The Performance of European Transport and Utilities in the Twentieth Century

The development of utilities has been highly influenced by the changing ideology of governments during the 19th and 20th centuries.[1] Indeed, it is fair to say that the role of governments, at municipal, regional, national, and finally at European level, has been a major determinant of the industry's ownership and profitability.

In some cases, like the airline industry, it was national security that encouraged state intervention.[2] However, the main factors underpinning the intervention of governments have been the public service and network technology characteristics of the several utilities, whether rail transport, electricity, gas or water.[3] Until the mid 1970s these economic activities had been considered a natural monopoly, that is, that the most efficient way to serve the market would be with a single firm for each utility. Problems arose because a monopolistic firm tends to set high prices, and can exhibit inefficient management, making regulatory action justified. By the beginning of 1980s only parts of the production process enjoyed natural monopoly status and governments encouraged competition in the industry as part of the drive towards privatisation.[4]

The importance of public ownership has varied in the several European countries and over the period studied. At the beginning of the 20th century, municipal ownership was very important in Great Britain, Germany and Belgium for the gas and electricity industries. After World War II nationalisation took place in United Kingdom, France and Italy resulting in state monopoly firms. With the ideological change that occurred in the 1980s, these state firms were privatised resulting in some of today's large utilities. All these ownership changes resulted in the presence or absence of companies in our sample that responded not only to the private versus public ownership but mainly to the type that the public ownership chosen by the different governments.

1. Business Development

The Transport and Utilities sector in this study consists of three subsectors in the 1913 and 1927 benchmarks: 1] railways, 2] transport and communication; and 3] utilities (electricity, gas and water).

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[1] Robert Millward concluded that State enterprise in France and Britain was linked with the socialist ideology while it was not the case in Italy, Germany and Spain. R. Millward, *Private and Public Enterprise in Europe* (Cambridge, 2005), 3-11.

[2] Security reasons for intervention are also found in other industries see: R. Millward, 'Geo-politics versus market structure interventions in Europe's infrastructure industries c. 1830-1939', *Business History*, 53/5 (2011), 673-87.

[3] Some authors point out that municipal or national governments regulated markets in response to the companies' request. H. Platt, *The Electric City* (Chicago, 1991). T. DiLorenzo, 'The Myth of Natural Monopoly', *The Review of Austrian Economics*, 9/42 (1996), 43-58.

[4] W. Primeaux, 'A Reexamination of the Monopoly Market Structure for Electric Utilities', in A. Phillips (ed.) *Promoting Competition in Regulated Markets* (Washington, 1975), 175-200. J. Clifton, P. Lanthier, H. Schröter, 'Regulating and deregulating the public utilities 1830-2010', *Business History*, 53/5 (2011), 659-72.

In 1913 the Transport and Utilities (T&U) sector's average size was $137.4 million, twice the size of the average of the overall sample. Fourteen T&U companies were amongst the fifty largest European firms. By 1927 the average size of the sector reached $232.7 million, 1.64 times larger than the average of the sample. In constant dollars the size fell marginally between 1913 and 1927 (see table one). However, the number of T&U companies in the top fifty stayed the same.

The major fall in asset size occurred in 1954 due to the nationalisation process that affected greatly the composition of the sector. There was only one railway company left in the sample whereas railways were the largest firms in the first two benchmarks. The same phenomenon affected some of the largest electricity companies. The average size of the T&U sector was $196.9 million, 70% of the average sample size. The number of T&U companies in the top fifty declined from 14 to 5, which demonstrates the big changes the sector underwent after WWII.

Table 1. Transport and Utilities Size, 1913-2000 (average assets in million dollars)

	Transport and Utility		European companies		Relative size
	Current USD	2000USD	Current USD	2000USD	T&U/all
1913	137.4	2,460.0	68.9	1,233.4	1.99
1927	232.7	2,306.4	141.8	1,405.3	1.64
1954	196.9	1,262.1	281.0	1,801.4	0.70
1972	2,695.8	21,620.0	2,164.5	15,482.8	1.25(1.0)
2000	22,722.0	22,722.0	47,302.5	47,302.5	0.48 (1.0)

Note: In brackets relative size when turnover is considered.

Between 1954 and 1972 the asset size of the T&U firms increased substantially: 13 times when the assets are measured in current US dollars and 17 times in constant dollars. In 1972 the average size of the T&U sector was 1.25 times larger than the average of the sample, higher than the relative size the sector had in 1954 but lower than the two first benchmarks. If instead of assets, turnover is considered then the average size of the T&U firms is the same as the average turnover of the sample. There were 12 T&U firms amongst the top fifty in assets terms and eight in the turnover ranking.

The asset size in current prices of the T&U firms increased almost 8.5 times between 1972 and 2000 due to the high inflation registered in this period. When the inflation effect is excluded the firm size in the sector had practically remained at the same assets level. As Table 1 shows average size in constant dollars increased by only 5% in the 28 year period. The relative size of the T&U firms had fallen to its lowest level, being less than half of the average of the sample. This can be explained because we lack some asset data from major companies and because the transport and telecommunications subsector is now split, with telecommunications firms studied separately in the knowledge industry sector in 2000. When turnover is considered the relative size of the T&U firms was unchanged. There were six T&U companies among the top fifty European companies in assets; five companies amongst the fifty largest when turnover is considered.

The relative size of the T&U companies in the 20th century declined. Before WWI the average asset size was almost double the average size of the largest European companies by the end of the 20th century was below that average. The number of large companies among the fifty largest also showed this trend. On the eve of WWI there were 14 companies among the largest fifty and by the year 2000 there were only six.

1.1

The large size of the T&U sector, $137.4 million in 1913 was due to the railways subsector. The average asset size of the railways companies was $328.4 million, while transport and communication it was $32.2 million and for utilities $30.3 million, both below the European average size.

The six largest European companies in the 1913 were French and British railway firms: Chemins de Fer de Paris à Lyon et à la Méditerranée (PLM), Midland Railway, the Chemin de Fer Paris-Orléans, Chemins de Fer de l'Est, London & North Western Railway and Great Western Railway. They were giant firms with assets four times the average of the T&U sector and almost eight times the average of the European sample. Railways made massive demands on the capital market and their geographical spread made them large and complex businesses. When the London & North Western Railway was created in 1846 it was the world's largest company ranked by size of capital employed, and later the Midland also enjoyed this distinction. Wardley's study of British companies in 1904/5 reveals that the top ten, ranked the market value of assets, were all railway companies, led by the Midland, London & North Western, and Great Western.[5]

In 1913 shipping companies were the majority in the transport and communication subsector accounting for 97.2% of assets. The only exceptions, out of the fifteen companies in the subsector, were the Swedish telephone company Stockholms Allmänna Telefonaktiebolag and the Belgium Canal de Blaton-Ath.

On the eve of the First World War the shipping industry had evolved considerably in technological terms. The replacement of iron by steel for the construction of the hull, the adoption the steam turbine and the use of twin screws improved the efficiency of the industry considerably. Additionally there was a change towards specialized ships increasing efficiency further.[6] The use of bigger ships required greater investment and also brought some overcapacity which increased uncertainty in the business and encouraged protectionism. Two different ways to limit competition emerged. The first devise was the creation of shipping conferences instigated by the British companies. The shipping conference established unified rates on specific shipping lines and divided the trade by fixing the number of sailings or allocating a specific port to each company. The second way was the merger of companies in order to create quasi monopolies in some areas. This was the strategy followed by J.P. Morgan with the International Mercantile Marine Co and the German firms.

The two largest companies, with assets that were double the subsector average, were: Hamburg-Amerikanische Packetfahrt-Actien-Gesellschaft (Hapag) and Norddeutscher Lloyd (NDL). These two German companies were in the 28th and the 33rd positions of the European ranking. Both companies were founded in the mid 19th century and expanded thanks to the massive migration to America. The profits the two companies obtained from the transatlantic emigrant passages paid for the expansion of other routes.

The third company in size, 38th in the overall sample, was Messageries Maritimes, founded in 1871 to provide passenger and freight services and to carry mail,

[5] P. Wardley, 'The Anatomy of Big Business: Aspects of Corporate Development in the Twentieth Century', *Business History*, 33/1 (1991), 278.

[6] P. N. Davies, 'British Shipping and the Word Trade: Rise and Decline, 1820-1939', in T. Yui and K. Nakagawa (eds.), *Business History of Shipping* (Tokyo, 1985), 58.

receiving an annual payment from the French State. The company had profited from the increase in business created by the French colonial expansion, but not without some financial problems. Up to WWI the relationship between the governments and the shipping companies was mainly confined to the contracts to carry mail. It was not always advantageous for the companies as the cases of Messageries Maritimes and NDL show. The conditions, in terms of regularity and speed that the French government imposed to Messageries Maritimes, clearly incompatible with commercial operations, so much so that the company concentrated on the passenger and freight services in 1912. Similarly, NDL lost 5.25 million Marks on mail-steamer lines to East Asia and Australia in spite of the 44.3 million Marks in subsidies that it received from the German government.[7]

The British steam mercantile fleet was the largest in the world with 45.2% of the total tonnage.[8] At the turn of the century the British shipowners regarded the formation of American and German groups and conglomerates with dismay and decided to emulate this strategy. The best example was the Royal Mail Steam Packet Co, which was the fourth largest firm in the transport and communication sub-sector, 45th in the overall ranking. Peninsular & Oriental Steam Navigation Company (P&O), in fifth place and 54th in the general ranking, also embarked on a merger wave that extended well into the 1920s.

