The Tradeoff between Centralized and Decentralized Health Services: Evidence from a Major Anti-Poverty Program in Mexico

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Abstract: This paper provides evidence on the effectiveness of centralized and decentralized health care organizations in the developing world. It compares performance by taking advantage of health care provider duplication in rural Mexico. The analysis benefits from differences in timing and models of health care decentralization, and from a quasi-random distribution of providers. In contrast with the most common predictions in the literature, the *centralized* provider of health services performs better. Households served by this organization face less regressive out-of-pocket health care expenditures (56% lower), and observe higher utilization of preventive services (15.5% more). Fortunately, state providers improve significantly in those areas targeted by Oportunidades (formerly Progresa), the main anti-poverty policy in Mexico. This program provides cash transfers to poor families conditional upon school attendance and receiving preventive care. The difference in outcomes between providers narrows in those areas where Oportunidades operates. These findings are robust to the possible effect of time and type of decentralization, state and health infrastructure effects, Oportunidades' early treatment, the use of alternative measures and other confounders.

I. Introduction

In the last three decades, health services decentralization has been widely recommended in countries with national health systems. As in many other fields, decentralization is usually portrayed as a way of increasing efficiency in the financing and delivery of health care. Proponents of these reforms argue that by empowering local governments, local knowledge is prone to be used in the fulfillment of local needs and tastes. The flexibility of decentralized health services is generally perceived as superior to the rigidities and failures of 'Stalinist' centralized planning. From a Political Economy perspective, decentralized health services have an additional advantage. They are less exposed to the political and budgetary considerations that affect federal policy-making. Underrepresented regions or populations overlooked by the federal government may be better off once the administration of health services resides in their communities.

Despite of decentralization's appeal, a branch of the literature predicts that a centralized provision of goods might be efficient under certain circumstances. (Weitzman, 1974, Bolton and Farrell, 1990) As it will be argued in this prospectus with the case of health services for the poor, centralization can be an effective tool if rapid action is required to reach in need populations, when the services provided are easy to standardize, if economies of scale can be exploited or when the homogenization of services across populations and regions is desirable. The proponents of decentralization argue that market failures in the health sector and regional disparities, which justified the centralization of health services in the first place, can be addressed in decentralized institutional frameworks containing the right incentives, resource transfers and better coordination of different government levels. (Bossert, 1998) In practice, it is difficult to put this system in place and it often takes a long time to do so. Consequently, it is still an open question whether providing basic health services to the poor is better under a decentralized or a centralized scheme.

The decentralization debate is acquiring new momentum as an increasing number of developing countries, mostly in Latin America, adopt conditional cash transfers programs (CCT) as the main strategy to tackle poverty. Cash grants in CCT programs are generally conditioned upon school attendance of children, and on

receiving basic health care, such as medical check ups, pregnancy care or vaccination. The effectiveness of publicly provided services will greatly shape the long-term success of this strategy. For instance, the quality of schooling will determine whether poor children acquire the skills needed for upward social mobility. Similarly, the efficacy of health care providers will influence the wellbeing of poor families.

Most evaluations of CCT programs have found positive effects on many outcomes. (Rawlings and Rubio, 2005) Yet research in this field stresses the effects of targeting and of the cash grant itself. (Behrman et al, 2001, Skoufias et al, 2001) It seldom evaluates the effectiveness of the health or education services used by the poor. While the federal government is often the main administrator of CCT programs, it usually coordinates with other federal agencies or state governments to provide the health care and education components. It is still unknown whether a centralized or decentralized approach works better to provide these services. Countries analyzing the possibility of introducing CCT programs can benefit from the best practices of existing programs. Countries with a CCT program already in place can improve the delivery of their own health care and education components by knowing which organizational form works better.

This research proposal makes a preliminary assessment of performance between federal and state health service providers in rural Mexico. Three decades ago, a centralized organization was made responsible for providing these services. During the 1980s, the government began an ambitious decentralization program that devolved all health services to half the Mexican states. A new administration interrupted the process in 1989, and a subsequent decentralization program that started in the mid-1990s opted for the co-existence of a federal and multiple state organizations in states that were not decentralized before. This paper takes advantage of this duality in 17 of 31 states of Mexico to propose the evaluation of two organizational models that match the institutional framework of both providers: The Unitary Organization (U-Form) that resembles the centralized provider and the Multifunction (M-Form) organization that fits into the federalist arrangement.

The analysis described in this research proposal initially screens the data to determine the comparability of the populations served by both, the centralized and decentralized providers. Once it is shown that the two populations are comparable, a

series of OLS, Tobit and Probit models test the effectiveness of federal and state providers using health care utilization and expenditures as main evaluation measures. Time and type of decentralization, state and health infrastructure effects, Oportunidades' early treatment and alternative variables are also considered to test the robustness of the results. This preliminary analysis shows that households served by the U-Form organization, or the centralized provider, yield significantly higher health care utilization rates (15.5%), measured as attendance to preventive health care. They also have significantly lower out-of-pocket expenditures (56%), which might indicate better supply of input and drugs and better quality of care.

More importantly, there is evidence that performance of state providers improves significantly in those areas targeted by Oportunidades. The centralized provider consistently shows a more homogenous supply of services to the rural population regardless of participation in Oportunidades. These findings raise some interesting questions, as they partly contradict the current consensus on the virtues of decentralized health services. A possible explanation of these results is related to a proposed model of costs and benefits of decentralization. This prospectus first reviews the literature and provides some background on the Mexican health system and its conditional cash-transfer program, Oportunidades. Later, it discusses the data and methods used in the analysis. Lastly, it discusses the possible causes of this differential and explores some ideas for future research.

II. **Literature Review**

The proposed research can contribute to the literature on health services decentralization. These policies have been studied from multiple perspectives in the social sciences. The dominant schools are those of Public Administration, Political Science and Economics. The Public Administration approach focuses on the conceptual definition of health service decentralization, its characteristics and the possible consequences of different administrative arrangements. (Bossert, 1998, Smith, 1997) Common issues in this debate are those of local management capacity, community participation, local financing of health services, coordination with the central government, oversight of decentralized health services and regional heterogeneity in resources' distribution and performance.

Rondinelli el al (1983) proposed a widely used typology of decentralization, distinguishing among deconcentration, delegation, devolution and privatization. While deconcentration is a shift in responsibility from the center to the periphery within an organization, delegation and devolution reallocates authority in separate government entities or sub-national governments. Privatization transfers ownership and sometimes responsibility to private agents. A series of case studies, mostly in developing countries, have used this framework to classify decentralization policies and compare their health systems before and after the change. (Gilson et al, 1994, Gershberg and Jacobs, 1998, Mwesigye, 1999) This perspective frequently assesses whether the decentralization process accomplished stated goals of efficiency, equity and quality of health services. (Mills, 1994, Collins and Green, 1994, Tang and Bloom, 2000, Frenk et al, 2003) A rising branch of this literature now deals with more specific administrative issues related to finance, auditing, wages, consumer choice or government responsibilities. (Bossert et al, 2000) For example, Wang et al (2002) establish a link between the human resources' literature and health services decentralization. This paper concentrates on productivity, labor incentives, industrial relations and the tradeoffs that governments face in both states.

Political scientists have focused more on the political motivations and consequences of decentralization. This literature generally uses a comparative approach and places health service decentralization within a broader set of liberalization policies. In the case of political transition, health service decentralization is frequently part of federalist and democratizing reforms in former authoritarian and corporatist countries. (Gibson, 2004, Montero and Samuels, 2004, Kaufman and Nelson, 2004) Other set of authors concentrate more on economic liberalization changes. (Kaufman, 2003, Kurtz, 2002) They see health service decentralization as one of the main components of structural adjustment programs, along with privatization of state assets, deregulation and trade liberalization policies. These studies also highlight the fact that decentralization was usually implemented in periods of deep economic crisis. (Birn, et al, 2000, Homedes and Ugalde, 2005, Laurel, 2000) Since these changes occurred in blocks of countries, comparative analysis is commonly used to study the reform experience. Various researchers take advantage of the European Union consolidation, the shift from import-substitution into export-oriented economies in Asia and Latin America, or

the transformation from centrally planned towards market-led economies in former communist countries to analyze the different types of health service decentralization and its performance. (Saltman, 2003, Lieberman et al, 2002, Jeppsson and Okuonzi, 2000)

Another branch of the literature in Political Science uses case studies. In this area, it overlaps with the Public Administration literature. Both follow similar methodologies and analytical frameworks, even though political scientists give more emphasis to the politics of decentralization and bureaucratic resistance to change. For example, Collins et al (2000), González-Block et al (1989) and Birn (1999) describe how originally ambitious decentralization policies fall short due to local resistance and centralized inertia from federal governments in Brazil and Mexico during the 1980s.

In general, the discussion in Public Administration and Political Science has ambivalent conclusions about the outcome of health services decentralization. Most contributions argue that decentralization neither increased local government health finances, nor improved equity, quality or efficiency. In many cases it had the opposite effect, as performance deteriorated due to financial constraints and supply failures. However, they acknowledge some positive effects mainly in the areas where community participation became more active and in some regions that traditionally devoted more resources to health care and were eager for more local autonomy. (Griffin, 1999) The main weakness of these two literatures is its failure to isolate the effect of decentralization from the overall consequences of economic adjustment. Health service decentralization was usually implemented in periods of deep economic changes. Thus, most studies overestimate the negative consequences of decentralization policies and cannot disaggregate the effect of organizational form (centralized versus decentralized) for itself.

