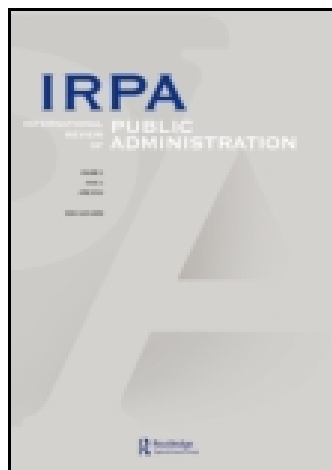


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Does Decentralization Matter in Health Outcomes? Evidence from 22 OECD Unbalanced Panel Data for 1995-2005

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DOES DECENTRALIZATION MATTER IN HEALTH OUTCOMES? EVIDENCE FROM 22 OECD UNBALANCED PANEL DATA FOR 1995–2005*

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Recently, scholars and practitioners around the globe have started to view decentralization as an integral part of broader health reforms. Nevertheless, the literature on decentralization has tended toward case studies and theoretical discussions rather than rigorous empirical analysis, and few quantitative studies have explored the practical consequences of decentralization of health service delivery. This study attempts to address this issue by exploring the impact of decentralization on health outcomes with a panel dataset of 22 countries from 1990 to 2005. Our findings indicate healthcare decentralization is nonlinearly beneficial to improve the health of a population. The effect of decentralization on population health remains positive within a certain threshold, but becomes negative beyond the transition point. Considering the institutional background of healthcare, the institutional setting of reliance on market mechanisms in service provision and on private insurance for basic coverage is a precondition for decentralization reform to further create a positive impact.

Key Words: healthcare decentralization, population health, public service delivery

DECENTRALIZATION AS A MEANS OF HEALTH REFORM

One of the most widely debated but still controversial agendas among politicians, bureaucrats, and donor communities in the world is decentralization (Regmi, Naidoo et al. 2010). Advocates of health sector reform for decades have proposed the decentralization of health systems as a desirable process to improve the performance of health service delivery (Bossert & Beauvais 2002; Jimenez-Rubio, Smith et al. 2008). Recently, scholars and practitioners around the globe have started to view decentralization as an integral part of broader health reforms to achieve improved equity, efficiency, quality, and financial soundness. In terms of service provision, supervision, and resource allocation decisions, decentralization of responsibilities from central to local governments has become an increasingly common strategy for addressing a variety of ills. In a health financing policy report from the World Bank (1987), decentralization policy was proposed as one arm of a sector reform strategy that has since become a standard policy prescription (WorldBank 1987). As a means of improving public healthcare systems in both the developed and developing world, decentralization has been acknowledged to increase the potential to more effectively address overall service provisions (Shaffer, Waitzkin et al. 2005; Regmi, Naidoo et al. 2010).

The diverse objectives of decentralization are embedded in the discourse of reform. On a philosophical and ideological level, decentralization has been seen as an important political ideal, providing the means for community participation and local self-reliance, and ensuring the accountability of government officials to the population. On a pragmatic level, it has been seen as a way of overcoming institutional and administrative constraints and allowing a higher level of responsiveness to local needs, improved management of supplies and logistics, and greater motivation among local officers, thus facilitating and speeding up implementation (Larmour, Qalo et al. 1985; Mills 1994).

The great volume of literature that has accumulated over the past several years reflects the considerable attention being paid to this issue (Khaleghian 2004; Jimenez & Smith 2005; Scheffler & Smith 2006; Costa-Font & Moscone 2008). Nevertheless, we possess an uneven understanding of the degree to which decentralization is achieving its objectives. In particular, the literature on decentralization has tended toward case studies and theoretical discussions (e.g., Zhong 2010; Keating & Hertzman 1999; Robalino, Picazo et al. 2001) rather than empirical analysis, and few studies have explored the practical consequences of decentralization of health service delivery in a quantitative way. In the case of cross-country qualitative analysis, this widening gap between empirical records and theories is even more severe. Thus, more empirical analyses are necessary to better understand whether and how the various benefits projected by the reforms have materialized. One of our focuses is testing the nonlinear relationship between health decentralization and health outcomes, which has been discussed only in a theoretical manner so far. The other contribution of this study is to explore various

interactions between decentralization and a country's existing healthcare system, an aspect that has also surprisingly been overlooked in the health decentralization literature.

LITERATURE REVIEW

Decentralization in the Health Sector: Theory and Practice

Many developed nations, such as the U.K., U.S., and Australia have struggled to meet ever-rising expectations on the public sector while at the same time facing sharp increases in costs over the past several decades (Humphrey, Miller et al. 1993; Farazmand 1999; O'Faircheallaigh, Wanna et al. 1999; Starling 2010). These incompatible trajectories have caused debates about the sustainability, equity, and efficiency of healthcare systems in Europe and North America to become quite fierce. Important questions raised repeatedly in the debates are whether the central government should decentralize healthcare policy—making itself to lower levels of government, and what the most appropriate degree of decentralization is (Zhong 2010).¹

In recent years, decentralization of the delivery of public services such as healthcare from central to local governments has become a widely accepted reform in various countries (WorldBank 2000). Advocates of decentralization argue that the reform promises a wide range of benefits: Decentralization can improve technical efficiency by empowering local knowledge (Passell & Ross 1978; Rondinelli, Nellis et al. 1984; Mundial 1997), expedite the bureaucratic process (Mills, Vaughan et al. 1990; Silverman 1992; Dillinger 1994; Huther, Shah et al. 1998), increase the level of representation of local populations (Burki, Perry et al. 1999; Dillinger & Fay 1999) and develop local democracy (Morgan 2001), induce policy innovation and reduce information asymmetries (Morgan 2001), and can bring service provision more in line with local preferences (Tiebout 1956; Oates 1972; Musgrave 1998). Especially when needs or preferences are geographically uneven, these benefits are much more visible because an uninformed public policy is unlikely to meet the demands of regional-specific provision of public service (Rubinfeld 1987), with one of the most frequently mentioned such cases being healthcare policy (Costa-Font & Rico 2006). In addition, more recent research have addressed various welfare benefits derived from inter-jurisdictional competition mechanisms (Besley & Case 1995; Revelli 2001), and these mechanisms are especially relevant in highly visible policy areas such as healthcare (Costa-Font & Rico 2006). Imperfectly informed voters in one jurisdiction might use another regional government's healthcare policy performance as a yardstick to evaluate their own government, if constituents and local incumbents can access information on health services in the neighboring jurisdiction (Salmon 1987). Decentralization potentially can give rise to externalities taking the form of informal regional competition amongst region-states,

which induces patients to move from one region to another in order to obtain better healthcare. This might well enhance the accountability of regional incumbents to implement desirable health policies in their territories (Besley & Coate 2003). Administrative autonomy also creates space for learning, innovation, community participation, and the adaptation of public services to local circumstances.

The basis of benefits proposed by decentralization reform is the premise that it situates local decision makers closer to the constituencies they serve. Assumptions underlying this basis regard the nature of information available to local decision makers, the presence of effective channels for the public to express wants and preferences, and the incentive environment motivating decision makers to respond. Each of these assumptions leads to specific conclusions regarding the benefits of decentralization.

In spite of the strong faith placed in decentralization, several factors might reduce or destroy the advantages of decentralization, if undertaken without sufficient planning or strengthening of the appropriate institutions, leading to outcomes that are potentially worse than centralized systems. These include fragmented planning, inadequate consideration or funding of recurrent expenditures, local capture, or under-provision of certain types of services (Mills, Vaughan et al. 1990; Collins & Green 1994; Prud'Homme 1995; Schwartz, Racelis et al. 2000; Jeppsson 2001; Akin, Hutchinson et al. 2005). In particular, undersupply of health services related to inter-jurisdictional spillovers is an important possibility to consider when discussing planning at the local level. Healthcare serves multiple jurisdictions but governance of it is controlled by the local district in which it is situated; therefore the aforementioned external effects might be present in these arenas (Oates 1972; Akin, Hutchinson et al. 2005)

Capture of the governance processes by special interest groups and local elites is also one of the concerns (Collins & Green 1994; Prud'Homme 1995; Bardhan & Mookherjee 2005). Targeting behavior caused by local capture is more likely to occur when private consumption goods such as curative healthcare are provided publicly, because these public goods are characterized in general by the inability to exclude consumption (Mills 1994). Therefore, this can cause a situation where local governments pay for private goods for a targeted interest group.

Some research objects to decentralization on the basis of the view that satisfying heterogeneous regional preferences can damage a strict idea of uniformity and give rise to regional inequalities. These inequalities could hinder static efficiency if one region becomes less operative compared with its neighbors due to a lack of management capacity, or alternatively due to a lack of local legitimacy and transparency (Heald, Geaughan et al. 1998; Redwood 1999; Calamai 2009). Similarly, decentralization is likely to favor wealthier areas, exacerbating region-specific lobbying, which in turn intensifies unnecessary regional sentiments at the expense of national unity (Markusen 1993; Rodriguez-Pose & Bwire 2004; Regmi, Naidoo et al. 2010).

