

Privatization and Decentralization in Network Utilities: What Lessons Can We Learn?¹

Rémy Prud'homme²

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I – Introduction

Over the past three or four decades, there has been a world-wide move towards privatization and decentralization (subsequently P&D). The reasons for this overall change are many. There was a growing demand for decentralization for political purposes: to give more power to sub-national politicians and/or sub-national bureaucracies. It was increasingly felt that the private sector was generally more efficient than the public sector. As activity and complexity of network systems were increasing, central governments realized that they could not cope, or cope well, with the management of these systems. Also, there was a shortage of public funding. Although the tax to GDP ratio was higher than ever in history, the share of social expenditures was increasing so rapidly that there was not enough central government money left for infrastructure investments. It was felt that sub-national governments and/or private enterprises could fill the financing gap.

Whatever the causes, the changes are unambiguous. The balance of power shifted from central governments to sub-national governments in most countries, developed and developing, with few exceptions (the UK being until recently a noteworthy one). Expenditure decentralization ratios (the ratio of sub-national government expenditures to total government expenditures) increased in most countries. So did tax decentralization ratios (the ratio of sub-national government taxes to total government taxes) –although less rapidly in most cases, implying an increase in central government subsidies. We will not give numbers here, because these crude measures of decentralization can be misleading. What is a “true” local

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² Professor emeritus, University Paris XII (prudhomme@univ-paris12.fr)

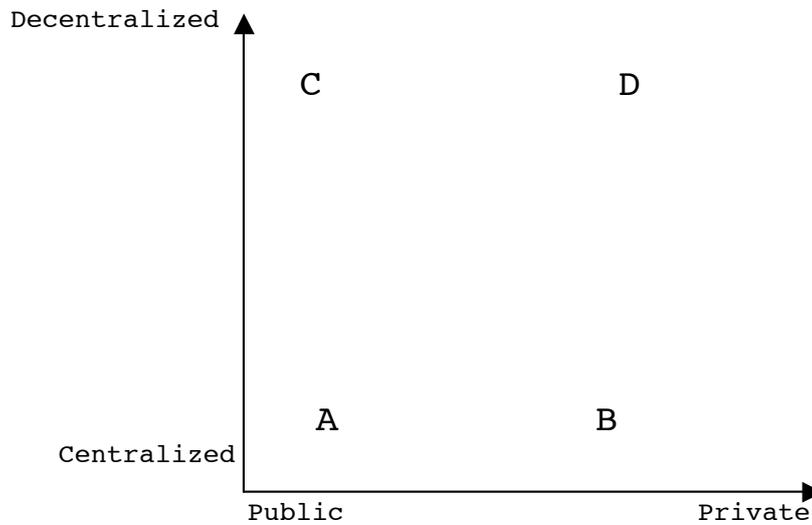
expenditure or a true local tax is not as clear as is often assumed, and is done with criteria that are not constant over space and time. What matters is the degree of freedom granted to sub-national governments. It involves issues such as the nature of subsidies (block grants or ear-marked transfers), the right to borrow, the constraints imposed upon tax rates or expenditures types, the right to impose regulations, or election rules –issues which are not captured in decentralization ratios. But overall, there is no doubt that the degree of freedom and of responsibilities granted to sub-national governments increased in past decades.

The balance of power also shifted from the public to the private sector. In most countries, a number of public enterprises (particularly enterprises operating in the competitive sector, such as banks, insurance, and industrial enterprises) were privatized. Many government controls on prices, imports, exports, borrowing, investments, etc. were relaxed or abolished. The share of investment directly or indirectly controlled by “ministries” declined almost everywhere. The growing internationalization or globalization was simultaneously a consequence and a cause of this privatization movement.

The network or infrastructure-based utilities sector was part of these changes. In the 1960ies, in most developed countries (and even more so in developing countries), many if not most network utilities were both public and centralized. This was in particular the case in transportation. Roads, bridges, ports, airports, railroads, were owned and operated by central governments or State enterprises. In most cases, the services provided by these infrastructure were offered for free, that is paid for by the national taxpayer. This was a relatively recent phenomenon. In the 19th century, by contrast, many networks had been developed by the private sector and/or by sub-national governments, usually at a cost for users. Over the course of time, however, partly for ideological reasons, partly for technical reasons, networks had become nationalized and consolidated. In the 1960ies, the pendulum began to shift in the opposite direction, towards privatization and decentralization.

In the language of Figure 1, that presents the various options in a stylized fashion, we moved from D in the 19th century to A in the mid 20th century, to go to B and C now.

Figure 1 – Institutional Framework for Utilities Provision



In the telecommunication sector, privatization were massive. Most national public telecommunication monopolies were broken and sold to the private sector. In power, a similar transformation is taking place, at a much slower pace. Water supply and treatment had always been decentralized in most countries, and in some countries, particularly France, contracted out to private companies: more cities decided to privatize the service.

In the field of transportation, the picture varies with the mode. For rail, decentralization took place in Japan, with the mammoth Japan National Railway broken down into six distinct regional entities. In many countries (including Japan) rail monopolies were divided, in particular between rail infrastructure and rail operation, and some (or all, as in the UK) of the units thus created were privatized. In France, regional rail transport was decentralized, with regions contracting out with SNCF, the State railroad company. For road, decentralization had always existed nearly everywhere, with local governments responsible for local roads, regional governments for regional roads, and national government for national roads and highways. In many countries, however, a number of "national" roads were declassified, and handed out to sub-national governments, a clear case of decentralization. In air transport, air companies have largely be privatized. Even air control has been privatized in at least one country, the UK. Airports are nearly everywhere decentralized and increasingly privatized. So are harbours.