The Economics literature has traditionally studied the effects of decentralization from the fiscal and institutional perspectives. As information on individual taste and preferences is dispersed, circumstances change fast, and the knowledge that responds to changing circumstances is local, this perspective is naturally inclined toward decentralization. (Hayek, 1945) Decentralization provides two main advantages, flexibility and the possibility of small-scale experimentation. The fiscal approach conceives of local governments as agents competing for taxpayers who are

also voters in political economy models. Taxpayers sort into districts where resource allocation matches their preferences. (Tiebout, 1959, Musgrave, 1989, Epple and Platt, 1999) Decentralization of public services is an intrinsic condition for this "yardstick competition" to exist, as local authorities are more responsive to local needs and tastes, and are therefore more likely to provide public services of better quality and efficiency. (Shleifer, 1985, Besley and Case, 1995)

Central organizations face the costly process of information transmission from the periphery, poorly informed decision-making at the center, and institutional arrangements that may not fit local needs. Nevertheless, a few papers propose a tradeoff between centralization and decentralization. These contributions model cases where centralization is efficient, for example, when rapid action is needed, when a more equitable distribution of resources is desirable, to fund long-term projects, when coordination is better, or if duplication, delay or regional conflicts of interests are too inefficient. (Weitzman, 1974, Sah and Stiglitz, 1988, Besley and Coate, 1999, Bolton and Farrell, 1990, Qian and Roland, 2006) At the micro level, the principal-agent problem has been applied to several areas where incentives change under decentralization. (De Groot, 1988, Weingast, 1995, Qian and Weingast, 1997, Qian and Roland, 1998)

One of the main concerns of economists about the recent public services decentralization in developing countries relates to the institutional weaknesses of local governments. (Bardhan, 2002) Many of these countries generally lack the basic institutions for an effective operation of decentralized services. Rule of law, management capacity of local authorities, effective channels for political participation or a depoliticized relationship between the center and the periphery are often poor. Some formal models predict that decentralization in this environment can lead to corruption and local "capture" by the dominant elites. (Bardhan and Mookherjee, 2005, Foster and Rosenzweig, 2001) Decentralization can thus enhance urban-rural differentials, promote individual and regional inequality, sponsor patronage of local politicians, affect the health status of the population and reduce quality and access to care. (Prud'homme, 1995, Banerjee et al, 2004)

In the specific case of health service decentralization, the evidence from empirical papers is mixed. Khaleghian (2004) uses cross-country time series data to assess the effect of decentralization on child immunization. She finds that

decentralized schemes perform better in low-income countries, while the opposite occurs in middle-income countries. Jimenez and Smith (2005) find similar positive effects of health services decentralization analyzing health spending and child mortality in a time series from Canada. Yet opposite findings have also been reported by Akin et al (2005), who model the budgeting decision of local governments under decentralization. Centralized health services seem to be more effective at internalizing the positive externalities of health care across districts. They find support for their model in data from Uganda.

III. **Model**

The theory of organizations can be useful to analyze the performance of different health systems. The M-Form (multidivisional form) and U-Form (unitary form) are two categories widely applied in the analysis of corporations.[1] (Chandler (1962), Williamson (1975)) Recently, this typology has been used to contrast different types of government arrangements in the literature of comparative economic systems. While the U-form resembles a highly centralized country, the M-form fits the description of a federalist nation. Qian and Xu (1999) conclude that an important difference between Russia's and China's economic performance is due to the organizational form of their governments before the split of the Soviet Union.[2] Maskin and Qian (2000) argue that a reason for this difference may lie in the incentives faced by managers under U-form and M-form arrangements. Since information is better used under M-form organizations, incentives for managers and yardstick competition work more effectively at improving performance. M-form arrangements have the additional advantage of flexibility for experimenting with uncertain projects. However, a tradeoff does exist between the U-form and M-form organizations. The U-form arrangement will be more effective at coordinating

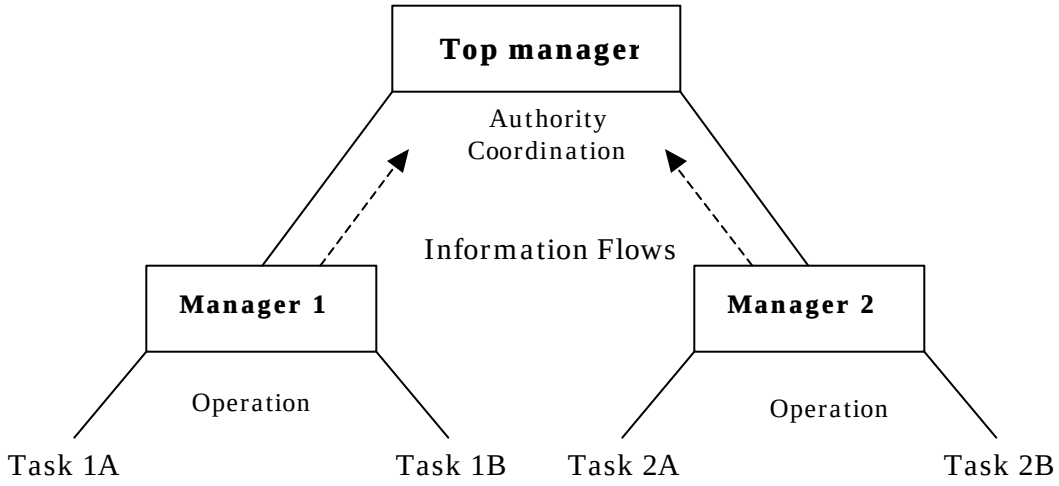
[1] An example of the U-form was Ford Motor Company before World War II. This company was organized in a number of specialized departments like production, sales, purchasing and others. In contrast, General Motors was the example of the M-form, since it included semi-independent firms such as Chevrolet, Pontiac or Oldsmobile, each firm with its own production, sales and purchasing departments. (Maskin and Qian (2000))

[2] While the Soviet economy was the prototype U-form organization with sixty centralized and specialized ministries (e.g. steel, mining), since 1953 China resembled the M-form organization, with an economy comprised of self-sufficient regions. (Maskin and Qian (2000))

similar tasks where managers can take advantage of economies of scale. (Qian and Roland, 2006)

A similar framework can be used to analyze government organizations within countries. For example, it can compare performance under different models of public service provision, like health or education services. In the U-form or centralized system, the federal government has the authority and responsibility of providing a public service to the population. Federal managers coordinate its provision through regional managers who are only responsible for operating public facilities. (Fig. 1) In this arrangement, regional and local governments are not involved in the administration of the public service and information for decision-making always flows from the periphery to the center.

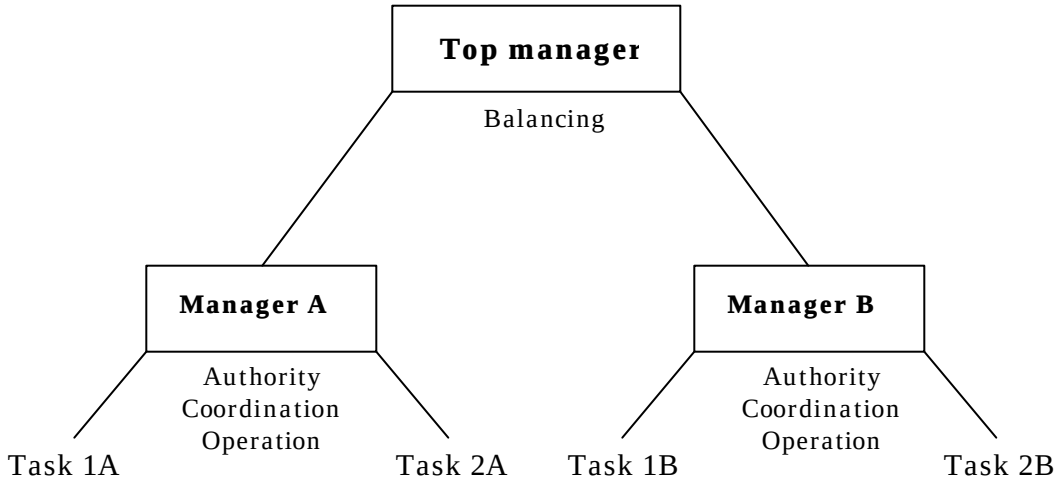
Figure 1. U-form organization of a centralized public service:



In the M-form or decentralized system, the national entity devolves the authority and responsibility for providing a public services to a regional or local government. (Fig. 2) As they are closer to their constituencies, these entities are also responsible for operating the public service. The central government keeps some balancing functions to insure that all citizens receive similar bundles of public services across regions. Federal managers can pursue this goal by evaluating regional governments' performance and later assisting under-performers. In addition, the federal manager can encourage regional managers to cooperate in those areas where they can take

advantage of some economies of scale, for example, in bidding for better prices with suppliers.

Figure 2. M-form organization of a decentralized public service:



The frameworks of Maskin and Qian (2000) and Roland (2000) can be combined to propose a model of government performance under decentralization. This model can be useful to explain the outcome of the empirical testing described in the second part of this proposal. Government officials of a hypothetical country with two regions A and B and two public services 1 and 2 say, distribute and prescribe drugs, have to decide whether to shift from a U-form to an M-form delivery model. Attributes between these public services *1r* and *2r* (*r=A,B*) must be matched to have a successful decentralization program.[3] (Fig. 1,2) It is assumed that ex-ante a decentralization program is well designed, although some of the attributes may not suit changing local conditions ex post. Thus, coordination is needed to solve unforeseen contingencies.

Coordination in the status quo depends on the quality of information available to decision makers in the organization. Each period, the middle managers *i* (*i=1,2*) in a U-form organization collect information about drugs' supplies (*iA*) and prescription

[3] In other words, if drugs are distributed expediently (1r), health professionals have to attend regularly to the clinics where the drugs are prescribed (2r). Yet, if physicians attend regularly, but there are failures in the supply of drugs, attribute matching fails. The same occurs if drugs' supply is adequate, but health professionals are often absent.

(iB) sending a report to the top manager, who has authority and responsibility to coordinate both activities. (Fig 1) The top manager in this case matches attributes for public services in both regions $1r$ and $2r$ (r=A,B). It is realistic to assume imperfect information transmission between the two regional managers and the top manager, so the probability of each message being correct is l , where $0 \leq l \leq 1$.

The proposed decentralized arrangement resembles the M-form framework. (Fig.2) In this case, middle managers are no longer responsible for operating a single public service in the two regions as in the U-form model. They get authority and responsibility to coordinate and operate both public services, within their regional jurisdictions. The top manager only provides some subtle balancing in the form of evaluation and guidance. She can suggest some changes and encourage inter-regional cooperation. Middle managers compete to be better evaluated by the top manager (to maximize federal grants), but they are free to choose whether to follow her recommendations.