The utilities subsector on the eve of the First World War was composed of a majority of electricity companies, 21% of gas firms and 7% of water utilities. Electricity firms accounted for 55% of total utility assets, gas companies for 37% and a single water company for 8%. Among the five largest utility companies in 1913 there were three electricity companies, one gas company and one water company. The biggest firm with assets 4.5 times larger than the average utility firm was Gas Light and Coke Co. It was the 22nd largest company in Europe, the second, if financial and railways companies are excluded, behind the German firm Krupps. The company was the first company to supply gas to London and became the largest gas company because it acquired many of the gas companies in London and the South East of England, then the largest European urban conurbation.

The second, third and fifth companies were electricity firms that were in the 30th, 55th and 88th places in the ranking of European big business. These were in fact low places for an industry that was more capital intensive than the railways. For example, in 1913 the capital/output ratio for the American electricity industry was 11 compared to 4.5 for the railways.[9] The high capital and low output are explained by the large fixed capital costs of the distribution network and the low load factor problem. The latter could only improve in time by combining lighting, power and traction consumption, and this in turn could only be economically achieved in large cities. As long distance electricity transport technology was only available from the turn of the century, the industry was confined to local level; electricity was generated, distributed and consumed within the city. Thus the size of the city determined the size of the business obtained. Up to 1913 the majority of the large utilities were companies based in the major metropolitan areas which had bought other firms either to avoid direct or potential competition. This was the case with Berliner Elektricitäts Werke, the third

[7] L. U. Scholl, 'Shipping Business in Germany in the Nineteenth and Twentieth centuries' in Yui and Nakagawa (eds.), *Business History of Shipping*, (Tokyo, 1985), 185-216.
[8] Davies, 'British Shipping', 77.
[9] W. Hausman, P. Hertner and M. Wilkins, *Global Electrification*, (Cambridg, 2008), 22.

utility, Società generale italiana Edison di elettricità Milan, and Newcastle-upon-Tyne Electric Supply.

From the very beginning of the electricity industry, electrical manufacturers created their own market by starting new businesses with the help of the banks. This is the case of the second company in the industry and the ninth largest European. The Deutsch-Ueberseeische Elektricitäts-Gesellschaft (DUEG) was set up by AEG in order to create electricity companies in Latin America, mainly Argentina. It can be argued that DUEG was closer to a financial company than an electricity one. The decision to include this conglomerate in the utilities sector lies in the fact that all its companies were electricity or tramway firms and its investment strategy was not only determined by the electrical manufacturers' wish to sell machinery but also to help the electricity firms become more efficient by securing the demand from the tramways for example.

The use of long distance transport technology, which allows the generation phase to be located far from the consumption centres and the companies to expand at a regional level, was slow. At the eve of World War I there were only nine regional power lines in Europe with an average length of 158 km. The larger financial requirements of hydro-electric power stations, where available, and of high voltage power lines resulted in larger companies. An example is Riegos y Fuerzas del Ebro, the fifth largest utility.

The fourth largest utility in 1913 was the Compagnie Générale des Eaux, 64th in the European sample. Municipal ownership in the water supply industry was the norm in the countries considered in our study, except for Spain where the private sector provided the service.[10] In spite of the fact that 75% of the water undertakings in France were municipally owned the only two water companies large enough to appear in our 20th century study were in fact French. The other company, Société Lyonnaise des Eaux et de l'Eclairage, was the tenth largest utility firm in 1929 and 1956. One might speculate that the larger size of this company was due to its diversification into the electricity business. This was not the case because in 1956, when the company no longer owned the electricity part of its business, Lyonnaise des Eaux was still in tenth place.[11] These two companies became large because they held the concessions to supply the large French metropolitan areas and beyond. The Compagnie Générale des Eaux held the concession to supply water to Lyon, Paris and Nantes and before the end of the 19th century supplied water to Venice, Lausanne, Porto and Constantinople amongst others. The international strategy and the diversification towards other public services explained the size and the success of Lyonnaise des Eaux which was also among the largest utility companies in 1972, and in 2000, as a part of Suez following their merger in 1997.

1.2

The average firm size in the T&U sector was $232.7 million in 1927. The railway companies were the largest with an average asset size of $617.4 million, followed at a big distance by the utility firms with $65.2 million and the transport and communication companies with $52.4 million, which were smaller than the average European firm.

The largest European company continued to be a railway firm: the London, Midland and Scottish Railway, which was the product of a government-enforced merger (see below). Similar interventions in Germany and France reduced the number of large private sector railway companies. Thus, while in 1913 railway firms occupied the top

[10] Millward, *Private and Public Enterprise*, 18-19 and 41-55.
[11] The electricity part of the company had been nationalized in 1946.

five places in the European ranking; in 1927 there were only two in the top five. Finance companies replaced them.

The 'giant' firms with assets four times larger than the average of the T&U sector were all railway companies: London Midland and Scottish Railway, the first European company in asset size, Société Nationale de Chemins de fer Belges, established as a public company in 1926, the fifth, and London and North Eastern Railway, the seventh. The 'big' firms, with assets twice the average, were the Great Western Railway, in ninth place in Europe, and PLM, in eleventh place. The majority of the 'giant' and 'big' companies were concentrated in Britain, one in Belgium and one in France.

Structural changes in Europe's railway industries produced a reduction in the number of independent private sector enterprises. In Germany the railways were nationalised in 1920, although in 1924-37 they were operated via a 100% government-owned private company, with the creation of the Deutsche Reichsbahn Gesellschaft. France followed suit in nationalising its railway companies in 1938. In Britain the policy pursued by the government was to enforce the merger of 180 separate companies into four large regional monopolies, three of which appear in our sample.[12] Still privately owned, these companies operated under a strong government-imposed regulatory regime.

The shipping companies continued to dominate the transport and communication subsector in 1927. There was only one telephone firm out of the 15 large companies considered. Shipping companies' assets amounted to 89.3% of the subsector total. In 1913 four companies were amongst the fifty biggest European companies while in 1927 there were only two, which shows the relatively decline in size of the shipping industry. The assets of P&O, the 39th largest European firm and the largest in the subsector, were only 27% of the Vereinigte Stahlwerke AG, the biggest company in this study excluding railways and financial firms.

The consequences of World War I were devastating for the majority of European shipping companies. The biggest three firms in 1913 experienced great losses. Hapag and NDL had hardly any fleet left because of wartime destruction, followed by confiscation of the remaining vessels over 1.600 GRT in reparation payments.[13] Messageries maritimes had 25 vessels fewer and had fallen to the 177th position in the ranking. In spite of such losses the two German companies managed an exceptional recovery. NDL was the fifth largest company in the subsector in 1927 and the 62nd of the European ranking with assets bigger in nominal terms than in 1913. Hapag was the sixth largest company and the 73rd European despite a reduction of $12 million in assets.

In the interwar period the supply of shipping exceeded demand. World trade grew at a significantly slower rate than before 1914 and after 1945. Migration to America, which had been a major revenue source, also declined due to the restrictions set by immigrating countries. With this fragile scenario, governments in Germany, France and Italy supported their industries with subsidies, construction loans and flag discrimination. In others countries such as Britain and the Scandinavian countries the shipping companies had to provide for themselves.[14]

[12] The 4th company was the Southern Railway.

[13] Gross Register or Registered Tonnage.

[14] J. Greaves, 'Managing decline. The political economy of British Shipping', *Journal of transport history*, 28 (2007), 57-74.

The British shipping companies had become the largest firms. P&O, the first shipping company, was in 39th place of the European ranking, Cunard Steam Ship in 50th and Royal Mail Steam Packet Co in 53rd. Although they were also affected by the war destruction, they had grown in size because they bought competitors in order to combat the oversupply of the interwar period.

The only non shipping firm big enough to appear in the transport and communication subsector was Compañía Telefónica Nacional de España (CTNE), the fourth company by asset size. Before WWI the telephone industry was limited to local networks; the technological advances in the telephone industry pushed towards the establishment of national telephone networks in the interwar period. Many countries in our study, Britain, Germany, France, Italy and Belgium, had nationalized their telephone systems.[15] In Spain the telephone industry remained in private hands until 1945. The interest of Primo de Rivera's Military Directorate to create a functioning national telephone network coincided with the strategy of the American firm, International Telephone & Telegraph (IT&T), to create a holding company of telephone businesses outside the United States. The result was the creation of CTNE in 1924, an IT&T subsidy, with a contract signed with the government granting a monopoly concession.[16]

By 1927, the importance of the electricity companies had increased to 78% of total utility assets, and four of the five largest companies were electric utilities. The proportion of assets represented by gas utilities had fallen to half of that of the previous benchmark period. Out of the fifty largest European companies there were four utilities: one British, one Spanish, one German and one Belgium.

