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YALE UNIVERSITY

P.O. Box 208269
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DECENTRALIZATION IN ARGENTINA

Nadir Habibi, Yale University
Cindy Huang, Yale University
Diego Miranda, Harvard University
Victoria Murillo, Yale University
Gustav Ranis, Yale University
Mainak Sarkar, Yale University
Frances Stewart, Oxford University

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Gustav Ranis, Mainak Sarkar, Frances Stewart

Abstract

Human development, reflected in the status of people's levels of health and education, affects future growth and, in turn, is affected by decentralization. Unlike earlier exclusive emphasis on budgetary issues, this study focuses on the impact of fiscal decentralization on the level of human development. It traces the origin and recent development of revenue-sharing arrangements across Argentina's provinces over time (1970-94). The study regresses two indicators of health and educational status on two decentralization measures. It highlights the link between decentralization and human development outcomes and suggests that devolutionary decentralization has a positive influence on the effectiveness of public policy directed towards an improvement in the level of human development. Decentralization is shown to reduce intra-regional disparities and increase levels of human development. While the paper also recognizes problems associated with decentralization, including addressing inter-regional disparities, the positive impact of decentralization schemes on human development is seen to be of relevance in evaluating the Argentine co-participation regime which is currently under negotiation.

JEL Classification: O18

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DECENTRALIZATION IN ARGENTINA

Nadir Habibi, Cindy Huang, Diego Miranda, Victoria Murillo, Gustav Ranis, Mainak Sarkar and Frances Stewart [*]

I. Introduction

The search for sustainable development has triggered broad processes of institutional innovation aimed at increasing efficiency and equity, while dealing with fiscal crises and their macroeconomic consequences. These processes have contributed to the spread of political and fiscal decentralization in Latin America, as well as in much of the developing world.[1] As a result, a strong body of scholarly literature has emerged analyzing different aspects of decentralization.[2] Fiscal decentralization is at the core of this literature, as scholars attempt to analyze the politics and economics underlying the transfer of resources and their collection, as well as the allocation of authority to lower levels of goverment. Most studies of fiscal decentralization in Latin America have focused on its budgetary effects because of the implications of budget deficits for macroeconomic stability. Scholarly attention has consequently focused on the 'softening' effect fiscal decentralization may have on the budget contraints of sub-national administrations, and the resulting macro-economic fiscal instability this could generate.

While we recognize the merits of this literature, we focus on a dimension that has received much less attention. Most studies of fiscal decentralization have overlooked its effects on the level of human development, or have given it only secondary consideration.[3] This dimension is not only crucial for its own sake, because it measures "bottom line" welfare, but

also because it, in turn, affects future growth and equity.[4] This article attempts to address this neglect of human development, focusing on the effect of evolving patterns of fiscal decentralization in Argentina on the evolution of a series of health and education performance indicators in Argentine provinces during the period 1970-1994. In this way the study aims to provide an empirical evaluation of the impact of fiscal decentralization on human development, highlighting the links between such decentralization and social outcomes over time. It contributes to the Argentine debate concerning fiscal decentralization by drawing on previously unavailable data.

This study thus hopes to make two contributions to the decentralization literature. Firstly, we hope our analysis illuminates the relatively neglected empirical relationship between fiscal decentralization and human development. We do so by documenting the positive impact of *devolutionary* decentralization (in the form of local taxation and a stable revenue sharing system) on health and education indicators. Secondly, our study informs the current debate on the effect of Argentina's federal institutions by using previously unavailable data. These data are disaggregated to the provincial level over a period of twenty-five years, allowing – for the first time – an evaluation of the dynamic characteristics of fiscal decentralization across all Argentine provinces.[5] While previous studies on Argentina rely on scattered empirical evidence or suffer from sample selection bias, our panel data set (with time-series and cross-sectional observations) corrects for these deficiencies.[6] Moreover, this study identifies the evolution of fiscal decentralization in Argentina over time, rather than the static patterns the previous literature was forced to highlight due to data limitations.

In the context of democratization and structural reforms, federalism and the extent of fiscal decentralization and its budgetary and overall policy impact have become central issues on Argentina's recent political agenda. By examining the impact of different levels of fiscal decentralization on the enhancement of human development, we hope to contribute to this debate, shifting its focus away from purely budgetary issues.

