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*Investing in Health Infrastructure: How Decentralization Matters**

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Abstract

This paper examines the infrastructure–decentralization nexus in the production of health services with a particular emphasis on the issue of health infrastructure. The first part of the paper presents evidence on health services and infrastructure spending in health for various countries or groups of countries showing the importance of infrastructure spending in the provision of health services. The second part of the paper examines why and how health services are joint production with collective and private characteristics. These characteristics affect the decentralization of such services and thus the decentralization of health infrastructure; it also raises the issue of who should finance what in health care. The third part examines case studies and policy choices in USA, Canada and Switzerland related to various aspects of health care and health infrastructure financing.

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Introduction

1. This paper examines the infrastructure–decentralization nexus in the production of health services with a particular emphasis on the issue of health infrastructure.

2. The first part of the paper presents evidence on spending on health services and infrastructure spending both in general and in health for various countries or groups of countries showing the importance of infrastructure spending in the provision of health services The second part of the paper examines how some of the characteristics of health services affect the decentralization of such services and thus the decentralization of health infrastructure. The third examines case studies and policy choices.

1. Health spending and health infrastructure spending; what is the evidence

3. This first part of the paper pulls together what evidence we were able to gather on health spending, infrastructure spending and health infrastructure spending, total and decentralized. Unfortunately, as the reader will see, the more relevant to us the data, the lesser its availability. We begin with a table (1) on health spending for groups of countries covering the world, followed by a set of tables (2a and 2b) examining some evidence on health spending for subsets of countries (Low income in Africa; low and middle income in South /Central America) of potential interest to the reader before turning to a last set of tables (3 and 4) on health infrastructure spending for both the OECD countries and other countries for which data could be found.

4. Before proceeding to the tables, one should be aware of possible measurement issues that make international and inter-temporal comparisons difficult. We illustrate this with an example. Eurostat[1] classifies hospitals that obtain more than 50 percent of their revenues from billing their patients as market enterprises and not as part of the public sector even if they are publicly owned, see their deficits paid for by the government while their patients' bills are covered by insurance schemes mandated by the government. Hence in 2009 and 2010, public hospitals of five Swiss cantons (Basel-Stadt, Basel-Land, Fribourg, Glarus and Zürich) were classified as belonging to the private sector;[2] but in 2012, since a new financing scheme will impose a maximum of 45 percent of revenues from billing patients they will again be classified as public.

5. We present in Table 1 data on health expenditures (share of GDP and in US$ per capita) and public health spending for 2010 using 32 World Bank groupings of countries. It shows extremely large variations in per capita health spending with North American

1. SCN 2008, p.640, paragraphs 22.28 et 22.29 ; also IMF 2001, p.12 ; eurostat 2010, p.14; *Manual of Government Deficit and Debt, Implementation of ESA95*, Eurostat Methodologies and Working Papers, European Commission, Luxembourg, 2012, 4th edition, pages 14-16.)

2. Source: *Statistique financières 2010 de la Suisse*, Rapport Annuel, Administration fédérale des Finances, OFS, Neuchâtel 2012, Série 18, pages 17-19. www.bfs.admin.ch>office fédéral de la statistique>thèmes>18>finances publiques>publications. Despite the fact that the all cantons have hospital networks, some publicly-owned hospitals are taken out of the public sector statistical data, in compliance with the SEC95 statistical system.

spending 200 times higher than the lowest spending region while the share of GDP spent on health varies from 4 percent to 17 percent and that of public health spending from 30 percent to almost 80 percent of total spending on health.

6. In addition to this data from the World Bank, we also examined a total of thirty World Bank Public Expenditure Reviews. We report the relevant information in tables 2a-2b for the period 2000/5 -10

Latin America

7. We found information for six countries; it is presented in table 2a. We also found some information on decentralized provision of health services. In the case of Honduras, some municipalities provide health services through groupings of municipalities (known as mancomunidades). Also some of the municipalities provide financial or operational support (such as ambulances or security services) to Ministry of Health facilities. Mancomunidades depend mostly on municipal financing (74 percent), with user charges (12 percent) and international sources (14 percent) accounting for the rest for current spending. A sample of municipalities reported spending 6 percent of the municipal budget on health with 55 percent going to construction or repair of health centres. But only 20 percent of this spending came from their own resources, with the rest funded from various central transfers.

8. Turning to Nicaragua one finds that in 2006, the current health budget was financed mainly by the Treasury (83 percent), but capital expenditures remain heavily dependent on foreign aid with 68 percent thus funded in 2006.

Africa

9. We found some information for nine countries which we present in table 2b.We also have some information on decentralization of health spending. In Mali deconcentrated (regional) health spending accounts for about 10 percent of central government spending in 2007-2008, a small share. In Sierra Leone, transfers for health to local councils have been steadily increasing in recent years, now accounting for 30 percent of the central health budget. In Tanzania, in 2009-2010, health spending is split 50-50 between the central and local government for both recurrent and development (capital) spending.

Table 1. Importance of Health and Public Health Expenditures by Country Group, 2010

World Bank Group of Countries	Health Expenditures Per Capita – 2010 (current USD)	Health Expenditures as Percent GDP - 2010	Public Health Expenditures as Percent Total Health Expenditures - 2010
Arab World	251.8	4.34	60.95
Caribbean small states	501.56	6.1	56.98
East Asia & Pacific (all income levels)	500.18	6.89	69.51
East Asia & Pacific (developing only)	182.82	4.75	53.38
Euro area	3969.01	10.84	76.15
Europe & Central Asia (all income levels)	2203.84	9.76	75.89
Europe & Central Asia (developing only)	438.68	5.81	64.98
European Union	3368.31	10.41	77.37
Heavily indebted poor countries (HIPC)	39.1	5.96	43.12
High income	4876.79	12.55	65.1
High income: non OECD	-	-	-
High income: OECD	5093.26	12.85	65.1
Latin America & Caribbean (all income levels)	671.46	7.68	50.22
Latin America & Caribbean (developing only)	670.24	7.69	50.18
Least developed countries: UN classification	34.39	5.13	42.84
Low & middle income	198.95	5.69	51.81
Low income	26.91	5.34	38.78
Lower middle income	70.93	4.28	39.54
Middle East & North Africa (all income levels)	322.23	4.64	57.8
Middle East & North Africa (developing only)	203.18	5.28	50.15
Middle income	225.13	5.7	52.04
North America	8049.79	17.24	54.18
Not classified	-	-	-
OECD members	4364.71	12.57	64.94
Other small states	264.57	6.14	63.57
Pacific island small states	175.83	6.6	78.23
Small states	314.81	6.15	61.78
South Asia	47.46	3.88	30.01
Sub-Saharan Africa (all income levels)	85.01	6.47	45.35
Sub-Saharan Africa (developing only)	84.32	6.5	45.07
Upper middle income	379.71	6.1	54.38
World	950.38	10.39	62.76

Source: World Bank World Development Indicators Database (http://databank.worldbank.org/ddp/home.do

Table 2a: Health related information, Public Expenditure Reviews 2000-2010, Latin America

	Expenditure on health/GDP	Year for column 1	Public expenditure on health/GDP	Year for column 3	Health expenditure in public spending	Year for column 5
	1	2	3	4	5	6
Belize	5.2	2001-2002	X	X	X	X
Dominica *	6.0	2001-2002	4.3	2001-2002	X	X
Haiti **	7.5	2003-2004	2.75	2003-2004	5.7	2002-2007
Nicaragua	X	X	3.1	2006-2007	14	2006-2007
Paraguay	X	X	2.3	2003-2004	9-10%	Recent years
El Salvador	8	2001-2002	3.7	2001-2002	X	X

Source: Authors using World Bank Public Expenditure Reviews.