Uncertainty exists on whether regional officials are capable of assuming authority in the distribution and prescription of drugs. There is a probability (p) that regional officials will out-perform once they are empowered, and a probability $(1-p)$ that they will fail. When the former occurs and decentralization is successful in the two regions (A,B), the total payoff is G. The net-present value is ½ in each region. If local authorities under-perform, the net-present value is 0, because the change toward decentralization is worse than preserving the status quo. In this case, a new decentralization program will be tried the following period with discount factor (d). It can be assumed that expected gross benefits from decentralization, relative to the status quo and conditional on good coordination, are positive (pG>1). The expected benefit of decentralizing both public services is:

$$p_m = pG + (1-p)dp_m = \frac{pG}{1-(1-p)d}$$

A decentralization policy has associated costs (C) that also need to be considered, for example, training regional authorities to match attributes. They have to learn how to buy drugs and administer the process of drug prescription. Under the M-form, $2C$ has to be paid since two managers are involved in matching public services. When decentralization is successful(p), no more costs need to be paid after the first

period. If it is unsuccessful $(1-p)$, a new program has to be tried the next period with discount factor (d) and costs need to be paid subsequently *(2C)* as managers have to become familiar with new guidelines. The cost function under decentralization is:

$$C_m = 2C + d(1-p)c_m = \frac{2C}{1-(1-p)d}$$

If the public services remain centralized under a U-form arrangement, in the future there can also be failures in the supply and prescription of drugs caused by poor decision-making from the center. As before, the model to provide public services is successful with probability(p). When public services provision fails$(1-p)$, a restructuring program is tried next period with discount factor (d). There are three possible outcomes of preserving the status quo: i) with probability l^4, coordination is successful for both regions A and B, ii) with probability$(1-l^2)^2$, coordination fails in both regions A and B, leading to infinite restructuring. iii) With probability$2l^2(1-l^2)$, coordination for one of the two regions is successful.[4] If this case occurs, the top manager applies the successful model of service provision to the region where the public services under-perform. Consequently, the payoff for keeping a centralized public service is:

$$p_u = p(l^4 G + 2l^2(1-l^2)(\frac{G}{2} + dp) + (1-l^2)^2 dp_u) + (1-p)dp_u$$

Where p is the expected payoff from public service provision in one region, or

$$p = l^2\frac{G}{2} + (1-l^2)dp = \frac{l^2 G}{2(1-(1-l^2)d)}$$

Using this recursive formula for p, it is possible to obtain

$$p_u = \frac{pGl^2(1-d(1-l^2)^2)}{1-d(1-l^2)(1-d(p(1-l^2)^2+(1-p)))}$$

Operating a centralized model has associated costs (*C*) that also need to be considered. Yet these costs are lower than M-form costs (*2C*), because economies of

[4] Since information transmission is imperfect under the U-Form status quo, the probability that each message will be transmitted successfully is $l^4 = l \cdot l \cdot l \cdot l$ where each l represents a region (*r=A,B*) and a public service (*i=1,2*). The same logic applies for the case of failure in region A $(1-l \cdot l)$ and in region B $(1-l \cdot l)$, where each l represents a public service; or for the case of success in one region $l \cdot l$ for the two public services, and failure in another $(1-l \cdot l)$.

scale rise from only one top manager doing attribute matching. With probability $(1-p)$ the status quo systematically fails, as discovered after one period. With probability $p(1-l^2)^2$ the model is good, but coordination fails in the two regions. In both cases, a new model is tried next period with discount factor (d). The costs in the centralized arrangement are:

$$C_u = C + d(p(1-l^2)^2 + (1-p))c_u = \frac{C}{1-d(p(1-l^2)^2+(1-p))}$$

Comparing the expected net payoff from the M-form with the U-form organization $M_F = p_m - c_m$ and $U_F = p_u - c_u$, it is possible to see that $p_m > p_u$ and $c_u < c_m$. The M-form benefits from better use of local information but forgoes economies of scale that give the U-form lower operation costs. Communication quality l and the costs of decentralization should be considered first to decide whether to decentralize drug supply and prescription. When $l \to 1$, $U_F > M_F$ because $p_m - p_u$ tends toward 0 and $c_u - c_u$ tends toward $\frac{C}{1-d(1-p)} > 0$. By continuity, there will be a threshold value l^* above which U_F will dominate M_F. Similarly, if $C \to 0$, M_F will dominate because of its advantages in operation. For l not too small, and if C is big enough, then U_F will dominate M_F.

IV. **Background**

After World War II, Mexico adopted a combination of two dominant models of health care organization:

i) A la "Bismark": Inspired in the Social Security laws pioneered in Germany during the XIX century, this model relies on employer, employee and government contributions. It was introduced in Mexico in the 1940s in the form of the Social Security Institute (IMSS – *Instituto Mexicano del Seguro Social*). This organization is centrally managed by the federal government and provides comprehensive health coverage through directly administered clinics and hospitals. No user fees or deductibles are charged for the services. The IMSS currently employs 380,000

federal bureaucrats and it is the largest direct provider of health care in the American continent. (OECD, 2005) In combination with other smaller Social Security institutes (for public workers, the military and the oil monopoly), the IMSS caters to the employees of the formal sector and their dependents. (50% of the population) Different attempts to outsource health services to the private sector have been unsuccessful, since IMSS has one of the most powerful and richest labor unions in the country.

ii) A la "Beveridge": Inspired in the National Health Service started in the United Kingdom in 1942, this model depends heavily on government financing and partly on user fees. The Mexican Ministry of Health (SSA – *Secretaria de Salud*) followed these guidelines to provide a safety net to the population of the informal sector, or those who were not covered by the Social Security institutes. Similar to the IMSS, hospitals and clinics of the SSA were directly managed by the federal government and staffed with government employees. After the Debt Crisis of 1982, the federal government started an ambitious decentralization program in 14 of the 31 states of Mexico.[5] Federal hospitals and clinics were devolved to state governments, yet most employees continued under the federal payroll and most resources remained under close federal government supervision. As this first experience was considered unsuccessful, the decentralization process was subsequently interrupted for six years (1988-1994).

In the mid-1990s, a new federal administration resumed health service decentralization nationwide. This policy comprised 17 states and the Federal District that were not decentralized before, and concluded the decentralization process in the remaining 14 states. This second decentralization phase was more aggressive as it devolved the control and ownership of all federal clinics administered by the SSA. Employees and all financial resources for health care were subsequently under the authority of state Ministries of Health (MoH).[6] This second decentralization stage officially concluded in the year 1997. (Moreno and Flamand, 2004) In both decentralization periods, states were free to choose between two

[5] These 14 states had already achieved greater financial decentralization for diverse historical reasons. Before decentralization, these states contributed to finance 17.4% of health expenditures on average, while in those states without decentralization, state governments only contributed with 5.5%. (González-Block, et al, 1989)
[6] Although all employees are now part of the state bureaucracies, they still negotiate wages at the federal level.

models of health service provision. The most common was the integrated model, where health services are linked to the state MoH. The second model provided some autonomy to an independent state provider of health services.

Despite of enjoying management autonomy, all Mexican states need to comply with a few federal benchmarks. State financing has also been growing slowly and most financial resources are still provided by federal grants. In 2005, state governments only contributed 16% of financial resources used by the state MoH. (OECD, 2005) Federal grants are distributed according to a formula that takes into consideration wealth, health needs and performance, and states partly compete to maximize federal transfers. In all services provided by the state MoH, users pay small fees, depending on the outcome of a means test. Recently, a program called Popular Insurance was introduced to wave user fees for the most cost-effective health services and drugs. To enroll in this voluntary program, users need to pay a subsidized pre-payment.

Targeting the poor

Although the Mexican Constitution guarantees universal access to comprehensive health care to all residents of the country, public health care delivery is often limited by distance, poor quality and supply failures. Most Mexicans often make out-of-pocket payments in the private sector to treat their health problems. Private spending on health care accounted for more than half of overall health expenditure of the country in 2006.[7] Poor households are generally the most affected, since they face the highest resource constraints to pay for health care out-of-pocket. In order to improve health care conditions of the most vulnerable population, recent government programs have targeted cost-effective interventions among the low-income population.

Up to now, the most ambitious efforts to improve public health care delivery for the poor have been contained within the broader poverty alleviation program known as Oportunidades (formerly Progresa between 1997 and 2002). This program promotes the accumulation of human capital through government cash transfers

[7] Mexico spends 6.1% of its GDP on health, a figure that is low by Latin American standards, where average spending is approximately 7% of GDP. This amount of total health spending is too limited considering that Mexico ranks third in per capita income in Latin America. (OECD, 2005)

and the provision of free education and health care in the poorest regions of the country. In 2005, Oportunidades provided aid to approximately 5 million households. These families represented nearly 45 percent of rural families and 20 percent of all households living in Mexico. The program now operates in over 85,000 localities nationwide, including urban areas, and has an annual budget of more than a billion dollars. (Oportunidades, 2006)

The cash grants of this program are conditioned upon school attendance and other requirements like participation on health education meetings and routine medical check-ups. On average, the cash transfers are US $55 per month, which represents approximately a fifth of the average family income. The health component of Oportunidades favors preventive health care. Children age 0-60 months get immunization and have to comply with visits for growth monitoring. Pregnant and lactating women are required to have prenatal and postpartum care. They also receive nutritional supplements. Other family members may go to the clinics for check up examinations and other basic health care services. Previous research on the effectiveness of Oportunidades has found increased utilization of public clinics, with a parallel reduction of private providers' utilization. (Gertler, 2002)

Since it was expected that health care demand would rise as a result of Oportunidades, the federal government coordinated with IMSS (federal) and SSA (state) to improve service delivery. Although IMSS is mostly responsible for the employees of the formal sector, in 1979 this federal agency was made responsible for providing basic health coverage in the poorest regions of the country. Since employers and employees wouldn't contribute to the financing of these services through mandatory wage contributions, IMSS created a separate organization known as IMSS-Coplamar entirely financed by the federal government.[8]

After the Debt Crisis of 1982, Coplamar was phased out, but IMSS-Coplamar survived as an independent organization within IMSS. In the first decentralization phase in 14 states, the MoH merged the hospitals and clinics of the SSA and those of

[8] Coplamar (*Coordinación General del Plan Nacional de Zonas Deprimidas a Grupos Marginados*) was the first anti-poverty program in Mexico and a direct antecedent of Oportunidades. Although Complamar didn't provide any cash grants, it was a coordinated government strategy to improve education, health and infrastructure in the poorest communities.

IMSS-Coplamar.[9] After this first decentralization period, IMSS-Coplamar kept 72% of its units and 60% of its national coverage. (González-Block, 1989) When the decentralization process was interrupted in 1989, a new government strategy to alleviate poverty under the name of Solidaridad was created. IMSS-Coplamar became IMSS-Solidaridad and the federal government continued to fund basic health care in the poorest regions of the country. In those 14 states where IMSS-Coplamar was merged with the state MoH during the 1980s, the SSA offered resources and training to improve performance, yet health services were neither re-centralized nor devolved to IMSS-Solidaridad.