The largest company in the subsector continued to be Gas Light and Coke, fell from 22nd European place in 1913 to 37th in 1927. The company managed to reinvent itself by diversifying into the domestic heating and cooking market when faced with the strong competition from electricity utilities in the lighting market.

The second utility and in 40th European place was Compañía Hispano Americana de Electricidad (CHADE). Following the demise of the electrical holding company Deutsch-Ueberseeische Elektricitäts-Gesellschaft, the second largest electricity company in 1913, due to consequences of World War I, Deutsche Bank decided to sell DUEG for three reasons. First, they did not have the capital necessary for the company to function efficiently, second, many shares had fallen in foreign hands,[17] and third, there was a fear that the shares would be seized for reparations. The buyer was a Spanish banking consortium that went on to create CHADE.

Countries with limited coal resources such as Italy, Spain and Sweden, had high incentives to exploit their hydro-electric power resources from a very early stage. During World War I coal supplies fell everywhere and prices increased sharply, causing major problems for the electricity companies in all countries. This helps to explain the large investments which electricity utilities made in the interwar years in hydro-electric power, increasing the need for larger amounts of capital. The war also made clear the need to interconnect the different generating plants in order to guarantee a more stable

[15] Millward, *Private and Public Enterprise*, 99-108. Italy nationalized its telephone network in 1907, privatized it in the 1920s and nationalized it again in the 1930s.

[16] A. Calvo, 'State, firms and technology. The rise of multinational telecommunications companies: ITT and the Compañía Telefónica Nacional de España, 1924-1945', *Business History*, 50 (2008), 455-73.

[17] By 1920 as many as 50% of the shares were in foreign hands because the devaluation of the mark made them very attractive (shares were denominated in Marks). See chapter 4 in Hausman, Hertner and Wilkins, *Global Electrification*.

electricity supply. A good example of this development is the third largest electric utility and the 41st European company, Rheinisch-Westfälisches Elektrizitätswerk Aktiengesellschaft (RWE). RWE was founded in 1898 to serve the city of Essen and the company expanded to embrace the neighbouring industrial cities. In 1929 the first 220 kV line in Germany was finished linking the coal fields in the Ruhr area to the Alps' hydro-electric power, connecting the north and south of Germany, and creating the world's largest power system. RWE is an example of the super-regional integration that occurred in many European countries prior to World War II.

The fifth largest utility in the 45th European place was the Belgium holding company Société Financière Transports et Entreprises Industrielles (Sofina). The company had been created by Union Elektrizitäts-Gesellschaft in 1892, which was in turn set up by American Thomson-Houston Electric Company with the objective to create their own demand. In 1902 AEG bought Union Elektrizitäts-Gesellschaft and with it Sofina. The company's growth was spectacular, between 1913 and 1927 it experienced an accumulative annual growth rate of 17.4%, and between 1927 and 1929 the capital increased 3.7 fold. By 1927 Sofina and other electrical holdings were highly interlinked and their operations expanded well beyond the European boundaries. Electricity had become a global business.

1.3

In 1954, the average size of the T&U firms was $196.9 million, a 16% fall in nominal terms compared with 1927. The big changes that the railway industry had undergone all over Europe explained the decline in the average firm size. As a matter of fact there was only one railway company left in the sample, which justifies the decision not to make railway companies a separate subsector. The average firm size in the transport and communication subsector was $190.8 million, while in the utilities subsector it was $203.5 million. For the first time the average utility size was larger than that of the transport and communication firms.

There were no giant firms in the T&U sector in 1954. The big firms, with assets over twice the sector average, were geographically spread, with one German, one Belgium, one Italian, one British and one Spanish: RWE, SNCB, Edison, P&O and CNTE.

The composition of the transport and communication subsector had become more diverse. In asset terms shipping companies represented 48.7%, railways 26.9% and telephone companies 24.3%. The shipping companies continued to provide the majority of firms with 69.2% of the subsector sample. The largest company in the subsector, 18th in the European ranking, was the railway firm Société Nationale des Chemins de fer Belges with assets 3.2 times larger than the average. However, it was 57% smaller than Imperial Chemical Industries (ICI), the largest non financial company. There were no British or French railway companies in the sample, since Britain followed France and Germany in nationalizing its industry in 1947. Until 1963 the railways were owned and managed by a government body, the British Transport Commission.

Amongst the five largest subsector companies there were three shipping companies: P&O in 24th European place, Cunard Steamship Co in 64th and Messageries Maritimes in 73rd. The post-war nationalization in the transport sector did not only affect the railways, since some shipping companies were also nationalized, including Messageries Maritimes in 1948, and Hapag and NDL in the late thirties.

The only telephone company in the sample continued to be CTNE, the 26th largest European company and the third largest in the subsector with assets 2.2 times larger than the subsector average. By then the company was controlled by the Spanish State, which owned a majority holding in its equity.

In the 1954 the electricity companies were once again dominant in the utilities subsector, accounting for 97% of all utility assets, but their size fell relative to Europe's largest companies. After World War II the role of the State became more important in Western European economies. This was not new in the utility industry, where the role of local and/or regional governments had been present from the very beginning in all countries with different intensities. The super-regional interconnections offered by advances in technology encouraged a merger wave which created regional monopolies and increased the interest of the state in controlling them.

RWE, the largest utility company, was the 15th European company or the fourth largest European firm if we exclude the financial companies, and provides an example of government participation before WWII. During the interwar years the private ownership of electricity companies gave way to state or municipal ownership in Germany. By 1920 RWE's major shareholders were the Westphalia municipalities. State ownership increased in all electric utilities in the 1930s. RWE was the only large German electricity company with less than 30 per cent state ownership.[18]

State ownership increased in all the major countries after the war through nationalisation or creation of state firms. From 1946 to 1948 the electricity and gas companies were nationalised in France and the United Kingdom creating at the same time large state monopolies. Italian nationalisation took place in 1962 when ENEL was created.[19] The French and British nationalisations affected more than a third of the 1913 and 1927 largest utility companies. If we include the Italian firms the affected companies rise to half. World War II accelerated the process of naturalisation of the electricity industry in many countries which ended in the 1970s.[20] This explained the disappearance of Sofina which was reduced to a shadow of its pre-World War existence due to the nationalisation and naturalisation of its interests around the World.

The second, third, fourth and fifth companies in 1954 were all major super-regional hydro-electric companies: the Italian Edison in 20th position in the European ranking, the Spanish Iberduero in 43rd place, the Italian SIP in the 53rd and the German Bayernwerk AG in 85th position.

1.4

In 1972 the average firm size for T&U sector was $2,698.8 million. The average size of firms in the Transport and communication subsector was $2,091.4 million, while for utilities it was $3,343.3 million. For the first time in the 20th century the average utility size was bigger (55%) than the average size of the European firms. There were two giant firms in this benchmark: the (British) Electricity Council Boards and Enel;

[18] U. Wengenroth, 'Rise and Fall of State-Owned Enterprise in Germany', in P. A.Toninelli (ed.), *The Rise and Fall of State-Owned Enterprise in the Western World* (Cambridge, 2000), 103-27.

[19] R. Giannetti, ' Industrial Policy and the Nationalization of the Italian Electricity Sector in the Post-World War II Period', in F. Amatori, R. Millward and P. A. Toninelli (eds.), *Reappraising State-Owned Enterprise: A Comparison of the UK and Italy* (Abingdon, 2011), 242-60.

[20] Naturalisation is a process whereby foreign companies are bought by nationals of the country. Hausman, Hertner and Wilkins named this process domestication. Hausman, Hertner and Wilkins, *Global Electrification*, 233.

and two big firms: the (British) Post Office and British Gas. The concentration of the large firms in Britain is striking.

The transport and communication subsector had been completely transformed. The few telecommunications companies (12%) had the largest proportion of assets (51.5%) and turnover (37%). The first, third and fourth largest companies in asset terms were telecom firms: the Post Office, the twelfth largest European company, the Italian telephone company SIP in 28th place and the Spanish CTNE in the 38th position. When turnover is considered only the Post Office maintains its position but SIP fell considerably to 73rd place and CTNE to 131st.

The railway companies represented 25% of the firms in the subsector and 32.6% of assets. The second and fifth companies in the subsector were the state-owned railway corporations SNCF, in the 25th European place, and British Railways Board, in 43rd place. The ranking by turnover was: SNCF 23rd, and British Railways Board 45rd place. Although in the public sector, the British and French railway enterprises were encouraged to operate on a quasi-commercial basis, and employed the accounting practices as if they were private concerns, with balance sheets and profit & loss accounts. They thus generated data which make it possible for us to include them in our sample.

The shipping companies that hold the majority of transport & communication assets in the preceding benchmark saw their importance drastically diminished, accounting in 1972 for only 4% of assets and 14% of turnover while they were still the majority in number of firms (31%). From the early 1960s the shipping companies faced increasing strong competition in long distance passenger transport from airlines. It took only ten years from 1958 when the first jet airline crossed the Atlantic for the transatlantic ship liners to virtually disappear. Some shipping firms like the German Hapag, did not even restart the transatlantic passenger service but concentrated instead on the cargo business. The successful shipping companies diversified, expanding into short-sea ferries, logistics, offshore support vessels and bulk carriers. By the end of the 1960s the shipping companies were facing another enormous challenge, this time in the freight market, with the emergence of the container revolution.[21] In the first years containerization created a merger movement in the European shipping industry, for example, Hapag and Nedlloyd formed Hapag-Lloyd, and Messageries Maritimes and Compaginie Générale Transtlantique created CGM.