Policy innovation and the diffusion perspective can be incorporated into the

discussion of decentralization and its benefits. Decentralization is able to place appreciable effects on health policy innovation, which leads to policy diversity (Rico, Fraile et al. 1998; Rico & Costa-Font 2005). Health policy innovation in one region can be disseminated to other regions with interregional externalities from a process of policy imitation. Given that policy innovation is conceived as a regionally determined healthcare reform initiative, evidence from the United States exhibits significant welfare policy innovation and diffusion within states (Arsneault 2000). Decentralized structures generate diverse policy communities and new policy ideas, because regional incumbents always want to improve their possibility of re-election through promoting policy innovation (Gow 1994; Costa-Font & Rico 2006). That is, neighboring local governments act as reference groups for where to collect information on new policies, meaning that there exists an incentive to free-ride on the policy experiments of those regions when a specific policy has demonstrated considerable success. Therefore, choosing successful policies in benchmarking jurisdictions is an efficient strategy to improve the quality of locally provided services (Besley & Case 1995).

Table 1. Effects of decentralization

Decentralization	
Positive effect	Negative effect
- Improve technical efficiency	- Create local capture
- Reduce bureaucratic processes and increase the speed of decisionmaking	- Cause fragmented planning
- Increase representation by local population	- Incur under-provision of certain types of services
- Promote policy innovation	- Incur undersupply of health services related to inter-jurisdictional spillovers
- Reduce information asymmetries	-Fund recurrent expenditure inadequately
- Develop local democracy	
- Bring service provision more in line with local preferences	
- Create inter-jurisdictional competition	
Contingency	
- Visibility: whether or not the policy is highly visible	
- Geographical heterogeneity: whether or not the needs or preferences are geographically uneven	
- Central monitoring: how strong the central monitoring is	
- Social capital: how well the social capital of the country is developed	
- Government capacity: how high the government capacity is	

Several case studies have also illustrated the effects of decentralization of health systems in countries across the globe. In the early 1990s, the Finnish healthcare system also underwent decentralization reforms, but there was no systematic evidence that major differentials had arisen between areas in terms of service provision and access even when municipalities in Finland acquired taxation powers (Keating & Hertzman 1999). In Bolivia, strong positive effects of healthcare decentralization have been found with regard to healthcare spending (Faguet 2004). Public healthcare services in a state of Brazil exhibit that positive outcomes followed when far-reaching institutional and management reforms were implemented by decentralized authorities, when the central government provided them with the proper incentives, guidance, and support (Sara 1994). An example of a donor-funded project in Indonesia presents how the benefits of decentralization accrue from investments in managerial capacity building (Bossert, Soebekti et al. 1991). In Latin America, the implementation of programs focusing on reproductive healthcare shows how community participation can be institutionalized in decentralized health systems and improve them (POLICYproject 2001). In South Korea, decentralization reform started in the 1990s and the depth of the reform has been most drastic in health and welfare administration by introducing the Revenue Sharing System and by decentralizing National Subsidies Systems for Healthcare and Welfare (Jang 2010).² The first Local Healthcare Plan was established in 1996 and has been updated with a 4-year term. Since then, the most extensive decentralization of healthcare was conducted in 2005. The Ministry of Health has a huge National Subsidies Systems for Healthcare and Welfare, which has an annual budget of USD 424 million, and it decentralized 12.3 percent of this to local governments, with 67 programs (Park 2006). However, among the total budget of National Subsidies Systems for Healthcare and Welfare, ordinary demand takes up USD 309 million, therefore, if we consider the non-ordinary demand, the actual level of decentralization of the system can reach 44.6 percent (Seo & Cho 2006). Contrary to the concerns related to this reform, Jang (2010) argues that the reform did not show negative effects.

Empirical studies on decentralization, focusing on healthcare services, do not make up a majority of the literature. Nevertheless, the current studies tend to present a positive effect of decentralization on health outcomes. Asfaw and his colleagues (2004) corroborate the previous results for rural India using an index of fiscal decentralization obtained by factor analysis on the basis of three variables for the period 1990–1997, and the results exhibit that the effectiveness of fiscal decentralization increases with the level of political decentralization (Asfaw, Frohberg et al. 2004). In addition, Habibi and his colleagues (2003) report that both the percentage of revenue raised locally and the proportion of controlled revenue over the total have a negative association with infant mortality rates for a panel of Argentinean provinces over the period 1970–1994. They find that regional inequalities were considerably reduced during the period of decentralization reforms studied (Habibi, Huang et al. 2003). Cantarero and Pascual

(2008) show that a shift towards greater decentralization in Spain was accompanied by improvements in population health, especially infant mortality and life expectancy, over the period of 1992–2003. Their results report that the more decentralization, the more positive effects of income and healthcare resources on infant mortality and life expectancy (Cantarero & Pascual 2008). Jimenez and Smith (2005) investigated whether shifts towards more decentralization would be accompanied by improvements in infant mortality rate, using panel data for the ten provinces of Canada for the period 1979–1995. The results showed that decentralization in Canada has had a positive influence on the population's health. In addition, Zhong (2010) suggests that decentralization in Canada is related to a lower level of overall and within-province inequity in the use of general practitioner and hospital services, and lower between-province inequity in the use of all three healthcare indicators: general practitioner utilization, specialist utilization, and hospital utilization (Zhong 2010).

There are few empirical cross-country analyses. For instance, Robalino and his colleagues (2001)³ examine, using panel data of low- and high-income countries, how fiscal decentralization influences infant mortality rates over the period of 1970–1995 (Robalino, Picazo et al. 2001). Khaleghian (2004)⁴ explores a relationship between decentralization and immunization coverage rates for Diphtheria-Pertussis-Tetanus 318 (vaccine) and measles in children at one year of age in 140 low- and middle-income countries over the period 1980–1997. However, the empirical evidence to date is not enough to be conclusive, due to the fact that centralized and decentralized organizations usually do not operate during the same time period and the different types of populations they reach are often not directly comparable. Another main weakness of the decentralization literature is the failure to isolate the effects of decentralization from the overall consequences of economic adjustments. Most recent decentralization programs occurred in periods of deep economic crisis; thus, negative consequences of decentralization policies are to be overestimated in research in this area and they cannot disentangle the isolated effect of decentralization on provider performance (Birn 1999; Homedes & Ugalde 2005; Laurell 2007). Our study attempts to address this deficit through a cross-country panel analysis on the effects of healthcare decentralization on health outcomes.

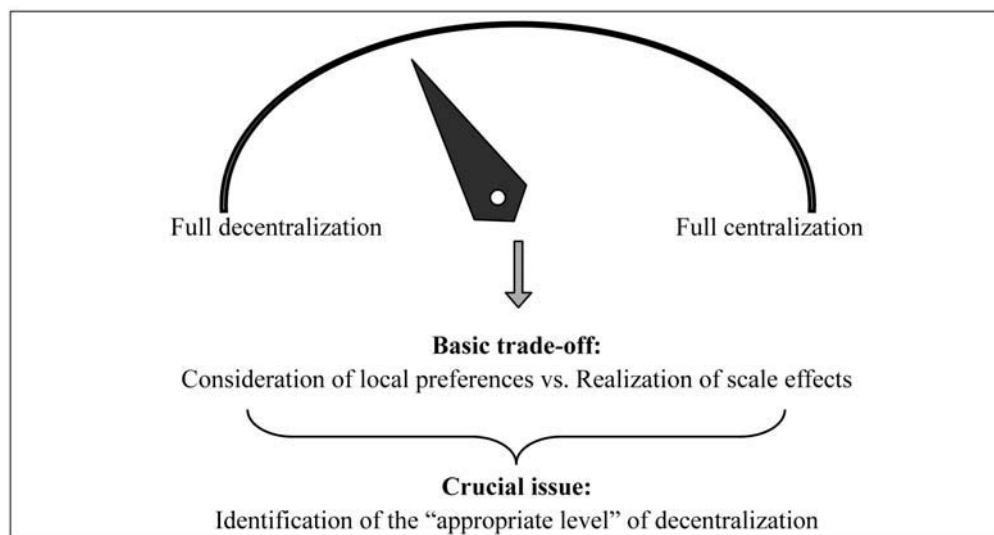
Nonlinear Relationship between Decentralization and its Performance

Regardless of fields and disciplines, scholars have believed that there is an optimal degree of decentralization with regard to monetary policy, financial repression, taxation, and so on (Bencivenga & Smith 1992; Sorensen 1999; Athey, Atkeson et al. 2005). Also in the literature on the decentralization of government activities, several authors, such as Breauss and Eller (2004) and ThieBen (2000), consider a non-linear relationship, or, in other words, a curvilinear relationship, meaning that there exists an “optimal degree” of

decentralization (ThieBen 2000; Breuss & Eller 2004). As mentioned in the previous section, decentralization does not always produce positive effects, which implies that there is basic tension over the appropriate level of decentralization, which comes from the trade-off between the realization of scale effects and the internalization of externalities, on the one hand, and the consideration of local preferences, on the other hand (Breuss & Eller 2004). This provides an explanation as to why “too much” decentralization creates difficulties for the internalization of inter-jurisdictional externalities and why economies of scale fall short of their goals. The same holds for a low level of decentralization, insofar as inefficiencies in the provision of public goods can be caused because local preferences are under-considered (ThieBen 2000; ThieBen 2003; Breuss & Eller 2004).