Recent decades therefore offer a vast menu of decentralization and privatization experiences. This paper is not a thorough survey of these diverse and numerous experiences. It is, more modestly, an attempt to draw some lessons from them. Section II discusses the benefits that can be and in many cases have been associated with these movements. Section III shows that network utilities have many dimensions or components that need not and should not be decentralized or privatized in the same way. Section IV shows that, in part to compensate or mitigate the costs also associated with it, decentralization and privatization do not imply a lesser role for central governments, but rather a different role. Section V concludes

II – P&D Can Increase Efficiency

A first lesson of decentralization and privatization experiences, and of the analytical efforts which have been devoted to the issue, is that both changes are potentially beneficial to society.

Privatization

Assessing the benefits of “privatization” is complicated by the fact that the word has several, different, meanings. It can refer to:

- the privatization of decisions (relative to the nature and location of the service);
- the privatization of production;
- the privatization of payment (by users rather than by taxpayers);
- and even the privatization of financing (by borrowing rather than by own resources).

A particular service can be public with regard to decision and production and private with regard to payment and financing, or alternatively public with regards to decision and financing but private with regard to production and payment. This defines 16 different options, and actually many more, because most of the dimensions considered are not dichotomic: payment, for instance can be in part public (by taxpayers) and in part private (by users). In practice, the number can be somewhat reduced. Complete privatization of decision is not a realistic option and is rarely, if ever, done. Privatization of

financing is a very real option, but one that does not matter much. Four options emerge as particularly interesting, that are represented in Table 1. Three have a dose of privatization.

Table 1 – Three Types of Privatization

| Produced by \ Paid by | Government, or State-owned enterprise | Private enterprise |
|-----------------------|--|---|
| Users | Option X Public tolled road | Option Y Private highway |
| Taxpayers | Option O Ordinary (non tolled) road | Option Z Contracted out road maintenance |

The case of privatization rests on two main arguments. One relates to production: it is that private enterprises are more efficient than public enterprises or governments, in the sense that they can deliver a given service at a lower cost (or more for the same cost). The other argument relates to payment: it is that taxes have an opportunity cost, in the sense that they do not merely transfer income, but that they also reduce income.

These gains can be explained as follows. The efficiency gain of private enterprises is not due to their "privateness" but to the competitive environment in which they operate. Private monopolies are as inefficient as public monopolies. But private enterprises subject to competition are under pressure as well as able to reward their most efficient workers (unlike the public sector, which cannot, for valuable reasons), to take decisions quickly (unlike the public sector that has to follow formalized procedures), to innovate and to take risks constantly (unlike the public sector). Studies have shown that private enterprises make as many mistakes as public enterprises, but that they acknowledge and correct their mistakes more quickly. The opportunity cost of taxes comes from the fact that most taxes (there are a few exceptions, like taxes on externalities), whether on income, on capital, on consumption, have disincentive effects: they lower the propensity to work, to save, to invest, to innovate.

Many empirical studies have attempted to estimate these potential gains of privatization. There is no consensus, but the efficiency gains seem to be in the 10%-

30% range. By coincidence, it happens that studies of the opportunity cost of taxation produce numbers in the same range. Let us keep 20% for both types of gains, as an order of magnitude. This would mean that moving from option O to option X leads to a 20% gain. So would a move from option O to Z. A move from O to Y would combine these two gains and produce a 44% gain. These effects –and these numbers– are the drivers of the privatization movement experienced world wide.

Note, however, that the privatization of payment (the use of tolls) may have a welfare cost that should also be taken into account. The toll charged for the use of an infrastructure, such as a road or a bridge, will eliminate some users. When the economic cost of supplying the service is not affected by usage, excluding some users implies a welfare cost. The surplus generated by the infrastructure will be reduced, and this reduction will be a function of the toll level. This point is only true for non-congested infrastructure. If, or rather when, there is congestion, then (at least in principle) a congestion charge is appropriate to maximize the benefit from infrastructure usage. A toll will in that case increase, not decrease, the surplus associated with infrastructure usage. It must also be added that the welfare loss generated by private payment will only occur when marginal production costs are zero or lower than the fee charged. This happens indeed with roads or bridges, but not necessarily with all types of infrastructure.

The combination of these three effects or mechanisms (the greater efficiency of private operations, the tax distortions, and the user's exclusion) implies that the economic utility of a given infrastructure investment is a function of the institutional and financial arrangements selected for the operation of this infrastructure. This is because these arrangements have an impact upon these mechanisms, which in turn determine the economic interest of the project. In another paper (Prud'homme 2005) we defined a simple project, a bridge, with a reasonable demand function, and considered seven institutional and financial options to build and operate it: (i) a pure public option (publicly built and operated, zero toll: the Z option of Figure 1), (ii) a pure private option (privately built, financially viable toll: the Y option of Figure 1), (iii) a public cum toll option (publicly built, public toll: the X option of Figure 1), (iv) a private cum subsidy option (privately built, lower toll, and a compensating subsidy), (v) a shadow-toll option (privately built, zero toll for users, a government payment based on usage), (vi) a delayed public option (the pure public

option delayed by three years), and finally (vii) a do-nothing option. A simulation model was used to calculate the economic internal rate of return (IRI) and the discounted net value (DVN) of the (same) project under the different options. Both the efficiency gain of private enterprise and the opportunity cost of taxes were estimated to be 20%. The results are shown in Table 2.

Table 2 – IRR and DNV of a Given Project Under Different Financial and Institutional Options

| Option : | IRR | DNV |
|-------------------|-------|-----|
| Pure public | 13.6% | 124 |
| Pure private | 17.4% | 133 |
| Public + toll | 15.1% | 126 |
| Shadow toll | 17.9% | 139 |
| Private + subsidy | 16.3% | 127 |
| Public delayed | 13.4% | 95 |

Source & notes : Prud'homme 2005 ; IRR = Internal rate of return, calculated over a 30 years period ; DNV = Discounted net value, calculated with a 6% rate of discount, also on a 30 years period.

The numbers are no better than the (reasonable) hypothesis used, but the ranking is probably fairly robust. It suggests several conclusions.