The airline companies appear for the first time in our sample due to the expansion experienced from the 1960s. In 1972 airlines represented 25% of the sample and held 12% of the subsector's assets and 21% of its turnover. The State did intervene in the sector from an early stage. After WWI every country claimed sovereignty over its own airspace because of the high military importance. There were many reasons that explain why the majority of countries ended with a national carrier that was either State owned (Air France, British Overseas Airways Corporation) or the State held a controlling stake (Lufthansa, Alitalia, SAS and Iberia). Amongst the most important there were: the low profitability of the airline industry in the interwar period; the desire to guarantee access to colonial territories; and last, but not least, the fear that the economic superiority of the American airlines would overshadow the national industries.[22]

[21] M. Levinson, *The Box. How the shipping container made the World smaller and the World Economy Bigger*, (Princeton, NJ, 2002).
[22] Millward, *Private and Public Enterprise*, 231-41.

In 1972 the importance of the electricity companies slightly diminished, representing 84% of utility assets, with the gas companies making up the remaining 16%. The largest utility, Britain's Electricity Council, was the twelfth largest European company but the second biggest if financial companies are excluded. If turnover is considered it was the sixth largest European company, the five above being non financial companies. The size of the utility companies had substantially increased since 1954 in relation to the rest of the Europe's companies. The picture in 1972 reflects the importance that nationalisation had in the utilities since four out of the five largest companies were state monopolies created with the British, French and Italian nationalisations. The resulting companies were: Electricity Council, the 6th largest European company in turnover terms, EDF the 21st, ENEL the 31st, and the British Gas Corporation, the 33rd place.

The only large company that did not result from nationalisation was also a state company. VEBA (Vereinigte Elektrizitäts- und Bergwerks-Aktiengesellschaft), the 19th largest European company in terms of turnover, was founded in 1929 by the Prussian government as a Berlin-based financial conglomerate for power and mining activities. In 1965 the Federal Republic of Germany placed the majority of its shares with private investors. The large size of VEBA was due to its diversification that extended beyond the initial electricity and mining business into chemicals, oil, glass and transport.

The major technological change that took place in the electricity industry in this period was the use of nuclear power. The first nuclear plants were built in Britain and France in the late fifties and early sixties. In France two-thirds of the electricity generated come from EDF nuclear plants, in Britain nuclear plants produced about 26% of the total and in Germany 23%.

There were important changes in the gas industry also. The major technological change was the shift from gas manufactured from coal distillation to the consumption of natural gas extracted from the gas fields under the North Sea and elsewhere. In Britain the Gas Act of 1972 merged all the gas boards established with nationalisation into the British Gas Corporation, which gained the third position in asset size in the sample. The company was privatized in 1986.

1.5

In 2000, the average T&U firm size was $22,722.0 million. In the transport and communication subsector the average was $12,285.0 million and the utilities it was $31,071.6 million, both substantially below the European average ($47,302.5 m.). EOn was the only giant firm, with assets four times the sector average. The big firms, with assets double the average were Suez, RWE, Ferrovie dello Stato, Endesa and Enel. In contrast with the previous period there were no British firms among the largest and there was quite a spread between countries: two German, two Italians, one French and one Spanish.

When turnover data is considered, the average size of the sector was $13,086.0 million, just below the European average ($13,185.3m). The average turnover in the transport subsector was $7,563.2 million and in utilities $17,634.2 million, a third larger than the European average. EOn continued to be the only giant company in the sector, while the big companies were RWE, Suez and EDF. In this case the largest companies were concentrated in Germany and France.

The composition of the transport sector was altered by the decision to study the telecommunication companies separately due to the importance they had gained (see the chapter on knowledge industries). Airline companies provided the majority of firms

(40%), accounting for 46% of the turnover in the transport sector. The airline industry liberalization that took place in Europe from 1993 brought important changes to the market, the emergence of new players and, with lower fares, an increase in the number of passengers. The second group in importance was the railway companies with a turnover of 35%. When assets are considered the Italian, German and French national railway monopolies account for 75% of the total.[23] The size of the railways companies that had been the giant businesses in the 19th and early 20th century had relatively diminished by 2000. Ferrovie dello Stato was the 42nd largest European firms followed by Deutsche Bahn in 52nd position. In Britain privatization in 1994 had produced a fragmentation of the industry's structure. The largest company was Railtrack, a quasi-private company which was wound up (and replaced by Network Rail, a quasi-public company) after the Hatfield rail accident in the year 2000. However, its asset-base was a matter for debate throughout its brief existence.[24]

When turnover is considered SCNF is the largest firm in the transport sector and 56th largest European company, British Airways the 72nd, Deutsche Bahn the 73rd, Lufthansa the 76th and Stinnes AG the 87th. For the first time there are two airlines among the top five in the transport subsector.

The average size of Europe's utilities was bigger than that of transport firms. The five largest utilities occupied places above the transport firms in the turnover ranking. The structure of the utilities subsector remained unchanged after the 1972 benchmark when electricity companies accounted for 75% of the assets and gas firms for 17%. However, the size of the utility companies did fall in comparison with the largest European companies. E.On was the largest utility in 2000, the 27th largest European company, and the eighth largest company excluding the financial firms. No gas company was amongst the top five utilities. The top five companies in asset terms were: E.On in the 27th place, Suez 32nd, RWE 38th, EDF 46th and ENEL 47th. When turnover is considered the utilities show a much larger size. EOn was in 7th place, followed by RWE 20th, Suez 29th, ENEL 49th and Preussag 55th.

The electricity industry experienced major changes from the 1970s due to privatisation, mergers and globalisation. The privatisation of state-owned companies that usually enjoyed a national monopoly had different outcomes. British privatisation avoided the creation of a private national monopoly by dividing the largest utility in 1972, into three companies: Powergen (the ninth largest utility in 2000), National Power and National Grid. The argument was that there was no need for an integrated industry since the technological changes had freed generation and retailing from the natural monopoly constrains.[25] On the other hand, although the Italian government privatised ENEL in 1992, the majority of shares were still in hands of the government and the company maintained its national monopoly until 1999.[26] In France, EDF's privatisation in 2004 did not imply a change in the size of the company.

In this period electricity utilities sought to became larger. In those countries that did not have a State monopoly there was a merger wave. The first utility company, E.On, was the result of a merger between VEBA and VIAG in 2000. In the 1990s both

[23] This figure is estimated because the SCNF asset data for this period was not available. Ferrovie dello Stato and Deutsche Bahn accounted for 59.4% of total assets in the transport subsector.

[24] T. Gourvish, *Britain's railways 1997-2005: Labour's strategic experiment* (Oxford, 2008), 59-111.

[25] M. Chick, 'The Power of Networks: Defining Boundaries of the Natural Monopoly Network and Implications for the Restructuring of the Electricity Supply Industry', *Annales Historiques de l'Electricité*, (2004), 89-106.

[26] Toninelli, *The Rise and Fall*, ix.

companies directed their efforts to their core business. This was also the case of the Spanish Hidrola and Iberduero that merged in 1992 to create Iberdrola. A larger size was crucial for international expansion, to play a role in globalisation. Many European companies took the opportunity to enter the Latin American market when some of the state monopolies were privatised, or the United States market. The European Union's policy of encouraging market competition in order to break up national monopolies was another factor stimulating growth through foreign acquisitions.

2. Performance based on Return On Equity

The performance of the transport and utilities sector based on the return on equity was relatively poor over the 20th century, with considerable fluctuations in benchmark periods.[27] In the first two benchmarks the mean ROE was at roughly the same level - 7.28% in 1911-13 and 7.59 % in 1927-29. The companies' profitability suffered a drastic reduction in the aftermath of WWII when the average ROE fell to half of the previous level - 3.50% in 1954-56, the lowest return in the century, and 3.68% in 1970-72. However, at the end of the century the T&U companies achieved their highest performance with an ROE of 11.11%. In comparison with the profitability of the whole sample of European big business the performance of the T&U sector was disappointing throughout. The ROE of the T&U companies was always below the average of the European firms. In the last column of Table 2.1 we can see that differential between the average ROE of the sector and that of the whole sample was always negative. The best period was in 1927-29 when the T&U's mean ROE was only 1.6 percentage points below the European one. The worst period was 1954-56, with an ROE 6.2 percentage points below the European mean.

Table 2.1. Return on Equity of Transport and Utilities sector, 1911-2000

	Transport and Utilities		European companies		Differential
	Mean	Median	Mean	Median	Mean
1911-13	7.28	6.27	10.04	8.69	-2.76
1927-29	7.59	6.96	9.16	8.33	-1.57
1954-56	3.50	4.74	9.70	7.30	-6.20
1970-72	3.68	2.23	7.62	7.55	-3.94
1998-2000	11.11	12.41	14.24*	12.32	-3.13

*Note: Excluding the outlier: the Finnish firm TIH Finland

The performance of the T&U companies did not only differ from that of the rest of the European sample in the level of profitability but also in the trend. The major difference was in the 1954-56 benchmark, when due to the important changes experienced in the sector and in particular the nationalisation process, profitability fell to half, while Europe's ROE increased.