These insights add to the complexity of the decentralization debate by taking it beyond the simple good-bad dichotomy. This study thus proposes a continuum of decentralization in order to explain why the previous empirical approaches show divergent results: They sometimes report that the reform was positive or sometimes negative, but it is possible to say that both are not optimal. This study conceptualizes this argument in Figure 1.

Figure 1. Issue of Appropriate Level of Decentralization



Note: This figure is adopted from Breuss and Eller (2004)

As the figure depicts, decentralization reforms implemented in many countries around the globe tend to fall between full decentralization and full centralization. Therefore, the assessment of a particular reform's success or failure is very likely to differ according to the depth of the reform. Regarding why and how the performance of decentralization can present such a J-shaped or U-shaped curve depending on the extent of reform, we can infer that too extensive decentralization reform can cause central authority to lose its minimum control over the decentralized governments, which is necessary to monitor and coordinate them. The efficiency of the decentralized system can deteriorate to the point at which the monitoring and coordinating systems put in place by the centralized authority become too weak, because in the public sector there are many functions in policy implementation that need inter-governmental tensions and/or cooperation. The proper or minimum levels of central control can differ among nations according to different political, cultural, historical, and institutional characteristics, but we state that there is such a transition point at which the decentralized system starts to reveal the central government's failure to monitor and coordinate local government. To avoid this kind of failure, some countries try to control, to some extent, decentralized healthcare authorities, even during drastic reforms; for example, in South Korea, where decentralization reform has been widely implemented since the 1990s, the Ministry of Health and Welfare has control to review and monitor the healthcare budget for local governments. The ministry also requires local governments to make a Local Healthcare Plan, which has to be connected and shared with the National Health Plan in terms of goals and indicators, so that the central government body can monitor and coordinate diverse healthcare policies among local governments (Jang 2010). Without these kinds of minimum levels of control, the decentralization reforms can face the aforementioned diverse problems. Based on this rationale, this study hypothesizes as below.

H1: Healthcare decentralization will be negatively associated with the infant mortality rate until it reaches a certain level, and after this transition point decentralization will exhibit a positive relationship with the infant mortality rate.

Institutional Environment of the Reform: Private-Public Ownership and the Regulatory System

Idealized promises of a certain reform could be misleading if there is no consideration of the institutional context amid which reform programs are implemented. This word of caution applies when examining healthcare sector reform as well, as a historically grounded institutional uniqueness in different countries can moderate the effects of decentralization reform. In particular, decentralization in the health sector can change not only the organizational and administrative structures of a country's health delivery mechanism but also the behavioral dimensions of insurers, providers, and users;

therefore, this single reform of decentralization can actively interact with other, existing, contexts. For example, in many cases, decentralization reforms in some countries have been fundamentally linked to privatized institutional settings (Capistrano 2008). However, there has been little attempt to explore the possible link between decentralization and institutional background, such as market-provision-style system and regulatory scheme.

Essential for this analysis is the question of what typology we will use for this study, since there are different classifications of healthcare systems developed by many different approaches. The earliest attempt was by Field (1973), who suggested four categories of healthcare system: pluralistic, insurance, health service, and socialized (Field 1973), but soon after, Terris (1978) introduced the National Health Service (NHS) and Social Health Insurance (SHI) types of healthcare (Terris 1978). Navarro (1987) proposed three types of healthcare system, two under the umbrella category of corporate model, NHS and SHI, and the liberal models (Navarro 1989). The OECD (1994) also developed a series of typologies and categorized country groups based on healthcare provision type and financing type (OECD 1994): provision categories are the public, private, and mixed provisions, and financing categories are public contribution, public taxation, private, and mixed financing. For more details of this categorization, see the Appendix. OECD (2004) proposed a simplified typology by deleting the mixed mode in healthcare provision and financing, thus finally narrowing the health system down to three types: the public integrated, the public contract, and the private insurance-provider models (OECD 2004).

These common typologies are usually based on variations in the funding of healthcare and corresponding differences in the organization of healthcare provision (Jimenez Rubio, Smith et al. 2008). Relatively well-known health system types are National Health Service (NHS), characterized by universal coverage, funding out of general taxation, and public provision of health services, such as in the U.K. and Sweden; and the Social Health Insurance (SHI) model, characterized by contributions paid by employees and employers, public and private provision of healthcare, and compulsory coverage for the population, such as in Germany and France; and the private health insurance (PHI) model, characterized by a healthcare system funded by the individual and employer premiums, in which healthcare delivery relies predominantly on private ownership, such as in the United States.

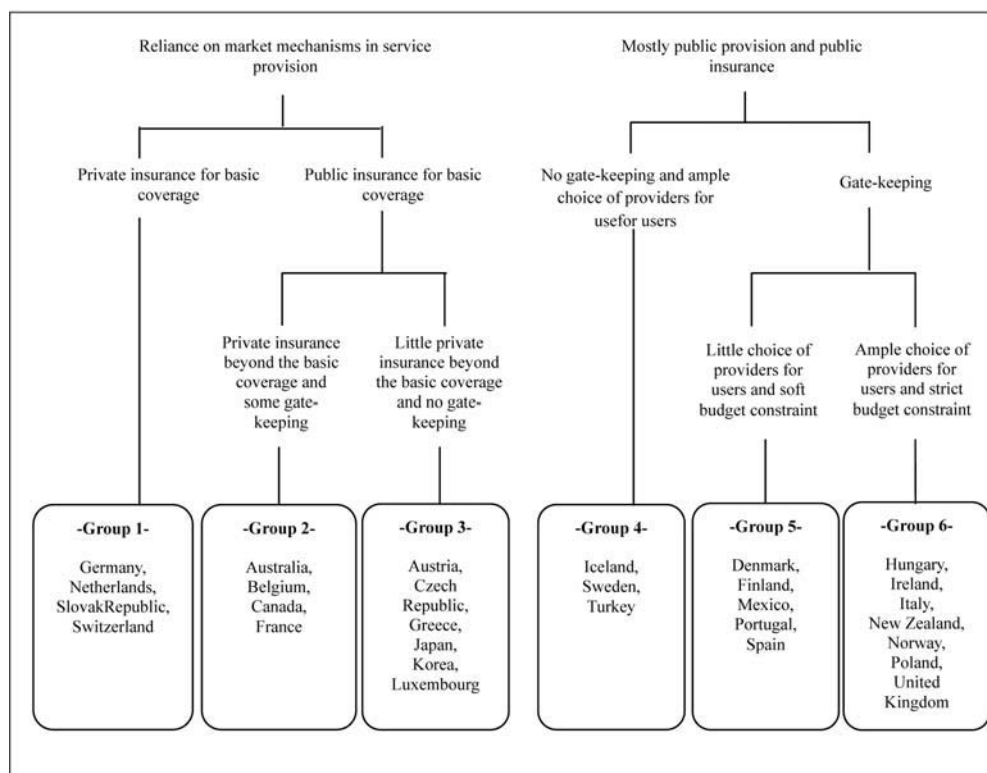
This study uses a categorization tool drawn from Joumard and her colleagues (2010), which is in continuum with previous typologies but uses more precisely developed methodology employing cluster analysis with DEA and factor analysis methods with cross-country quantitative indicators. Joumard and her colleagues (2010) create six groups of institutionally similar countries identified in terms of private-public ownership and regulatory structure, providing a useful framework to investigate the complexity of healthcare systems. The characterization of those systems can be summarized as follows

(Joumard, Andre et al. 2010). The categorization for this, as mentioned earlier, is based on well-developed cluster analysis using DEA and factor analysis tools with diverse indicators. We then identified the characteristics, as explained below. The reason we have chosen this categorization instead of existing ones is that this typology uses quite recent data, reflecting current reforms and shifts in the healthcare system in each country. Countries' institutions are not fixed, but rather changing constantly, especially in this era of worldwide reforms in various areas. Although the tradition and historical experience of the healthcare system in each country are important to consider, the data-driven approach, such as the typology that Joumard and her colleagues (2010) use, has advantages in this regard. Yet, there is congruence rather than discordance between the typology we use and existing ones.

Group 1 involves extensive reliance on market mechanisms in regulating both basic and "over-the-basic" insurance coverage and abundant private provision of healthcare. This group includes Germany, the Netherlands, the Slovak Republic, and Switzerland. Group 2 involves public basic insurance coverage combined with private insurance beyond the basic coverage. This shows heavy reliance on market mechanisms at the provider level, with wide patient choice of providers and fairly large incentives to produce high volumes of services contained by gate-keeping arrangements. This group includes Australia, Belgium, Canada, and France. Group 3 involves public basic insurance coverage with little private insurance beyond the basic coverage, showing extensive private provision of care, with wide patient choice of providers and fairly large incentives to produce a high volume of services. There is no gate-keeping, and there is soft budget constraint and limited information on quality and prices to stimulate competition. This group includes Austria, the Czech Republic, and Luxembourg. Group 4 includes countries that rely mostly on public insurance. Users are given ample choice of providers, but private supply is limited and prices are tightly regulated. Gate-keeping is virtually nonexistent. This group includes Iceland, Sweden, and Turkey. Group 5 also involves mostly public insurance. Healthcare is provided by a heavily regulated public system and the role of gate-keeping is important. Patient choice among providers is limited and the budgetary constraint imposed via the budget process is rather soft. This group includes Denmark, Finland, Portugal, and Spain. Group 6 also involves mostly public insurance. Healthcare is mainly provided by a heavily regulated public system, with strict gate-keeping, little decentralization, and a tight spending limit imposed via the budget process. This group includes Hungary, Ireland, Italy, Norway, and Poland.