Six years later, a new change in administration and another economic crisis ended with Solidaridad. After the Currency Crises of 1995, Solidaridad was canceled, and IMSS-Solidaridad survived as an independent organization for a second time. With the second decentralization process (1995-1997), the federal government re-considered merging IMSS-Solidaridad with the state MoH. Although political considerations were partly at play in the opposition to decentralizing this organization in the remaining 17 states, the relative effectiveness of IMSS-Solidaridad in reaching the poorest regions prevented the federal government from trying harder. Following bureaucratic inertia, when Oportunidades started operations in 2002, IMSS-Solidaridad changed its name for the third time to IMSS-Oportunidades. In those states where IMSS-Oportunidades is not present, the state MoH are responsible for providing the health component of Oportunidades. By 2005, the SSA was able to reach almost half the rural and urban population in the 31 states of Mexico and its Federal District. IMSS-Oportunidades covers mostly rural areas in 17 states of Mexico.

Models of Health Care organization in Oportunidades:

U-Form: IMSS-Oportunidades can fit the description of a unitary organization, since the services are coordinated from its headquarters in Mexico City. The central

[9] One of the main reasons for interrupting this first decentralization process between 1988 and 1994 was decreased performance in those clinics that were part of IMSS-Coplamar. The decline was blamed on low management capacity of local authorities and opposition from former IMSS-Coplamar employees to follow the new guidelines. Some employees of IMSS-Coplamar left after decentralization or asked for a transfer to other states were IMSS-Coplamar continued operating. (González-Block, 1989, Birn, 1999)

authority controls financial flows, buys and distributes resources, while they evaluate program achievements. The model of health care delivery is the same across the country. IMSS-Oportunidades sub-divide its operations in 45 health districts with a defined target population of 30,000 to 100,000 people. They live in small towns and communities at a walking distance of a maximum of two hours. Each district has one or two rural hospitals and three to four basic health units. A multidisciplinary team serves both, hospitals and health units. Each health unit is staffed with a rotating physician and an auxiliary nurse. They have a daily radio communication with their supervisors. Zone supervisors check all hospitals and health units regularly. A technician trained to repair medical equipment accompanies the supervisor in these visits. (IMSS-Oportunidades, 2006)

M-Form: The SSA resembles more the description of a multifunction organization, as state MoH have the authority and responsibility to provide health services in their jurisdictions. Each state has to develop the entire production and service delivery process, with similar task being performed in each state. Although the federal government provides most resources used by the state MoH, they can only define and evaluate basic standards. State governments are free to choose how to spend federal grants and their own resources, leading to some heterogeneity on health care delivery models. Management autonomy inspires certain variation on how they spend resources, organize services and distribute inputs and personnel. There are a few areas where the states coordinate with the federal government to take advantage of economies of scale, although not always successfully. Recently, state governments abandoned their collaborative agreement to purchase drugs as a single entity, as they were unable to solve drug scarcities.

V. Comparing Performance: Is allocation of health care provider exogenous?

Taking into consideration that IMSS-Oportunidades and SSA have to provide the same services, none of these programs can charge (legally) for them and that the target population is likely to be similar, then the co-existence of both organizations

offer an opportunity to test whether centralized or decentralized health services are more effective at providing health care to the rural poor. The provider that is more effective at reaching the poor will observe higher rates of health care utilization and less out-of-pocket health expenditures in the population they serve. According to the model discussed in Section III, SSA could be more effective if the gains in flexibility and cross regional experimentation under the M-Form (decentralized model) outweigh the economic loss created by duplication. IMSS-Oportunidades may perform better if the gains from economies of scale prevail over the loss from homogenization and information processing.

Since the selection rule of program placement is probably the most important factor for the empirical analysis, it was necessary to assess it and take it into consideration. As it will be discussed in the next section, to compare the population served by decentralized and centralized providers it is necessary to fulfill the exogeneity assumption of program placement. If IMSS-Oportunidades or SSA targeted regions or populations with particular characteristics (i.e. poverty, distance, indigenous population), the simple comparison of means will suffer from endogeneity problems and the coefficients will be biased. However, in the series of interviews with former and current government officials, and according to documental sources[10], it was possible to conclude that "there was no rule" in the allocation of clinics, as it was stated in one of the interviews.

The decision to place IMSS-Oportunidades and SSA changed across time and states and it was mostly determined by political factors. The most consistent criteria that guided the placement of clinics after the second decentralization in the mid-90s was to build IMSS-Oportunidades health centers in the poorest rural regions (in the 17 states where this programs operated), once state governments decided which areas they wanted to reach. The factors determining the location of SSA clinics were different across states. In the next two sections, the implications of this criteria of clinic placement will be discussed. As it is argued, the allocation of health care providers across rural regions of Mexico looks quasi-random, suggesting that the exogenous motives regulating program placement is helpful for the proposed assessment of performance.

[10] They include the administrative rules of both programs and the official requests of information to the Mexican government through its freedom of information system.

VI. **Data**

The preliminary analysis for this research proposal uses the 2003 rural evaluation of Oportunidades. The initial stage of this program evaluation included an experimental design. A sample of eligible communities was randomly assigned as a treatment (320 villages) and comparison (186 villages) groups in seven states of Mexico. The treatment households first received benefits in 1998, while the comparison group stared to receive benefits in 1999. Thus, the experimental stage lasted 20 months. Due to political reasons, future evaluations since 2001 are quasi-experimental, although the new follow-up rounds continue to be linked to the pre-program evaluation of 1997. Each new survey selects a new comparison group defined by matching procedures that receives treatment the following year.

VII. **Methods**

The empirical strategy to compare performance between federal (IMSS-Oportunidades) and state (SSA) providers of health services uses private health expenditures and health care utilization as dependent variables. Private health expenditures can be a good outcome measure, since the program provides free health care and drugs at public clinics, in part, to reduce regressive out-of-pocket expenditures. If users of either IMSS-Oportunidades or SSA cannot solve their health needs at the public clinic or if drugs are not available, they will choose to pay out-of-pocket in the private sector. Anecdotal evidence also suggests that another possibility that is not widespread, but that certainly occurs is the illegal charge for health services at the public clinics.[11] Prospective users may then prefer to receive care with private health providers rather than paying bribes to health personnel. The second group of variables proposed for the comparison of both organizations consists of health utilization measures included in the survey, like preventive care,

[11] Since most users of public clinics are not well informed and indigenous users are not always fluent in Spanish, some health personnel ask for illegal payments to provide services. Just recently, Oportunidades required that the legend "The services provided in this clinic are free and should not be charged" has to be visible in all public clinics.

diabetes and hypertension tests, variables of child monitoring visits, and delivery of nutritional supplements.

The target population is defined next. Since a few households use health services in both, IMSS-Oportunidades and SSA, they are excluded from the two categories. This problem is mostly observed in one state (Hidalgo), where both services are close to each other. A comparison of means can be helpful to assess the comparability of the treatment and control groups. If there were many differences between the population served by federal and state providers, the effect of organizational form (M-form U-form) would be more challenging to determine. In addition, if the population served by IMSS-Oportunidades and the SSA balance with respect to the treatment/comparison groups of Oportunidades, then it can be feasible to do inferences about any differentiated effect of the program among users of both health care organizations.

A series of regression models can be useful to analyze the relationship between organizational form and performance. These specifications use the standard treatment effect framework with simple treatment versus comparison estimations:

$$y_i = d_i y_{1i} + (1 - d_i) y_{0i} \quad \text{for} \quad (i = 1,2,.....8889)$$

where:

$y_{1i} = a_{1i} + w_{ji} + xb_{1i} + e_{1i}, j = 1,0$ are the outcomes for SSA

$y_{0i} = a_{0i} + w_{ji} + xb_{0i} + e_{0i}, j = 1,0$ are the outcomes for IMSS-Oportunidades

In both equation, y_{ij} represents the outcome measure for the two performance variables: out-of-pocket health expenditures, utilization of preventive health care and alternative measures. Participation in the treatment and control groups of Oportunidades is considered in the term w_{ij}. Other confounders, interaction terms, state fixed effects and community infrastructure values are included in xB_{ij}. Under the mean independence assumption $y_j \perp d, j = 0,1$, it is possible to estimate the two parameters of interest for this paper, the average treatment effect and the average treatment effect on the treated:

$$ATE = E(y_1) - E(y_o) \qquad ATET = E(y_1|w=1) - E(y_0|w=1)$$

The mean independence condition occurs with randomization or when *d* is forced into the subjects by some event or rule unrelated to y_0 and y_1. In an ideal situation, the comparison between IMSS-Oportunidades and SSA could have benefited from an ex-ante randomization of program placement, yet it didn't happened that way. The only possibility is that all the exogenous factors that determined the location of IMSS-Oportunidades and SSA clinics would have provided a random distribution of centralized and decentralized clinics ex-post. In the next section, the comparison of means will show that the population reached by these organizations is almost identical. Thus, it simulates the conditions of a random distribution of providers that at the same time fulfills the mean independence condition for the empirical analysis.

To address the two periods when the population received treatment (1998 and 2003) from Oportunidades, dummy variables are defined for each year. As it was mentioned before, the comparison group of 2003 was selected through matching methods. Therefore, the regression models include variables that could differ between the treatment and comparison groups, along with state fixed effects and health infrastructure controls at the community level and other likely confounders. For the most relevant dependent variables, the average treatment effect and the average treatment effect on the treated effects can be calculated with interaction terms for health care provider (IMSS-Oportunidades or SSA) and the two treatment groups of Oportunidades. (Heckman, Smith, et al, 1997, Heckman, Tobias, et al, 2001)

The regression models for health care expenditures use OLS with a log transformation for the dependent variable to address the natural skewness in the distribution of this variable. Another problem of modeling health expenditures is the significant number of households with zero health expenditures. (See Table 1) To address this issue, the literature recommends two alternatives. (Manning, Newhouse, et al, 1987) The first is to add a positive constant in the observations with zero health expenditures and run OLS with log health expenditures. It is common to set the constant equal to one, a convention that was replicated in this

analysis. The second alternative is to use Tobit models that may adjust better to the distribution of health expenditures. These can be tested for the entire sample and by truncating those observations with zero health expenditures. Both empirical strategies are considered here. Models for health utilization use Probit, as the estimated parameter corresponds to the likelihood of attending preventive health care services. All means comparisons and specifications have clustered standard errors at the locality level.

A useful way of evaluating the robustness of the initial results would be to test the models considering other possible institutional changes, like time and type of decentralization. As it was described in the previous section, Mexico's decentralization occurred in two different periods, with six years in between when the process was interrupted. States that decentralized early might be more experienced in the provision of health services, influencing any state versus federal difference. Two of the seven states in the sample correspond to the first period of decentralization. (Figure 3) A dummy variable and an interaction term with users of state services were defined for those affected by early decentralization.