[27] The ROE data is available for 94% of the T&U firms.

Table 2.2. Geographical distribution of the one quarter best performing T&U, firms, 1911-2000.

	Germany	United Kingdom	France	Italy	Spain	Belgium	Sweden	Finland
1911-13	3		1	1	2	1	1	
1927-29	1	1	3	1	2	1	1	1
1954-56					2	1	1	2
1970-72	4				1	1		1
1998-2000	1	2		1	2	2		
20th century	9/35	3/31	4/31	3/24	9/15	6/11	3/11	4/8
Success rate	25.7	9.7	12.9	12.5	60.0	54.6	27.3	50.0

Note: success rate is the percentage of firms of a country with a ROE in the last quartile of the T&U sector.

The geographical distribution of the 25% T&U best performing firms in each benchmark shows that the large countries did not dominate the best performing firms in the 20th century (Table 2.2). Germany and Spain had the largest number of firms while the United Kingdom, Italy and Sweden had the lowest. Given that the number of firms considered in this study depended on a country's size, the more profitable countries, with a higher proportion of firms among the most profitable of the sector, were Spain with 60.0% of its firms being among the top 25% higher ROEs. Belgium followed closely with 54.6% and Finland with 50% of their firms in the top quartile. The United Kingdom was the worst, only 9.7% of the British firms in the T&U sector reached a high enough profitability to be counted among the 25% best. France and Italy with 12.9 and 12.5% did not do much better. Germany did better that the other big countries but still substantially worse than Spain. This data suggests that the dimensions of the country tended to act against firm profitability, although given the monopolistic nature of the sector a country's industrial policy highly influenced its companies' performance. The absence of top profitable firms in the 1954-56 and 1970-72 in the United Kingdom, France and Italy is explained by the industrial policy effects mentioned above. The high profitability of the Spanish firms in this sector is, on the other hand, indicative of the capture of the State by the private firms.

Table 2.3. Geographical distribution of the one quarter worst performing T&U firms, 1911-2000.

	Germany	United Kingdom	France	Italy	Spain	Belgium	Sweden	Finland
1911-13	1	2	4	2				
1927-29	1	4	3	1		1		1
1954-56	3		2	1				
1970-72		3	2	1		1		
1998-2000	1	1	3	2				1
20th century	6/35	10/31	14/31	7/24		2/11		2/8
Failure rate	17.0	32.3	45.2	29.2	0	18.2	0	25.0

Note: failure rate is the percentage of firms of a country with a ROE in the first quartile of the T&U sector.

The larger countries provided most firms with the worst performance in the 20th century as table 2.3 shows. The country with the highest number of firms in the first

quartile was France with 14 companies, followed by the United Kingdom with 10 and Italy and Germany with seven and six respectively. That meant that 45.2% of the French firms in the T&U sector were among the lowest performing firms, 32.3% of the British, 29.2% of the Italian and 25% of Finnish firms. Germany, however, was an exception, with only 17.0% of its firms in the first quartile, while Belgium had 18.2%. There were two countries with no firms amongst the worst performers: Spain and Sweden.

2.1

The best performing subsector within T&U in 1911-13 was utilities with an average ROE of 8.28%, while railways was the worst with a 6.39%. The average for transport and communication was 7.33%. This was a very poor performance since no other subsector in our study performed worse than the subsectors of T&U. The utilities' ROE, with the best performance, was 7.63 percentage points below that of best performing European subsector, Oil, rubber, chemicals and others. Railways was the worst performer of the whole study in this period. The T&U sector as a whole showed a lower dispersion in comparison with the whole sample, with a 3.44 standard deviation. Within the sector railways showed the lowest dispersion, followed by the utilities.

Table 2.4. Return on Equity of Transport and Utilities subsectors, 1911-13

	Mean	Median	SD
Railways	6.39	5.88	2.62
Transport & communication	7.33	6.92	3.87
Utilities	8.28	5.84	3.80
T&U	7.28	6.27	3.44
Highest and lowest performance:			
Oil, rubber, chemicals and others	15.91	9.68	13.45
Railways			

The poor aggregate performance is translated at company level since only three firms, all utilities, were among the top 25% best European performers. Berliner Elektricitäts-Werke was the 24th most profitable company, just one place behind was Stockholms Allmänna Telefonaktiebolag, while the Compagnie Générale des Eaux was in the 43rd place.

The utilities subsector had the highest percentage of its firms in the top quartile with 38.5%, followed by transport with 23.0% and only 6.6% in the railways. Germany, with three companies was the country with more firms in the top quartile of the T&U sector. Spain followed with two and the rest of countries had one except for the United Kingdom and Finland with none.

In 1911-13 there was no company in the T&U sector that made losses. The subsectors with the highest number of their firms in the bottom quartile were railways and transport and communication with four companies each, there was only one utility among the worst performing. France, with four companies was the country with more firms in the bottom quartile. United Kingdom and Italy had two and Germany one. The rest of countries had none.

The utilities, the best performing subsector had a low performance compared to the rest of business which can be explained by the high capital intensity, regulation of tariffs and/or profits and the low load factor that affected the majority of companies in the sample. All network industries, electricity, gas and water companies needed large initial capital requirements. Industry prices were regulated by the municipalities from

the beginning of the industry in most countries. The most important problem, especially for the electricity was the low load factor. Those companies that could soften the peaks on the daytime demand curve by striking the right balance between lighting, power and traction were able to enjoy higher returns. This would explain that the four best performing utilities with ROEs above the average performance of all European leading companies were: Berliner Elektrizitäts Werke, Compagnie General des Eaux, Transport and Entreprises and Società Generale Italiana Edison. There was a positive correlation between the size of companies and their profitability with the exception of the largest firm, Gas-Light and Coke, which was the penultimate worst performer.

The most profitable company in the transport and communication subsector was the already mentioned Swedish telephone company. The performance of the shipping companies, the majority of the subsector, show opposed outcomes due to the strategies followed by the firms to deal with the increasing overcapacity, as mentioned in the previous section. Three French shipping companies were among the worst performing and two German shipping firms amongst the best ones. In this sector there seem to be no clear correlation between the size of the firms and their profitability. On the other hand, there was a strong correlation between the country and profitability. The best performing shipping companies were the German, followed by the British, the Italian and last the French.

The Spanish Ferrocarriles Andaluces was the only railway among the best performing quartile of the sector. Two out of the four worst performers were British: the Midland Railway and the Great Western, which were among the largest companies in Europe. By 1911 the industry was heavily regulated by government, and the prospect of nationalisation was very real. On the other hand, many scholars have criticised railway managements for their sub-optimal operating policies. As Robert Millward has observed, most railway systems in Europe were 'on a knife edge'.[28]

2.2

Although T&U was still the worst performing sector in 1927-29, its subsectors were no longer the least profitable ones, 'commercial activities' and 'transport equipment' replaced them. Utilities continued to be the best performing subsector within T&U with an ROE of 10.98%, doubled that of the railways with 5.65% and transport and communication with 5.52%. Compared with the previous benchmark, this meant an improvement for the utilities' profitability of 2.7 percentage points and a deterioration for the Transport and communication and the Railways subsectors which lost 1.8 and 0.7 percentage points respectively. The improvement in the utilities' ROE also narrowed the gap with the best performing subsector (Wood and paper products) to less than four percentage points. The utilities had become the fifth best performing subsector out of the 15 subsectors considered. This was the best time for the utilities in the 20th century, with a much lower profitability data dispersion in comparison with the whole sample.

Table 2.5. Return on Equity of Transport and Utilities subsectors, 1927-29

[28] Millward, *Public and Private Enterprise*, 148, and see also the work of J. Dodgson and N. Crafts.

	Mean	Median	SD
Railways	5.65	4.94	2.40
Transport & communication	5.52	6.06	2.39
Utilities	10.98	8.84	6.22
T&U	7.59	6.96	4.92
Highest and lowest performance:			
Wood and paper products	14.90	10.62	11.86
Commercial activities	3.31	11.49	39.46

The marginal improvement was reflected in an increased number of firms among the top 25% best European performing companies. The best performing firms were electricity companies: in ninth place was Sofina with an ROE of 29.91%, the highest profitability any T&U firm reached in the 20th century, followed by Sydsvenska kraftaktiebolaget in 20th place with 19.83%, Hamburgische Electricitäts-Werke AG, with 14.92% in 39th place and Sydfinska Kraftaktiebolaget in 59th place.

The utilities subsector had again the highest percentage of its firms in T&U's the top quartile with 56.3%, followed railways with 16.7% and transport and communication, which had no firm in the top quartile. France, with three companies, was the country with more firms in the top quartile. Spain followed with two and the rest of countries had one.

Lloyd Triestino was the only company in the T&U sector that had losses (-0.06%) in 1927-29. Railways and transport and communication had 41.7 and 40.0% of their firms in the least profitable quartile. There was no utility firm in that group. The United Kingdom with four and France with three firms in the bottom quartile concentrated more than half of the worst performing firms.