This categorization allows meaningful comparisons between countries with different institutional environments that can better serve to help extend or shrink the impact of decentralization reforms.

Figure 2. Groups of countries sharing broadly similar institutions



Source: Jourmard et al. (2010), p.50.

In sum, this study can contribute to the literature in several important ways. First, given that there is little to none empirical analysis with cross-country data, our research can provide useful information as to cross-country level comparison. Second, this study tests the nonlinear relationship between decentralization and the health outcome, which has heretofore been limited to theoretical discussions. Third, existing institutional characteristics of healthcare systems, such as privatized healthcare delivery, are considered in our modeling, testing the interaction between decentralization and different institutional environments. Assembling these strands of argument, this study hypothesizes as follows.

H2: The relationship between healthcare decentralization and the infant mortality rate will be different in different institutional environments.

METHODS AND DATA

To examine the relationship between health system decentralization and health service performance, this study used panel regressions. This regression makes use of panel datasets that consist of time-series measurements on each of the cross-sectional observations. Panel data were used in this study because they create variability and provide more informative results while eliminating the need for lengthy time-series observations, since the data can make use of available information about the dynamic reactions of each subject. An additional advantage of using panel data estimation techniques is the attenuation of the problem of omitted variables. Panel data models control for individual heterogeneity, which are inherent characteristics that are (n)either unobservable or non-measurable. The use of a fixed effects panel data model, together with a wide range of control variables, intends to overcome the problem of oversimplification in modeling the complexities of decentralization effects.

Due to the spatial and temporal characteristics of panel data, the use of ordinary least squares can bias results and ignore factors that may be specific to each country. Therefore, this study has chosen a fixed effects estimator, an econometric approach frequently used to analyze panel data. The main advantage of this estimation technique is the attenuation of the problem of omitted variables. This model controls for individual heterogeneity, that is, inherent characteristics that are either unobservable or non-measurable. The use of a fixed effect panel data model can overcome the problem of oversimplification in modeling the complexities of decentralization, offering the advantage of holding constant any unobserved (omitted) country-specific (time-invariant) determinants of the dependent variable, where the cross-country analysis has constraints in the availability of large set of variables. This study uses cross-sectional time-series data for 22 countries (Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, France, Finland, Germany, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, the Slovak Republic, Spain, Sweden, Switzerland, Portugal, Iceland) from 1990 to 2005. The selection of the time-series range and country coverage is constrained by the availability of data, but the number of observations in this study is comparatively not small, although still hardly sufficient, given that other cross-country analyses dealing with decentralization are also not large enough and contain no more than hundreds of observations due to the lack of an international dataset (Robalino, Picazo et al. 2001; Im & Cho 2008). However, it is true that the lack of reliable data with large sample sizes is one of the critical weaknesses in this kind of cross-country quantitative study. There is a need to collect and analyze a larger dataset in future studies.

This study uses the infant mortality rate as the measure of health outcomes. This indicator is widely used for measuring a population's overall health (Young 2005) and has been considered as the single most exhaustive measure of health in a country, which reflects children's health and pregnant women's health, in addition to the state of health

development within the society. For two main rationales, infant mortality is regarded as a superior measure to life expectancy, the alternative measure of health status. Firstly, infant mortality is more reliably measured than life expectancy because infant mortality figures are based on actual data, whereas life expectancy figures are based on extrapolations from child mortality data and assumed life-length tables (Jimenez & Smith 2005). Secondly, infant mortality is more sensitive to policy reforms than are life expectancy and other total-health measures (Habibi, Huang et al. 2001; Jimenez & Smith 2005; Asfaw, Frohberg et al. 2007). Although this indicator could have some limitations in developed nations, it is still suitable as the index of the policy impact with aforementioned reasons.

Health service decentralization is defined as local governments' health expenditure over central government's health expenditure (%), which is differentiated from an aggregated measure of decentralization in general because there can be a danger of an aggregation bias that arises when using the decentralization of total expenditure as an indicator, as we can see in previous empirical approaches (Barankay & Lockwood 2007).⁵ Among various types of decentralization, we focus on fiscal decentralization. It is argued that devolution of the budget, which enables local governments to meet the needs of the people, is the most important step in decentralization (Asfaw, Frohberg et al. 2007), and the extent of a public authority's activities in taxation and in the expenditure of public funds is surely a component of fundamental importance in determining the authority's influence on the allocation of resources (Vrangbæk & Christiansen 2005). An important limitation of measuring decentralization in this way is that there could be discrepancy between budgetary items and actual decision-making in that expenditure could be mandated from above (Fisman & Gatti 2002). Nonetheless, this measure could be the best proxy available, since it is hard to find alternative indicators of the extent of decision-making decentralization that allow comparative analysis at the cross-country level.

The relationship between decentralization and health outcomes can be affected by the economic and social domains, in addition to the institutional setting in which decentralization is implemented. Therefore, births was controlled, since demographic variables such as birth, population, and population density have been widely suggested as interconnected with health outcomes (Nair 1974; Frenk, Bobadilla et al. 1989; Jamison & Mosley 1991; Keating & Hertzman 1999). This study also controlled social expenditure, because the literature suggested that socioeconomic inequality, unemployment, and social safety nets can affect population health (Kawachi & Kennedy 1997; Acheson, Baker et al. 1998; Coburn 2000; Fiscella & Franks 2000; Navarro 2007; Currie, Molcho et al. 2008). The logged per capita income variable we controlled is one of the most frequently identified factors affecting health status (Stronks, Van De Mheen et al. 1997; Mackenbach, Martikainen et al. 2005; Gwatkin, Rutstein et al. 2007; Deaton 2008; Aittomaki, Martikainen et al. 2010). Table 2 shows the variables and measures along with the data sources.

Table2. Variables, measures, and data sources

Variable	Definition	Source
Infant mortality rate	Deaths per 1,000 live births	OECD Health Data
Decentralization (health sector)	Local governments' heath expenditure over central government's health expenditure(%)	IMF GFS
Healthcare institution (dummy)	Group1: Germany, Netherlands, SlovakRepublic, Switzerland Group2: Australia, Belgium, Canada, France Group3: Austria, CzechRepublic, Luxembourg Group4: Iceland, Sweden Group5: Denmark, Finland, Portugal, Spain Group6(base): Hungary, Ireland, Italy, Norway, Poland	Joumard et al. 2010
Per capita income (log)	Real GDP per capita (Constant Prices: Laspeyres), derived from growth rates of domestic absorption	Penn World Table
Social expenditures	Gross public social expenditures as percentages of current GDP	OECD
Births	Number of births, in thousands	OECD Health Data

Note: Categorization of healthcare institutions is from Jourmard et al. (2010).

In sum, our econometric analysis has three objectives: first, to test effects of health sector decentralization on health outcomes, controlling for other determinants such as per capita income, social expenditure, and birth; second, to examine a possible curvilinear relationship between decentralization and health outcomes; and third, to test how these effects are modified in the presence of various factors of healthcare institutions. To do this, this study models health outcome using the following general form:

$$Y_{it} = Decentralization_{it} + Decentralization\ squared_{it} + X_{it} + Z_{it} + \nu_{it} + \epsilon_{it},$$

where Y is health outcome measured by infant mortality in country i at time t , decentralization is a variable for health sector decentralization, X is a vector of structural indicators, Z is a vector of interaction terms, ν is country-specific effects, and ϵ is disturbance term.