State governments also had to choose between granting direct control of their health services to the state MoH and creating autonomous organizations to administer these services. In those states where health services are directly managed by the state MoH, services resemble the U-Form in a small scale, as authority is centralized in the minister of health. States with autonomous health services resemble the M-Form at the state level, as a separate government organization is in charge of providing and administering health services. Another set of dummy variables and interaction terms take into consideration this difference. Alternative measures to the main dependent variables are also used to test the robustness of results. A household level analysis may be the most convenient, since most measures of income and expenditure were reported at this level. In addition, health expenditures are commonly pooled among family members.

VIII. **Results**

Consequently, it was chosen as the main explanatory variable. The distribution of this population by SES (using Oportunidades index) resembles that of a normal

distribution, and confirms that most sampled households are below the poverty line (Figure 4).[12] As shown in Table 1, households reached by state providers outnumber by 2/3 the number of households served by the federal provider. They correspond to the extra SSA users in the two states where IMSS-Oportunidades was merged with the state services. If the comparison restricts to the five states with IMSS-Oportunidades, the number of families covered by the federal and state services is homogeneous, with a single exception. (Table 2)

The next stage of the analysis compares the population in the treatment/comparison groups of Oportunidades and its distribution by type of health care provider. When the two treatment categories of Oportunidades (early and late treatment) are compared among users of IMSS-Oportunidades and SSA in Table 2, these groups seem to be similarly distributed by health care provider. It is thus feasible to use the treatment/comparison groups of Oportunidades to make inferences about the different effects of health care provider on program recipients. This initial assessment of the data shows that the target population is similar by SES, type of health care provider, treatment/comparison categories of Oportunidades, across and within states.

A means comparison (t-test) between users of federal and state services in Table 3 and 4 provides some initial evidence on the differences between centralized and decentralized health care providers. Table 4 shows no differences in most sociodemographic, household, health and community infrastructure measures. This group of variables is a small sample from a larger comparison of means that includes 55 relevant measures from the survey. The only two comparison categories that were statistically different are: the number of communities reached by a health campaign and those with basic hospitalization services. Naturally, they were always included in the regression analysis. This exercise suggests that the comparison groups (IMSS-Oportunidades vs. SSA services) are balanced and the selection rule of providers is exogenous. It also implies that if the population is almost identical in their observable variables, it should also be similar in its unobservable measures. Thus, the differences in the dependent variables considered here should not be driven by factors different from organizational form (U-form and M-form).

[12] Those at the left of the line are poor, while those at the right are considered almost poor or not poor.

Perhaps the most interesting results in Table 3 are the differences in health care expenditures and health utilization. Overall, these variables are significantly different between the population reached by federal and state providers. It suggests that those households served by the centralized health care provider (IMSS-Oportunidades) make fewer private health expenditures and observe higher utilization of preventive services. The distribution for the population experiencing health care expenditures also shows that users of state services experience slightly higher health expenditures on average. (Figure 5)

A series of regressions can be useful to take into consideration confounding factors, test alternative hypotheses, and estimate the average treatment effect and the average treatment effect on the treated for the comparison categories of Oportunidades. The results in Table 5 confirm what was initially suggested in the descriptive statistics. All specifications show a clear difference on private health expenditure between users of IMSS-Oportunidades (federal) and SSA (state). In all models, the coefficients are statistically significant and positive. Households reached by the SSA have higher (56%) private health expenditures on average.[13] (Model 2, Table 5 and Figure 6) This effect is robust to different combinations of confounding factors, state and health infrastructure effects.

With respect to the population in Oportunidades, those families in communities targeted by this program have lower private health expenditures on average. In Model 4 of Table 5, the interaction terms of Oportunidades' treatment/comparison groups in 2003 and SSA show a strong difference (43% vs 117%) in health expenditures relative to the control group of IMSS-Oportunidades (base category). It suggests heterogeneous performance of state providers in areas reached by the program. The interaction between IMSS-Oportunidades and Oportuidades is non significant in all specifications and the difference with the base group is negligible (4.5%). It implies a more homogenous provision of health services across localities for the population reached by the centralized provider.

Despite the improved performance of state health services in regions targeted by Oportunidades, it doesn't outperform the centralized provider of health services. A difference of 38.5% in health expenditure remains within the treatment group of

[13] All coefficients with log dependent variables and OLS slightly differ from those in Tables 5 and 7, since they need to be interpreted using the formula $100 \cdot [\exp(\hat{b}_1) - 1]$. (Wooldridge, 2002)

Oportunidades. As could be expected, there is no significant difference on health expenditures for those experiencing early treatment (triple interactions for 1997). Using a predicted quadratic relationship to picture the overall difference in health expenditure by treatment groups of Oportunidades, Figure 8 confirms that private health expenditures are on average higher for users of state health services. This graph pictures the better performance of SSA in areas covered by Oportunidades, as they face lower health expenditures. No difference exists for those served by IMSS-Oportunidades, which confirms that the centralized organization provides more homogeneous benefits across populations and communities.

While this first analysis of health expenditures implies that U-Form or the centralized provider of care is more effective at reducing the amount of regressive out-of-pocket expenditures regardless of Oportunidades, it is possible that these differences are driven by other factors. Alternative explanations that are explored here are the early or late decentralization and the type of decentralization effect. It is likely that states experiencing early decentralization (83-88) are now more capable of providing health services than those who were decentralized more recently (95-97). Results in Table 5 show that this possibility cannot be confirmed as the interaction for early decentralization is not statistically significant. The second alternative hypothesis is type of decentralization. As it was suggested before, integrated health care organizations resemble the U-Form organization at the state level (centralized within the state). There seems to be an effect of this organizational form at the state level in Model 5, where those states with integrated health care services experienced 27.3% lower health expenditures compared with those states with an autonomous health care provider.

To confirm whether the difference in health expenditure remains, two additional robustness tests were done. First, a Tobit model with truncated observations in households with zero health expenditures shows similar results.[14] (Table 6) Coefficients are not directly interpretable and they cannot be compared directly with those of OLS in Table 5. Yet all significant terms remain the same and have the same sign. In this case the difference between the population in the treatment group of Oportunidades and the base group (control group served by IMSS-Oportunidades)

[14] Results for the non-truncated Tobit model (not shown) were essentially the same to those of OLS with log transformed health expenditures and a constant term in zeros. (Table 5)

is stronger, while the effect of having a U-Form organization at the state level (integrated model) is weaker. The second test corresponds to the use of alternative variables with related measures of private health expenditures. Table 7 shows regressions for drug payments and cost of physician visits that were asked in a different section of the survey. As can be expected, drug payment and costs of physician visits are higher (35% and 43%, respectively) among the population reached by state providers and the difference is statistically significant. (Model 1 and 3 in Table 7) With respect to performance toward the treatment population of Oportunidades, once again there seems to be a positive effect for state providers, and there are no differences in the health expenditures of the population reached by the centralized provider. Time and type of decentralization effects are non-significant.

The second part of the regression analysis uses different measures of health care utilization as dependent variables. Perhaps the most important measure in this group of variables is preventive health care utilization. Table 8 and Figure 7 confirm once again the better performance of the centralized provider, as households catered by IMSS-Oportunidades are more likely to attend preventive care (15.5% in Model 2), considering different combinations of possible confounding factors, state and health infrastructure effects. In Model 5, there is an important effect of Oportunidades in the likelihood of attending preventive care for households reached by both, state and federal providers (54% reached by SSA and 74% reached by IMSS-Oportunidades). In contrast with health expenditures, utilization of preventive health care in areas reached by IMSS-Opotunidades is also higher in localities targeted by the program. These results confirm the improved performance of SSA services in areas targeted by Oportunidades. They also show that the objective of increasing preventive services among the poor through Oportunidades is effective, regardless of health care provider. This difference can be seen graphically in Figures 9, where utilization is almost the same for the control group, while it increases for the population in the treatment group of Oportunidades.

For preventive care utilization, there is a weak delayed treatment effect of Oportunidades, since the population that was in the treatment group in 1997 was 14% more likely to use preventive care relative to the comparison group population in 1997 (that received treatment in 2000). Time and type of decentralization can be tested in this section too. The results in Table 8 show that performance among those

states experiencing early decentralization (83-88) is slightly better as the population is almost 50% more likely to attend preventive health care, than in those states where services were decentralized late (95-97). These findings may suggest that in those states experiencing early decentralization, services improved slightly as a consequence of transferring personnel and expertise of the centralized providers to state control. (Model 5) The second alternative hypothesis that uses type of decentralization is not significant.

Lastly, when related measures of health utilization are tested, differences between the federal and state provider remain for the number of hypertension tests and nutritional supplements delivered to children. (Table 10) Similar performance exists in the variables of "healthy child" services, suggesting that child monitoring is relatively homogenous between federal and state providers. SSA observes better performance in measuring children, the single category where state providers out-perform the centralized provider, but the difference is only significant at the 90% level of significance. The centralized provider is better at delivering nutritional supplements (14% difference) and in the administration of hypertension tests (20% difference) in areas targeted by the program. (Models 2 and 5 in Table 10) Both findings confirm the increase in preventive care as a consequence of conditioning the cash grant, as utilization in all services is positive for the treatment group of Oportunidades, despite of health care provider. Using variables of health infrastructure at the community level, it is interesting to assess possible areas of improvement in reaching the target population. In Table 10, health promotion, the number of clinics and the cost of reaching the clinics seem to be the main determinants of using federal and state health services.

IX. **Discussion**

The results presented in the previous section showed that the centralized provider consistently observed better performance and more homogenous outcomes, even if targeted households were not benefiting from Oportunidades. More importantly, Oportunidades seems to be effective at raising health care utilization, despite of health care provider. In contrast with health expenditures, in those areas reached by the centralized provider, preventive care utilization increased

significantly. Nevertheless, if decentralized providers improve, an important differential (15%) remains, and it might be in the interest of Oportunidades to address it.

Even if this analysis shows a differential in utilization between centralized and decentralized providers, it cannot disaggregate its causal mechanisms. Three possible explanations are likely. The conditioning of grants in Oportunidades may have a positive effect in health care utilization. Early detection of health care conditions can contribute to the reduction of health care expenditures. In other words, the requirement of getting regular check-ups may force families that are reached by both, state and federal providers, to take preventive measures against conditions that would have been more expensive to treat later. Consequently, private health expenditures are lower in the future, even for those who receive care from SSA. Another possibility is the inter-state transfer of resources from regions not reached by Oporutnidades to those that are targeted by the program. As the federal government is interested in making this anti-poverty strategy to work, state governments may have incentives to improve performance in these regions.