The most important one is that different financial options for the same infrastructure investment (here, a given bridge) lead to different economic IRR and DNV. Institution and finance do matter for economics. The standard question: "what is the economic justification of a given project?" calls for a counter-question: "under what financial option?".

Then, the private options appear attractive. The pure public option does not fare well. It has the lowest economic IRR and DNV of all options. It can be somewhat improved by the introduction of a toll: what is lost in terms of consumer's surplus is more than compensated by what is gained through a reduction in tax-associated damages. The private options are all superior. The shadow toll option is the option that has the highest IRR and DNV. But even the private-cum-subsidy option is better than the public options.

Decentralization

Assessing the benefits of decentralization is no less delicate. The standard theory distinguishes between two main types of benefits.

The main economic benefit expected from decentralization is improved *allocative efficiency*. The

argument of the standard fiscal federalism theory is as follows. The inhabitants of different regions or areas have different tastes and needs. If taxes and expenditures are decided by a central government, there is no bundle of taxes and expenditures that will suit all regions, in terms of volume or of structure. People in region A will have more taxes (and expenditures) than they really want; people in B will have less; people in C will have more transport and less education than they want, while the reverse will be true for people in D. By contrast, a decentralised system, in which each region decides on the volume of taxes and on the structure of expenditures that best suits its needs, will make it possible for all the inhabitants to enjoy their preferred bundle of public goods and services. In this view, the change from a centralised to a decentralised system will necessarily improve welfare.

Decentralization is also likely to improve *productive efficiency*. Sub-national governments, it is argued, can do the same thing as national governments at a lower cost. They are better informed of local needs and opportunities, they can respond faster and more flexibly, and they are more closely watched and monitored by the electorate. They enjoy an information advantage. To put it otherwise, decentralization decreases transaction costs.

Note that the first argument applies to decentralization across the board, and much less to the decentralization of a particular infrastructure service. If only one type of infrastructure, such as roads, is decentralized, particularly with ear-marked subsidies, not much can be expected in terms of allocative efficiency. Progress can only be expected in terms of productive efficiency.

Counter arguments have also been offered (Prud'homme 1995). The allocative efficiency argument assumes that all the inhabitants of a given region have similar tastes, and also that they have similar incomes. It assumes further that local and regional elections are an effective mechanism for the expression of a detailed demand for public goods and services. It also assumes that central government are unable to treat differently different regions and in practice assumes away deconcentration. All these assumptions are highly questionable.

The productive efficiency argument is weakened by the existence of economies of scale, and by the strength of nation-wide bureaucracies. If or rather when unit costs decrease with quantities produced, national provision may

turn out to be more cost-effective. Ready-made clothes may involve greater transaction costs than clothes made to measure by next door tailor, and yet be cheaper. In many cases, strong, efficient, well controlled and properly monitored national bureaucracies perform better than fragmented, generally more politicised, not so well trained local bureaucracies.

Empirical studies are scarce and often unconvincing. In the 1980ies, particularly at the World Bank, a number of cross countries studies tried to explain infrastructure network efficiency (E) by the degree of decentralization (D) and other explanatory variables (X):

$$E = f(D, X)$$

They did not achieve much, because it is very difficult to find good, meaningful, indicators for both E and D, and also because one is never sure to have included all the relevant X. Case studies of partial decentralization are another approach. They are probably more trustworthy, but their explanatory power is always limited. This been said, the overall impression left by these studies is that, in many cases, decentralization of infrastructure services can indeed increase efficiency. In France, for instance, the decentralization of regional train passenger transport seems to improve efficiency. Each of the 22 regional governments now negotiates with SNCF, the monopoly provider, the services that should be rendered in the region and the required subsidy. There is some evidence that they do better than the central government was ever able to do –which may not be much because the central government proved utterly unable to tame the SNCF monster– and some hope that they will improve the quality and the efficiency of their control over the course of time.

III – P&D imply the unbundling of infrastructure services

A second lesson of P&D experiences is that we should beware of generalizations. To privatize (or to decentralize) network infrastructure in general, or transport infrastructure at large, or even road transport is not a very meaningful proposition. It does not call for a "yes" or "no" answer, not even for a "more or less" answer. What is true and desirable for a given infrastructure is not be true for another. What is feasible for one component or one dimension of a particular sector is not for another. For analysis and for policy, it is necessary to "unbundle" sectors and

services, to "deconstruct" them. The various parts of a given sector will not move towards privatization or decentralization at the same pace, or along the same road.

Unbundling can be done in many different fashions, depending upon the technical characteristics of the service considered.

Production/transportation/distribution

In power and water, and also in postal services, it is useful to distinguish between (i) production, (ii) transportation and (iii) distribution. The market failures that justify the "public" nature of power for instance, and the notion that it cannot be left to market forces alone, do not apply or do not apply equally, to each of these three components. The decreasing cost argument, for instance, producing natural monopolies, applies (in the case of power) to distribution and to a lesser extent to transportation, but not to production. It is not possible to have several distinct entities offering power at the consumer level on distinct networks. It is not easy to have several companies offering to transport electricity over long distances from A to B, on parallel power lines, although this is perhaps not unthinkable if one company transports it via C and another via D on distinct networks. But there is nothing preventing distinct entities to produce power (by different means perhaps) in a competitive fashion, in order to sell it to a transportation and distribution company.

This means that privatization of power should begin at the production level or stage, where it will be relatively easy to implement. It does not mean that no privatization can take place at the other two levels. When competition *on* the market cannot function, there remains the possibility of competition *for* the market. Private entities can bid for the (temporary and controlled) transportation and distribution monopolies.

It also means that decentralization of distribution is much more appropriate than decentralization of the other components. Distribution is local or regional. There is no reason why the responsibility for this service would remain in the hands of the central government. It can well be discharged by local or regional governments, that will chose to do it directly or to contract it out to private enterprises.