EMPIRICAL FINDINGS

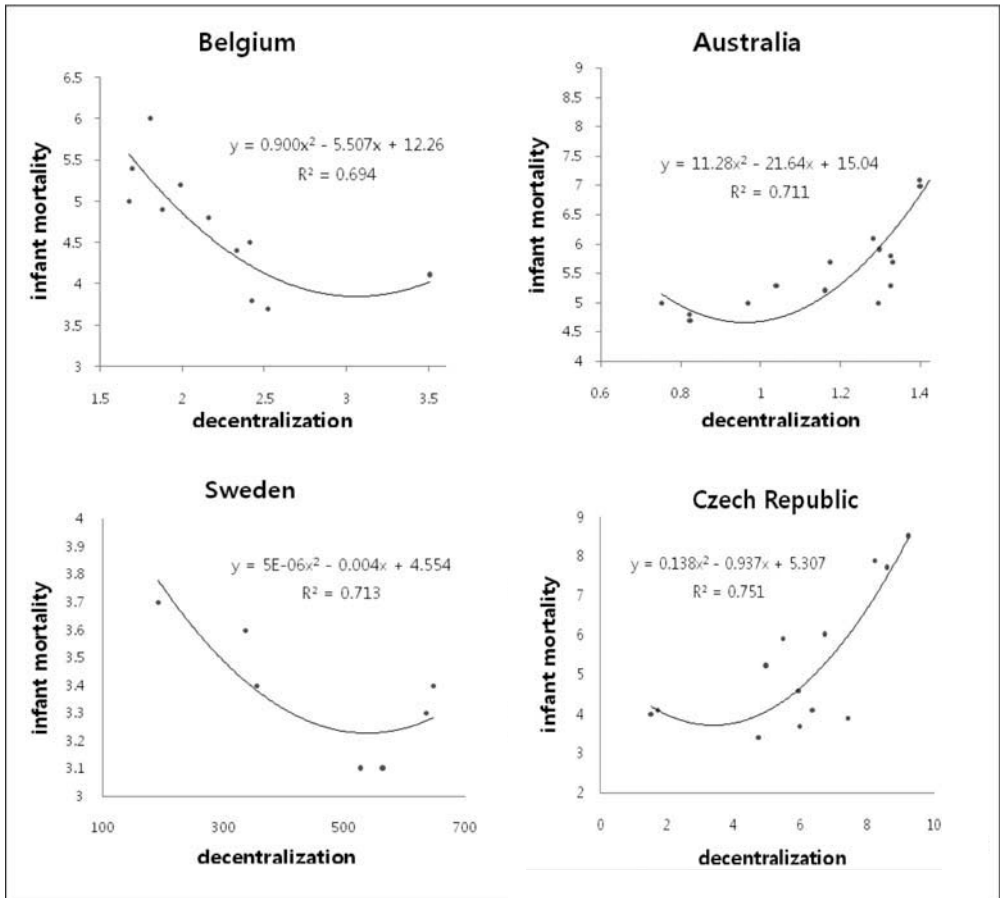
Table 3 shows summary statistics for the variables used in our regression. The decentralization variable, which is measured by healthsector fiscal decentralization, is highly dispersed, ranging from 0.12 to 3182.67. The variable decentralization involves relatively high values of the standard deviation, suggesting a great variation in the degree of decentralization among the countries in this study or the existence of outliers among the values of decentralization.⁶ We found Denmark to have extreme values of the degree of decentralization, compared to the other countries. These values appear to be outliers. Denmark has experienced a gradual process of decentralization in health policy since 1970 (Vrangbaek & Christiansen 2005), which provides a great opportunity to identify various effects of decentralization on social services, including healthcare. Our data show a strong relationship between decentralization and health outcome in Denmark. We compare two regression models, those that include and exclude Denmark. Decentralization still has a significant effect on infant mortality after excluding Denmark. Another regression model excluding Denmark is presented in Appendix 2.

Table 3. Summary statistics(N=255)

Variables	Means	Std. Dev.	Minimum	Maximum
Infant mortality rate	5.40	1.76	2.30	15.10
Decentralization	179.79	508.04	0.12	3182.67
Per capita income (Log)	10.16	0.38	8.97	11.17
Social expenditures	21.79	4.38	13.56	30.38
Births	221.98	232.60	4.00	830.00

Figure 3 presents some examples of curvilinear trends as to the relationship between decentralization and infant mortality. This figure shows that the relationship looks clearly curvilinear even without controlling major confounding factors, presenting an estimated trend line with quadratic term R-squared value of approximately 0.7. From this trend presented in Figure 3, we can understand that the squared curve can better explain the effects of decentralization, as suggested in the first hypothesis.

Figure 3. Curvilinear trends of decentralization impact



The regression results are displayed in Table 4. Model 1 indicates that decentralization is negatively related to the infant mortality rate (p -value<0.05), while the squared term of decentralization is positively associated with the infant mortality rate (p -value<0.01). This means that the more decentralization, the less infant mortality. That is, until decentralization reaches a certain inflection point where the positive impact of the reform turns negative, which is similar to the trend depicted in Figure 3. This empirical finding supports Hypothesis 1 in this study. This implies that there can be a threshold beyond which decentralization has negative effects on health outcomes. Breuss and Eller (2004) suggested the existence of an “appropriate” level of decentralization,⁷ beyond which there are negative effects of decentralization.

Many of the scholars (Faguet, 2004; Robalino, Picazo et al., 2001; Habibi, Huang et al., 2003; Khaleghian, 2004; Jimenez & Smith, 2005) have reported a positive impact of decentralization on policy outcomes. Scholars have, however, neglected to identify whether the impact is linear or nonlinear. Our finding shows the nonlinear effect of decentralization, which means that the positive impact of decentralization disappears in some points. Further study is required to test the nonlinear relationship between decentralization and health outcomes.

Model 2 presents the effect of the interaction term by which group variables, categorized by the institutional setting of healthcare system, are multiplied. The results show that the interaction between decentralization and Group 1 (dummy), which indicates the country group where extensive reliance on market mechanisms in insurance coverage and abundant private provision of healthcare exist, presents a significant and negative relationship. This means that the inflection point, where the benefits of decentralization turn harmful, is moved favorably, which implies that decentralization reform creates its most positive impact in the institutional setting with reliance on market mechanisms in service provision and private insurance for basic coverage.⁸ Our finding suggests that in countries such as these, more market based characteristics can gain more benefits from healthcare decentralization compared to other countries with less market based healthcare systems.⁹ In other words, the interaction of decentralization and a more privatized health system can improve the health outcome through enhancing efficiency and quality. In practice, local government also can privatize administrative functions by means such as contracting out. This tends to lower the current operating expenditures of local government, since personnel costs tend to be the largest expenditure in operating budgets (Rondinelli, McCullough et al. 1989).

The impact of decentralization on health outcome depends on the institutional context. However, none of the above-mentioned studies has explicitly considered this issue.¹⁰ Our finding suggests that the effect of decentralization varies with the degree of marketization or the other institutional characteristics of the healthcare system. Strong consumer rights may be critical to inducing the positive effects of decentralization. The privatized system provides more opportunity for consumers to choose among the products of many competitors. In other words, efficiency and quality are guaranteed through the incentives provided by the “invisible hand” of the market (Parry 1997). In addition, Robalino and his colleagues (2001) show that political rights influence the relationship between decentralization and health outcomes. The positive effect of decentralization on infant mortality is greater in institutional environments that promote political rights (Robalino, Picazo et al. 2001). Further studies are required to ascertain how the effect of decentralization on health outcomes varies indifferent institutional contexts.

Control variables such as per capita income, social expenditure, and birth rate are all statistically significant and don't change that much between Model 1 and Model 2. Both

per capita income and social expenditure have a negative sign while birth rate has a positive sign. These results are consistent with previous findings.

Table 4. Regression results(Dependent variable=infant mortality rate)

	Model 1		Model 2	
	Coeff.	Std. dev.	Coeff.	Std. dev.
Constant	79.8135***	4.0051	80.2605***	4.0875
Decentralization	-0.0012**	0.0006	-0.0012**	0.0006
Decentralization squared	2.608E-7***	0.0000	3.428E-7***	0.0000
Decentralization*Group1			-0.0367*	0.0219
Decentralization*Group2			-0.0043	0.0094
Decentralization*Group3			0.0005	0.0216
Decentralization*Group4			0.0007	0.0017
Decentralization*Group5			-0.0003	0.0014
Per capita income (Log)	-7.0036***	0.3892	-7.0331***	0.3964
Social expenditure	-0.2470***	0.0372	-0.2567***	0.0380
Births	0.0167***	0.0025	0.0185***	0.0029
Number of observations	255		255	

Note: statistically significant at * 0.1, ** 0.05, and *** 0.01; fixed effects included but not reported.

DISCUSSION AND CONCLUSION

Decentralization has been promoted by advocates of healthcare sector reform for decades, and recently scholars and practitioners around the globe have started to view decentralization as an integral part of broader healthcare reforms to achieve improved equity, efficiency, quality, and financial soundness. However, there are still insufficient analytical frameworks and empirical evidence that systematically explore how decentralization can or cannot achieve this objective. This study attempts to address this issue by constructing a more specific theoretical framework that examines the impact of decentralization on healthcare performance with a panel dataset of 22 countries.

Our findings suggest nonlinear effects of decentralization on health outcomes and various potential interactions between decentralization and institutional contexts.