Other important findings relate to type and time of decentralization. Early decentralization and early treatment of Oportunidades made the difference in utilization. It may suggest that those states that were reached by decentralization first have gradually improved performance at reaching their populations. In contrast, type of decentralization had an effect on health care expenditures, suggesting that those states that adopted a less centralized structure within the state were more ineffective at providing health services that reduced the likelihood of spending out-of-pocket in the private sector.

Future research should explore the causes of the differential between centralized and state providers. A possible explanation for the relative success of the centralized provider derives from the model proposed in the Section III. The economic loss from duplication at the state level is bigger than the benefit from more flexibility and possibilities of local experimentation. Similarly, the benefits in economies of scale and coordination from IMSS-Oportunidades seem to offset the costs of failures in information transmission and homogenization. These general predictions of the literature may partly explain the findings of this paper, yet there are other specific issues that derive from the particular organizations analyzed here:

i) Type of product: Since providing a handful of cost-effective interventions to the rural poor doesn't require a high degree of specialization, the possible earnings from flexibility and local experimentation may not be as significant as the savings from an homogenous provision in all rural areas. In other words, since the administered product is relatively simple and easy to standardize, it may be less sensitive to local taste and variation, and a centralized provision is more efficient.

ii) Incentives: It is also likely that IMSS-Oporutnidades has more resources and can offer better incentives to health personnel. They can be more motivated and it can have a positive effect on health care provision and utilization. For instance, IMSS-Oportunidades offers better pensions and benefits compared to SSA. It may partly contribute to the self-selection of medical professionals, whose first choice in entry-level job openings is usually the IMSS. By selecting the personnel with higher scores in these exams, IMSS-Oportunidades could increase the likelihood of offering better services. In addition, a higher social status of IMSS personnel may also contribute to the self-selection of higher quality personnel.

iii) Expertise: Another possible explanation of the differential relates to the expertise of the IMSS in this area. This organization developed a relatively successful provision model since they went into the field in the late 1970s. In this period of time, they have been able to establish a vertically and well coordinated government organization. The turf conflicts that this organization has historically sustain with the SSA, may have contributed to an imperfect transmission of the IMSS experience in this area. Even if the SSA applied the model of IMSS-Oportunidades, its implementation may have faced more difficulties if there is a self-selection of personnel to IMSS-Oportunidades.

iv) Local capacity: If the centralized provider of health care has more expertise and better personal to provide services that benefit highly from economies of scale, the only advantage of state providers becomes local knowledge. Even if local authorities are closer to their communities and are more familiar with their taste and limitations, they need managerial skills to provide health services that require some

level of expertise. If these skills are less developed at the state level, they won't be able to perform better than the centralized provider, even if they are closer to their communities.

X. **Conclusions**

The centralization of public services was a common development strategy in middle-income countries after the II World War. Many government organizations used centralized planning to expand education, health care, industrial production and infrastructure to remote areas of the country where government presence was non-existent. This approach was highly criticized since the 1970s and decentralization became one of the most recommended policies. In many countries, health service decentralization was not necessarily the complete devolution of responsibilities and resources. It was often the reorganization of the health system that gave new agents, like regional and local governments, a more active role in the financing and delivery of health care. While this approach could be useful in some environments, it is certainly costly and it has been a risky enterprise to undertake.

Despite its popularity, there is not clear evidence that decentralization has been more successful than centratilization at reaching the rural poor. Thirty years after the decentralization movement has been advancing in Mexico, reaching the poor through a highly centralized, and almost military-designed organization seems to be more effective at providing basic health services than the more recent decentralized approach. The empirical analysis provides consistent evidence that a difference between U-form and M-form organizations exists and it is not caused by other institutional variables like program placement, time or type of decentralization or any state or health infrastructure effects. It benefited from differences in timing and models of health care decentralization and from a quasi-random distribution of providers. More importantly, the empirical analysis shows that performance of state providers improves in areas targeted by Oportunidades. While the differential in performance between IMSS-Oportunidades and SSA is assessed here, future research should explore its causes more deeply.

XI. **References**

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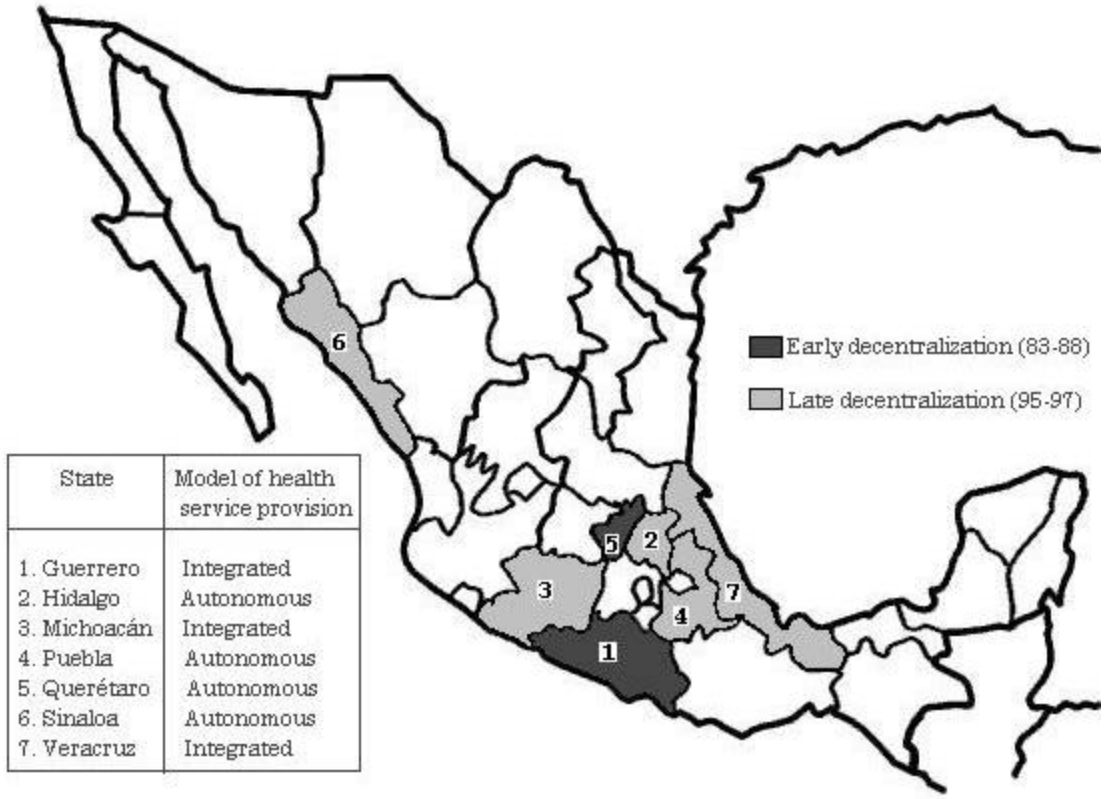
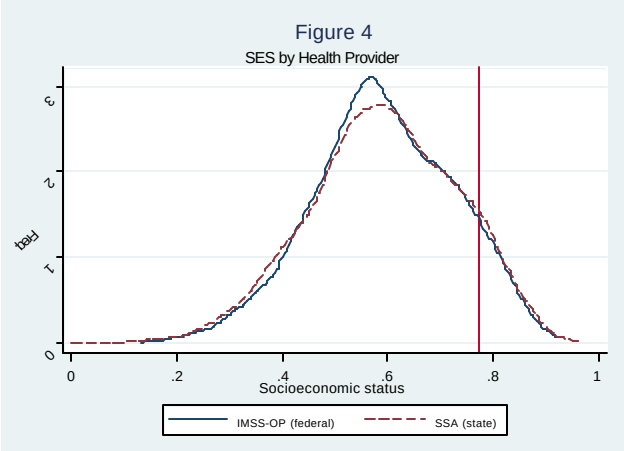
XII. **Figures and Tables**

Figure 3. Sampled states in Mexico: Time and type of decentralization



State	Model of health service provision
1. Guerrero	Integrated
2. Hidalgo	Autonomous
3. Michoacán	Integrated
4. Puebla	Autonomous
5. Querétaro	Autonomous
6. Sinaloa	Autonomous
7. Veracruz	Integrated

Fig 4-5. Distribution of the population: socioeconomic status (SES) and health expenditures



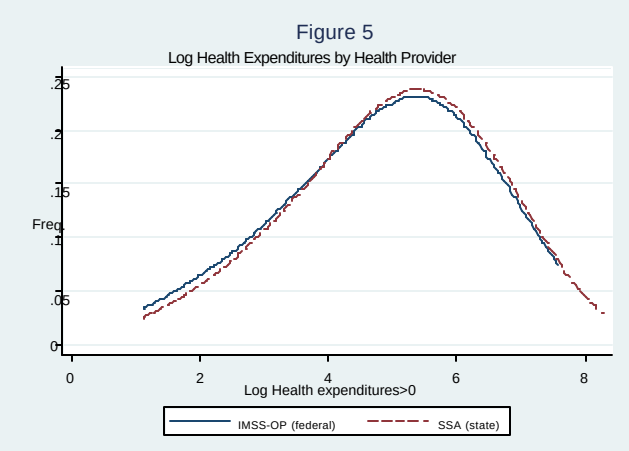
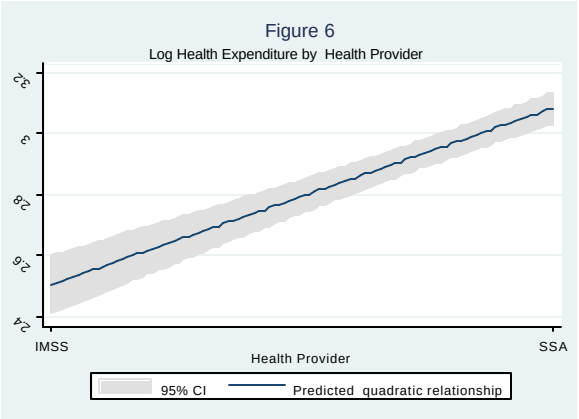