The very high profitability of Sofina 29.91%, ten percentage points higher than the second most profitable company, may be explained by the fact that it was a holding company with interests around the world and therefore exposed to a higher country risk of their investments. In spite of the big size of Sofina, there seems to be a week negative correlation between the size of the utilities and their ROE in this period. The second and fourth most profitable companies, Sydsvenska Kraftaktibolaget (19.83% ROE) and Sydfinska Kraftaktibolaget (11.79%), were, respectively, the second smallest and the smallest companies in asset terms.

Hamburgische Elektrizitäts (14.92%), Hidrola (11.32%) and Energie Electrique du Littoral Méditerranéen (9.82%) complete the list of the most profitable utilities. All these companies had experienced an increase in efficiency thanks to the interconnection of the regional systems allowed by long distance electricity transmission technology.

Within the transport and communication subsector the shipping companies performed particularly badly. In spite of the reduction in the number of vessels caused by WWI, the decline in trade during the interwar period caused overcapacity in the industry. The negative effects of overcapacity on profitability would have been worse without the merger wave and the shipping conferences. The British firms had the lowest ROE followed by the French. The best performance was by Stockholms Rediaktibolag Svea and the Compagnie Maritime du Congo.

2.3

The average ROE of the T&U sector firms in 1954-56 was less than half of that of the previous benchmark, the worst of the whole century. Transport and communication was the worst performing subsector with an ROE of 1.69%. The

utilities performed much better but, nevertheless, it was the third worst of a total of fourteen subsectors with an average ROE of 5.64%. Compared to the previous benchmark, the profitability of the utilities was halved and that of the transport and communication was a third of the pre-war level. The disparity in performance between utilities and finance, the best performing subsector, was an immense fifteen percentage points, that is an ROE almost four times higher. In this period, the T&U sector had a higher dispersion in the profitability data than the European sample (see table 2.1). The utilities performance data distribution was more homogenous with a standard deviation of 1.72, while that of transport and communication was more dispersed, with a standard deviation of 9.66.

Table 2.6. Return on Equity of Transport and Utilities subsectors, 1954-56

	Mean	Median	SD
Transport & communication	1.69	3.12	9.66
Utilities	5.64	4.97	1.72
T&U	3.50	4.74	7.35
Highest and lowest performance:			
Financial intermediation	20.69	10.32	31.44
Transport &communication			

The sharp decline in the profitability of the sector was reflected in the reduction to just one company in the top 25% best European performing companies. This was the Swedish shipping company Ångfartyg Tirfing AB, in 16th place with an ROE of 20.0%.

The two subsectors had the same proportion of high profitable firms. However, the worst performing firms were all concentrated in the transport and communication subsector with half of its firms in the first quartile. No utility was among the worst performers.

The best performing firms in the top quartile were from the small countries: Spain and Finland had two and Belgium and Sweden one each. On the other hand, Germany had three of the worst performing firms followed by France with two and Italy with one.

The devastation caused by Second World War increased the demands governments had on the utilities. Price and profit regulation tightened and profitability declined. All utility companies had an ROE below the average of European business except for Intercommunal Belge d'Electricité with 9.67%. The concentration movement that took place in Belgium after the war prompted the creation of three companies resulting in an increase in their efficiency. The other two utilities in the top quartile were the Finnish Imatran Voima, and the Spanish Iberduero, which was the only large utility within the group.

In spite of the fact that the there were two shipping firms in the best performing quartile, the above mentioned Swedish firms and the Finnish Suomen Höyrylaiva, these were the exceptions in an industry that performed rather badly. The only two companies with losses were German shipping firms: Hansa with a negative ROE of 22.11%, and Hapag with -7.67%. Italian and French shipping were the next worst performers with very low profitability. Although there was a direct correlation between the size and the profitability of the company, the second most profitable company was 35 times smaller

than the third. In this period the country seems to matter for profitability since the shipping companies of a given country have very similar ROEs.

The third best performing company in the T&U sector was the Spanish telephone company CTNE by then under state control.

2.4

In 1970-2 the performance of the T&U sector was practically unchanged and continued to be the worst of all the sectors. There was a reduction in the performance gap because the rest of the sectors experienced a sharp decline.

The utilities' mean ROE fell further, to 5.39%, the worst rate of the 20th century. This was a marginal fall of 0.25 percentage points, negligible in comparison with the shock the industry had experienced in the previous period. The gap with commercial activities, the most profitable subsector, was almost ten percentage points. Nonetheless utilities performed better than the transport and communication subsector, which with an ROE of only 2.08% was the second worst performing subsector behind mining. The sector as a whole showed a low data dispersion with a SD of 5.04.

Table 2.7. Return on Equity of Transport and Utilities subsectors, 1970-72

	Mean	Median	SD
Transport & communication	2.08	1.00	3.69
Utilities	5.39	5.00	5.83
T&U	3.68	2.23	5.04
Highest and lowest performance:			
Commercial activities	14.84	14.34	10.35
Mining	0.82	3.43	14.05

There were only two companies, both German utilities and large companies in size, among the 25% best European performers: VEBA, with a 17.59% ROE, was in 24th position and RWE, with 12.86%, was in 50th place.

The utilities subsector had the highest percentage of its firms in the top quartile of the sector with 35.7%. For transport and communication the percentage was 13.3. Germany, with four companies was the country with more firms in the top quartile of the T&U sector. Spain Belgium and Finland had one.

In this period there were seven firms which were experiencing losses, the highest number in the 20th century. The firm with the highest loss was Alitalia (-5.52%), followed by Gaz de France, three railway companies (British Railways Board, SNCF, SNCB), the British Electricity Council and Boards and the British Post Office, all state-owned enterprises and the largest companies in the sector. The countries that provided the worst performing firms were Britain with three firms, France with two and Belgium and Italy with one each.

The top five performing firms were electricity companies. In addition to the two large firms above mentioned there were Hidrola (10.46%), Vereinigte Elektrizitats (9.49%) and Intercom Belge (7.98%). At the same time this was the only period in the 20th century in which utilities experienced losses. Gaz de France had an ROE of -3.35% and Electricity Council Board -0.51%; we have no data for EDF and South of Scotland Electricity Board. It was this dismal performance of the large state-owned companies that prompted privatisation. But state-owned companies were no less efficient than those which were privately owned. Between 1950 and 1973, productivity growth in the electricity and gas industry was higher in the United Kingdom than in the USA, where

no state owned enterprise existed.[29] The poor performance of the utilities derived from the non commercial obligations the governments laid on them.[30] There was a negative correlation between the size of the utilities and their profitability.

As in the preceding benchmark, in 1970-72 there were two transport firms in the top quartile of best performing firms. The German Hapag-Lloyd, which had made substantial losses in 1954-56, became the most profitable shipping company in the transport and communication subsector. This change of fortune was based on the merger of the two companies, and the subsequent concentration in the cargo business. The Finnish Suomen Höyrylaiva Oy was again the second most profitable company. There seems to be a negative correlation between the size of the transport firms and their ROE in this period.

2.5

In 1998-2000 the T&U sector reached its highest profitability (11.11%) in the 20th century, but it continued to be the worst performing sector.[31] Both the utilities and transport subsectors reached their higher performance with 12.60% and 9.30% ROE respectively. The improvement was impressive for the transport subsector which saw a 4.4 fold increase and substantial for utilities with an ROE 2.3 times higher. Despite this improvement the gap between utilities and the best performing subsector, mechanical engineering, remained high at nine percentage points and the transport subsector remained the second lowest performer. The sector as a whole showed a lower profitability dispersion in comparison with the whole sample, with a 7.21 standard deviation compared to 19.40. Within the sector utilities showed the lowest data dispersion.

Table 2.8. Return on Equity of Transport and Utilities subsectors, 1998-2000

	Mean	Median	SD
Transport	9.30	9.83	8.09
Utilities	12.60	13.39	6.24
T&U	11.11	12.41	7.21
Highest and lowest performance:			
Mechanical engineering	20.23	15.44	13.75
Food, drink and tobacco products	8.49	9.54	8.19

The improved performance of T&U is reflected at company level with six firms among the top 25% best European performers. Snam with a 27.67% ROE, was the 26th most profitable firm, Iberia (22.02%) was in 50th place and Lufthansa (18.57%), CMB (18.48%), Centrica (18.41%) and Electrabel (18.38%) were between 61st and 65th place. None of the above was among the very large companies of the sector.

The utilities subsector continued to have the highest percentage of its firms in the top quartile of the T&U sector with 29.4% while transport had 21.4%. There seems to be a week negative correlation between the size of the utilities, measured in either with assets or turnover, and their ROE in this period. The transport sector also shows a negative but stronger correlation between performance and size.

[29] M. O'Mahony, *Britain's Productivity Performance: An International Perspective*, (National Institute of Economic and Social Research, 1999).
[30] Millward, *Private and Public Enterprise*, 295 and see chapter 14.
[31] When excluding outlier TIH Finland from the 'Leisure and tourism' subsector. Otherwise the 'Knowledge industries' was the worst performing sector.