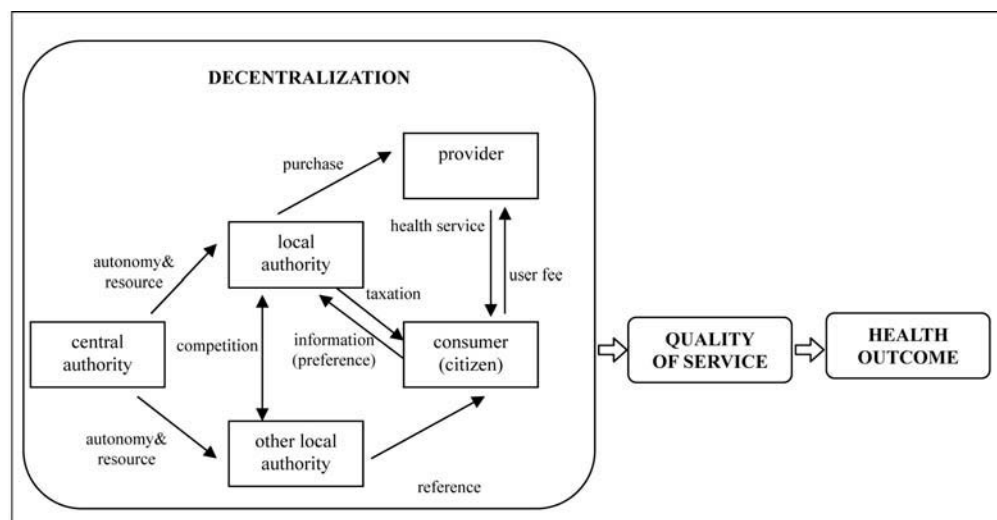
First, healthcare decentralization is beneficial in improving the health status of a population, until a certain level of decentralization is reached. We provide evidence that infant mortality could be positively affected by decentralization (see Table4). This result

parallels many other findings about the positive effects of decentralization on infant mortality.¹¹ However, our findings also suggest that fiscal decentralization is not a magic recipe to improve health outcomes. Beyond a certain point, fiscal decentralization could have negative effects. Fiscal decentralization, for instance, breeds social inequity, including health inequity (Jimenez Rubio, Smith et al. 2008; Zhong 2010). According to Oates' model, wealthier communities try to fend off poor neighbors; thus, there needs to be central government intervention (Thießen 2000). Therefore, the optimal level of health expenditure at the local government level and a more appropriate balance of responsibility between the levels of government should be considered. Norway, which had a highly decentralized health system and has experienced recentralization healthcare reform, could be a good example (Mosca 2006).

Second, considering the institutional background of healthcare, an institutional setting with reliance on market mechanisms in service provision and private insurance for basic coverage is a precondition for decentralization reform to have a positive impact. This means that the characteristics of the healthcare system also need to be considered before implementation of decentralization reform. In Germany, which relies intensively on market mechanisms for managing both basic coverage and service supply, decentralization reform led to a positive outcome because decentralization functioned as a measure of quality control for healthcare (Bankauskaite, Saltman et al. 2004; Sommariva, Hogg et al. 2004). Other conditions need to be considered in order to successfully implement decentralization. They could be political, cultural, psychological, organizational, or financial contexts (Rondinelli, McCullough et al. 1989; Parry 1997). We hope that future research will be carried out to address this issue.

It is still unclear what specific mechanisms involve the effects of decentralization on health outcomes. Identifying these mechanisms is not easy due to various complicating factors involved in the mechanism of decentralization and divergent healthcare systems across countries, which make any simplification vulnerable to the omission of unaccounted-for factors. Given this limitation, the mechanism that can be drawn from the aforementioned literature is presented in Figure 4.

Figure 4 suggests that decentralization¹² with relevant competition provides incentive to local authorities to operate the healthcare system more efficiently and more responsively.¹³ In the particular case of specialized hospital care, decentralization reform changed a public integrated model with more centralization into a public contract model with more decentralization. The decentralized mechanism allows the provider to offer healthcare service that the local authority¹⁴ wants to provide, reflecting citizens' preferences and needs. This induces improved quality of service, which in turn creates better health outcomes. However, these are the dynamics of the black box of healthcare decentralization.

Figure 4. Mechanisms of healthcare decentralization affecting health outcome.

This study has several limitations for further research. First, not all OECD countries or time periods were available. The analytical technique used (fixed-effect regression) limits the conclusion only to those countries and years that were analyzed. Using a different selection of countries or years may provide different conclusions. Second, the indicator of healthcare decentralization in this study, fiscal factors, captures only one of the multiple dimensions of the healthcare decentralization process. Future research needs to use more varied types of measurements representing the nature of decentralization with various theoretical meanings. In particular, regulatory characteristics are very important to take into consideration. Further, the measure of health outcomes, such as infant mortality, the measure employed in this study, does not fully reflect the underlying level of health in a society. Further empirical research needs to test the relationships between decentralization and more varied health outcomes, including mortality and life expectancy. Finally, this study doesn't consider the effects of decentralization on the equity of health outcomes, which is also a very important indicator of healthcare system performance. Despite these limitations, however, this research contributes to our existing knowledge, adding a new empirical perspective on the nonlinear effects of decentralization on health outcomes and suggesting decentralization's varying effects across different institutions along market mechanisms and public provision in healthcare delivery.

NOTES

* This paper is based on a previous paper presented at the 2011 KAPA-ASPA International Conference, Seoul, Korea, October 28-29, 2011.

1. Given that different scholars have in the past employed “diverse, often inconsistent, [and] sometimes overtly contradictory” (Bankauskaite & Saltman 2007) frameworks when discussing the concept of decentralization, in a general sense the term refers to the transfer of authority or a dispersal of power in public planning, management, and decisionmaking from the national to sub-national level (Rondinelli, Nellis et al. 1984), or more generally from higher to lower levels of government (Mills, Vaughan et al. 1990).
2. The structure of the system is very complex. For more detailed information about the reform, see Jang (2010).
3. Their fixed effects model reports that decentralization is associated with lower infant mortality rates, after controlling for a set of structural variables (GDP per capita, corruption, ethno-linguistic fractionalization, etc.). The marginal benefit from decentralization is found to be greater at low income levels.
4. The main indicator of fiscal decentralization used in this study is a binary variable defined as the presence of taxation, spending, or regulatory authority on the part of sub-national authorities. Two other decentralization indicators were used to double-check the results: the share of sub-national expenditure of total government expenditure, and the share of healthcare spending of total sub-national expenditure. The model also included several control variables (GDP per capita, illiteracy rate, democracy score, ethnic tension, etc). The findings suggest that decentralization improves coverage rates only in low-income countries.
5. We have used expenditure of only the local government without considering the spending by the other sub-national governments such as county-level or state-level government.
6. We checked the differences in the standard deviation of the variable of decentralization between inclusion and exclusion of Denmark. The standard deviation of decentralization is 136.34 excluding Denmark but 508.04 including Denmark. This suggests that including Denmark or not can have a significant effect on the empirical result.
7. The concern now would be what the appropriate level is. On the basis of the test results, we reached the conclusion that the situation in Denmark will be the marker for this appropriate level. Therefore, we conducted additional analysis with the data excluding Denmark. We found similar findings in the level of decentralization as presented in the Appendix. However, it is controversial whether Denmark is a unique case that affects the overall picture or a true reflection of the situation, because of the limitations of the available data. In future studies, an effort should be made to find the appropriate level.
8. This can be said because the incline drops more steeply the left of the inflection point and rises less steeply to the right of the inflection point.
9. The group with a market-mechanism healthcare system includes Germany, the Netherlands, the Slovak Republic, Switzerland. According to the OECD (1994), Germany has a public-private mixed provision system where the financing is by public contribution. Switzerland provides healthcare by private provider; the system is also financed by the private sector. And the Netherlands has a public-private mixed financing system with dominant private providers.

The common element of the healthcare system in these countries is an emphasis on (or allowance of) more choice for consumers in healthcare provision.

10. Robalino and his colleagues (2001) provide empirical evidence from an cross-country analysis (using panel data on infant mortality rates, GDP per capita, and the share of public expenditures managed by local governments) that greater fiscal decentralization is consistently associated with lower mortality rates. When political rights are high, communities can better influence policymaking at the local level, and thus encourage an allocation of resources that better meets their needs.
11. Those relevant findings include Cantarero and Pascual (2008) in Spain, Asfaw, Frohberg et al. (2007) in India, Jimenez and Smith (2005) in Canada, Habibi, Huang et al. (2001) in Argentina, and Robalino Picaza et al. (2001) with an cross-country analysis.
12. Decentralization starts by granting decision-making autonomy to local authorities with or without transferring a greater amount of resources such as budget and the right to impose additional taxes. More decentralized systems induce inter-jurisdictional competition: If we assume a fully mobile citizen, competition can be driven by citizens “voting with their feet” in welfare migration (Tiebout 1956), but even if we have an insignificant level of geographical mobility in a population, constituents of one jurisdiction are able to evaluate the performance of similar jurisdictions, which provides a reference point, thus indirectly pushing their own government to do as much as its neighboring region. Competition is therefore caused by electoral competition, rather than population mobility.
13. The advantage of this competition among local authorities comes from the asymmetry of information, meaning that local government can have a better understanding of its constituents’ preferences and needs. This information is used when the local authority purchases healthcare services from providers. This purchasing pattern can diverge according to different healthcare systems, because some countries have national health services while others have a social insurance system or a private system. But we simplify this arrangement as purchasing, because reducing central government control and increasing local freedom in the provision of services usually makes it possible for a municipality to adopt a more active role as a purchaser, instead of acting mainly in the role of producer, as with the Finnish case (Hakkinen 2005).
14. This refers to local government in NHS or non-governmental organizations in NHI.

