

General Research Outline

The problem of improving infrastructures is currently on the agenda of many EU governments, faced as they are with large fiscal deficits. Infrastructure is understood as being a key to economic growth and quality of life, providing jobs and also the infrastructure upon which most business, trade and investment depends. This also relates to the question of integration (Millward 2005, 2010), which focuses the role of infrastructure integration approaches and also related to the core-periphery of infrastructure.

In this respect, devising new schemes of public-private partnership seems to be an effective way to overcome public balance constraints. After all, the end of the twentieth century witnessed a major institutional change in Europe, that of deregulation and privatisation.

Deregulation and privatisation were expected to improve managerial efficiency, reduce the financial drain of public enterprises on the public purse, offer a better solution to market failure problems (such as natural monopoly) and introduce competition to sectors that are no longer understood to constitute monopolies.

An historical approach to the problem may contribute to shedding light on the interactions among technological innovation, infrastructure services and finance, and to clarify the wide range of objectives that public ownership and control intended to achieve. The origins of both regulation and government ownership date back well into the nineteenth century and reflect multiple economic, social and political targets. The historical experience of public enterprise over the last two centuries reveals a mix of motivations, such as strategic factors related to external and internal security, in some cases directed to social and political unification, especially in new or fragile nation states and economic growth and development.

Another phenomenon described recently in infrastructure are phases of infrastructure development, so called waves, relates to the effect, that some infrastructure roll-outs happen in high peaks followed by a time of low activity almost identically across industries and countries. They have been described by e.g. Hausman/Hertner/Wilkins (2008) or Millward (2005).

For monopoly control, arms' length regulation has been a major tool. However following the 1930s depression, arms' length regulation gave way to more direct controls via state-owned enterprises. This implied that once confidence in markets and private enterprise has been restored, a return to arms' length regulation would reappear as it did since the 1980s.

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. Cross-sectional studies in the past have failed to show any significant differences between the costs of private and public firms. It is worth stressing 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. The research on performance since the WWII suggests that European state-owned enterprise 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.

To achieve a deeper understanding of the philosophy of provision of infrastructure and its related macro-economic effects it will be of high value to analyse the infrastructure provision in ancient times. Athens under Pericles exhibited a high rate of public expenses, that amounted to one fifth of the national product - far more than the early Roman Empire (about 5%) - and that was comparable to the (15th-century Republic of Florence). Even allowing for a primitive public financial system, strongly dependent on the allies' tributes, the public provisioning mechanisms seem remarkable. The low public expenses rate in Ancient Rome reflected not only the restricted fiscal capacity of an agrarian society, but also the laissez-faire policy that characterised the early Roman Empire. Despite these limits aqueducts represented some of the major infrastructures built up in Ancient Times and the road network - mainly created for military reasons, and whose costs were part of the military expenses - could develop all over the Roman territories.

The Early Modern Age as well could provide useful hints for a wide comprehension of the infrastructure financing issue even if it has not been entirely investigated up to now. Spanish Milan, for instance, proves to be an interesting case of public intervention for the canal maintenance by collecting capitals straight in the market.

The initial considerations above draw an illustrative picture on how manifold and interrelated infrastructure provisioning and financing is in terms of business, economics, organization, social, welfare and other areas. The consortium decided to focus on major research questions in order to cover the interests of the EIB as follows.

Major Objectives:

- How is infrastructure provisioning and financing realized in different time periods, different regimes, different sectors and regions? Where and which phases exist in the area of, private, public or mixed (public and private) activities?
- How does the introduction of transnational (pan-European) infrastructure impact on infrastructure finance and regulation? (European singularities: Single market, TENS, integration needs infrastructure for trade, investment and free movement)
- Do best-in-class examples exist – and if – what do they look like? Is there any systemic scheme between innovation, finance structure and regulation of infrastructure sectors?
- What are the outcomes of public engagement in public infrastructure provisioning? Do and how do they differ from public/private/public private engagement and in which dimensions?
- What lesson learnt can be taken for contemporary policy debates?
- And overall: What can history teach us about efficient finance of infrastructure?

Tasks:

- Gain long-term insights in the history of infrastructure provisioning and outline the long-term evolution in infrastructure finance and the ability to match the needs for service improvements.
- Identify and catalogue infrastructure financing schemes across time, sectors, engagement, region, law, and other framework conditions.
- Identify and develop infrastructure finance case studies.
- Implement and analyse historical perspective.
- Draw future perspectives.
- Evaluate outcomes of case studies.
- Draw recommendations for contemporary policy debates

Historical context

Public infrastructure dates back to ancient times. Examples like ancient Greece or the Roman Empire did serve their citizens already with public infrastructure in exchange for taxes. Outstanding research towards political economics was done already by Adam Smith in the 17th century.

