalist enterprise did not emerge well from the 1930s and the employers (especially in coal and electricity in the UK) often proved reluctant participants in schemes for reorganisation and rationalisation. The French railways had been effectively taken over by the state in 1937 (Société Nationale des Chemins de Fer Français) and in the late 1940s we find public ownership emerging on a wide national scale in the two countries, France and the Britain, where it was least developed: Électricité de France, Charbonnages de France and Gaz du France were established in 1946, the National Coal Board and the British Transport Commission in 1947, the British Electricity Authority (controlling the Central Electricity Generating Board and the Area Boards) in 1948, the Gas Council (controlling the Area Boards) in 1949 and state enterprises in iron and steel slightly later. The central banks were nationalized in both countries and in France four commercial banks were taken over, along with 36 insurance companies.

* Some of the material in this section is taken from Millward 2011.
The net result was that by 1950, railways, airlines, coal, electricity, iron and steel, gas and telecommunications were fully or partly government owned everywhere in Western Europe – even though public ownership had emerged in a variety of ideological settings – socialist, fascist, pro market. In Britain and France the rhetoric in the 1930s and 1940s was certainly socialist (the Popular front and the Attlee government) but there was little nationalisation of manufacturing (outside steel and Renault), commerce and land and hence neither government could be said to own the ‘means of production’ (Moch 1953, Millward 1997). Socialist influence was strong in coal, as noted earlier, and some of the traits of early 20th century municipal enterprise and local government were carried over into the new enterprises, organised as they were as public corporations, but that was probably the limit of left wing influence.

The nationalisations were concentrated on what the Labour Government called the ‘basic’ industries- energy and transport plus coal and steel. ‘Basic’ was never defined but they were central to national reconstruction in the desperate conditions of the late 1940s. So also was cotton and motor cars for exports but as long as the firms met their national targets they were able to escape nationalisation. In France the impetus to planning and the key role of state enterprise in those plans stemmed directly from a determination not to suffer a fourth German invasion. The plan gave priority to six ‘basic sectors’ coal, steel, electricity, transport, cement and farm machinery. It demanded control over Germany’s coal industry and the Commissariat du Plan was located in the Prime Minister’s office (Hackett and Hackett 1963, Kuisel 1981). In sum, much of public enterprise by the 1950s can be dated back to the 19th and early 20th century strategic concerns with the takeovers in France and Britain in the 1940s closely linked to the demands of post war reconstruction and to the failure of arms’length regulation in the inter-war period and with coal as the main example of socialist influence.

The performance of public enterprise 1945-80 is discussed in the next section but some insights on the nature and incidence of public ownership can be gleaned from the privatisation process which started in the 1980s. The autarkic elements in economic policy in Germany, Japan and Spain disappeared in the post war years allowing the manufacturing and commercial sectors to develop mainly under private ownership. In other parts of Western Europe two factors affected these sectors. One was the rescue, and later abandonment, of some of Europe’s manufacturing firms in the face of fierce competition from Third World manufacturing, as noted earlier. The other was decreasing concern with ensuring security in the defence sector by the use of SOEs - in part reflecting the more subtle devices for screening, spying and monitoring, heralded by the micro-chip revolution. Thus sovereign naval dockyards, international telecom enterprises, oil companies and military aircraft manufacturers find their way on to the privatisation agenda, albeit sometimes accompanied by government golden shares (as in Britain for Cable and Wireless, British Aerospace and Amersham International producing radio active chemicals; cf Parker 2009).

Indeed symptomatic of the original rationale for some public enterprises was that airlines and telecom were the first big enterprises to be privatised. In the case of airlines, technology change and loss of colonies undermined the case for the national flag carriers.
Many opportunities for air travel opened up after the war, especially when the jets came on stream, and the high cost national carriers were under constant pressure. The emergence of inclusive tours, packaging flight and hotel, eventually, in the 1960s, proved too attractive to resist and the independent operators with charter flights were allowed to blossom. The logic of having one schedule carrier for each country, from the early strategic concerns, lost some force by the 1980s and paved the way for privatisation and de-regulation.