Engineering/Construction/Management/Maintenance

Most network utilities imply, nearly by definition, an infrastructure which is utilized to produce the service. What matters is obviously the service, although in some cases the importance of the infrastructure is such that the name of the infrastructure is used to describe the service. "Sewers", for instance, often refers (perhaps incorrectly) to sanitation, the service rendered, and not merely to the particular piece of infrastructure used to render this service. To underscore this distinction, Table 3 provides a list of public goods and services and of the associated infrastructure.

Table 3 – Public Goods^a and Services With Corresponding Infrastructure

| Public good/service | Related infrastructure ^b |
|---------------------|--|
| Education | Primary/secondary schools, universities |
| Health | Medical offices, clinics, hospitals, etc. |
| Defense | Military barracks, warehouses, air bases |
| Justice | Courts, jails |
| Culture | Museums, theaters, libraries |
| Transportation | |
| air | airports, radar stations, control towers |
| road | Roads, highways, bridges, tunnels |
| rail | Railway lines, stations, signaling |
| waterways | Canals, locks |
| maritime | Ports, lighthouses |
| urban transit | Subways, street networks, traffic signals |
| Telecommunications | Lines, satellites, switching stations, cable |
| Electric power | Power plants, power lines, transformers |
| Water supply | Dams, pumps, pipes, purification plants |
| Sanitation | Sewer systems, waste treatment plants |
| Street lighting | Streetlights |
| Recreation | Parks, stadium, swimming pools, gymnasiums |
| Postal services | Post offices, processing centers |
| Religion | Places of worship, cemeteries |
| Research | Laboratories, offices |

Source: Prud'homme 2000, p. 335

Note: ^aThe word is used in its non-technical sense; ^bthe infrastructure listed here are illustrative not exhaustive; an "etc." could and probably should appear on each line.

A piece of infrastructure has to be (i) designed, (ii) constructed, (iii) operated, and (iv) maintained if it is to produce the expected service. These four phases or dimensions of service provision can and should be distinguished for privatization and (to a lesser extent) decentralization purposes. Any of these activities can be privatized independently of the other ones. One could for instance privatize the construction and keep public the other three activities, or privatize design and maintenance and keep public construction and operation.

This appears clearly when one looks at public-private partnership contracts. They are very diverse in the

definition of the responsibilities of the private party. Some contracts relate to infrastructure provision alone; other to operation alone, without infrastructure provision; yet other to both infrastructure and operation, as indicated in Table 4 below. This Table also describes the other element always found in public-private partnerships contracts, namely the mode of remuneration of the private entity involved.

Table 4 - Possible Contents of Public-Private Partnerships Contracts

A - Services provided by the private firm :

Infrastructure without service :

- Design
- Construction
- Maintenance

Service without infrastructure :

- Limited manangement
- Overall management

Both infrastructure and service :

- Service with initial infrastructure
- Service with additional infrastructure

B - Remuneration of the private firm :

By the public sector entity (price)

- Fixed price
 - Immediate
 - Deferred
- Proportional price
 - On the basis of the service provided
 - On the basis of financial outlays

By the user (fee or toll)

- Average cost
- Marginal cost
- Ramsey-Boiteux price

Mixed (service fee + price)

A familiar form of the design/ construction/ operation/ maintenance unbundling is the distinction between infrastructure ownership and service provision formally endorsed and imposed by the European Union for rail transport. The famous 91-440 directive makes it compulsory for EU members to distinguish between rail infrastructure ownership and provision which can remain monopolistic, and train operation which should become competitive. Any (properly certified) company should in principle be allowed to operate trains on the rail network. In practice, a number of countries are slow to introduce this sort of competition. In France, for instance, it is the SNCF, the traditional monopolistic operator, that is responsible for granting candidate competitors the technical certification; it does not exhibit a great eagerness to do so.

Regional or Spatial Unbundling

Another strategy for "opening" up nationwide network utility companies is to divide them along geographic lines. In some cases, like water or waste disposal, it is fairly easy and obvious, and these services are generally not provided by a national entity in the first place. They lend themselves particularly easily to decentralization. In other cases, like rail transportation, carving out meaningful regional subsets or specific lines (or corridors) is more difficult, although not impossible. One has to select a particular service, such that most of the activity takes place within regional boundaries. This was done for the privatization of rail transportation in Japan and in the UK, and for rail decentralization in France.

Unbundling offers great possibilities to implement P&D strategies. Distinguishing between different zones or parts or components of a given service makes it possible to privatize or decentralize only what can most efficiently be privatized or decentralized. It maximizes benefits and dampens opposition. It offers some of the advantages of made to measure over ready-made.

Unbundling, however, is not always an easy solution, and might create problems of its own. Unbundling a given service can be done in different ways, and finding the most appropriate division requires a good understanding of the technical and economic characteristics of the service. The expertise and methodology necessary to do that are scarce and fragile. Then, and this is the other side of the unbundling coin, unbundling creates a need for coordination. The various components of the unbundled service, be they functional or geographic, have to be articulated. If several independent companies are allowed to use the same rail infrastructure, someone must make sure that they do not do it at the same moment on the same rail-track. The coordination function is done in-house in the case of a single monopolistic enterprise. It is done by the market in the case of purely private goods. But in the case of an unbundled public service, it has to be done by a special coordinating or regulatory entity.

IV – P&D Require Central Government Intervention

Many people take it for granted that privatization and decentralization are synonymous with less government or central government intervention. They find it very attractive when government or central government is weak,

inefficient, or corrupt, as is sometime the case in certain developing countries. One lesson we have learnt is that such views are mistaken. Successful and efficient P&D require on the contrary a great amount of government (particularly central government) intervention in the form of subsidies, regulations, monitoring, controls, coordination, etc. Doing things indirectly (which is what P&D imply) rather than directly (which is what Central government provision is about) is as difficult or more difficult. It is a different role, but not an easier one.