Today's 20th century public ownership dates its origins back to the early 19th century. On the one hand, in that long-term perspective, public ownership was not the main instrument for dealing with natural monopolies and market failures. On the contrary, for monopoly control arms' length regulation was the major and most common instrument. On the other hand, public enterprise was often an instrument for promoting social and political unification, securing national defence and similar strategic assessments, in some instances for promoting economic growth. Hence geo-political factors and the concern for internal unification and security seem explaining much of the rationales for 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.

Such a trend was combined with a gradual move to mass joint consumption of services (railway, gas and water, the telegraph and, later in the century, the spread of electric cables, tramlines and telephone wires), that were also prompted by the growth of urban areas. With the exception of water supply, these infrastructure industries were offering new services based on technological innovations. They all suffered the traditional problems of monopoly. Railways were often owned by a single company on a regional basis, as well as the electric telegraph, while the towns witnessed a flourishing competition between gas, electricity and water suppliers and a following emergence of a local monopoly or intercompany agreements on districts to be served. These networks exhibited great potential for opening up regions and perhaps enhancing economic growth.

Unlike the 19th century commitment to free enterprise capitalism, these sectors were strictly regulated and sometimes taken over by local and central governments. Private enterprise was nonetheless widespread. Almost without exception it was involved in the entire initial construction and running of the new networks and, across Europe, was still the dominant form of undertaking in 1913 on the eve of the WWI.

The economic problems arising from Europe's growing industrial towns were treated as a local issue in the 19th century. Central governments were not involved in it. This was not the case for railways and telegraph, which relied on regional and national networks and, by joining up different parts of the country, were objects of national concern. In all countries, apart from Belgium, the initial development of the new 19th century railway infrastructures was undertaken by the private sector. Yet most governments did not withdraw fully (take out of it) and provided guarantees of interest on railway investment projects.

In the 19th century government intervention in the infrastructure industries did not appear univocally linked to the pace these industries developed at in a particular country or the level of income per head in that country. Private enterprise was common in countries with high income levels (like in the United Kingdom) as well as in less developed countries (like in Spain and Italy). Similarly, municipal ownership was to be found in infrastructures with high growth rates (Norwegian electricity, gas in Denmark and in large towns in Germany and in the United Kingdom) as well as in cases of relative low growth (tramways in the United Kingdom, telephone in France, gas in Sweden and Norway).

Government ownership in the 19th century was not strongly linked to the kind of ideological positions present in 20th century Europe. It was not a lack of confidence in capitalism that prompted state ownership, but rather more pragmatic issues, such as the control of information flows, speeding up construction work and ensuring social and political unification.

At the same time, municipal socialism as an ideology cannot explain the main initial surge of municipalisation that occurred for gas and water from 1850 to 1870 and electricity and trams from the 1880s: the debates on municipal socialism actually occurred only in the 1890-1914 period. Municipal enterprises flourished mainly when they acted as "cash cows": this implies that municipalisation was common in rapidly growing urban areas and where profit transfers to finance public health programmes were supported by middle-class councils as a form of non-tax revenues. Such transferred profits were a tax on all users and therefore were welcomed by the limited number of local taxpayers.

Private enterprise was dominant in the early growth of all new networks due to high risks and in settings like Spain and Italy where coal supplies were limited. 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. Central states were interested in connecting disparate regions by cultural and physical links and in having infrastructures that facilitated the moving of troops, messages and military supplies. Both objectives could be achieved by the use of subsidies and so they did not necessarily imply state ownership. The latter had to be used when the construction of infrastructure had to be speeded up or when the routes were not profitable so that no subsidy could provide a credible incentive for a company to privately run such infrastructure (e.g. parts of France and Italy in the 1880-1913 periods).

Therefore, the choice of public enterprise over the binomial combination of regulation and subsidy to private operators appears to have been due to a desire to speed up the initial construction process and/or avoid unsustainably high subsidy levels and/or ensure tight control of security. In some instances, as in Sweden and France, shortage of capital may have been a cause of private company failure or delay, leading to government interventions by the means of takeovers or guarantee of loans, but the main cause in such government involvement often derived from strategic concerns. In the other cases, from early days the monopoly factors in railways and tramways, gas, electricity and water supply stemming from their basic technology were managed by arms' length regulation, which included a close scrutiny of the companies. These considerations largely account for the classic features of communication infrastructures in Continental Europe.