The countries with more companies in that quartile were Belgium, Spain and United Kingdom with two companies and Germany and Italy with one. At the end of the 20th century the giant and big companies of the sector were not the most profitable firms. Three out of the top quartile utilities were gas companies and for the first time two airlines were among the top profitable companies.

In 1998-2000 there were two companies, both Italian, with losses in the T&U: Ferrovie dello Stato and Alitalia, which already had losses in the previous benchmark. The transport subsector had the highest number of their firms in the bottom quartile (35.7%) while utilities had only 17.6%. France, with three companies was the country with more firms in the bottom quartile, followed by Italy with two, and Germany, Great Britain and Finland with one.

3. Performance based on Holding Return

The study of the performance based on the holding return complements the return on equity analysis, since the former may be defined as the future expectations the market had for the development of the firm.[32] The T&U's holding returns (HR) for the 20th century were above the ROEs except for the 1911-13 benchmark, as is also the case for the whole sample. The HR trend was quite different from the ROE one as the HR increased from an average of 4.80% in 1911-13 to 18% in 1954-56, the highest of the century, while the ROE was flat at 7.4% in the first two benchmarks to reach its lowest point (3.5%) in 1954-56. In 1970-72 the HR was a third of its previous value, then it doubled at the end of the century, while the ROE remained at the 1954-56 level, then increased three fold in 1998-2000. The gap between the two indicators was at its maximum in 1954-56 with 14.5 percentage points; which can be explained because the T&U stock value benefited from the general optimism of the market. In the following two benchmarks the gap was reduced to less than three percentage points.

Table 3.1. Holding Return of the Transport and Utilities sector, 1911-2000

	Transport and Utilities		European companies		
	Mean	Median	Mean	Median	Differential
1911-13	4.80	4.59	4.81	4.48	-0.01
1927-29	14.22	11.79	14.11	11.18	0.11
1954-56	18.00	23.85	24.94	20.90	-6.94
1970-72	6.59	6.30	8.22	7.80	-1.63
1998-2000	13.65	9.18	17.60	12.43	-3.95

The performance of the T&U firms was inferior to that of the whole sample of European big businesses, as the last column of Table 3.1 shows. In the first two benchmarks, before WWII, the average HR of the T&U firms was practically the same as the average HR for the whole sample. In 1954-56 the HR differential between the

[32] The HR data is available for the T&U firms in the following percentages: 84% in 1911-13, 95% in 1927-29, 68% in 1954-56, 60% in 1970-72 and 75% in 1998-2000. Therefore some caution should be applied for the 1954-56 and 1970-72 interpretations.

T&U and the whole sample reached almost seven percentage points, the highest of the 20th century. On the other hand, the HR median of the T&U sector is three points higher than that of the whole sample which would indicate that the market had better expectations for a large part of the T&U firms than for the European business. The HR differential between the T&U sector and the whole sample was substantially reduced in 1970-72 due to the massive fall suffered by the majority of European companies. At the end of the century, despite the increase in the average HR for T&U firms the differential increased to almost four percentage points.

The analysis of the geographical distribution of the best T&U performing firms has limitations, since the data is not fully available for all countries in all benchmarks. The data for Italy and Finland has to be used with caution because less than 2/3 of the HR data was available for those countries (Table 3.2).

Table 3.2. Geographical distribution of the one quarter best performing T&U firms, 1911-2000.

	Germany	United Kingdom	France	Italy**	Spain	Belgium	Sweden	Finland **
1911-13	2	4	1	2			1	
1927-29		1	7	1		1	1	
1954-56	2	1			1		*	
1970-72	1	*	*		1	1	1	1
1998-2000	1	1	1			1	2	
20th century	6/32	7/26	9/26	3/16	2/14	3/12	5/9	1/5
Success rate	18.8	26.9	34.6	18.8	14.3	25.0	55.6	20.0

Note: success rate is the percentage of firms of a country with a HR in the last quartile of the T&U sector. *No data available for Sweden and less than 15% for France and the UK. **Less than 2/3 of data is available for the 20th century.

The picture that emerges is quite different from the one obtained analysing the ROE. The large geographical differences in success rate when ROE is considered are less pronounced when the HR is taken into account. Sweden with 55.6% of its firms among the top performing ones was the most successful country, followed by France with 34.6% and the United Kingdom with almost 27%. The success rate for the latter countries would probably be higher if data was available for the period 1970-72. The sound performance of France and the United Kingdom when HR is considered contrasts with the low success rate shown when ROE was analysed (their success rate was the lowest). The case of Spain highlights this contrast in the other direction because it was the most successful country in ROE terms and the least successful in HR terms, which could be explained by the less developed Spanish capital market.

Table 3.3. Geographical distribution of the one quarter worst performing T&U firms, 1911-2000.

	Germany	United Kingdom	France	Italy**	Spain	Belgium	Sweden	Finland **
1911-13	1		3	2	1	2		
1927-29	6	2	1	1				1
1954-56		1	2			1	*	
1970-72	3	*	*	2				

1998-2000	1	3		1				1
20th century	11/32	6/26	6/26	6/16	1/14	3/12	0/9	2/5
Failure rate	34.4	23.1	23.1	37.5	7.1	25.0	0	40.0

Note: failure rate is the percentage of firms of a country with a HR in the first quartile of the T&U sector. *No data available for Sweden and less than 15% for France and the UK. ** Less than 2/3 of data is available for the 20th century.

The geographical distribution of the worst performing firms shows that Germany was the country that contributed the most, though the bad performance is highly concentrated in the interwar benchmark showing the low expectations the market had during the 1920s in particular. The countries with a higher failure rate were Finland with 40% and Italy with 37.5% and despite of the fact that we do not have data for all the firms, we can say that Italian firms' performance was very poor throughout the 20th century. On the other hand, Sweden had no firm in this category and only 7.1% of the Spanish firms belonged to the worst performers.

3.1

In 1911-13 the expectations the market had of the T&U sector were low in comparison with the other sectors. The transport and communication subsector had the highest HR (7.70%), due to the relatively good performance of the shipping companies, although it was ten percentage points below electrical engineering, the best performing subsector. The T&U subsector with the worst expectations was railways with an HR of 2.62%, better though than textiles and leather (-0.36%), the worse performing sector in our study.

Table 3.4. Holding Return of Transport and Utilities subsectors, 1911-13

	Mean	Median	SD
Railways	2.62	3.47	4.05
Transport & communication	7.70	9.86	11.59
Utilities	4.25	4.13	4.48
T&U	4.80	4.59	7.79
Highest and lowest performance:			
Electrical engineering	17.08	3.07	28.39
Textiles and leather	-0.36	0.30	9.99

In this period there were nine T&U companies among the top 25% best European performers. The five most profitable firms were shipping firms from the large countries. Cunard Steamship co. was the eighth most profitable firm in Europe with an HR of 25.22%, followed by Lloyd italiano, in 12th place with 21.11%, Royal Mail Steam Packet Company with 19.42% in 13th place, Chargeus réunis in 23rd place with 12.13% and Hamburg Südamerikanische Dampfschifffahrts- Gesellschaft, in 27th place with 11.68%. There were ten companies with a negative HR, the highest proportion of the 20th century (27% of the firms). The worse performing was the Belgium Canal de Blaton-Ath with an HR of -11.35%, followed by the French shipping companies Messageries maritimes -10.47% and Compagnie Générale Transatlantique -7.77%.

The performance of the utilities subsector was just below the average of the sector at 4.25% below the ROE (8.28%), which shows the weak expectations investors had of a new sector with fast changing technology. The low market expectations of the electric utilities (5.07%) contrasts with the high expectations of electrical engineering

(17.08%), which shows that electric utilities were not the main beneficiaries of the electrification process in this period. The Metropolitan Electric Supply co was the only utility among the top quarter best European performing firm while there were two companies with a negative HR - Compagnie Générale du Gaz and Società generale italiana Edison di elettricità. There seems to be a correlation between the size of the utilities and the HR achieved.

The poor expectations the market had of railways were reflected in the negative HRs of a third of the companies. The two companies with better expectations were the Swedish Bergslagarnes Järnvägsaktiebolag with 9.93% and the tramway firm Gesellschaft für elektrische Hoch- und Untergrundbahnen in Berlin with 8.57%. The data indicates that there was a positive correlation between the size of the railway firms and their performance.

3.2

The market expectations of the T&U sector in 1927-29 improved substantially. It was the only period in the 20th century that the average HR of the T&U sector was higher, though very marginally, than the average of the European sample. All subsectors benefited from the general optimism evident with the recovery from the long post-war recession, although it came to an end after the Wall Street Crash. The average utilities HR of 24% was the highest achieved in the 20th century, a massive 20 percentage points increase on the previous benchmark. The subsector was the third best performer behind 'electrical engineering' (28.29%) and 'transport equipment' (24.63%). Railways, on the other hand, had the fourth worst prospects of all the subsectors. In this period firm size does not seem to influence the HR in any of the three subsectors.

There were nine T&U companies among the top 25% firms in our study sample. In fourth place was Compagnie Générale Transatlantique with an HR of 96.98%. This was the company that in the previous period showed the worst expectations with a negative HR (-7.77%). Six electricity companies followed with HRs ranging from the 77.71% of the Belgium Sofina, in fifth place, to the 26.46% registered by Società generale italiana Edison di elettricità in the 47th place. Market expectations were high and companies immersed in the globalisation wave benefited the most.