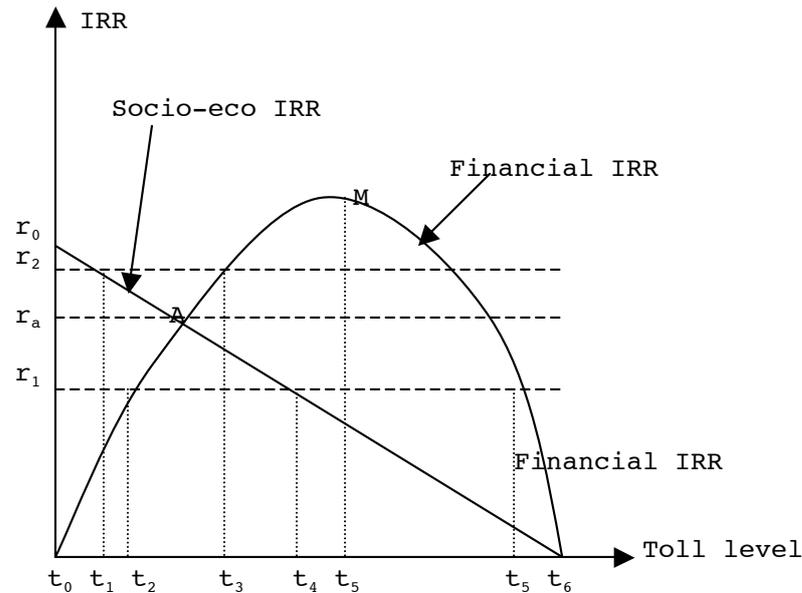
Hence a well-known paradox. The countries that need most to privatize and/or decentralize network services, because the central government is unable to provide them efficiently, are also the countries that are least able to privatize and decentralize correctly. Conversely, the countries that have a central government sufficiently sophisticated to manage well a P&D program are also the countries where this program is least needed because this same central government is usually quite good at direct services provision.

Subsidies

It is often felt that privatization and/or decentralization necessarily alleviates the expenditure burden of central government. It is not necessarily so, and in many cases, it implies grants and subsidies. This is worth emphasizing, because in many people's minds a service should be either totally private or totally public (that was for many years the position of the powerful French Conseil d'Etat)

Let us assume that a government (central or local) wants a private company to build and operate a toll road or bridge. Both the socio-economic rate of return (for society at large) and the financial rates of return (for the private company) are a function of the toll level, as shown in Figure 2.

Figure 2 – Internal Rates of Return As A Function of Toll Levels



The socio economic rate of return is maximal, and equal to r_0 when the toll level is t_0 , that is when there is no toll, because no one is excluded from the bridge usage. When the toll level increases, some users are excluded, and the socio-economic IRR declines. There comes a point, for $t=t_6$ when so many people have been excluded that the $IRR=0$. For the financial IRR, the picture is different. When the toll level is low or zero, the IRR is also low (or even negative). An increase in the toll level improves the financial IRR, up to a certain point, because with a very high toll level, patronage declines so much that the IRR decreases. There is a toll level, t_5 , that maximizes the financial IRR, at M , and it is the one a private enterprise would select if it were free to choose the toll level. Let us assume that the minimal rate of return r^* is the same for the government and the private enterprise (this is an assumption that simplifies the presentation but can easily be abandoned). The government will not decide the project if its socio-economic IRR is below r^* ; and the private enterprise will not undertake it if its financial IRR is below r^* . Two cases may arise, with r^* lower than r_a (the rate determined by the intersection A of the two IRR curves) or higher than r_a .

If the minimal rate of return is lower than r_a for instance equal to r_1 , then it is possible to privatize the infrastructure. Any toll between t_2 and t_4 will be acceptable, because it will produce an economic IRR and simultaneously a financial IRR higher than the minimal rate. A private enterprise will be ready to make the

investment and manage the infrastructure. A government will also find the operation desirable from a socio-economic viewpoint. Note that the interests of the two parties differ relative to the toll level: the private enterprise would want it to be as close as possible to t_4 ; the government should want it to be as close as possible to t_2 .

If the minimal rate of return is higher than r_a , for instance equal to r_2 , however, it is not possible to privatize without some sort of subsidy. There is no toll level that is satisfactory for both the government and the private enterprise. A toll higher than t_1 is not acceptable for the government, but neither is a toll lower than t_3 for the private enterprise. Only a government subsidy to the private enterprise, that will shift upwards the financial IRR curve, will reconcile the interest of both parties.

This very simple model shows that subsidies can be necessary for privatization. If it is felt that the efficiency benefits associated by private management are worth having, they will require, in some cases, government subsidies. The simulation discussed above shows that in certain cases at least, the private-cum-subsidy option can be more desirable than the pure public option. But our simple model also suggests that defining the appropriate toll level and the related appropriate subsidy level, a task for government, is a particularly difficult task. It requires a good understanding of the two IRR curves, and a good appreciation of the minimal rates. Many governments, whether national or a fortiori sub-national, are unable to do such complicated calculations.

Decentralization also often implies subsidies. In theory, decentralization is the joint decentralization of taxes and expenditures. Indeed, the allocative benefits of decentralization will only be fully reaped if the sub-national government is responsible for both taxes and expenditures, if it balances the political benefit of a marginal euro of expenditure with the political cost of a marginal euro of taxes. In practice, however, things are very different. In most countries, particularly in Europe, the taxes of sub-national governments are much lower than their expenditures. The balance is covered by subsidies. There are good reasons, known as the vertical and the horizontal imbalances, why it should be so. First, it is much easier to decentralize expenditures than taxes. Many (indeed most) expenditures are more efficiently done at a sub-national level. This is not true of taxes: for administrative or efficiency or fairness reasons few taxes

can be decentralized. This is known as the vertical imbalance problem. It justifies across the board subsidies to sub-national governments. In addition, the various sub-national governments of a given country will always have different tax bases. Some will be richer than others. This is known as the horizontal imbalance problem. If these differences are not to increase over time, they must be corrected by appropriate subsidies. Decentralization must therefore be accompanied by complicated subsidy systems. These systems must achieve many and often conflicting goals: correct horizontal and vertical imbalances, without affecting too much the incentives of sub-national governments to behave efficiently and responsibly.