Table 2b: Health related information, Public Expenditure Reviews 2005-2010, Africa

	Public expenditure on health/GDP	Year for column 1	Health expenditure/ public spending	Year for column 3	Capital spending / health budget	Year for column 5
	1	2	3	4	5	6
Burundi	n.a.		8.5	2008		
Guinée-Bissau	3.5	2007				
Liberia	2.3	2007	7.8	2009	6.0	2010
Mali			7.4	2007	36.1	2006
Uganda	1.7	2009	9.8	2006		
RDC-Congo			4.1	2007	22.0	2006
Tanzania	2.4	2009	3.7	2008	9.3	2010
Sierra Leone	1.3	2008	7.5	2007		
Chad	1.0	2007-2009			21-22	2005-2006

Source: Authors using World Bank Public Expenditure Reviews.

10. Table 3 presents information on gross capital formation in the health sector for OECD countries.

11. Table 3 shows that gross capital formation (public + private) for health purposes is usually of the order of 0, 3-0, 5 percent of GDP. The USA with 0.7 or Canada (0.63) are high and Italy (0.35) France (0.40) or Germany (0.41) in that range. The breakdown between public and private reflects the organization of health services in each country. For example the private share is thrice the public share in the USA while the public share is six times the private share in Canada reflecting how hospitals, clinics and other health facilities in both countries are owned and financed. As a share of health spending, gross capital formation in health is usually in the 3-6 percent range in OECD countries. This is a bit lower than the figures reported in Table 4 for a sample of non-OECD countries which are more in the 5-8 percent range, reflecting perhaps both a greater unmet need or catch-up phase and a population growing faster.

Table 3: Privately and Publicly Financed Gross Capital Formation in the Health Sector for OECD Countries: 2010 or earlier (*) as Percent of Total Health Expenditure and GDP

	Publicly Financed Gross Capital Formation in Health Sector, 2010		Privately Financed Gross Capital Formation in Health Sector, 2010	
	As % GDP	as % Total Health Expenditure	As % GDP	As % Total Health Expenditure
Australia*	0.2	2.42-	0.27	3.21-
Austria	0.35	3.16	0.24	2.14
Canada	0.53	4.63	0.09	0.77
Chile*	0.12	1.79-	-	-
Czech Republic	0.19	2.56	-	-
Denmark	0.41	3.67	-	-
Estonia	0.01	0.15	0	0
Finland	0.36	3.98	0.08	0.89
France	0.25	2.18	0.15	1.33
Germany	0.26	2.21	0.15	1.28
Greece*	0.08	0.82	0.3	3.08
Hungary	0.19	2.38	0.04	0.51
Ireland	0.28	3.04	0.04	0.45
Israel*	0.1	1.34	0.15	-
Italy	0.21	2.24	0.14	1.52
Korea	0.12	1.7	0.24	3.41
Mexico*	0.15	2.57	-	-
Norway	0.3	3.16	0.05	0.55
Poland	0.31	4.4	0.13	1.86
Portugal	0.23	2.11	0.34	3.21
Slovak Republic	0.04	0.49	0.47	5.16
Slovenia	0.32	3.51	0.06	0.65
Spain	0.21	2.24	0.03	0.29
Sweden	0.4	4.21	0.1	1.02
Turkey*	0.22	4.05	0.1	-
United States	0.16	0.93	0.53	2.99

Source: Authors using OECD (2012), "OECD Health Data: Health expenditure and financing", OECD Health Statistics Database).

Table 4. Spending on Capital Formation of Health Care Providers in 21 non –OECD Countries, 2005-2010 (as percent Total Health Care Expenditure)

Country	2005	2006	2007	2008	2009	2010
Afghanistan	-	-	-	1.8		-
Armenia	9*	-	-	-	-	-
Bangladesh	7.3	8.6	6.3	-	-	-
Bhutan	-	-	-	-	20	
Burkina Faso	6.3	5.6	7.9*	9.3*	11.3*	-
Democratic Republic of the Congo	-	-	-	3	-	-
Ethiopia	-	-	6		-	-
Georgia	3.7	6.6	6.5	2.7	3.4	-
Kenya	1.3		-	-	3.6	
Liberia	-	-	7		-	-
Micronesia	3.4	6.8	4.9	1.9	-	-
Mozambique	6	9.02	-	-	-	-
Myanmar	3.1		-	-	-	
Qatar	-	-	-	-	18	15
Rwanda	-	7	-	-	-	-
Seychelles	-	-	-	-	8*	-
Sri Lanka	10.6	10.9	-	-	-	-
Tanzania	5.7		-	-	-	-
Vanuatu	5.2	-	-	-	-	-
Zambia	2.2	2.65	-	-	-	-

Sources: Authors using various National Health Accounts for the relevant country WHO Note: we included all countries that had the relevant information available Data are from reports such as for Kenya: http://www.who.int/entity/nha/country/ken/kenya_nha_2009-2010.pdf.

12. The main conclusions one can draw from this part of the paper are:

- significant differences in the importance of health expenditures between groups of countries reflecting mainly their relative income level but also the organisation of health services within each country;
- the fact that spending on health infrastructure is more important as a share of health spending in emerging countries than in OECD countries .Overall, one expects that it accounts worldwide for about 5-7 percent of health spending and 0.3-0.5 percent of GDP

2. The inter-governmental assignment of health services /infrastructure: what principles should apply?

13. In this part of the paper, we first briefly recall the principles of decentralization and review a few empirical studies slinking decentralization and health outcomes. We then examine issues linked to the decentralization of health services and finally discuss characteristics of health infrastructure with regards to decentralization. We attempt to assess if the characteristics of health services /infrastructure makes them different from other publicly provided services in terms of:

- the desirable degree of decentralization;
- the inter-governmental coordination arrangements both vertical and horizontal once a degree of decentralization has been settled.

2.1. Decentralization principles and empirical work on decentralization and health

14. Governments have two main ways to carry out their responsibilities to ensure the provision of a specific activity or service: spending, including tax expenditures, and regulation. These powers should be clearly assigned to appropriate levels of government. The two classic contributions to the literature on decentralization are those of Musgrave (1959) and Oates (1972). Musgrave (1959) suggests that, for conceptual purposes, the activities of government should be separated into three functions or branches: macroeconomic stabilization, redistribution, and resource allocation. Thus, health activities belong to both the allocation branch for the supply and production of health services and in the redistribution branch for access to services for the population who has not the capacity to pay – leaving aside at this point the political principle of "right to health for everyone". Oates (1972) puts forward three criteria to assign specific roles to specific levels of government as follows:

- Economies of scale. The existence of significant economies of scale constitutes an argument for a higher level of government to provide a particular good or service. In the area of health services, the personalized nature of many services makes health services a poor candidate for gains from scale
- Heterogeneity of preferences also matters. Groups living in different parts of a country may display strong heterogeneity of preferences. Decentralization is an appropriate response to these different preferences if these groups are separated by political (devolved) borders that match those of areas with groups with differentiated preferences or circumstances. By extension, heterogeneity of circumstances also matter with different environments in terms of climate or topography. On this point Derycke and Gilbert (1988, p.8) add the dimension of distance to service in the definition of local public service. So the inbound distance – the case for hospital – from the residence (or the place of accident) of the potential user to the place of service delivery or the outbound-distance from the place where inputs (labour, capital) are assembled into a service provision mechanism and the place where the

service is delivered – the case of the fire extinction brigade from the fire station to the location of the fire (or the cat in the tree)[3].

- The presence of externalities, negative or positive, has an impact. If some of the activities of one government at a given level have important external effects on the individuals or businesses located in other jurisdictions or on other governments at the same or a different level, then these activities should be more centralized, or at a minimum the actions of lower-level authorities should be well coordinated.