The telecommunications sector had not only been in public ownership since the late 19th century but had been deeply embedded in sections or agencies of government departments, with the employees effectively civil servants. They were, by the 1920s, often integral parts of Ministries of Post, Telegraph and Telephone. We noted earlier the British government’s involvement with international telecoms via Cable and Wireless. In both Europe and USA, the technology available up to the 1970s made for a fairly simple domestic system: a long distance network with natural monopoly features plus one type of terminal equipment, the telephone. Hence the telecommunications business had strong monopoly power, regulated at a distance in USA, less concerned at it was by security issues than the European countries where the business was ensconced in government departments. By the late 1970s, the distinction between communications and data processing was becoming blurred and once the possibilities of alternative long distance networks arose and the simple handset came to be replaced by a complex terminal equipment market of computers, fax, email etc., the case for dominant monopolies was undermined. Hence the 1980s saw the divestiture by AT&T of its 22 telephone companies which were re-organised into 7 new regional Bell companies, the regulation of which required a review of regulatory procedures (Temin 1987). In Japan, the state owned Nippon Telephone and Telegraph was privatised in 1985, albeit with 51% of shares still in government hands and universal service retained. In Europe new telecommunications companies emerged as part of a three fold process: disentanglement of operations from being a section of a government department since the telegraph and telephone were no longer regarded as key sources of security concern; privatisation of the new undertakings (Telecom Denmark, British Telecom etc.); de-regulation of the markets. This was a complex process where ideological passions certainly affected the pace, whilst in other cases (Deutsch Bundespost) several Parliamentary hurdles had to be jumped. Such technology changes in telecommunications and airlines were mirrored in another sector, electricity supply, where, especially in the use of combined cycle gas turbines, technology changes facilitated the break-up of the generation market and was enhanced by the promotion of competition in the retail market.

It is clear that an important element of the privatisation process was the disappearance, by the 1990s, of any major hangovers from the inter-war depression years 1919-39 in arm’s length regulation of private natural monopolies. By the 1940s, that kind of solution was shunned but it became an acceptable alternative in the 1990s in Europe and Japan, manifest clearly in the privatisation of natural gas and electricity transmission grids and of Japanese National Railways in 1987 and of British Rail (much less successfully) in the 1990s.
In all countries, the tension for state enterprise in the period 1945-1990 between their public service obligations on the one hand and the requirement, on the other, to balance revenues and expenditures, is well documented. A central thread from that issue is that state enterprise financial losses were an important part of public sector deficits which plagued many countries in the Western World after the macro-economic disturbances of the 1970s. The incidence of privatisation can often be traced to specific financial crises in each country. Questions about security and about social and political unification were still important but a wider range of instruments were available and railways, telephone and airlines no longer seen as essential tools. The great technological changes of the last quarter of the 20th century, the changing priorities in geo-political strategies and the changing array of policy instruments have played an important element in the whole deregulation and privatisation process. They explain why in Europe, Japan and USA the whole process did not start earlier and why not later.

One thing which has remained is a strong difference between USA/Britain on the one hand and, on the other Continental Europe where national governments were still (by 2006 at least), more strongly linked to their infrastructure industries by share ownership (Köthenbürger, Sinn and Whalley, 2006; Clifton, Comin and Fuentes 2006). Thus telecommunications were still part owned in France, Germany, Ireland, Sweden, Netherlands, Belgium, Italy. Railways were still fully state owned in most countries. State shares, sometimes golden, were still held in GDF, EDF, Air France, Endesa, Repsol and Iberia in Spain, ENEL and ENI in Italy whilst state enterprise survived in Swedish power (Vattenfall), Spanish coal (Hunosa) and Portuguese airlines. There does however seem to be reduced usage of these sectors as instruments of strategic policy and we see a pattern of ownership and regulation more predictable from market forces. If one were to simply count the number of privatisations (a term which I use here to refer only to changes in ownership) then manufacturing, banking and commerce would dominate. Many of the firms were small. In Britain, the number of privatisations was smaller but this was the exception to prove the rule with a larger proportion of privatised enterprises in infrastructure industries like energy, telecoms and transport where large firms dominate. Manufacturing, commerce and banking are sectors without major scale economies and where competition might be expected to flourish. In the infrastructure industries, privatisation has occurred mainly in the sub-sectors where the technology and economics would allow some element of competition to develop –electricity generation and retailing, airlines, airports, oil and gas exploration and refining. The grid networks, where natural monopoly conditions prevail, have seen the least privatisations with railways and postal services still generally in state ownership, governments retaining shares in natural gas and electricity grids, complete re-nationalisation in Netherlands electricity and partial in British rail track. These natural monopoly sectors are also those where short-run substitutes are sparce and hence they are sectors where strategic considerations remain strong.
7) Evaluating the Performance of Public Enterprises