REFERENCES

- Acheson, D., D. Baker, et al. 1998. “Inequalities in Health.” *British Medical Journal* 317(7173): 1659.
- Aittomaki, A., P. Martikainen, et al. 2010. “The Associations of Household Wealth and Income with Self-rated Health-A Study on Economic Advantage in Middle-aged Finnish Men and Women.” *Social Science & Medicine* 71(5): 1018-1026.

- Akin, J., P. Hutchinson, et al. 2005. Decentralisation and Government Provision of Public Goods: The Public Health Sector in Uganda. *Journal of Development Studies* 41(8): 1417–1443.
- Arsneault, S. 2000. “Welfare Policy Innovation and Diffusion: Section 1115 Waivers and the Federal System.” *State & Local Government Review* 32(1): 49–60.
- Asfaw, A., K. Frohberg, et al. 2007. “Fiscal Decentralization and Infant Mortality: Empirical Evidence from Rural India.” *Journal of Developing Areas* 41(1): 17–35.
- Asfaw, A., K. Frohberg, et al. 2004. “Modeling the Impact of Fiscal Decentralization on Health Outcomes: Empirical Evidence from India.” *Discussion Papers*.
- Athey, S., A. Atkeson, et al. 2005. “The Optimal Degree of Discretion in Monetary Policy.” *Econometrica* 73(5): 1431–1475.
- Bankauskaite, V., R. Saltman, et al. 2004. “The Role of Decentralization of European Healthcare Systems.” *Report to IPPR*, London.
- Barankay, I. and B. Lockwood. 2007. “Decentralization and the Productive Efficiency of Government: Evidence from Swiss Cantons.” *Journal of Public Economics* 91(5–6): 1197–1218.
- Bardhan, P. and D. Mookherjee. 2005. “Decentralizing Antipoverty Program Delivery in Developing Countries.” *Journal of Public Economics* 89(4): 675–704.
- Bencivenga, V. and B. Smith. 1992. “Deficits, Inflation, and the Banking System in Developing Countries: The Optimal Degree of Financial Repression.” *Oxford Economic Papers* 44(4): 767–790.
- Besley, T. and A. Case. 1995. “Incumbent Behaviour: Vote-seeking, Tax-setting, and Yardstick Competition.” *American Economic Review* 85(1): 25–45.
- Besley, T. and S. Coate. 2003. “Centralized versus Decentralized Provision of Local Public Goods: A Political Economy Approach.” *Journal of Public Economics* 87(12): 2611–2637.
- Birn, A. 1999. “Federalist Flirtations: The Politics and Execution of Health Services Decentralization for the Uninsured Population in Mexico, 1985–1995.” *Journal of Public Health Policy* 20(1): 81–108.
- Bossert, T. and J. Beauvais. 2002. “Decentralization of Health Systems in Ghana, Zambia, Uganda and the Philippines: A Comparative Analysis of Decision Space.” *Health Policy and Planning* 17(1): 14–31.
- Bossert, T., R. Soebekti, et al. 1991. “Bottom-up Planning in Indonesia: Decentralization in the Ministry of Health.” *Health Policy and Planning* 6(1): 55–63.

- Breuss, F. and M. Eller. 2004. "The Optimal Decentralisation of Government Activity: Normative Recommendations for the European Constitution." *Constitutional Political Economy* 15(1): 27–76.
- Burki, S. J., G. Perry, et al. 1999. "Beyond the center: Decentralizing the State". *World Bank Publications*.
- Calamai, L. 2009. "The link between devolution and regional disparities: Evidence from the Italian regions." *Environment and Planning A* 41(1): 1129–1151.
- Cantarero, D. and M. Pascual. 2008. "Analysing the impact of fiscal decentralization on health outcomes: empirical evidence from Spain." *Applied Economics Letters* 15(2): 109–111.
- Capistrano, D. 2008. "Decentralization and Forest Governance in Asia and the Pacific: Trends, Lessons and Continuing Challenges." In: C.J.P. Colfer, R.D. Dahal and D. Capistrano (eds) *Lessons from Forest Decentralization: Money, Justice and the Quest for Good Governance in Asia-Pacific*. London: Earthscan/
- Coburn, D. 2000. "Income inequality, social cohesion and the health status of populations: the role of neo-liberalism." *Social Science & Medicine* 51(1): 135–146.
- Collins, C. and A. Green 1994. "Decentralization and primary healthcare: Some negative implications in developing countries." *International journal of health services: planning, administration, evaluation* 24(3): 459.
- Costa-Font, J. and F. Moscone. 2008. "The impact of decentralization and inter-territorial interactions on Spanish health expenditure." *Empirical Economics* 34(1): 167–184.
- Costa-Font, J. and A. Rico. 2006. "Devolution and the interregional inequalities in health and healthcare in Spain." *Regional Studies* 40(8): 875–887.
- Currie, C., M. Molcho, et al. 2008. "Researching health inequalities in adolescents: the development of the Health Behaviour in School-Aged Children (HBSC) family affluence scale." *Social Science & Medicine* 66(6): 1429–1436.
- Deaton, A. 2008. "Income, health and wellbeing around the world: Evidence from the Gallup World Poll." *Journal of Economic Perspectives* 22(2): 53–72.
- Dillinger, W. and M. Fay. 1999. "From centralized to decentralized governance." *Finance and Development* 36(4): 19–21.
- Dillinger, W. R. 1994. "Decentralization and its implications for urban service delivery." *World Bank Publications*.
- Faguet, J. 2004. "Does decentralization increase government responsiveness to local needs?: Evidence from Bolivia." *Journal of Public Economics* 88(3–4): 867–893.

- Farazmand, A. 1999. "Globalization and public administration." *Public Administration Review*: 509–522.
- Field, M. G. 1973. "The Concept of the Health System at the Macrosociological Level." *Social Science & Medicine* 7(10): 763–785.
- Fiscella, K. and P. Franks. 2000. "Individual income, income inequality, health, and mortality: What are the relationships?" *Health Services Research* 35(1 Pt 2): 307–318.
- Fisman, R. and R. Gatti. 2002. "Decentralization and corruption: evidence across countries." *Journal of Public Economics* 83(3): 325–345.
- Frenk, J., J. Bobadilla, et al. 1989. "Health transition in middle-income countries: new challenges for healthcare." *Health Policy and Planning* 4(1): 29–39.
- Gow, J. 1994. *Learning from others: administrative innovations among Canadian governments*, Institute of Public Administration of Canada.
- Gwatkin, D., S. Rutstein, et al. 2007. *Socioeconomic differences in health, nutrition, and population within developing countries*. The World Bank, Washington, D.C.
- Habibi, N., C. Huang, et al. 2001. "Decentralization in Argentina." *Center Discussion Paper No. 825*, Economic Growth Center, Yale University.
- Habibi, N., C. Huang, et al. 2003. "Decentralization and human development in Argentina." *Journal of Human Development and Capabilities* 4(1): 73–101.
- Heald, D., N. Geaughan, et al. 1998. "Financial arrangements for UK devolution." *Regional & Federal Studies* 8(1): 23–52.
- Homedes, N. and A. Ugalde. 2005. "Why neoliberal health reforms have failed in Latin America." *Health Policy* 71(1): 83–96.
- Humphrey, C., P. Miller, et al. 1993. "Accountability and accountable management in the UK public sector." *Accounting, Auditing & Accountability Journal* 6(3): 7–29.
- Huther, J., A. Shah, et al. 1998. *Applying a simple measure of good governance to the debate on fiscal decentralization*, World Bank, Operations Evaluation Department, Country Evaluation and Regional Relations Division.
- Im, T. and W. Cho. 2008. "Decentralization and Economic Growth in Korea." *The Korean Journal of Policy Studies* 23(1): 49–71.
- Jamison, D. and W. Mosley. 1991. "Disease control priorities in developing countries: health policy responses to epidemiological change." *American Journal of Public Health* 81(1): 15.