15. Finally one should note that emulation, also referred to as competition, which helps increase or introduce best practices in government, requires at least two, and probably more, units involved in a given activity. This is an argument for decentralizing government activities.

16. Before going further into the analysis, it seems relevant to inquire if there is evidence that varying levels of decentralization may matter to health outcomes. If the answer is no, then the above discussion is moot.

17. There are at least two strands of literature of potential interest in answering this question. The first can be characterized as analytical/ descriptive with the work of Saltman *et al* (2007) a good example. In it, one finds discussions of issues such as what is meant by decentralization in health (chapter 1) or the difficulty of measuring decentralization (chapter 3). Chapter 4 concludes by reminding us that: "*most decentralization initiatives will be driven by a combination of functional performance–related concerns, legitimacy issues and self-interest*'' (p.74). Interesting to note is that nowhere does Saltman *et al* examine issues linked explicitly to infrastructure.

18. The second strand of literature is of an empirical nature. Using data on a sample of countries (Robalino *et al*, 2001; Jiménez-Rubio, 2010) or on subnational units within a specific country, various authors examine the impact of decentralization on either health spending, health outcomes or both. Examples of country specific work includes that of Hiroko and Jütting (2007) who examine for China the impact on infant mortality using data for twenty-six provinces over seven years of within province decentralization (county level data). They find that '*'more decentralised provinces perform better with respect to health outcomes if two conditions are met: first, if a functioning transfer system is established between the province and county levels, and second, if county governments' own fiscal capacity is strengthened*'' (p.21). Or Asfaw et *al* (2004) examine for India the impact on rural infant mortality rate for fourteen states over the 1990-1997 period. They conclude that '*'Generally, the results of the study indicate that fiscal decentralization can help to reduce infant mortality rates and political decentralization can be one important factor that affects its effectiveness*''. Or finally Simatupang (2009) examines the case of Indonesian municipalities for 2006, noting that: '*'decentralization brings mixed changes to measured health outcomes. The results show improvement of mortality rates with significant declines in infant under 5 mortality rates as well as longer life expectancy. But some decentralized health services seem to be less*

3. Sa**i** = Sa N **-α** where Sa is the supply of collective good "a" and N the total number of "i" potential consumers. –α gives the characteristic of the local versus central publicness: if α=0, then N=1 and characterizes a pure collective good since the quantity offered to the "i" user is available for all others; α=1 correspond to a pure market good and consumer "i" receives 1/N of the total supply. With $0 < \alpha < 1$, the good supply is more or less divisible, that is local or a club service. **α** can have various specificities .

available, as percentage of labor assisted by medical workers, vaccination coverage, and number of active contraceptive users show declining trends'' (p.73). Each study uses a specific measure of decentralization but none take into account explicitly the decentralization of health infrastructure.

19. Overall, the literature supports the view that decentralization in the provision of health services can lead to better outcomes; but health infrastructure expenditures as such are not separately examined.

2.2. Decentralizing health; a functional analysis

20. How should one thus apply the criteria noted above to the field of health? One must first clarify that production of health involves numerous activities that may be assigned to one or another level of government. In what follows we will assume a three level country with a central, regional and local governments. These are devolved entities that have some budgetary and regulatory autonomy and that have their own elected or coopted autonomous decision makers.

Categories of health services

21. Assume a fully public health system with no private provisions of health services. Such a system must provide three kinds of health services: population health, universal access on demand and individual health. Population health, or public health as it is also called, offers services that are often preventive in nature, that do not target a specific individual but that benefit the population in general. These may be informational such as advice on hand washing or nutrition or health enhancing by vaccinating individuals against diseases. Individual health is comprised of both universal access on demand and curative services. "On demand access" means that potential users know that there is a network of (public) hospitals/clinics always available to them and ready to provide curative services in case of accidental or emergency need. It is a pure public good: everyone benefits from the same quality and quantity of potential access to health (usually hospital) care.[4] Both population health and universal access on demand are *public goods* (non-rival and non-excludable). Curative individual health services are offered to specific sick individuals with the aim to restore or maintain the health of individuals through drugs, surgery and other interventions (speech therapy…). They are private or individual services (i.e. *private goods* rival and excludable). Decisions must be made on the quantity and quality of services provided including their accessibility (age, location…), on the quantity and quality of the human and physical capital inputs used to provide them and thus on their remuneration and on the financing of these services. Tables 5 and 6 presents some answers to the various questions raised above; Table 5 addresses who should do what and Table 6 how should institutional governance be organized.

4. Note that the quality of the network (design, output…) will affect the health outcomes but a network of a given quality gives the same level universal access to potential beneficiaries.

Table 5: Provision of health services by level of government and type of service

Choice type	Specific issue	Considerations	Decision maker	Implementation
Population health	Who should set standards for vaccination, communicable diseases cattle disease control, food quality	Spillovers within or beyond national borders (international treaties)	Supra national body (EC) Central government or for food importing government (USA FDA rules)	National Regulations Or financial incentives / penalties
Population health	Who should implement public health measures (vaccination, …)	Heterogeneity such as cultural sensitivity varying on a geographical basis	National for some inputs (vaccines) Level in charge of primary health center (regional/local?) for distribution	Primary health center + Special teams
Hospital / Clinic network	Territorial (geographical) distribution of hospital centres	Economies of scale,+ horizontal and vertical coordination of services, specialities and equipment	Central and regional government in partnership	Regional and local depending on the nature of the service; central or inter-regional for high-tech specialities
Individual health	Who should set standards for individual health care (delineation between standards and private health services, administrative prices of medical and hospital service, waiting lists, procedures covered...?	No spillovers (services are rival and excludable); redistributive consideration (user' s capacity to pay)	Government that is main payer –higher individual territorial mobility for medical service calls for centralization	Issues to be addressed: cooperation agreements : border areas, specialized services
Individual health	How is access to health centers determined : free or boundary restricted	No spillovers Economies of scale Minimum size for excellence		

Source: Authors.

Table 6: Issues in the Institutional Governance of the Health Sector

General Question	Specific questions
Who decides where to build/maintain/operate health facilities?	Assuming that who decides which health and hospital services are attributed to primary, secondary and tertiary health centers. Issues then are: First, how is vertical coordination secured? Second, appropriate distances to service centers must be set in order to optimise the network. Finally if private clinics and hospitals are considered part of the health network, under what conditions?
How is health infrastructure financed?	There are two issues here. One is the funding mechanism used which can range from spending from general revenues to various forms of public borrowing to PPPs. Second is what government mobilizes this funding for public facilities. Is this based solely on the location and type of infrastructure or are interactions accounted for in the capital funding as such rather than solely in the current funding (with some compensation for the access to facilities)?
Who trains (sets quotas/provides facilities) health staff?	How much (inter)national mobility exists in trained health staff? Are diploma delivered in one region (country) recognised in another? How is the limit set, by whom, between in-house doctors and independent doctors, specialists and nurses?
Who sets the pay of health staff? Their pension arrangements?	Consideration of mobility and competition between public health facilities operated by different level of governments ; Also consideration of mobility public – private; mobility in-house – independent doctors
Who hires/fires health staff?	How much room of manoeuvre hospital/clinic boards have? Are employees covered by public law or by private labour market law?
Who decides on the structure (fees, taxes…) of financing of health services (given the amounts offered)?	One must first distinguish between the three types of services Population health is usually paid out of general revenues It is universal access and curative services that tend to have a fee based funding component. In those cases, who sets the shares of the various sources and the specific fees? If user-pay is implemented, how much is paid through health and accident insurances and how much is charged directly to the beneficiaries? In hospital stays, is there a difference between medical services and accommodation pricing?
Who supervises the quality of practice?	Competition and emulation between service units might not suffice.