Taxation

The decentralization of certain services, particularly transport services, raises serious taxation issues. Most tax systems do not generally discriminate between sectors. The corporate income tax, or the personal income tax, or the value-added tax apply equally to income earned or spent in the shoe or in the book or in any other industry. The transport sector is an exception. In most countries, it is subject to a number of specific taxes, i.e. to taxes that do not exist for other goods or activities. These taxes benefit differently different levels of government. At any point in time, there is therefore a balance between what each level of government gets in taxes from the transport sector and what it spends in expenditures for this sector. This balance may or may not be optimal. But in any case it will be seriously affected by a decentralization of expenditures. In other words, decentralization of transport-related expenditures should not be discussed independently of decentralization of transport-related taxes. The practical importance of this issue is such that it deserves some elaboration.

Transport taxes concern road transport only. Air, rail or water transport are not subject to specific taxes. "Transport-related taxes" actually means: "road transport related taxes". Road transport taxes are many. In France, for instance, there are at least 9 such taxes. Above all, they are heavy. Road transport taxation is an important gross contributor to public finance in most OECD countries. Its relative importance varies from country to country (and with the definition of "public finances" used), but is close to 10% in many European countries. In France, in 2003, specific road transport taxes represent 2.2% of GDP, and 12.7% of central government taxes (but only 4.8% of all government taxes, including social

security taxes). Total road transport taxes would represent much more¹.

In most countries, the picture is dominated by fuels taxes. In France, for instance, fuels taxes (in excess of the ordinary VAT paid by all goods) account for about 80% of transport related taxation. The tax rate is usually significantly higher for gasoline than for diesel oil. Tax rates vary from country to country, and also over the course of time. In Europe, the average tax rates are about 200% (of pre-specific tax price) for gasoline and 150% for diesel oil. In the UK, the country with the heaviest road transport tax burden, the numbers are 285% and 257% respectively. In France, they are "only" 270% and 178%.

There is a good economic justification for this heavy taxation of road transport. All (or nearly all) taxes are distorsive –and modify resource allocation and welfare in an undesired way– but some are less distorsive than others. They should be preferred. The least harmful taxes are those that hit goods and services that exhibit the smallest price elasticities. A large increase in the price of such goods will decrease only moderately the demand for these goods, and change only moderately the allocation of resources. The theory of "optimal taxation" therefore states that tax rates on goods should be inversely proportional to the price-elasticity of goods². The benefits of road transport are so great that road transport can be –and is– heavily taxed without affecting too much the demand for it and the consumption of it. Ministers of Transport may not be fully aware of this, but Ministers of Finance certainly are.

Road transport related taxes and fees are generally much more important than road transport public expenditures. In France, for instance, in 2002, specific road taxes represent nearly twice as much as public expenditures on roads (total road-related taxes would represent four of five times as much). Similar orders of magnitude would be found for most other European countries, although not for the USA and Canada. In public finance terms, road transport is a major net contributor³.

¹ Total road transport taxes would also include VAT on fuels, vehicles purchases, vehicle repairs and maintenance ; social security taxes on the wages of people working in road transport related activities ; and corporate income taxes of enterprises involved in such activities.

² This idea was first introduced by Ramsay before World War II, then rediscovered by Boiteux after World War II in a slightly different context.

³ Public finance is not the only dimension to be considered ; but it is an important one, although it is often curiously neglected.

The key issue for our discussion is that this contribution is very unevenly distributed between levels of governments. Most taxes accrue to the central government, but most expenditures are borne by sub-national governments. Table 5 illustrates this point on the French case. Government as a whole benefits greatly from road transportation, in public finance terms. However, local, that is sub-national, governments do not. If decentralization in road transportation means giving more expenditures responsibilities to sub-national governments –as it does generally– then decentralization means increasing the massive net gain of the centre and increasing the equally massive net loss of local governments.

Table 5 – Road Transport Related Taxes and Expenditures, by Levels of Governments, France, 2001

| | Taxes ^a (G euros) | Expenditures ^b (G euros) | Balance (G euros) |
|--------------|---------------------------------|--|----------------------|
| Central gov. | 33.0 | 3.2 | +29.8 |
| Local gov. | 0.2 | 13.6 | -13.4 |
| Total gov. | 33.2 | 16.8 | +16.4 |

Source : Calculated from : URF (2003), pp. III-10-11.

Notes : ^aSpecific taxes only ; ^bCurrent expenditures plus investment expenditures ; « G » (giga) stands for billion (10⁹).

One could argue that increased expenditures decentralization in the transport sector should be treated independently of increased tax decentralization, that even if greater local transport expenditures imply greater local resources, this concerns local resources in general, and has nothing to do with transport-related taxes. This argument has some value, but it is not entirely convincing either, for several reasons.

Greater local resources should, at least in part, consist of greater local taxes (or more precisely, greater local access to tax bases). Transfers from the central government are only a second best solution. As mentioned above, transfers do not force local governments to weight the political benefits of an additional euro of expenditures against the political costs of an additional euro of local taxes. Accountability suffers, and the main theoretical advantage of decentralization is lost or eroded. One cannot recommend decentralization of expenditures without pushing also simultaneously for decentralization of taxes. The mere importance of transport-related taxes is such that they must be considered, like any other tax, as candidates for the tax decentralization consistent with expenditures decentralization. Then, transport-related taxes are a particularly interesting candidate because of the specific

tax treatment of the transport sector. To a certain extent, road taxes are user fees. They are a price paid by road users for the costs they inflict upon society when using the roads. Since many (not all) of these costs, and certainly road damage costs, are borne locally, there is a case for taxes to be also paid locally. One cannot escape a discussion of the decentralisability of road transport taxes. Can they be good local or regional taxes?