The historical experience of public enterprise over the last two centuries reveals a mix of motivations. I have argued that strategic factors related to external and internal security were important, in some cases directed to social and political unification, especially in new or fragile nation states. All public enterprises were expected to perform efficiently (a term to which we shall return), some were rescue acts for manufacturing firms that in retrospect seemed doomed to fail, others a medium for general strengthening of the economy, whilst in some sectors like coal the drive to public ownership reflected decades of perceived worker exploitation.

The complexity of these objectives provides a clue to a striking feature of empirical studies of public enterprise, namely that in few cases is it clear that they are being evaluated according to the objectives set, as opposed to those imposed by the researcher. A good example is the study of railways and telecoms where several writers have assumed that extending telephone penetration (number of telephones or telephone calls) and railway track length, relative to population, are the reasons for public ownership. Thus Wallsten’s comprehensive analysis (2005) of data on European telephone systems in the period 1911-13 is concerned to explain network spread and concludes that competition and private ownership proved more successful – the lumbering French government owned system being a classic contrast. There are two problems in this approach. Firstly government ownership was often focused on trunk lines (Sweden, Italy) and yet the data do not allow any analysis of that dimension. Indeed Wallsten commends the private telephone systems in Sweden in the early 20th century, yet it was the state board, Televerket, which constructed a national network outside Stockholm, completed in 1900. In Norway private networks were restricted to towns and it was the publicly owned Telegrafslyret which constructed a national network, completed in 1920. For Denmark the available data suggest that only 1.3% of telephones were linked to the publicly owned system but this reflected state ownership of trunk lines (Anderson-Skog 1996, 1999; Espeli 2002; Jeppson, Paulsen and Schneider 1988).

Since in these cases the state systems were doing a different job from the private sector, the telephone penetration test is irrelevant. The second point is that if state intervention is geared in part to security factors –as the enshacement of many European telecom systems in government departments suggests –then any evaluation of performance has to test for that. That is why Littlechild’s study (1983) of network spread in telephone systems through the world for 1975 also misses the point. If the Prussian state in the 1870s nationalised its railway system in order to closely control it, one ideally would need to compare the outcome with alternative means of achieving the same security level -not easy!. Bogart (2009) has at least gone some way in his study of railways 1860-1912 by allowing that the presence of hostile contiguous states meant that military preparedness was an element in railway spread.

One of the problems in evaluating public enterprise is therefore that of imagining alternative instruments for achieving the same objectives. In some contexts private and public have coexisted –classically in 20th century local utilities in USA and in 19th
century gas, electricity, tramways and water supply in Europe. There is a literature which
looks at the impact of municipal ownership on price levels and, in the British context,
some historians argued that municipal enterprises in the 19th and early 20th centuries
aimed for lower prices for poor consumers. Certainly there is evidence that the charges
for gas were often lower in towns supplied by municipal enterprises. Unfortunately these
writers did not control for cost differences arising from the different location of private
and public firms, and, once that is done, the price differences disappear. The hypothesis
that municipal ownership was primarily directed to raising the income of those local
authorities with mounting public health programmes, as argued earlier, seems best
supported by the evidence (Millward 1991). Another literature is concerned with the
performance of public enterprises in US electricity. Pelzman (1971) for example, thought
managers were interested in prolonging the existence of their enterprise and their jobs,
the vehicle for which was political support. He expected prices to be below profit
maximising levels and examined 1966 electricity bills of 10,000 customers and found
that customers of public firms had consistently lower bills, which he attributed to
preferential tax treatment of public firms. One problem with this is that he had no control
for costs but, setting that aside, the main problem with this approach and indeed with
much of the public choice literature which flourished in USA is that it reflected the
politicisation of the civil services at municipal and state levels, a feature that does not
carry over so easily to Europe.