The early years of the 20th century marked a turnabout in Europe. All telegraph and telephone had been taken over and run from government departments, fearful 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 and, in 1905, in order to finally secure a unifying network, Italy completed the nationalisation of its railways.

In several German states, too the systems were nationalised, for strategic reasons, faced as they were by hostile Russian and French neighbours. A final government interest in the alignment of routes and methods of operation arose from a desire to directly control information and the movement of people and goods. For this reasons, state ownership was unavoidable and seems to explain the widespread state ownership of telecommunication systems and of the railways as part of the Prussian state in the period from 1870.

It is not possible to identify a single model spread all over Europe. Indeed, on the eve of the WWI the pattern of regulation and ownership exhibited a large range of possibilities. Even if legislative ceilings on fares, tariffs and rates were common, the use of the concession system, franchises, profit sharing, subsidies and grants was deeply differentiated. Municipal ownership of gas, water and electricity was strong in some areas like Germany and Scandinavia but not in others like Spain and Italy. Railways were still mainly privately owned in Britain, France and Spain but not in Norway, Italy or Germany. In the period 1914-1945 a major regulatory change occurred in the role of the central state, which increased its presence especially in the form of state ownership. Most of this trend had emerged by the end of the 1930s, when the central governments had taken a strong control on all the infrastructure industries. At the end of the WWII most Western European countries had a substantial state enterprise sector. The following decades until the 1980s were strongly affected by public enterprise. In energy, telecom and transport, several state owned enterprises had emerged throughout Western Europe before the WWII, with a wide range of origins and objectives. By the 1950s, public enterprise was dominant in these sectors. In France and Britain, railways, airlines, telecommunications, gas supply, electricity supply and coal mines were all nationalised.

Faced to this framework, all European infrastructure sectors were to cope with two general problems in the first half of the 20th century:

- a) how to develop national networks (electricity and telephone) sometimes in front of resistant small scale municipal and private enterprises;
- b) many of the services of infrastructure industries came to be seen and demanded as public services, bringing about pressures for "low" and "fair" prices.

Also a "universal prices" principle emerged often under the form of similar rates independent of location and cost.

The new states in the late 1940s were expected to be widely involved in the macroeconomic management, to ensure a fair allocation of resources for reconstruction and raise the living standards of the poor. The infrastructure industries would have a central role in this respect. Firstly, the export targets could not be reached without prior development, domestically, of the infrastructure sectors. Secondly, many of the services produced by the infrastructure industries were either important items of working-class budgets or were essential parts of current residential models. For instance, water supply and transport were "essentials" insofar as demand was inelastic with respect to income and price. During the 1940s and the 1950s, central states were

subjects to political pressures to stop rail fares, gas, water and electricity tariffs outpacing wages. Nor could access to services be significantly different in different parts of the country. It was in this context that the idea of the “universal service” became common. All of this gave room for an enhanced role of the state in economic life and extended the range of functions that these industries were expected to fulfil. The final result was that by 1950, railways, airlines, coal, electricity, iron and steel, gas and telecommunications were fully or partly public owned everywhere in Western Europe.

Actually, there were strong differences between countries, as it is clearly shown by the Italian and British cases. By the second half of the 20th century, state-owned enterprises holdings, like IRI and ENI, were widespread in all sectors of the Italian economy, while in the United Kingdom they 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 and national reconstruction after WWII.

Nonetheless, a distinction is to be drawn. 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 have been state-owned for most of the last two centuries. 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, particularly in Germany, Italy and Spain.

Everywhere in the Western economies, 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 and 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. Sometimes, as a major after-effect of privatisation, regulatory regimes have been built up so that for some the state involvement was hardly reduced.

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. As a matter of fact, state enterprise financial losses were an important part of public sector deficits which affected many countries in the Western World after the turmoil of the 1970s.

The privatisation process was often related to specific financial crises on a country-basis. Security, social and political issues were still important but since a wider range of tools was available railways, telephone and airlines had no longer priority. The great technological changes of the last quarter of the 20th century, the changing geo-political framework and the changing array of policy instruments has not been neutral in the whole deregulation and privatisation process. They explain that in Europe the whole process did start just at that time.

A remarkable difference exists between USA/ United Kingdom and the Continental Europe where national governments were still (by 2006 at least), more strongly linked to their infrastructure industries by share ownership. Thus telecommunications were still part owned in France, Germany, Ireland, Sweden, Netherlands, Belgium, Italy. Railways were still fully state owned in most countries. However, there does seem to be reduced usage of these sectors as instruments of strategic policy and the ownership and regulation patterns seem more predictable from market forces. 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.