A good local tax has several characteristics. It is a tax that will not induce taxpayers to move out of a high tax rate jurisdiction at too high an economic cost. A corporate income tax, levied at the location of corporate headquarters, is not a good local tax, because it is too easy for corporations to move their formal, paper, headquarters in order to reduce their tax burden. The tax base of a "good" local tax must also be associated with activities that take place in the local jurisdiction, and not elsewhere. For that reason also, corporate income tax does not qualify, because the income of the society is produced (at least for multi-jurisdictions corporations) in many different jurisdictions, and cannot be allocated easily to each of them. A good local tax is also a tax the tax base of which is reasonably well distributed between the various localities or regions. An import tax, or a mining tax, for instance, would not qualify, because it would unfairly favour the regions that have, by chance, a harbour or a mine located on their territory.

Decentralisability of vehicles ownership taxes - Taxes on motor vehicles ownership can make relatively good regional or even local taxes. They can be considered as a form of property taxes -and property taxes are the local tax par excellence. There is a small danger that motor vehicles owners register their vehicle in a low tax rate jurisdiction. It happened in France with a yearly ownership tax (vignette) which was established as a département tax¹ (the département, of which there are about 100, is an intermediate level of government between municipal governments and regional governments). Haute-Marne, a département which was not very populated nor very rich, deliberately chose a very low tax rate to become an attractive location for rental car companies to register their vehicles. By definition, these vehicles operate in the entire country. It worked. Many of these companies responded by having a sizable share of their fleet registered in Haute-Marne, and the département ended up having a much higher than average tax yield per capita. But this is an extreme and not very significant case. Most

¹This tax was abolished in 2000.

of the time, paying registration, inspection, or ownership taxes in a region which is not the region where the motor vehicle owner lives is considered cumbersome, time consuming or costly and not worth the potential gain. In addition, in developed countries at least, motor vehicles ownership is spatially rather well distributed. Car ownership ratios do not vary much between regions, much less so than many other tax bases such as income or output or goods consumption. Motor vehicles ownership taxes are therefore good candidates for decentralization. As a matter of fact, they are already decentralised in many countries

Decentralisability of fuels taxes – Can the same thing be said of fuels taxes, which constitute the bulk of road transport related taxes ? To a certain extent, yes, for at least three reasons.

Varying tax rates between regions could induce some people to cross the borders of high rates regions in order to buy fuels in neighbouring low tax rates regions, or people crossing several regions to fill their tanks in low tax rates regions. But this tax competition (which would not be entirely negative in the sense that it would make people aware of tax rates differentials) cannot possibly be very important. Most of road transportation takes place within regions, and tax rates differentials could hardly justify the time and money required to outside the region fuels shopping.

Regional tax collection would be easy. Fuels taxes are presently calculated and paid at the refinery level, by oil companies, which are very few and well organised. They know how their sales are regionally distributed, and it would not be difficult for them to apply the tax rates decided by the different regions of a country, and to pay them accordingly. Their natural reluctance at playing the role of taxman should be easy to overcome.

Third, fuel consumption per capita is also spatially well distributed, better than GDP per capita for instance. In France, for instance, the coefficient of dispersion (standard error divided by mean) of per capita fuel consumption is 0.13, lower than that of GDP per capita (0.16) or than that of existing regional tax bases per capita (0.15).

There are nevertheless several serious difficulties with the decentralization of fuels taxes. One is that fuels consumption no longer increases as fast as GDP in developed countries. Road transport nearly does. But the

fuel efficiency of all types of vehicles keeps increasing. Furthermore, there is a shift from gasoline powered cars to diesel oil powered cars. This is one of the reasons why the ratio of fuel consumption to mileage declines. And since diesel oil is not as highly taxed as gasoline, this further shrinks the fuels tax base. There is every reason to expect these trends to continue. Great efforts are made to reduce oil consumption in transport, and to develop non-oil based vehicles; in the medium term, they cannot but be successful. Giving regions fuels consumption as a tax base is therefore in part a poisonous gift, or at least a gift which is not as attractive as it might seem.

A second difficulty is that in most countries a decentralization of fuels taxes would only be partial. The amounts involved are so high that in many cases they would exceed the additional and even present (road) transport expenditures of regions, not to mention the drain this would put on central government budgets. In practice, such a decentralization would mean that fuel consumption as a tax base is shared between central and regional governments. They would be eating in the same pot, with each imposing its own tax rate. The freedom of regions in rate setting could be, at least at the beginning, somewhat limited or constrained by floors and/or ceilings.

Note that this is very different from "shared taxes". A shared tax is a central tax, with a tax rate decided by the central government. A certain share of the tax (30% for instance) is allocated to regional governments, usually pro-rata the tax amount which has been collected in each region. For a region, a shared tax is not a tax, it is a mere subsidy. The regional government does not take the political decision of voting a tax rate. It takes what is given to him by the central government, which is the definition of a transfer or subsidy. The total amount of the subsidy is defined in relation to a national tax (30% of a fuels tax, for instance), but it does not "come" from that tax, since all central government resources are fungible. This total amount is then allocated pro-rata the amount collected in each region: this is one criteria for the regional allocation of a transfer, but one amongst many possible criteria, and usually not a very good one. Shared taxes do not qualify as decentralised taxes.

Shared tax bases do, but at least in the case of fuel taxes they raise problems of their own. Both the central government and each region decide their tax rates. The actual price paid by the road user depends upon (i) the pre-tax price, which fluctuates over time, (ii) the central government tax rate, and (iii) the regional

government tax rate. Not every taxpayer identifies the exact relative importance of each cause. This does not facilitate tax responsibility. Regional governments might be tempted to increase their tax take in the hope that taxpayers will blame the central government, or OPEC, or oil companies, for it.