These two settings have also proved useful for comparing the cost effectiveness of public
enterprises. Although they are invariably required to operate ‘efficiently’ and that one
dimension is to be cost effective, care is needed in drawing conclusions about the
performance of management if they do face political pressures to lower prices, keep
plants and railway lines open. Nonetheless cross-section studies in the past have failed
to show any significant differences between the costs of private and public firms. Studies
including Canadian railways (1956-62), Australian airlines (1964-74), US electricity and
water supply (1960-75), UK gas supply (1890s). The major message is that cost functions
and production functions reveal little difference in the performance of public and private
firms though the presence of competition has favourable effects (Domberg and Piggott
1986, Foreman Peck and Millward 1994). Other issues are involved in the empirical
studies of health, education and refuse collection which are outside the remit of this
paper.

What evidence has been provided by the privatisation experience since 1980? The more
one focuses on manufacturing, banking and finance and the more the criterion is
profitability the more successful has been privatisation. A recent collection of studies on
European Union countries (Köthenbürger et al 2006) suggests that market liberalisation,
including de-regulation, has had beneficial effects on prices. Financial institutions have
been strengthened in some counties like Austria as the stock market expanded. In the
manufacturing sectors of Italy, Austria and France privatisation has lead to a rise in
profitability. These findings confirm those in an earlier world-wide study by Megginson
and Netter (2001) that privatisation has been associated with rising labour productivity
and profitability. Whether labour productivity is adequate to capture productivity effects
is something we will consider shortly. The rise in profitability does raise the question
about the range of goods and services supplied by public and private firms. In the former, in the period 1945-80, profitability and the share of investment self-financed have often been seen as low relative to the private sector. Since higher profits, other things like costs being equal, would tend to be associated with restrictions on the range of goods and services provided, and perhaps higher prices, the question arises as to whether public firms were supplying an excess range and volume of goods and services? That question is not easy to answer, given second best problems, even if prices moved towards marginal costs. There is little doubt however that when public enterprises did not meet target profit rates - such as breaking-even – it was often taken as a sign of deficient management.

Turning finally to infrastructure industries where monopoly elements are present, it is clear that profitability is an inadequate guide to efficiency and cost effectiveness and measures like total factor productivity (TFP) have been used. A striking feature of recent empirical work is that so little has been done on TFP. A recent collection of studies from various parts of the world (Roland 2008) suggests that evidence on TFP has not been done in some areas (Latin America, India) or the performance has been mixed as in Britain, Africa and Eastern Europe. There are still no studies for Denmark, Austria, Finland, France and the data for Italy by Goldstein (2006) relate to labour productivity not TFP. The studies that have been made in Britain include some comparisons with other countries. By the criterion of TFP growth in infrastructure industries 1945-95, publicly owned firms in Britain, France and Germany have in general performed as well as, and indeed slightly better, than comparable (more privately owned ) industries in USA and than their privatised successors. Thus in the classic period of state enterprise 1950-73, the annual rate of TFP growth was higher in Britain than USA in airlines (11.53% versus 9.53%), electricity supply (5.51% and 3.93%) and gas ( 4.7% and 3.02%). Moreover after airlines and electricity were privatised, the growth rates fell (to 4. 48% and 2.77 % respectively for 1973-95). Gas production in Britain did improve in the last quarter of the 20th century but this was largely due to the discovery of North Sea natural gas reserves. Coal and railways provide inconclusive evidence. Neither was privately owned in Britain until the mid 1990s. The British coal industry’s TFP growth exceeded USA throughout the second half of the 20th century, mainly as an effect of large scale pit closures. In railways it was the reverse. The American industry was rapidly declining in the face of severe competition from airlines on internal routes (not so in Europe).

Telecoms is the major exception to the above; the British performance 1950-73 was better than USA (2.13% versus 1.73%) but after privatisation it was even better (4.08% and 2.84%). Much of this evidence is derived from O’Mahoney and Vecchi (1999, 2001) who also show that in coal mining, electricity supply and telecoms, the publicly owned French industries performed better than both the UK and USA throughout the second half of the 20th century. These results confirm other studies of the British case (Florio 2004, Parker 1998, Iordanoglou 2001) suggesting that there is no evidence that privatisation has raised productivity.
8) Conclusions

a) The origins of public enterprise in the modern Western World c. 1830-2000 do not lie mainly in monopoly control nor in the socialist pressure to reduce worker exploitation though in the process of transition and in some cases these two factors were present.