- Jang, D. H. 2010. "The Effect of the Introduction of Decentralization Revenue Sharing System." *Korean Policy Studies Review* 19(2): 79–104.
- Jeppsson, A. 2001. "Financial priorities under decentralization in Uganda." *Health Policy and Planning* 16(2): 187.
- Jimenez-Rubio, D., P. Smith, et al. 2008. "Equity in health and healthcare in a decentralised context: evidence from Canada." *Health economics* 17(3): 377–392.
- Jimenez, D. and P. Smith. 2005. "Decentralisation of healthcare and its impact on health outcomes." *Discussion Papers in Economics* 10.
- Jimenez Rubio, D., P. C. Smith, et al. 2008. "Equity in health and healthcare in a decentralised context: evidence from Canada." *Health economics* 17(3): 377–392.
- Journard, I., C. Andre, et al. 2010. "Healthcare Systems: Efficiency and Institutions." *OECD Economics Department Working Papers*.
- Kawachi, I. and B. Kennedy. 1997. "Health and social cohesion: why care about income inequality?" *BMJ: British Medical Journal* 314(7086): 1037–1040.
- Keating, D. and C. Hertzman. 1999. *Developmental health and the wealth of nations*, Guilford Press.
- Khaleghian, P. 2004. "Decentralization and public services: the case of immunization." *Social Science & Medicine* 59(1): 163–183.
- Larmour, P., R. Qalo, et al. 1985. *Decentralisation in the South Pacific: local, provincial, and state government in twenty countries*, University of the South Pacific.
- Laurell, A. 2007. "Health system reform in Mexico: a critical review." *International Journal of Health Services* 37(3): 515–535.
- Mackenbach, J., P. Martikainen, et al. 2005. "The shape of the relationship between income and self-assessed health: an international study." *International Journal of Epidemiology* 34(2): 286–293.
- Markusen, A. 1993. "American federalism and regional policy." *International Regional Science Review* 16(1–2): 3–15.
- Mills, A. 1994. "Decentralization and accountability in the health sector from an international perspective: what are the choices?" *Public Administration and Development* 14(3): 281–292.
- Mills, A., J. Vaughan, et al. 1990. *Health system decentralization: concepts, issues and country experience*, World Health Organization Geneva.
- Morgan, K. 2001. "The new territorial politics: rivalry and justice in post-devolution

- Britain.” *Regional Studies* 35: 343–348.
- Mosca, I. 2006. “Is decentralisation the real solution?: A three-country study.” *Health Policy* 77(1): 113–120.
- Mundial, B. 1997. *World Development Report 1997: The state in a changing world*. The World Bank. Washington.
- Musgrave, R. A. 1998. “Who should tax, where, and what?” *International Library of Critical Writings in Economics* 88: 63–80.
- Nair, P. 1974. “Decline in birth rate in Kerala: a hypothesis about the inter-relationship between demographic variables, health services and education.” *Economic and Political Weekly* 9(6): 323–336.
- Navarro, V. 1989. “Why some countries have national health insurance, others have national health services, and the US has neither.” *Social Science & Medicine* 28(9): 887–898.
- Navarro, V. 2007. *Neoliberalism, globalization, and inequalities: consequences for health and quality of life*, Baywood Pub.
- O’Faircheallaigh, C., J. Wanna, et al. 1999. *Public sector management in Australia: New challenges, new directions*, Macmillan Co of Australia.
- Oates, W. E. 1972. *Fiscal federalism*, Harcourt Brace Jovanovich New York.
- OECD. 1994. *The Reform of Healthcare Systems*. OECD: Paris.
- OECD. 2004. *Proposal for a taxonomy of health insurance*. OECD: Paris.
- Park, H.-J. 2006. “A Study on Problems and Suggestions for Their Improvements in the Local Devolution of Social Welfare Works.” *Korean Governance Review* 13(3): 279–300.
- Parry, T. R. 1997. “Achieving balance in decentralization: A case study of education decentralization in Chile.” *World Development* 25(2): 211–225.
- Passell, P. and L. Ross. 1978. *State Policies and Federal Programs*. London, Praeger.
- POLICYproject. 2001. *Health Reform, Decentralization, and Participation in Latin America: Protecting Sexual and Reproductive Health*. Washington, D.C., Policy Project.
- Prud’Homme, R. 1995. “The dangers of decentralization.” *The World Bank Research Observer* 10(2): 201.
- Redwood, J. 1999. “The death of Britain.” *The UK’s Constitutional Crisis*. London,

Macmillan.

- Regmi, K., J. Naidoo, et al. 2010. "Decentralization and district health services in Nepal: understanding the views of service users and service providers." *Journal of Public Health* 32(3): 406–417.
- Revelli, F. 2001. "Spatial patterns in local taxation: tax mimicking or error mimicking?" *Applied Economics* 33: 1101–1107.
- Rico, A. and J. Costa-Font. 2005. "Power rather than path dependency? The dynamics of institutional change under healthcare federalism." *Journal of health politics, policy and law* 30(1–2): 231–252.
- Rico, A., M. Fraile, et al. 1998. "Regional decentralisation of health policy in Spain: social capital does not tell the whole story." *West European Politics* 21(4): 180–199.
- Robalino, D. A., O. F. Picazo, et al. 2001. "Does fiscal decentralization improve health outcomes? Evidence from a cross-country analysis." *World Bank: Policy Research WorkingPaper* # 2565.
- Rodriguez-Pose, A. and A. Bwire. 2004. "The economic (in)efficiency of devolution." *Environment and Planning A* 36(11): 1907–1928.
- Rondinelli, D., J. Nellis, et al. 1984. *Decentralization in developing countries: A review of recent experience*. Washington DC, WorldBank.
- Rondinelli, D. A., J. S. McCullough, et al. 1989. "Analysing Decentralization Policies in Developing Countries: a Political Economy Framework." *Development and change* 20(1): 57–87.
- Rubinfeld, D. 1987. "The economics of local public sector." *Handbook of Public Economics*: 571–645.
- Salmon, P. 1987. "Decentralisation as an inceptive scheme." *Oxford Review of Economic Policy* 3: 24–43.
- Sara, T. 1994. "Trust in a rent-seeking world: health and government transformed in Northeast Brazil." *World Development* 22(12): 1771–1791.
- Scheffler, R. and R. B. Smith. 2006. "The impact of government decentralization on county health spending for the uninsured in California." *International Journal of Healthcare Finance Economics* 6(3): 237–258.
- Schwartz, J., R. Racelis, et al. 2000. *Decentralization and local government health expenditures in the Philippines*. Mimeograph, University of North Carolina at Chapel Hill.

- Seo, J. S. and K. H. Cho 2006. *Study on improving the decentralization revenue sharing system in Korea Seoul*, KRILA.
- Shaffer, E., H. Waitzkin, et al. 2005. "Global trade and public health." *American Journal of Public Health* 95(1): 23.
- Silverman, J. M. 1992. *Public sector decentralization: Economic policy and sector investment programs*, World Bank Publications.
- Sommariva, C., H. Hogg, et al. 2004. "Environmental impact of seawater desalination: relations between improvement in efficiency and environmental impact." *Desalination* 167(1–3): 439–444.
- Sorensen, P. 1999. "Optimal tax progressivity in imperfect labour markets." *Labour Economics* 6(3): 435–452.
- Starling, G. 2010. *Managing the public sector*, Wadsworth.
- Stronks, K., H. Van De Mheen, et al. 1997. "The interrelationship between income, health and employment status." *International Journal of Epidemiology* 26(3): 592.
- Terris, M. 1978. "The three world systems of medical care: trends and prospects." *American Journal of Public Health* 68(11): 1125.
- Thießen, U. 2000. *Fiscal federalism in Western European and selected other countries: centralization or decentralization? What is better for economic growth?* Deutsches Institut für Wirtschaftsforschung(DIW).
- Thießen, U. 2003. "Fiscal decentralisation and economic growth in high-income OECD countries." *Fiscal Studies* 24(3): 237–274.
- ThieBen, U. 2000. *Fiscal Federalism in Western European and Selected other Countries: Centralization or Decentralization? What is Better for Economic Growth?* Deutsches Institut für Wirtschaftsforschung(DIW).
- Tiebout, C. M. 1956. "A pure theory of local expenditures." *Journal of Political Economy* 64(5): 416–424.
- Vrangbæk, K. and T. Christiansen. 2005. "Health policy in Denmark: leaving the decentralized welfare path?" *Journal of Health Politics, Policy and Law* 30(1–2): 29–52.
- WorldBank. 1987. *Financing Health Services in Developing Countries: An Agenda for Reform*. Washington, DC.
- WorldBank. 2000. *World Development Report 1999/2000: Entering the 21st Century*. Washington, D.C..

Young, T. 2005. *Population health: concepts and methods*. USA: Oxford University Press.

Zhong, H. 2010. "The impact of decentralization of healthcare administration on equity in health and healthcare in Canada." *International Journal of Healthcare Finance & Economics* 10(3): 219–237.

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Appendix 1

Table A. Typology of healthcare systems developed by OECD

		Healthcare provision		
		Public provider	Mixed (public + Private)	Private provider
Financing	Contribution		Belgium, France, Germany, Austria, Luxemburg, Japan	
	Public	Ireland, Spain, Denmark, Finland, Greece, Portugal, Norway, Sweden, Italy, UK	Australia, New Zealand	Canada
	Taxation			
	Mixed (public + private)		Turkey, Korea	Netherlands, Mexico
	Private			U.S.,Swiss

Source: OECD (1994)

Appendix 2

Table B. Regression results excluding Denmark

	Model 1		Model 2	
	Coeff.	std. dev.	Coeff.	std. dev.
Constant	79.4223***	4.1115	79.7405***	4.1946
Decentralization	-0.00097*	0.000529	-0.00096*	0.000565
Decentralization*group1			-0.03692*	0.02232
Decentralization*group2			-0.00431	0.009606
Decentralization*group3			0.000892	0.02210
Decentralization*group4			0.000719	0.001759
Decentralization*group5			-0.00406	0.006319
Per capita income (Log)	-6.9786***	0.3994	-6.9931***	0.4067
Social expenditure	-0.2384***	0.03920	-0.2499***	0.04006
Births	0.01670***	0.002581	0.01863***	0.002933
Number of observations	240		240	

Note: statistically significant at * 0.1, ** 0.05, and *** 0.01; fixed effects included but not reported.