Table 3.5. Holding Return of Transport and Utilities subsectors, 1927-29

	Mean	Median	SD
Railways	7.91	7.27	11.39
Transport & communication	8.82	6.98	28.79
Utilities	24.00	13.30	23.55
T&U	14.22	13.30	23.80
Highest and lowest performance:			
Electrical engineering	28.29	27.42	23.14
Oil, rubber and other non metallic	2.38	-0.62	15.29

An analysis of the quarter best performing firms of the sector shows a high concentration of the firms in the utilities (6), followed by railways (3) and transport and communication (2). The distribution of companies with negative HR complements this analysis since out of the nine worst performing firms, six belong to the transport and communication subsector and three to railways. The utilities had experienced a substantial increase in demand and efficiency and it was expected to continue in the future which would explain the high HR. The data gives a conflicting picture of the transport and communication subsector with two high performing firms, including the best performer, and six companies with negative HR. This disparity can also be seen

with the high standard deviation (Table 3.5). The same happened in the railway subsector. A closer look reveals that the best performing companies in the subsector were French except for the Swedish railway Bergslagarnes Järnvägsaktiebolag.

3.3

The market expectations of the T&U firms in 1954-56 reached the highest level of the 20th century and the biggest gap between the average HR (18.0%) and the ROE (3.5%).[33] The subsector with the highest HR (18.40%) was utilities, in spite of the fact of being almost six percentage points lower than in the previous period. On the other hand, the average HR of the transport and communication subsector increased to 17.73%. The market expectations between the firms in the T&U subsector had converged.

In comparison with the other subsectors the performance of utilities was poor, with a huge 37 percentage points below 'Oil, rubber and other non-metallic', the best performing subsector. Transport and communication was the third worse subsector behind 'textiles and leather' and 'mining'. The HR data for utilities seem to be directly correlated to the size of the firms, while there would be no correlation between the two variables with the transport firms.

Table 3.6. Holding Return of Transport and Utilities subsectors, 1954-56

	Mean	Median	SD
Transport & communication	17.73	20.18	17.37
Utilities	18.40	25.15	14.74
T&U	18.00	25.15	14.74
Highest and lowest performance:			
Oil, rubber and other non metallic	55.98	31.71	92.68
Textiles and leather	14.44	13.30	14.37

Sector expectations seemed to be getting worse. Only four T&U firms were amongst the best 25% performing firms, a reduction to less than half of the number of the previous benchmarks; and the position those firms occupied was lower. The best T&U firm, in 34th place, was Peninsular and Oriental with an HR of 36.94%. In 40th, 41st and 42nd place there were: another shipping company, Hansa with 35.48%, the electric utility, RWE with 35.39% and the telephone firm, CTNE with 35.19%. The close average HR of T&U's two subsectors was reflected in the even distribution of the firms between the best and worst performers. The best and the worst firms were shipping companies.

There seems to be no national pattern between the best and worst performing firms. Only France concentrates the worse performing firms including the only two firms with negative HRs: Messageries Maritimes with -14.49% and Compagnie Générale des Eaux with -4.43%.

3.4

The generally low expectations of the 1970-72 period were clearly reflected in the low HR of the T&U sector (6.59%).[34] The difference in performance between the

[33] In the 1954-56 period, HR are available for 68% of the T&U firms.
[34] In the 1970-72 period, HR are available for 59% of the T&U firms.

two subsectors increased again, this time the transport and communication subsector with an average HR of 8.00% overtaking the utilities with an HR of 5.59%. Despite the fact that there was not such a big gap between the average HR of the whole sample and that of the T&U, there was a difference of eleven percentage points between the transport and communication HR and that of electrical engineering, the best performing subsector. On the positive side, there were subsectors that enjoyed worse HRs, such as mining, with an HR of -2.98%.

The relation between the performance and the size of the firms was negative, reaching the highest correlation in the utilities.

Table 3.7. Holding Return of Transport and Utilities subsectors, 1970-72

	Mean	Median	SD
Transport & communication	8.00	9.04	10.76
Utilities	5.02	6.30	6.80
T&U	6.59	6.30	6.80
Highest and lowest performance:			
Electrical engineering	19.06	16.18	18.90
Mining*	-2.98	-2.24	20.91

Note: *The lowest performing sector was 'Services to business' with an HR of -5.16 but since there was data for only one company we took the second lowest performing subsector.

In this period there was only one T&U company among the top 25% best performing firms of the whole sample: the shipping firm, Suomen Höyrylaiva Oy, with an HR of 23.70%, in 31st place. The quarter best performing firms of the T&U sector were in addition to the company mentioned: the Spanish telephone company, CTNE with an HR of 15.27%, two shipping companies, Ångfartyg Tirfing AB and Hansa with 15.07% and 13.89% and the electric utility Intercom Belge d'Electricite with an HR of 12.62%.

There seems to be no correlation between the country and the best performing firms but there is with the worst performing ones. The worse performing quarter of the firms were three German and two Italian. The German companies were electric utilities: VEBA (-6.20%), RWE (-4.47%) and Vereinigte Elektrizitätswerke Westfalen (1.97%), which is striking since VEBA and RWE were the most profitable companies in ROE terms. The two Italian were Alitalia the worse performing firm with an HR of -15.68%, and the telephone company SIP (2.67%).

3.5

At the end of the century, the average HR for the T&U sector had recuperated from the severe fall it had suffered in the previous period.[35] The utilities subsector had an HR of 15.82% while the HR for the transport firms was 10.61%. These performances were poor in comparison with the mining subsector with an impressive HR of 45.09%, although, substantially better than 'commercial activities', the worst performing subsector, with a negative HR of -3.12%. There is an inverse relation between a firm's performance and its size measured either in assets or in turnover.

Table 3.8. Holding Return of Transport and Utilities subsectors, 1998-2000

	Mean	Median	SD

[35] In the 1998-2000 period, HR are available for 75% of the T&U firms.

Transport	10.61	10.97	27.40
Utilities	15.82	9.01	16.90
T&U	13.65	9.18	21.50
Highest and lowest performance:			
Mining	45.09	14.86	86.55
Commercial activities	-3.12	-2.49	18.36

There were four T&U firms among the top 25% best performing companies: the transport firm, Broströms group with an HR of 74.40% was the ninth best, three utilities followed, Vattenfall with 48.00% in 28th place, CEA-Industrie with 42.52% in 33rd and Centrica with 42.00% in 34th.

There were big differences in performance between the firms in both subsectors as the large standard deviations show. Particularly striking is the 96.5 percentage points difference the best performing firm Broströms group and the worst performing one Alitalia with -22.16%, both within the transport subsector. This difference also persisted when considering the same economic activity comparing the Broströms group with P&O with an HR of -11.16%, the second worst performer.

In spite of the fact that the two best performing firms were Swedish and that three of the five firms with negative HR were British, there is no clear pattern as the UK had also two companies with high performances.

Conclusions

The performance of the T&U sector was disappointing throughout the century in comparison with the profitability of the whole sample of European big business. The ROE of the T&U companies was always below the average of the European firms. Before WWII the ROE was around 7.5% and after it fell to 3.5% where it stayed until the end of the century when it reached 11%. The performance of the T&U companies did not only differ from that of the rest of the European sample in the level of profitability but also in the trend. The major difference was in the 1954-56 benchmark, when due to the important changes experienced in the sector and in particular the nationalisation process, profitability fell to half, while Europe's ROE increased.

The more profitable countries, with a higher proportion of firms among the most profitable of the sector, were Spain, Belgium and Finland. The worst performing countries were France, the United Kingdom and Italy. Germany did better that the other big countries but still substantially worse than Spain.

The relation between the performance of the T&U firms, in ROE terms, and their size, measured by value of their assets, changed along the 20th century and it was almost always negative.

The railways subsector was the worst performer. Heavily regulated owing to its market dominance in inland transport during the 19th century, it suffered in the 20th century as motor transport offered potent competition in both the passenger and freight markets. However, governments were slow to liberalise rail markets.

Utilities was the best performing subsector within the T&U sector. Its improved performance coincided with periods when the industry became more global and the worst performances with periods when state intervention was at its strongest. Although

regulation has always been present in the industry the impact of the different types and intensity of the regulation altered the amount of profits the companies made.

The transport subsector profitability declined from the first benchmark until the middle of the century to recover by the end of the century to a slightly higher level. The high proportion of shipping companies with a declining profitability due to the overcapacity problems explained the decline. The improvement at the end of the century was due to the increased importance of the airline firms, with some high profitability.

The future expectations the market had for the development of the firms in the T&U sector (HR) were generally higher than their returns (ROE). Nonetheless, in comparison with the overall sample the average HR achieved by the T&U firms was lower.

The HR's geographical analysis delivers a quite different picture from the one obtained analysing the ROE, with smaller differences in the countries' success rates. Sweden was the most successful country, followed by France and the United Kingdom. Spain was the least successful in HR terms, which could be explained by the less developed Spanish capital market. The worst performing countries were Italy and Germany, with the majority of its worse performing firms concentrated in the interwar period.