b) For monopoly control, arms’ length regulation has been the prime instrument. However following the 1930s depression and some disillusionment with private enterprise and capitalism, arms’ length regulation gave way to more direct controls via state owned enterprises. This carried the implication that once some confidence in markets and private enterprise was restored, a return to arms’ length regulation would reappear as it did from the 1980s.

c) Geo-political factors and the concern for internal unification and security explain much of the pattern of public enterprise, particularly in the period of new and strong nation states 1830-1939 in railways, telecoms, coal, iron and steel, armaments, airlines, nuclear power.

d) In the 20th century, central governments were more explicitly concerned with living standards, economic strength and economic growth. Italy is a classic example where SOEs were instruments for strengthening the economy, in this case geared to providing finance and offering scope for entrepreneurship in the public sector.

e) This carries the implication that proper evaluation of the performance of public enterprise requires a clear recognition of their objectives and empirical work on the alternatives to public enterprises which might have achieved these same objectives – subsidies versus public ownership for defence and security purposes for example. Few studies in the historical literature can claim to have done that.

f) The list of factors underlying the formation of public enterprises implies that as technology, economic strength and political alliances change over time, existing SOEs might lose their rationale - airline flagships carriers and telecom systems are perhaps the best examples.

g) The research on performance since 1945 suggests that European SOEs in the infrastructure industries do not have an inferior productivity record relative to their privatised successors nor to comparable industries in the more privately owned American industries.

h) There is scope for developing business models which capture the essence of public enterprises as they have developed in Europe since 1950. I will restrict myself here to the British case. A model SOE would be one with explicit public interest obligations and subsidies, healthy sales growth, well developed personnel programmes, modest salaries, cost effectively run and organised and making a profit – this last to show that at least one of the quantifiable objectives is achieved. In Britain whilst the coal and railway industries never met those criteria, one could make a case for the following: British Gas, Cable and Wireless, the British National Oil Corporation, the Electricity Supply Boards, Amersham International, the British Transport Dock Board.

R.M. April 2010
TABLE 1. STRATEGIC INSTRUMENTS:
COAL, WARSHIPS, CABLES, SHIPPING AND RAIL TRACK 1892

<table>
<thead>
<tr>
<th></th>
<th>UK</th>
<th>GERMANY</th>
<th>FRANCE</th>
<th>RUSSIA</th>
<th>JAPAN</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal Output (‘000 metric tons)</td>
<td>184,704</td>
<td>92,350&lt;sup&gt;a&lt;/sup&gt;</td>
<td>26,179</td>
<td>6,950</td>
<td>3,176</td>
<td>162,686</td>
</tr>
<tr>
<td>Warships (‘000 metric tons)</td>
<td>650&lt;sup&gt;b&lt;/sup&gt;</td>
<td>88&lt;sup&gt;c&lt;/sup&gt;</td>
<td>271&lt;sup&gt;c&lt;/sup&gt;</td>
<td>260&lt;sup&gt;c&lt;/sup&gt;</td>
<td>15&lt;sup&gt;c&lt;/sup&gt;</td>
<td>169&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Merchant Shipping (net registered capacity in ‘000 metric tons)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sail</td>
<td>3080</td>
<td>986</td>
<td>407</td>
<td>323</td>
<td>n.a.</td>
<td>2172</td>
</tr>
<tr>
<td>Steam</td>
<td>4565</td>
<td>696</td>
<td>409</td>
<td>206</td>
<td>n.a.</td>
<td>2016</td>
</tr>
<tr>
<td>Total</td>
<td>7645</td>
<td>1682</td>
<td>816</td>
<td>529</td>
<td>102</td>
<td>2188</td>
</tr>
<tr>
<td>International Telegraph Cables (length in kilometres)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Companies</td>
<td>155,814&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0</td>
<td>13,427</td>
<td>0</td>
<td>0</td>
<td>38,987</td>
</tr>
<tr>
<td>Governments</td>
<td>7804&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1541&lt;sup&gt;d&lt;/sup&gt;</td>
<td>8432&lt;sup&gt;d&lt;/sup&gt;</td>
<td>524</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>163,618&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1541&lt;sup&gt;d&lt;/sup&gt;</td>
<td>21,859&lt;sup&gt;d&lt;/sup&gt;</td>
<td>524</td>
<td>0</td>
<td>38,987</td>
</tr>
<tr>
<td>Railway Density and Spread</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Track mileage open</td>
<td>Per 1000 sq. miles</td>
<td>197</td>
<td>132</td>
<td>105</td>
<td>2.5</td>
<td>12</td>
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<thead>
<tr>
<th>Per million</th>
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<tbody>
<tr>
<td>Population</td>
</tr>
<tr>
<td>527</td>
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</tbody>
</table>