Source: Authors.

22. In both tables we assume a three tier system: primary care centers that is basic health units or clinics staffed by GPs and nurses or at least nurse practitioners and available at the municipal/village level; secondary health centers staffed by specialists MDs and specialized staff (speech therapist…) at the regional level; tertiary health centers in a few locations in the country offering specialized care for the more complex problems.[5]

23. Aside from infrastructure, how does health compare to other commonly decentralized public services? One can only answer this by distinguishing between population and individual curative health and comparing this with for example education and roads; this is done in Table 7. Population health is the best candidate for centralized production while individual health is better suited for decentralization; yet both can be, and often are, provided by the same institutions such as local health centres. This is different from the education system where the provision of compulsory and higher education is usually carried out by separate institutions in different locations (although some facilities may be rented out by one body to another). Or from the provision of roads which are distinct in their spatial nature even if interconnected. So jointness of production appears to matter more for the two types (population and individual) of health services at the primary health center level than for other types of public services. This is much less of an issue at the secondary and tertiary level since these institutions specialize in individual health care.

24. The main conclusions one can draw from tables 5, 6 and 7 are first that the provision of health services is more akin to a joint production decision than the provision of other publicly provided services, due to the overlapping of public and private services offered by a specialized personnel. The general consequence of this for health infrastructure is the need for substantial vertical and horizontal integration/coordination. Second, the joint nature of health services, that is on the one hand universal access, emergency services and hospital network (collective) and on the other hand individual curative services (private), calls for nuances in financing health infrastructure. When both categories of services are offered, one cannot ask that user charges billed to individual patients cover the total infrastructure costs; there must be a public funding. Inversely, if (private) clinics do not offer services that are collective by nature, they should not receive public financing.

5. If one adds a parallel set of private providers of health services then one must also address issues of coordination between the public and private services and of the regulation of private providers. Private hospital and clinic centers offer mainly curative or individual health services, which are private services. The questions are whether and how they contribute to population health and, more important, how they accommodate the constraints (in terms of organisation, infrastructure and medical staff) of acting as part of in the health network that offers universal access (mainly by offering minor emergency services and non-discriminatory tariffs).

Table 7 Comparative impact of determinants of decentralization: education, health and roads

	Population health	Individual health	Compulsory Primary / secondary education	Higher education	Local (market) roads	National roads
Economies of scale	High (vaccine production, information)	Low (labour serves one patient at a time although some on the capital side)	Low-medium	Medium	Low	High
Heterogeneity of preferences	Low	Medium (as revealed by choices)	Medium (language, pedagogy, protection of territorial minorities)	High (variety of trainings)	Low	Low
Externalities	High	Nil-Low	Medium (required for private employment but some social benefits :raising children, participation in society)	Medium (spillovers between jurisdictions with labour mobility y	Low	Medium
Redistribution	Low	High (low fees; capacity to pay with a user-pays tariff)	Low (free access to compulsory school)	Medium	Low	Low (even with toll roads, generally no redistributive consideration

Source: Authors.

2.3. Characteristics of Health Infrastructures and decentralization

25. One can address the question of the decentralization of health infrastructures in a different way by noting that health infrastructures:

- Have for various reasons increasing units costs per meter², as they become both more specialized, bigger and less numerous, as shown in Table 8. First, primary facilities will for example have exam rooms but not operating rooms found in secondary and tertiary facilities. Such surgery rooms are more expensive to build

and maintain. Second, the absolute size of secondary /tertiary facilities will require connecting spaces, isolation mechanisms (to avoid the spread of diseases) and so on. Third they will have more developed ancillary services such as cafeterias for their staff. This last item if fully self–financing will have no impact on costs but this requires charging a proper rent to these services or imputing depreciation and so on. Is there a trade-off between local control and the availability of technologically differentiated care? For example locally provided simple maternity services with slightly higher death rates than more sophisticated services with slightly better outcomes but further away from the place of residence of the expecting mother either because of better equipment or better skilled specialized MDs. Can distance spanning technology (tele-medicine) correct for this? Who decides what bundle of services to offer?

Table 8: Construction cost per meter², three types of health centers, Seven selected countries, 2011, US$

Country	Day centre (1)	Regional hospital (2)	General hospital (3)	Ratio (3)/(1)
Australia	3014	3400	5337	1.77
Canada	3748	5774	6888	1.84
China	679	823	920	1.35
Germany	1960	3130	3410	1.74
Malaysia	589	786	884	1.50
South Africa	845	1056	1267	1.50
Vietnam	676	1302	1302	1.93

Source: International construction cost survey Turner & Townsend 2012; Australia, p.8; Canada, p.10; China, p.12; Germany, p.14; Malaysia , p.22; South Africa, p.28; Vietnam, p.38.

- Are (should be) meshed in spatial and specialized units network operated by various levels of governments making coordination between autonomous governments at a given level and between levels of autonomous governments an issue. Spatial coordination is horizontal between service precincts that deliver the same baskets of services. Vertical coordination is needed not only from the territorial point of view, but also for the assignment of specialities to each governmental layer. One may be faced with deconcentrated entities of devolved governments interacting together Thus one can ask if the coordination between levels of governments and governments at a given level is consensual or top down? Is it between local units producing services together? Through what means is coordination achieved? Through financial (ranging from soft, signalling devices like earmarking of funds…to hard, conditional, matching grants) financing; top down planning; or institutional [appointments of director positions , coordinating/dialog councils etc..]). Or put differently the assignment of services responsibilities (primary health;

secondary health, etc.) and the assignment for infrastructure provision may differ. The latter might change constantly as projects go through several stages of the planning building cycle. The planning cycle for a new secondary health facility may be initiated by a local group of potential users who are tired of incurring high private costs (time and money) to use facilities away from their residence in a growing urban centre. It may be taken up by a local politician or central deconcentrated bureaucrat who champions it, and then be formally accepted by the health planners. It is not always the case that the entity that plans, appraises, provides the budget etc., is also the one that implements or later also operates the facility. Indeed, changing ownership of infrastructure over time is often required under private sector financial arrangements;

- Are subject like all public projects to costs overruns. We were unable to find a systematic comparisons of the extant of cost overruns by type of infrastructure – education, health, roads- or by type of health facility (hospital, clinic).There is however evidence for transportation projects that costs overrun are more important for technologically complex projects at 45% for trains, 34% for fixed links(bridges..) and 20% for roads[6] .The authors conclude that[7]:
    - *Cost underestimation exists across 20 nations and 5 continents; it appears to be a global phenomenon.*
    - *Cost underestimation appears to be more pronounced in developing nations than in North America and Europe (data for rail projects only).*
    - *Cost underestimation has not decreased over the past 70 years. No learning that would improve cost estimate accuracy seems to take place.*
    - *Cost underestimation cannot be explained by error and seems to be best explained by strategic misrepresentation, i.e., lying.*
    - *Transportation infrastructure projects do not appear to be more prone to cost underestimation than are other types of large projects.*
- Have both characteristics of a stand-alone service and of network. Going further than the stand alone-network dimension, one must note the jointness of the services. They are both private and public in nature. Private in that both rivalry and exclusion apply: when patient A is hooked up to a given machine, patient B is not. And one can exclude A or B using the pricing mechanism (should one do it is another issue). Public in that the health network is available to all when an accident occurs; indeed access to emergency services is a priority in health institutions with triage giving more immediate access to more urgent cases;