Fig 6-7. Predicted quadratic relationships by health provider



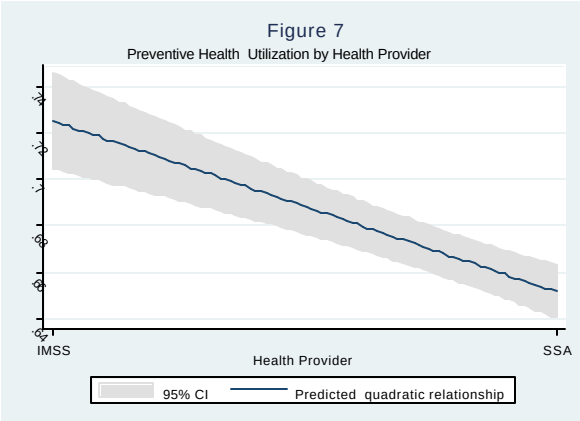
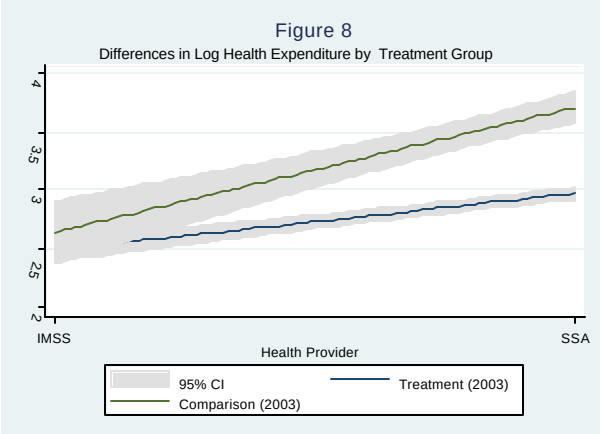


Fig 8-9. Predicted quadratic relationships by health provider and Oportunidades' receipt



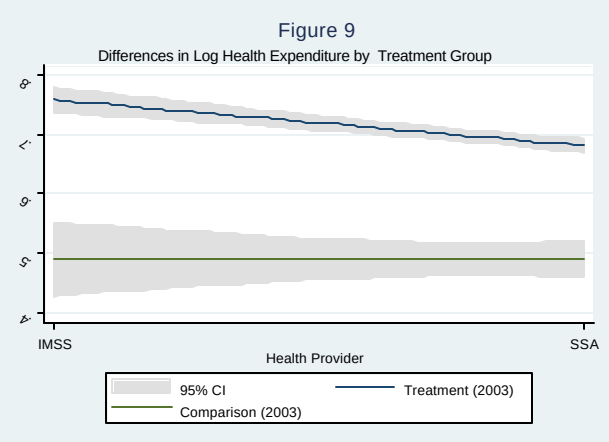


Table 1 – Users of SSA (state), IMSS-Op (federal) health services

	Households	With health expenditures
IMSS -Oportunidades	2,025	39%
SSA	6,864	52%
Total	8,889	49%

Table 2 – Differences in socioeconomic status (SES), state distribution and Oportunidades' treatment groups by health care provider

	IMSS	SSA	Coefficient	S.E.	t-value
SES I (Oportunidades)	.5926608	.5918274	.0008334	.0071175	0.12
SES II (PCA)	.3029824	.3146724	-.0116901	.0087141	-1.34
HH income	2623.294	2815.994	-192.6993	112.7497	-1.71
HH expenditure	2111.259	2293.661	-182.4028	122.7686	-1.49
Food Ex.	1315.315	1435.271	-119.9559	112.095	-1.07
School Ex.	81.72527	86.94624	-5.220974	4.34221	-1.20
Transp. Ex.	144.6446	147.5342	-2.889623	11.14702	-0.26
Tobacco Ex.	5.054305	5.818944	-.7646392	.998974	-0.77
Oportunidades' treatment groups					
Treatment 1997	.6097973	.5964702	.0133271	.0415828	0.32
Treatment 2003	.877037	.8502331	.0268039	.025845	1.04

	State distribution				
Integrated model	.4671605	.5065559	-.0393955	.0395115	-1.00
States: Hidalgo	.2064198	.1416084	.0648114	.0354998	1.83
Puebla	.1377778	.1321387	.0056391	.0229054	0.25
Sinaloa	.1767901	.1152389	.0615512	.0238006	2.59*
Michoacán	.1491358	.1311189	.0180169	.0223746	0.81
Veracruz	.3091358	.2495629	.0595729	.0349001	1.71

Table 3 - Differences in health expenditures and utilization by health care provider

	IMSS	**SSA**	**Coefficient**	**S.E.**	**t-value**
Out-of-Pocket Health Ex.	115.1635	163.0648	-47.90123	8.737856	-5.48*
MD visits expenditures	24.18537	34.85098	-21.87298	4.267453	-5.13*
Drugs expenditures	77.45597	103.5211	-26.06516	5.776549	-4.51*
Preventive care	.7249383	.6519522	.0729861	.0174714	4.18*
Diabetes test	.7535802	.6857517	.0678285	.0155232	4.37*
Hypertension test	.3775128	.3364544	.0410584	.0078126	5.26*
Child monitoring	.3846914	.4012238	.0165324	.01502	1.10

Table 4 – Differences in socio-demographic and health infrastructure variables by health care provider

	IMSS	**SSA**	**Coefficient**	**S.E.**	**t-value**
Age of HH head	48.60148	48.16394	.4375342	.5814968	0.75
Years of school HHh	5.271111	5.254079	.0170319	.1633127	0.10
Family Size	6.324938	.9467932	-.1434475	.1017373	-1.41
Dependency Ratio	.9205243	.9548909	-.0262689	.0221514	-1.19
Sex comp (Male=1)	.4942266	.492894	.0013326	.0042761	0.31
Works	.343716	.3475332	-.0038172	.0064027	-0.60
Migrant member	.3491358	.347465	.0016708	.0146105	0.11
	Health status				
Sick HH member	.6301235	.6437937	-.0136702	.0178836	0.76
Days of sickness	7.666173	7.913462	- .2472887	.4311392	0.57
Days of inactivity	3.114074	3.13039	- .0163164	.2569028	0.06
Physical condition	13.47302	13.12733	.3456926	.4339744	0.80
Has hypertension	.1758025	.1717366	.0040659	.0045421	0.90
Has diabetes	.1066667	.1131993	-.0065326	.0089296	-0.73
Frequency of Care	2.415802	2.443777	-.0279745	.0635376	0.44
	Community infrastructure				
Health campaign	.6158025	.6907051	-.0749027	.0376561	-1.99*
Freq of health campaign	4.168971	3.931855	.2371166	.1765755	1.34
Physician practice	.3254321	.3186189	.0068132	.0435374	0.16
Pregnancy care	.374321	.3457168	.0286042	.0419978	0.68
Child delivery services	.2676543	.2325175	.0351368	.0407521	0.86
Vaccination	.4434568	.4865967	-.0431399	.0399066	-1.08
Diarrhea treatment	.457284	.4745047	-.0172207	.0402812	-0.43
Family planning	.4479012	.4578963	-.009995	.0405882	-0.25
Basic hospitalization	.1945679	.1047494	.0898185	.0365779	2.46*
Injection application	.7101235	.7236305	-.0135071	.0340014	-0.40
Distance:					
Physician practice	5.840241	6.023533	-.1832921	.5450836	-0.34
Pregnancy care	5.246987	6.532712	-1.285725	.7256262	-1.77
Child delivery services	9.081131	9.650197	-.5690657	.9634589	-0.59
Vaccination	3.971065	4.242481	-.2714161	.4449379	-0.61
Diarrhea treatment	4.20091	4.381782	-.1808722	.4540533	-0.40
Family planning	4.177814	4.608215	-.430401	.5025226	-0.86
Basic hospitalization	14.06825	15.86664	-1.798389	1.297827	-1.39
Injection application	2.726719	2.771153	-.044434	.4702695	-0.09

Table 5. OLS: Log health expenditures by health care provider

	(1)	(2)	(3)	(4)	(5)
State provider (SSA)	0.454	0.451			
	(0.059)***	(0.063)***			
Treatment	-0.368	-0.368			
Oportunidades	(0.095)***	(0.094)***			
Int 1:			0.341	0.361	0.510
SSA*TreatOp			(0.183)*	(0.190)*	(0.198)**
Int 2:			0.778	0.777	0.927
SSA*ContOp			(0.190)***	(0.190)***	(0.196)***
Int 3:			-0.063	-0.048	-0.028
IMSS-Op*TreatOp			(0.187)	(0.203)	(0.203)
Triple Int 4: SSA*				-0.033	-0.038
TreatOp*1997				(0.076)	(0.076)
Triple Int 5: IMSS-Op*				-0.025	-0.003
TreatOp*1997				(0.123)	(0.125)
Early decentralization	0.136	0.009	0.010	0.012	-0.000
	(0.120)	(0.152)	(0.150)	(0.151)	(0.343)
Int 6: State provider*					-0.012
Early decentralization					(0.298)
Integrated model	-0.103	0.326	0.327	0.333	0.573
	(0.073)	(0.204)	(0.202)	(0.202)*	(0.235)**
Int 7: State provider*					-0.243
Integrated model					(0.122)**
SES (Oportunidades)	2.393	2.270	2.258	2.256	2.241
	(0.239)***	(0.222)***	(0.222)***	(0.222)***	(0.222)***
Age H head	-0.009	-0.008	-0.008	-0.008	-0.008
	(0.006)*	(0.006)	(0.006)	(0.006)	(0.006)
Age 2 H head	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Education H head	-0.006	-0.005	-0.004	-0.004	-0.004
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Literacy	0.121	0.163	0.164	0.164	0.166
	(0.096)	(0.094)*	(0.094)*	(0.094)*	(0.094)*
Indigenous	-0.302	-0.279	-0.277	-0.279	-0.287
	(0.071)***	(0.072)***	(0.072)***	(0.072)***	(0.073)***
Family size	0.024	0.026	0.026	0.026	0.025
	(0.012)**	(0.012)**	(0.012)**	(0.012)**	(0.012)**
Dependency ratio	0.057	0.046	0.045	0.045	0.046
	(0.031)*	(0.031)	(0.031)	(0.031)	(0.031)
Sick member	0.321	0.310	0.311	0.312	0.307
	(0.057)***	(0.055)***	(0.055)***	(0.055)***	(0.055)***
Frequency of care	0.085	0.080	0.000	0.080	0.080
	(0.014)***	(0.013)***	(0.013)***	(0.013)***	(0.013)***
Days sick	0.014	0.013	0.013	0.013	0.013
	(0.003)***	(0.002)***	(0.002)***	(0.002)***	(0.002)***
Days of inactivity	0.017	0.017	0.017	0.017	0.017
(due to sickness)	(0.005)***	(0.005)***	(0.005)***	(0.005)***	(0.005)***
Preventive care	-0.181	-0.183	-0.185	-0.184	-0.185
	(0.051)***	(0.048)***	(0.048)***	(0.048)***	(0.048)***
Has diabetes	0.128	0.129	0.129	0.129	0.127
	(0.069)*	(0.067)*	(0.066)*	(0.066)*	(0.067)*
Has hypertension	0.265	0.293	0.290	0.290	0.292
	(0.114)**	(0.113)***	(0.113)**	(0.113)**	(0.112)***
Private care	2.739	2.729	2.729	2.729	2.730
	(0.067)***	(0.069)***	(0.069)***	(0.069)***	(0.069)***
Constant	0.616	0.447	0.192	0.196	0.084
	(0.262)**	(0.287)	(0.318)	(0.319)	(0.324)
State fixed effects	**NO**	**YES**	**YES**	**YES**	**YES**
Infrastructure	**NO**	**YES**	**YES**	**YES**	**YES**
Observations	**8889**	**8889**	**8889**	**8889**	**8889**
R-squared	**0.28**	**0.30**	**0.30**	**0.30**	**0.30**