**Notes**

- a) Includes 20,978,000 metric tons of brown coal.
- b) 1880 Britain.
- c) 1880.
- d) Includes all imperial links
- e) Britain, i.e. excluding all Ireland.
- f) 1897

**Sources**

### List of Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
<th>Founded</th>
</tr>
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<tbody>
<tr>
<td>AGIP</td>
<td>Azienda Generale Italia Petroli</td>
<td>1926</td>
</tr>
<tr>
<td>ASST</td>
<td>Azienda di Stato per I Servizi Telefonici</td>
<td>Italian state enterprise for trunk telephone lines</td>
</tr>
<tr>
<td>BERG</td>
<td>Berg u. Huttenbezie AG</td>
<td>former Herman Goering works, 1936</td>
</tr>
<tr>
<td>BOAC</td>
<td>British Overseas Airways Corporation</td>
<td>1940</td>
</tr>
<tr>
<td>BEA</td>
<td>British European Airways</td>
<td>1946</td>
</tr>
<tr>
<td>BP</td>
<td>British Petroleum</td>
<td>1914</td>
</tr>
<tr>
<td>CAMPSA</td>
<td>Compañía Arrendetaria del Monopolio de Petrólos</td>
<td>Spain, 1927</td>
</tr>
<tr>
<td>EDF</td>
<td>Électricité de France</td>
<td>1946</td>
</tr>
<tr>
<td>EFIM</td>
<td>Ente Finanziamento Industria Manifatturiera</td>
<td>Italian state holding company, 1960s</td>
</tr>
<tr>
<td>ENDESA</td>
<td>Empresa Nacional de Electricidad</td>
<td>Spain, 1944</td>
</tr>
<tr>
<td>ENEL</td>
<td>Ente Nazionale de l'Energia Elettrica</td>
<td>Italy, 1962</td>
</tr>
<tr>
<td>ENHER</td>
<td>Empresa Hidroelectrica de Ribargorzana</td>
<td>Spain, 1946</td>
</tr>
<tr>
<td>ENI</td>
<td>Ente Nazionale Idrocaruri</td>
<td>Italian state financial company holding shares in AGIP and others</td>
</tr>
<tr>
<td>FFSS</td>
<td>Azienda Autonoma delle Ferrovie dello Stato</td>
<td>Italian state railways, 1905</td>
</tr>
<tr>
<td>GDF</td>
<td>Gaz du France</td>
<td>1946</td>
</tr>
<tr>
<td>IATA</td>
<td>International Air Transport Association</td>
<td>1945</td>
</tr>
<tr>
<td>INI</td>
<td>Instituto National de Industria</td>
<td>Spain, 1941</td>
</tr>
<tr>
<td>IRI</td>
<td>Istituto per la Ricostruzione Industriale</td>
<td>Italy, 1933</td>
</tr>
<tr>
<td>SOE</td>
<td>State Owned Enterprise</td>
<td></td>
</tr>
<tr>
<td>Televerket</td>
<td>State telegraph and telephone board in Sweden</td>
<td>1853</td>
</tr>
<tr>
<td>TFP</td>
<td>Total factor productivity</td>
<td></td>
</tr>
<tr>
<td>Vattenfall</td>
<td>Statens Vatterfallswerk</td>
<td>Swedish state electricity power board, 1909</td>
</tr>
<tr>
<td>VEBA</td>
<td>Vereinigten Elektrizitats u. Bergwerk AG</td>
<td>Germany, 1929</td>
</tr>
<tr>
<td>VIAG</td>
<td>Vereinigten Industrie Unternehmungen AG</td>
<td>Germany, 1923</td>
</tr>
<tr>
<td>WWI</td>
<td>World War I</td>
<td></td>
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<tr>
<td>WWII</td>
<td>World War II</td>
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