[6] Bent Flyvbjerg , Mette Skamris Holm & Soren Buhl (2002) Underestimating Costs in Public Works Projects: Error or Lie? , Journal of the American Planning Association, 68:3, 279-295, table 1, p283
[7] Ibid, p290

- Are more often in competition with private providers than roads or primary schools infrastructures. There is not only competition between private and public hospitals/clinics in a given territory/ jurisdiction but also potential competition across jurisdictions between public hospitals. The normative reference here is that of FOCJs (for Functional Overlapping Competing Jurisdictions) put forward by Frey and Eichenberger (1979) Thus health zone borders and the rules that govern their setting and crossing will matter to infrastructure decisions. Do patients decide (if they have a choice and there are payment agreements)? Or are hospitals built independent of consideration of demand? Can private facilities offer only a subset of profitable activities or are they required to offer full coverage? With or without full payment by the public providers or private insurers and using what price list? And what about the micro-locational choice of building a hospital within a given territory?
- Are affected by a combination of roads and ambulances in two ways. First, this links the three tiers of institutions. An improvement in this network (lower travelling time, less jarring travel) facilitates the coordinated provision of services. It may also facilitate regrouping specialized activities in a smaller number of facilities. The resulting improvement in quality may well more than compensate for the additional cash and time costs to access them. Second, the same improvement may, depending on the existing spatial distribution, reduce the required number of primary care units since it may reduce the travel time of users of such facilities. Note that this matters the most for emergencies and unplanned health consumption.[8] However better roads by facilitating the growth of private transportation options such as buses or moto-taxis may modify the supply of available services.

26. Let us return to the FOCJ issue. Assume two hospitals A and B located in two adjacent jurisdictions JA and JB; they are monopolies. Since the population of JA is larger than JB (but not too large so as to avoid the upward sloping part of the cost curve), A has lower operating costs than B due to economies of scale along the same cost function. If the rules stipulate that residents of JA are treated in hospital A and the same for JB except in case of emergencies, then the only issue is how both hospitals are compensated in that case: using their price/cost structure which is higher in B than A or the price structure of the place of residence of the patient.

27. But what happens if patients are allowed to access health services where they wish if they reside within fifty kms of the JA-JB border? Or if the monopoly clause is abandoned?[9] Then if they must contribute a copayment (deductible) to the cost of their health care,

8. The exact relationship between health facilities and transport is not clear; see Toloo, Sam; FitzGerald, Gerard; Aitken, Peter; Ting, Joseph; Tippett, Vivienne; Chu, Kevin (2011) *Emergency Health Services: Demand and Service Delivery Models*. Monograph 1: Literature Review and Activity Trends. Queensland University of Technology

9. This is the very precise sense of FOCJs: Functional because the two service precincts supply the same function, here hospital health care; Overlapping since with C for Competing, the functional area for hospital A is not only JA but also JB (or part of it in the 50 km deep border example), and inversely for hospital B. Thus the institutional and functional territories are not identical: for hospital A the functional territory is JA and JB whereas the institutional limit is the political governmental unit JA in charge of the public hospital A; and the reciprocal for hospital B.

residents of JB may prefer to use hospital A. Note that the lower cost in A is not due to greater efficiency or better procedures but simply to the size of JA relative to JB. This means than when planning its supply of services hospital A will plan on a share of JB residents, Bm (m for mobile) as users and thus will adjust its infrastructure size upwards accordingly. It could even pursue a proactive competition to attract more Bm users (behind fifty kms) and gain further economies of scale (going further in the upward sloping part of the cost curve). How will hospital B react? It could give up Bm users and thus plan on JB-Bm users with the required adjustment in services offered and thus the necessary infrastructure along with higher costs. Or it could ramp up its offerings targeting Am users; this would require it to invest more in infrastructure so as to lower its costs to the level of A. In this second case, it may well be able to retain the Bm users. Overall, however, both hospitals may have planned for too large a clientele in the absence of coordination. In hospital investment planning, as for other public services which are capital intensive, a pure FOCJ approach clearly leads to non-cooperative outcomes and, thus, allocative inefficiencies.

28. The main conclusions one can draw from this first part of the paper are:

- health services include both public and private (as defined by economists) services;
- the delivery of both types of services is often carried out by the same agent even though their impact and financing are different;
- there are important benefits (economies of scales, expertise , better outcomes) to a tiered system with specialized care provided in specialised institutions that are less numerous and thus further away from users than basic health services centers;
- tiered systems require substantial horizontal and vertical coordination due to geographic spillovers as well as vigilance against over provision;
- infrastructure costs increase per patient served with specialization of the health facility; thus intergovernmental finance arrangements for both operating and infrastructure provision matter.
- Leaving hospital units competing for patient beyond their "natural" jurisdiction may lead to non-cooperative options and thus inefficiencies.

3. Case studies and policy choices

29. A key issue of this paper is how health facilities in general and hospitals in particular are or should be financed in a decentralized setting. One way to answer this question is to examine how it is done in various countries in the world. Another way is to examine the debate between proponents and opponents of Private Public Partnership (PPP).That done we can turn to plausible policy recommendations.

3.1. Financing health facilities; country evidence

30. We examine information for three countries which are the United State, Canada and Switzerland with more attention on the later as it has since 1990 undergone changes in the provision and financing of health of particular interest in the context of this paper.

United States

31. We begin with the United States where financing for hospitals is mainly from financial markets but not always as we shall see. In the USA, access to markets by hospitals is a key factor in the financing of health infrastructure. Sussman and Jordahl (2010) examine the situation following the upheaval in the bond market of 2008. They argue that (p.7): "*Health care is a very capital-intensive business and access to debt financing keeps hospitals in business. Few hospitals today can generate enough cash flow from their operations and reserves to fund short and long-term strategic investments in people, programs, facilities, and technology. Most hospitals must access external debt on a periodic basis to assure the provision of continued health care services in their communities. The ability to issue and support debt is not a "nice-to-have" capability; it is essential to the viability of nearly all U.S. hospitals and health systems."* Hospitals often finance themselves by issuing municipal bonds and were thus quite affected by the collapse of the insurers in that market in 2007-2008. Hospitals bonds are about 10 times more risky than standard municipal bonds (WSJ 8-9 2012).[10] Thus Sussman and Jordahl,(2010, p.11) identify eight financing options: *municipal bonds, direct bank loans, FHA Section 242 credit enhancement, leasing, USDA Rural Development Program, New Market Tax Credit Program, debt restructuring, and asset sales.* Some are standard access to private markets (*municipal bonds(issued by municipalities on behalf of hospitals to take advantage of their established credit rating) , direct bank loans, leasing)* while others use a mortgage guaranty from the federal government to reduce borrowing costs (*Federal Housing Administration Section 242)* or a mortgage guaranty or direct loans from the USDA Rural Development Community Facilities Program for health facilities in rural areas and towns with populations of up to 20,000.[11] For the direct loans, there are three levels of interest rates set according to the median household income and the type of project: poverty rate, market rate (set by U.S. Treasury Department) and the intermediate rate is set halfway between these two. The rate used depends on the median household income (MHI) of the area and the type of project being financed. Finally the *New Market Tax Credit Program* allows individual and corporate investors to receive a tax credit against their Federal income tax return in exchange for investing in Community Development Entities (CDEs).[12] The credit totals 39 percent of the original investment amount and is claimed over a period of seven years.