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6. Tobit: Log health expenditures by health care provider truncated at zero

	(1)	(2)	(3)	(4)	(5)
State provider (SSA)	0.947	0.959			
	(0.101)***	(0.105)***			
Treatment	-0.717	-0.697			
Oportunidades	(0.113)***	(0.119)***			
Int 1:			0.643	0.694	0.914
SSA*TreatOp			(0.265)**	(0.271)**	(0.298)***
Int 2:			1.428	1.425	1.646
SSA*ContOp			(0.275)***	(0.275)***	(0.303)***
Int 3:			-0.244	-0.246	-0.217
IMSS-Op*TreatOp			(0.273)	(0.300)	(0.301)
Triple Int 4: SSA*				-0.088	-0.095
TreatOp*1997				(0.102)	(0.102)
Triple Int 5: IMSS-Op*				0.001	0.029
TreatOp*1997				(0.196)	(0.197)
Early decentralization	0.273	0.008	0.011	0.016	-0.167
	(0.105)***	(0.194)	(0.194)	(0.194)	(0.638)
Int 6: State provider*					0.154
Early decentralization					(0.629)
Integrated model	-0.266	0.680	0.680	0.697	1.073
	(0.082)***	(0.207)***	(0.207)***	(0.208)***	(0.291)***
Int 7: State provider*					-0.383
Integrated model					(0.205)*
Socio demographics	**YES**	**YES**	**YES**	**YES**	**YES**
State fixed effects	**NO**	**YES**	**YES**	**YES**	**YES**
Infrastructure	**NO**	**YES**	**YES**	**YES**	**YES**
Observations	**8889**	**8889**	**8889**	**8889**	**8889**

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7. OLS: Alternative measures of health expenditures

	(1) Log Payment phy visit	(2) Log Payment phy visit	(3) Log Payment drugs	(4) Log Payment drugs
State provider (SSA)	0.308		0.364	
	(0.036)***		(0.058)***	
Treatment	-0.375		-0.184	
Oportunidades	(0.072)***		(0.092)**	
Int 1:		0.250		0.494
SSA*TreatOp		(0.109)**		(0.195)**
Int 2:		0.690		0.720
SSA*ContOp		(0.121)***		(0.186)***
Int 3:		-0.136		0.058
IMSS-Op*TreatOp		(0.102)		(0.199)
Triple Int 4: SSA*		-0.015		-0.022
TreatOp*1997		(0.050)		(0.072)
Triple Int 5: IMSS-Op*		-0.002		0.036
TreatOp*1997		(0.068)		(0.124)
Early decentralization	0.412	0.341	-0.090	-0.084
	(0.087)***	(0.244)	(0.099)	(0.304)
Int 6: State provider*		-0.055		-0.042
Early decentralization		(0.220)		(0.262)
Integrated model	-0.103	0.397	-0.019	0.368
	(0.045)**	(0.163)**	(0.068)	(0.210)*
Int 7: State provider*		-0.233		-0.172
Integrated model		(0.075)***		(0.121)
Socio demographics	**YES**	**YES**	**YES**	**YES**
State fixed effects	**NO**	**YES**	**NO**	**YES**
Infrastructure	**NO**	**YES**	**NO**	**YES**
Observations	**8889**	**8889**	**8889**	**8889**
R-squared	**0.41**	**0.42**	**0.18**	**0.20**

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8. Probit: Preventive care utilization by health care provider

	(1)	(2)	(3)	(4)	(5)
State provider (SSA)	-0.186	-0.155			
	(0.048)***	(0.047)***			
Treatment	0.537	0.579			
Oportunidades	(0.065)***	(0.066)***			
Int 1:			0.551	0.469	0.546
SSA*TreatOp			(0.127)***	(0.130)***	(0.135)***
Int 2:			0.007	0.011	0.087
SSA*ContOp			(0.123)	(0.123)	(0.130)
Int 3:			0.733	0.727	0.736
IMSS-Op*TreatOp			(0.129)***	(0.142)***	(0.143)***
Triple Int 4: SSA*				0.143	0.139
TreatOp*1997				(0.058)**	(0.058)**
Triple Int 5: IMSS-Op*				0.012	0.027
TreatOp*1997				(0.090)	(0.092)
Early decentralization	-0.055	0.270	0.270	0.261	-0.223
	(0.077)	(0.110)**	(0.110)**	(0.114)**	(0.244)
Int 6: State provider*					0.491
Early decentralization					(0.225)**
Integrated model	-0.087	-0.658	-0.656	-0.681	-0.536
	(0.051)*	(0.136)***	(0.136)***	(0.140)***	(0.172)***
Int 7: State provider*					-0.155
Integrated model					(0.094)
SES (Oportunidades)	0.271	0.073	0.066	0.073	0.064
	(0.164)*	(0.167)	(0.166)	(0.165)	(0.165)
Age H head	0.019	0.020	0.020	0.020	0.020
	(0.005)***	(0.005)***	(0.005)***	(0.005)***	(0.005)***
Age 2 H head	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Education H head	-0.007	-0.007	-0.006	-0.007	-0.007
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Literacy	0.089	0.090	0.090	0.087	0.087
	(0.070)	(0.069)	(0.069)	(0.069)	(0.069)
Indigenous	0.008	0.038	0.039	0.043	0.037
	(0.049)	(0.050)	(0.050)	(0.049)	(0.050)
Family size	-0.004	-0.006	-0.006	-0.005	-0.005
	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)
Dependency ratio	0.052	0.044	0.044	0.045	0.045
	(0.023)**	(0.024)*	(0.024)*	(0.024)*	(0.024)*
Sick member	0.094	0.071	0.072	0.071	0.068
	(0.036)***	(0.035)**	(0.035)**	(0.035)**	(0.035)*
Frequency of care	0.062	0.065	0.065	0.065	0.065
	(0.009)***	(0.008)***	(0.008)***	(0.008)***	(0.008)***
Days sick	0.000	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Days of inactivity	-0.000	0.001	0.001	0.001	0.001
(due to sickness)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Has diabetes	0.360	0.377	0.377	0.378	0.375
	(0.049)***	(0.048)***	(0.048)***	(0.049)***	(0.049)***
Has hypertension	0.564	0.552	0.550	0.547	0.548
	(0.093)***	(0.091)***	(0.091)***	(0.090)***	(0.090)***
Private care	-0.034	-0.038	-0.038	-0.039	-0.038
	(0.055)	(0.055)	(0.055)	(0.055)	(0.055)
Constant	-1.505	-1.472	-1.604	-1.640	-1.345
	(0.212)***	(0.247)***	(0.263)***	(0.262)***	(0.250)***
State effects	**NO**	**YES**	**YES**	**YES**	**YES**
Infrastructure	**NO**	**YES**	**YES**	**YES**	**YES**
Observations	**8889**	**8889**	**8889**	**8889**	**8889**

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 9. Probit: Alternative measures of health utilization

	(1) Diabetes test	(2) Hypertension test	(3) Measure the child	(4) Weighted the child	(5) Delivered supplement
Int 1:	0.024	0.094	0.326	0.335	0.488
SSA*TreatOp	(0.148)	(0.140)	(0.224)	(0.185)*	(0.147)***
Int 2:	0.011	0.127	-0.067	-0.271	0.344
SSA*ContOp	(0.148)	(0.145)	(0.237)	(0.288)	(0.155)**
Int 3: IMSS-Op*	0.134	0.286	0.182	-0.003	0.526
TreatOp	(0.144)	(0.121)**	(0.215)	(0.218)	(0.136)***
Early decentralization	0.052	-0.031	-0.252	4.379	0.348
	(0.251)	(0.342)	(0.380)	(0.372)***	(0.389)
Int 6: State provider*	-0.056	-0.016	0.534	-4.568	-0.218
Early decentralization	(0.252)	(0.337)	(0.374)	(0.000)	(0.397)
Integrated model	-0.236	-0.415	-0.432	-0.230	0.160
	(0.150)	(0.156)***	(0.265)	(0.437)	(0.186)
Int 7: State provider*	0.021	-0.040	-0.026	0.012	-0.071
Integrated model	(0.093)	(0.112)	(0.190)	(0.283)	(0.139)
Socio demographics	**YES**	**YES**	**YES**	**YES**	**YES**
State fixed effects	**YES**	**YES**	**YES**	**YES**	**YES**
Infrastructure	**YES**	**YES**	**YES**	**YES**	**YES**
Observations	**8889**	**8889**	**8889**	**8889**	**8889**

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 10. Probit: Likelihood of health utilization by health care provider

	(1) Service in SSA	(2) Service in IMSS-Op
SSA H. promotion	0.121	
	(0.045)***	
Freq H. promotion	0.005	
	(0.009)	
SSA clinic in loc	0.102	
	(0.208)	
No of SSA clinics loc	0.172	
	(0.102)*	
Days of operation SSA	-0.009	
	(0.027)	
Distance to SSA clinic	-0.001	
	(0.001)	
Time to SSA clinic	-0.001	
	(0.000)	
Cost to SSA clinic	-0.001	
	(0.001)**	
IMSS-OP H. promotion		0.397
		(0.090)***
Freq H. promotion		0.814
		(0.388)**
IMSS-OP clinic in loc		0.084
		(0.196)
No of IMSS-OP clinics loc		-0.068
		(0.036)*
Days of operation IMSS-Op		-0.002
		(0.002)
Distance to IMSS-Op clinic		-0.001
		(0.001)
Time to IMSS-Op clinic		0.000
		(0.001)
Cost to IMSS-Op clinic		-0.658
		(0.067)***
Observations	**8889**	**8889**

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%