Then, national fuels taxation is presently also utilised for non-fiscal purposes. Central governments use it to moderate fluctuations in pre-tax prices, to favour diesel oil as opposed to gasoline, or to discriminate against road transport. In addition the European Commission also tries to harmonise and restructure fuels taxation, without much power and success it is true. Fuels tax rates are therefore an important and legitimate instrument of energy and transport policy in many countries. Defining and modifying tax rates in a way that pleases the many stakeholders (producers, haulers, The EU, the Greens, etc.) is a difficult task. Letting regions define and modify a part of these tax rates can only complicate that task.

These two difficulties are serious, but perhaps not diriment. A partial decentralization of fuel taxation would introduce spatial differences. At a given date, there would be only one national tax rate (and one pre-tax price). Interregional differences would therefore come from regional rates and policies only. In view of the great importance of fuels expenditures in households expenditures, and of the relatively small number of regions in most countries, it can be hoped that the media would emphasise interregional differences, that purchases-voters would be aware of such differences and that regionally elected officials would be held accountable. The greater the relative importance of regional fuels taxation, the more likely this responsibility mechanism will function. In practice, decentralised fuels taxation should account for at least something like 25% of present fuels taxation to fulfil the accountability function expected from a decentralised tax.

Relative to the issue of national non fiscal policies, two points can be made. One is that regions too can want to utilise fuel taxation for non fiscal purposes. If a region wants to tax even more road transport in order to subsidise even more rail transport, why not ? Taxpayers-voters will approve or disapprove this choice at next elections, provided this choice is made clear to them (and not hidden behind central government subsidies). The other point is that decentralised fuels taxation could be defined as proportional (rather than additional) to

central fuels taxation. Regions would vote a surcharge to national taxes. This would respect the fuels tax structure wanted by central government (on the gasoline-diesel oil differential, for instance) as well as fuels tax evolutions wanted by central government.

Decentralising fuels taxation, and more generally road transport related taxation, is not as simple and obvious a solution as is often thought and said. The tax base will not increase as fast as GDP. Tax responsibility will be shared, and therefore in part diluted. Using fuels taxation for non fiscal purposes will be made more difficult. On the other hand, most other conceivable tax bases raise similar or even greater difficulties when one tries to decentralise them. There are very few tax bases that lend themselves perfectly to tax decentralization. Yet tax decentralization is a necessary corollary of expenditures decentralization. Imperfect tax decentralization is the price to pay for the benefits of expenditure decentralization. All things considered, fuels taxation appears as a reasonably good candidate for decentralization.

Regulation

Unbundling, then privatizing or decentralizing, even if proper subsidy and tax systems are in place, is not enough. Government, and central government in particular, cannot wash its hands of what happens. Most privatized systems will not function well by themselves: they call for regulation. Indeed, privatization calls for more, not less, regulation. Regulation raises two main issues: what should be regulated, and what should be the rules of the game? And who should be the regulator?

Regulation begins with the writing of the contracts that are to be offered to private enterprises. Government must define precisely what is to be expected, and how it will be remunerated (along the lines described in Table 4 above). It must identify the various risks associated with the production of the service, and allocate them to the parties involved, the government entity and the private entity. To imagine systems that will provide the private enterprise with the proper set of incentives to perform efficiently, and the best rules of exit, is particularly delicate.

Regulation continues with the selection of the enterprises which are awarded the contract. This is delicate, because saying that one has to choose the enterprise that offers the best price is often not enough.

Other considerations, such as the reputation, the reliability, the technology, etc. of the candidates must also be taken into consideration. And bidding procedures, one could say bidding technologies, are many, often complex and always delicate to implement.

Regulation also relates to the monitoring of the newly privatized or decentralized system. The markets that have been created must function smoothly, and not be captured by one or two actors. Pricing systems must be devised. In the case of rail, for instance, separating infrastructure from operation implies that the enterprises that will operate will pay a fee to the enterprise that provides the infrastructure. Determining this fee, or the system that will produce it, is a government responsibility, and a particularly delicate one.

There is no regulation without a regulator. Governments, or the law can and should determine the main objectives of public goods and services provision, and the main instruments of regulation. But the implementation of these objectives or of these instruments is necessarily delicate. The law cannot think of all the technical, social and economic changes that will take place. In addition, government can hardly be simultaneously party and judge. Much must therefore be left to a regulation agency. Or more precisely to regulation agencies, because a different one is needed for each of the privatized services.

Much is required from the regulator. He (or she, or it if the regulator is an agency) must be competent, familiar with the economic, technical and financial characteristics of the service considered. He must be devoted to the common good. He must be independent, and perceived as such. These qualities are partly antagonistic. Most people competent in rail matters, for instance, are people who have been associated with the rail monopoly, and their independence is not guaranteed. Magistrates would be independent, but their competence in highly technical matters will often be insufficient. It is therefore difficult, although not impossible, to find people and designation procedures that will reconcile all these constraints.

V - Conclusion

There is no doubt that both privatization and decentralization offer great potential benefits in the

area of network public services, and particularly in the area of transportation. The uncritical and systematic endorsement of these moves, however, can be dangerous. Badly conceived or hastily carried P&D reforms can backfire and do more harm than good. The experience gathered in these areas over the past two or three decades can help avoid some of these pitfalls. In this paper the emphasis has been put on two main ideas. One is that in most cases, it is desirable to unbundled the service that one intends to privatize or to decentralize, in order to identify what part of the service can most easily be privatized or decentralized, and how. The other idea is that it would be mistaken to think that privatization implies less government intervention, and that decentralization implies less central government intervention. They imply different kinds of public intervention, in ways that are always delicate and not yet fully understood.

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