32. The use of bond financing is likely to result in more autonomous investment choices by hospitals than the use of grants financing presented below for Canada and Switzerland. Thus bond financing result sin less vertical and horizontal coordination than since it is not the result of centralized decisions but of market choices

Canada

33. Before WWII the provision of private health services was funded by private payments either from the pocket of the patients or from their insurance with in some cases subsidies to

10. Hospitals' Debt Gets a Checkup: http://online.wsj.com/article/SB10000872396390444900304577579360896916848.html
11. For more details see http://www.rurdev.usda.gov/HAD-CF_Loans.html
12. For more details see http://www.cdfifund.gov/what_we_do/programs_id.asp?programID=5

the poor by provinces. It is after WWII that there is involvement of the governments in the provision of health services. With respect to intergovernmental relations four items should be noted.[13]

1. National Health Grants are introduced in 1948 by the federal government mainly for capital expenditures;
2. The federal Hospital and Diagnostics Services Act comes into effect in 1958; it uses a50-50 cost-sharing formula for covering hospital costs;
3. The federal Medical Care Insurance Act comes in force in 1996; it also uses a 50-50 cost sharing formula covering the cost of services by MDs in hospitals and their private offices.
4. A series of health accords in the early 2000s leading to increased federal funding.

34. This broadening financing by the federal government occurred often because ‘*’provincial push led to federal pull in convening the provinces and in drawing them into an intergovernmental arrangement*’’ (Maioni, 2002, p3). So provinces introduced hospital insurance and then encouraged federal financing , knowing that there was interest at that level of government for doing this given past policy statements. One interesting point for us is that while infrastructure spending was the entry point,[14] it quickly became insufficient as a policy tool. Now in Canada there is no federal program funding hospital infrastructure. Hospital capital funding is usually a mix of (i) public funds provided by the province which borrows it or finances it out of general revenues and transfers it as grants to hospitals and (ii) privately raised funds by the foundation of the hospital carrying out a capital project. For example in Montreal, the main children’s hospital (Sainte-Justine) just launched a capital campaign to raise 150 million Can $ with the support of Céline Dion. The previous campaign raised 125 million used for new buildings.[15]

35. Federal capital grants were made between 1948 and 1969 and then anew as of 2000. The first type of grants was mainly for buildings while the second are for medical equipment. In both cases, grants are to provinces which pass them on to hospitals. There is no direct federal payment to hospitals as in the USA. That said, federal grants finance provincial priorities rather than determining them. Provincial priorities are set mainly by their respective ministries of health with inputs from intra-provincial bodies such as health districts.

36. Public capital in hospital is in the range of 3-4 percent of GDP in Canada in the 1961 - 2001 period;[16] it is declining slightly between 1981 and 2001 while health spending increases, yielding a lower output/ capital ratio.

37. Day to day operations are under the control of autonomous hospitals who decide within the constraints of collective agreements that can be more or less uniform across hospitals such things as staffing levels, MDs accreditation, type of services offered and so

13. We draw this information from the *Appendix: Key Events in Health Insurance Legislation in Canada* in Maioni.
14. ‘‘The grants offering financial support for planning and organization, public health, and hospital construction’’ HEALTH POLICY IN CANADA Prepared by:Nancy Miller Chenier Political and Social Affairs Division Revised 4 December 2002 http://publications.gc.ca/Collection-R/LoPBdP/CIR/934-e.htm
15. http://fr.canoe.ca/divertissement/celebrites/nouvelles/2012/12/12/20426166-qmi.html
16. Mackenzie(2004) Chart 5, p.10.

on. Surpluses or deficits may result from day to day operations. Deficits are quite common in Canadian hospitals[17] ; while usually not allowed by regulations or laws, provinces cover them as provincial subsidies account for a substantial amount of hospital financing[18]. One explanation for this behaviour is that at least in some provinces hospital deficits are not part of provincial deficits and thus the underfunding of hospitals that results in these deficits appear as cost cutting measures. Of interest to us is how surpluses are used; this is addressed managed by McKillop (2002). In the case of Canada, he finds (Table 5, p.18) that in some provinces it is recommended that they be used for capital equipment (Alberta, British Columbia, Ontario) in others part (Manitoba) or all PEI) goes back to provinces.

Switzerland

38. Up to the 1990s, the Swiss hospital system was comprised of three levels. Level 1 was small and regional hospitals, mainly operated by local governments (communes) organized except for large ones in multi-communal hospital districts.[19] Most of these establishments had religious or private charity origins. At level 2 one finds cantonal hospitals with more developed services while there are a few level 3 highly specialized university /cantonal hospitals (Genève, Lausanne, Berne, Zurich, Basel-Town), carrying out research activities and using cutting edge technologies. Level 3 hospitals are not federal; they are operated by the canton where they are located with horizontal access and cost sharing agreements (concordats) with neighboring cantons.

39. In the 1990s, centralization began when the cantons started promulgating technical norms and minimum standard requirements in order to limit inefficiencies: this was the case when new technology appeared (scanning instead of X-rays for example) so as to avoid each district hospital acquiring its own equipment that could serve more that the residents of the hospital district; or to improve quality with a minimum number of acts (obstetric departments are good examples).

40. In the 2000s, centralization accelerated. In most cantons, vertical coordination was obtained through the merging of district hospitals (level 1) into the cantonal level 2 in order to organize a larger cantonal hospital network.[20] This meant that – not without heated political debates in cantonal Parliaments and opposition in the rural areas – several district hospitals

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[17] For Ontario see *More than one-third of Ontario hospitals didn't balance books* MARIA BABBAGE TORONTO — THE GLOBE AND MAIL Last updated Thursday, Aug. 23 2012 http://m.theglobeandmail.com/news/politics/more-than-one-third-of-ontario-hospitals-didnt-balance-books/article1320892/?service=mobile ; For Québec see *Quebec to appoint financial monitor at MUHC McGill hospital centre's deficit could hit $115M* CBC News Posted: Dec 18, 2012 6:58 AM ET Last Updated: Dec 18, 2012 10:27 PM ETHttp://www.cbc.ca/news/canada/montreal/story/2012/12/18/muhc-cuts-patient-care.html

[18] 90% in 2010 Figure 14, p19 National Health Expenditure Trends, 1975 to 2011 Canadian Institute for health Information https://secure.cihi.ca/free_products/nhex_trends_report_2011_en.pdf

19. In several places, the functional limits of the hospital service jurisdiction overlap over two cantons. This is not uncommon and shows how federalism can organize adaptable and creative solutions in order to gain efficiency and economies of scale, taking into consideration distance and cantonal frontiers. These special jurisdictions sometimes have been given as illustrative examples of FOCJs. But the analogy is not correct. They were functional jurisdiction, but neither overlapping (their position was monopolistic in the territory of the members communes) nor competing (hospital of first and second level were attributed their own political boundaries and hospitalized persons could not "choose" other establishments).

20. For example in the cantons of Valais in 2004, Neuchâtel 2006, Vaud and Fribourg 2007.

were closed. Between 2000 and 2010, more than 35 percent of Swiss hospitals were closed.[21] This centralization was eased also by the improvement of mobile medical technologies found in ambulances and the development of helicopter rescue and inter-hospital link.

41. Two points are of interest in this move towards centralization: the arguments that are proposed for centralization at the cantonal level and the public finance solution.

42. In most cases, the arguments for the cantonalization of hospitals can be summarized as follows[22]:

- This stops a race between district hospitals leading to over equipment overall at that level;
- This stops encroachment by district hospital in the areas of competencies of cantonal hospitals, preventing the consequent vertical inefficiencies;
- This allows better organization in the purchase of medical products and equipment (no local overstocking yet more cantonal power in price negotiation);
- This facilitates harmonization of the management, computer program, billing and other bureaucratic measures;
- This creates scale economies in infrastructures and equipment;
- This increases the quality of medical and surgery service delivered with a higher number carried out in each now larger hospital (practice makes perfect argument).

43. Financing the re-assignment of hospital care and thus investments from the communes to the cantons was done by modifying the taxation of various bases (mainly taxes on personal income and wealth, and on corporate profit and capital) levied by both communes and cantons. As one knows, re-assigning functions in a federal or decentralized system always creates budgetary problems. One way to render acceptable this shift is to group bottom-up and top-down re-assignments so as to obtain a zero-sum change. This has proved to be both difficult and hazardous not only at the moment of the re-assignment, but also because the rates of growth of the re-assigned functions can take unexpected paths – with the result that losers in a given round are reluctant to take on a second re-assignment round. This pitfall was avoided using an innovative technique (innovative in Switzerland at least): the vertical compensation of the tax coefficient on direct taxation. Each canton calculated how much the communes paid, in this case for hospital care, infrastructures and equipment in the last three (sometimes five) years preceding the shift. Then the ratio (total past communal hospital expenditure) / (the tax base) is used to calculate the relevant communal tax coefficient. In counterpart, the communes have the obligation to reduce their own tax coefficient (piggyback taxation) in proportion.[23]

21. « Statisques de la santé 2010 », pages 71-76, vol. 14, Federal Office of Statistics, Neuchâtel www.bfs.admin.ch/portal/fr/index/news/publications. Consulted February 1, 2013.

22. Message 251, March 13, 2006 for the executive government of canton Fribourg to the Parliament explaining the draft law on the cantonal hospital network (Message in French): pages 1 and 2. The arguments developed in this Message are illustrative of the arguments previously forwarded in other cantons (see footnote 17).

23. In the canton of Neuchâtel, the cantonal coefficient was increased with 0.30 from 1.00 to 1.30 and the communes' tax coefficients were globally reduced by 0,30 points. [Note: in the tax system $T = t \times B \times k$ where t is the tax rate schedule, B the tax base and k the annual coefficient; k=1 gives $T=t \times B$ which is the basic tax schedule written in the law, k serves to balance the budget. The calculation was (∑hospital expenditures in the communes

44. Let us now turn to the magnitude of decentralized health expenditures in general and for investments. Table 9 summarizes the situation for the period 1990-2010[24]. Investment expenditures at the cantonal and communal level have varied from 9.3 percent of total hospital and home expenditures in 1990, decreasing to 7.7 percent in 2000 and going back to over 10 percent from 2008 onwards. The 2005-2007 figures are lower: they concerns the years where cantonalisation took place in many cantons, thus limiting new investments in that period of institutional re-organization. The cantons' shares of investment expenditures have regularly increased over time, compared to the communes' share, from 64/36 percent in 1990 to 85/15 percent in 2010, and this will certainly continue in the near future up to a near 100 percent in the cantons' hands. The Confederation does not operate hospital; it only legislates in that area.

divided per B the total cantonal tax base = Δk)]. This global negative move was strongly criticized thereafter by individual communes because it did not correspond to their own hospital expenditures.

In the canton of Fribourg, the cantonal tax coefficient on direct taxation (personal income and wealth, corporate profit and capital) was increased from 1,00 to 1,089 points. The communes had to reduce accordingly their own coefficient. The decrease was calculated for each commune. In the author's commune, this corresponded to a decrease in the tax coefficient from 0.85 to 0.77 points.

24. In the nomenclature of Swiss public accounting, health expenditures are regrouped under Function 4, and several sub-functions. In Table 9, hospital infrastructures concern subgroup 411 Hospitals, 412 Homes for elderly people and 413 Psychatric Hospitals and Clinics, which all give in-patient health care, grouped in sub-function 41.

Table 9 Public Health Expenditure, Switzerland, 1990-2010, in 1,000 CHF

	1990	1995	2000	2005	2006	2007	2008	2009	2010
Total hospital and home	**9,914,075**	**13,140,682**	**14,319,763**	**18,242,477**	**18,435,598**	**19,300,901**	**8,258,495**	**8,788,580**	**8,815,252**
Health expenditure : total	**10,769,188**	**14,251,061**	**15,579,322**	**19,751,925**	**19,974,506**	**21,072,410**	**10,634,149**	**11,270,274**	**11,328,790**
Public expenditures: total	**105,118,888**	**139,873,305**	**151,836,715**	**176,235,767**	**176,973,488**	**183,706,306**	**187,890,993**	**185,536,151**	**189,407,520**
Total hospital and retirement home/ Total Health spending %	92%	92%	92%	92%	92%	92%	78%	78%	78%
Health Spending / total public expenditures %	10%	10%	10%	11%	11%	11%	6%*	6%*	6%*
Cantons' share in Total hospital and retirement home 41	60	56	56	58	59	59	91	91	92
Communes' share in Total hospital and retirement home 41	40	44	44	42	41	41	9	9	8
Investment share in Total hospital and retirement home	9.3	8.8	7.7	5.3	4.6	5.7	10.6	10.2	10.3
Cantons' share in health Investment%	64	74	72	67	73	79	78	80	85
Communes' share in health investment %	36	26	28	33	27	21	22	20	15

Sources: Federal Department of Finance, Berne, http://www.efv.admin.ch/ > Documentation > Statistique financière > Rapport > Modèle SF > sous-secteur et agrégats. Authors' report and calculation from various Tables: F11.7, F40.7.5, F23.7 F70.7.5, F80.7.5 (all refresh 31.01.2013). PIB: SECO, 25.09.2012. Information about the investment share in 41 and the cantons' and communes respective shares in percent have been obtained directly from the Federal Department of Finance, 01.02.2013.

Note: This drop is the result of a statistical artifact noted above.

45. From 2012 onwards, hospital financing has changed radically. Following years of political debate, the federal government imposed on the cantons and hospitals a funding system based on federally set unit costs for each medical act. Hospital expenditures will no longer be covered through lump-sum amounts and contracts with private health insurances. Thus the federal government sets the value of each medical act; the hospitals are reimbursed according to this fee schedule, which applies to all hospital throughout the country. It benefits the hospital to be as efficient (cost minimizing) as possible given the fee schedule. Also new is that, at least on paper, the patient can chose which hospital to use – cantonal and district hospitals have lost their territorial monopoly. The objective is to increase competition between establishments and, through competition, to increase efficiency and lower hospital recurrent costs per medical act and thus per patient. Finally, according to the new law, the cantons will have to cover at least 55 percent of the hospital costs, current and capital. After one year of implementation, some problems already appear. (i) the implicit hypothesis of the single fee schedule is that all hospital are on the same position in the U-shape cost curve right from the beginning, this does not rely on empirical evidence and is unlikely to hold given the existing territory/clientele served by each hospital; (ii) since savings are not easily done in terms of spending on investment, equipment or medical products, pressure to save occurs mainly on human resources. Medical staff and nurses are complaining that priority is given to medical acts rather than to the relationship between staff and hospitalized patients; this relationship may matter more for their well-being but is not taken into account by the fee schedule. Thus some health experts are arguing that the system should return to cooperative rather than competitive federalism since hospital functions are first collective goods and not market services. It is too early to say if patient mobility and the capacity to choose one's hospital anywhere in Switzerland will enhance quality and efficiency. If it does, then this shift towards a more competitive (private) type of provision of hospital services may have been for the better; otherwise, it is most likely for the worse.
46. The discussion above only examines the public hospital health sector and says nothing about the private sector or PPP. Unfortunately, actual statistical data blur the debate on public/ private hospital so that the issue becomes uncontrollable. Consider the following situation (2010). The left column gives the number of establishments in the functional classification; the middle one the nature of the unit.

47.

[function 411] 121 hospitals	30 university and cantonal 91 regional and small	84 public or private and subsidized 37 private and not subsidized
[function 412] 1523 home for elderly people		465 public 467 private and subsidized 455 private and not subsidized
[function 413] 179 clinics	88 selected hospital care and specialties 50 psychiatric 41 physical disability re-adaptation	72 public or private and subsidized 107 private and not subsidized

Source : « Statistiques de la santé 2010 », pages 71-76, vol. 14, Federal Statistical Office, Neuchâtel

www.bfs.admin.ch/portal/fr/index/news/publications. Consulted February 1, 2013.

The interest of these figures is in the right hand-side column. According to the normative view developed in section 2, only hospital units that deliver a collective good in terms of hospital health care, mainly with open access and day-night emergency services, should be (partly) funded out of public budget. But one can no longer cross-cut public /private ownership with collective service/ individual care when public finance statistical data are organized according to the SEC95.[25] In there, the concept of "economically significant prices"[26] and a system of pricing which is applied to both public and private hospital have eliminated from the "public" statistics into the "private" sector a substantial number of publicly-owned hospitals. Hospital health expenditures have not been reduced, nor have they disappeared. They are simply recorded in the private sector and not accessible. This is more than unfortunate since hospital policy remains essentially in public hands.

[25] See *Manual of Government Deficit and Debt, Implementation of ESA95*, Eurostat Methodologies and Working Papers, European Commission, Luxembourg, 2012, 4th edition, pages 14-16. Also *www.imf.org/external/pubs/ft/gfs/manual/fra/index.htm*; *http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication*
Déficit et dette, *epp.eurostat.ec.europa.eu*>government finance statistics>manuel ;

[26] This is the 50% criterion : if half or more of the relevant total costs (to be defined ?) are financed through user charges and bills to patient, then the producing unit is classified in the private merchant sector of the economy. Note that this methodology is adopted by the big five: EU, IMF, WB, UN and OCDE. In consequence, the discussion in this paragraph goes much further than the simple "Swiss" case that is described.

48. A complement to a more market oriented provision of health services is a more market oriented financing of health investments as embodied in PPP. We thus turn to a discussion of this financing system now.

PPP

49. Montagu and Harding (2012) examine the role of the private sector in the provision of health services and health infrastructure. They first note a fair amount of confusion in the terminology and propose four definitions.

Services: Operating contract: A private organization is brought in to operate and deliver publicly-funded health services within a public facility.

Facility/finance: PFI: A public agency contracts a private entity to finance, design, build and operate a hospital facility. Health services within the facility are provided by government.

Combined BOT+PPIP: A private organization establishes capacity (through new construction or expansion of existing facility) to provide health services under sustained public or social insurance reimbursement.

Co-location: A public agency allocates a portion of a public hospital's land and/or premises for sustained use by a private organization in exchange for payment and specified benefits to the public agency.

Table 10

	Infrastructure PPPs	Hospital PPPs	Implications
Government vs Private purchaser of output	Private buyers/payers • Government does not enter into long-term service purchasing relationship as part of transaction	Government (or social health insurers) buy all or most services • Government enters into long-term service purchasing relationship as part of transaction	Substantial risks to government payer as a result of long-term funding "lock in" obligation • Substantial political risks to private partners in hospital PPP
Business risk vs Political risk	Borrowing costs reflect estimated risk of demand for infrastructure services by total market of potential payers	Borrowing costs reflect risks associated with single (or multiple) government payer agencies	Cost of finance (and therefore capital) higher for hospital facility investment
Measurability	Comparators for benchmarking cost of facility availability services are somewhat limited	Comparators for benchmarking cost of services often extremely limited	Probability of that payment contract will set excessive rates is higher for hospitals
Variability of outputs over time	Products stable over time	Products highly variable due to volatility in demographics and disease	• Risk to private partners necessitating either higher return contingencies, or flexibility in contract modification • Risk to government due to "locked in" commitment to hospitals/ configuration that may not be needed in the future
Variability of technology over time	Service delivery technology and organizational models change slowly	Service delivery technology and organizational models change rapidly	Risks to government and private partners as a result of lost flexibility to adapt service organization; or cost of unpredictable adjustments to technology, systems and staffing
Ratio of investment to operating capital	High ratio of capital to operating costs	Low ratio of capital to operating costs	Efficiency gains from private finance/ design/ construction and operation of hospital PPPs lower than for infrastructure PPPs

Source: Table 2 as such: Montagu and Harding (2012).

50. McKee *et al* (2006) review various PP health facilities and note several issues both financial (Box 10) and in terms of quality of the facilities. Their abstract summarizes well the issues:

> *"Although experience is still very limited and rigorous evaluations lacking, four issues have emerged: cost, quality, flexibility and complexity. New facilities have, in general, been more expensive than they would have been if procured using traditional methods. Compared with the traditional system, new facilities are more likely to be built on time and within budget, but this seems often to be at the expense of compromises on quality. The need to minimize the risk to the parties means that it is very difficult to "future-proof" facilities in a rapidly changing world. Finally, such projects are extremely, and in some cases prohibitively, complex. While it is premature to say whether the problems experienced relate to the underlying model or to their implementation, it does seem that a public–private partnership further complicates the already difficult task of building and operating a hospital."*

51. A presentation by Loening[27] shows that while the major spending item of hospitals is on delivery of care (54 percent), the second largest item at 15 percent is construction.

52. The main conclusions one can draw from this part of the paper are that:

- there are various models commonly used to finance health infrastructure, relying more or less on debt and more or less on private funds;
- as shown for Switzerland it is possible to modify the role of various levels of governments in the provision of health services through more centralization for example but this needs to be accompanied by well thought out changes in financial arrangements;
- one model often put forward as the modern way, the PPP, should be considered with great caution

Conclusion

53. Investment in health infrastructure is carried out to provide health services. These are amongst the commonly provided public services those that use more specialized manpower. Thus the complementarity of human and physical capital is an important factor in designing a proper health infrastructure funding arrangement. One must also note that the availability of medications is a key part of successful health outcomes. A second important factor is the need for quick universal access in case of emergency since not all health needs are predictable; this requires taking into account networks interactions between roads, ambulances and facilities. Third, one must balance the benefits and costs or concentrating care in specialized care centers.

27. 2007 World Bank Workshop on Public Private Collaboration in Health Care Provision, Montenegro: http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/ECAEXT/EXTECAREGTOPHEANUT/0,,contentMDK:21494453~isCURL:Y~menuPK:3256336~pagePK:34004173~piPK:34003707~theSitePK:511545,00.html

54. One difficult issue is that there are three inputs in health and particularly curative health services: labor, structures and technology. The last one changes faster than the technology in education or road maintenance and trends higher cost wise. In a decentralized health system, how should one fund technology? As an ongoing cost or as a depreciable (at what rate) infrastructure? Does this have an impact on horizontal cooperation? For example one equips hospital A with technology T1, then B with T2, the A with T3 and so on in some kind of leapfrogging approach? With patients in the catchment area A sent to B when T2 benefits them and vice versa for T3. Or does give T1 to A and B, skip T2 and go for T3 with a period when T2 which is useful is not available thus reducing the quality of health care for a while for all.

55. These various factors combined with the fact that one often finds decentralized (devolved) provision of health care with a link between less specialized care and smaller governments has consequences for the funding of infrastructure. In general, it will make sense to have a funding and standards role for the national government or at least large SNGs to internalize externalities and optimize the network while avoiding a medical arms race.[28]

56. Finally, it is common to end a paper for a plea for more research. Here we believe this would not be useful given the lack of data. So we end with a plea for more data comparable over time and space. This is necessary not only for research but also to guide policy.

28. A term commonly used in health policy research. For example see Changes in Hospital Competitive Strategy: A New Medical Arms Race? *Health Services Research*. 2003 February; 38(1 Pt 2): 447–469 http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1360894/

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