The paper is organized into four sections. In section II, we present a brief overview of the theoretical considerations underlying our study. Section III, advances reasons that make Argentina an interesting case for testing these ideas, along with providing a political economy analysis of the origins and recent development of the Argentine decentralization regime. Section IV presents the empirical test of our central hypothesis, namely that devolutionary decentralization has a positive impact on human development; Section V summarizes our findings and provides some conclusions.

II. Theoretical Considerations

Decentralization has been defined in a variety of ways, according to the degree of delegation and autonomy of local actors, and who these local actors are.[7] For the purpose of this study, we follow a three-stage definition based on the degree of discretion and responsibility given to local authorities:[8]

Deconcentration: refers to the dispersion of activities previously carried out by the central government to local bodies, while the center retains control over decision-making so that local officials remain accountable to the central administration. As a result, local authorities are

able to make very few decisions without referring to the center. This type of decentralization is often found in unitary systems of government.

Delegation: refers to the transfer of decision-making authority from the central administration to local authorities for pre-defined activities. It usually involves the distribution of fiscal resources to the local level accompanied by specific instructions about their allocation. Since the central administration retains the power of reallocating resources, this form of decentralization has some of the characteristics of a principal-agent relationship, with the central government as the principal and the local governments as the agents. Federal governments in recently independent countries are most likely to choose this type of decentralization.

Devolution: refers to the transfer of significant fiscal and allocative decisions to local authorities who gain full responsibility for them, with no interference from the central administration. This may be accomplished by granting substantial tax powers to local governments—a rare occurrence in the developing world—or by creating relatively unconditional revenue sharing in the form of block grants to local bodies, as in Argentina. The issue that is most discussed in the decentralization literature, i.e., the determination of who sets and collects which taxes, is thus captured by the concept of devolution. But by considering automatic, conditionality-free transfers as well, devolution also encompasses "softer" forms of decentralization such as the Argentine revenue sharing regime.[9] This type of decentralization is qualitatively different from the previous two because local authorities gain complete control over resource allocation and are generally accountable to local constituencies, which should increase decision-making responsiveness to local needs.

In this paper we concentrate our analysis on the comparative characteristics of devolution and delegation in the Argentine context, assessing the effect of different fiscal "mixes" of revenue sharing on the generation of health and education outcomes. Therefore, our exogenous variables are all on the revenue side. We are interested in testing the proposition that devolutionary decentralization produces an increase in the accountability and responsibility of policymaking and a consequent positive influence on the "efficiency" of public policy in the generation of human development. We expect this effect of devolution to be especially strong in health and education because of their direct impact on the overall level of human development of the population.

There are many *ex ante* reasons for expecting devolution to have positive effects on policy making. More so than other forms of decentralization, devolution enhances the ability of public administrators to take into account local preferences and information, minimizing costs, and increasing efficiency (by internalizing and reducing transactions costs).[10] It may also improve equity within the region as a result of the enhanced visibility and accountability to the local population. Expenditure decisions at the local level are likely to be tied more closely to real resource costs and, if local governments have significant fiscal powers, we can expect total revenues to be enhanced according to the benefit principle of taxation.[11] Furthermore, when there are many local authorities providing similar services, we might expect a higher level of experimentation and innovation in the provision of local public goods, potentially leading to improvements in overall productivity, employment and economic growth.

Decentralization, even in its devolutionary form, is not a panacea, however. Although some forms of decentralization may improve equity *within* regions, they may worsen it *across*

regions. Cross-regional equity can only be addressed by a central government with redistributive powers. Indeed, decentralization without some type of central government redistributive formula would be likely to exacerbate existing regional inequalities, a point nineteenth century Argentina makes painfully clear (Sawers 1996). From an efficiency point of view, moreover, decentralization risks limiting gains obtained from economies of scale in technology and information, while the lack of local expertise could offset some of the potential efficiency gains; excessive trial-and-error experimentation and duplication might, of course, also result. Equally important, while there may be greater transparency at the local level, we cannot be certain that corruption is not likely to also be greater, given the frequently substantial power of local elites.[12]

The importance of these problems may change over time. One expects, for example, that, as a result of trial and error experimentation, democratic accountability would improve efficiency while limiting corruption at the local level. The full impact of devolution on human development is not likely to occur instantaneously. A single period cross-sectional analysis therefore cannot capture the true impact of decentralization on human development, since it fails to endogenize much of the impact that happens only over time.[13] Therefore, by examining the impact of different levels of "devolutionary" decentralization on health and education indicators in Argentina, over the period 1970-1994 we hope to get better estimates of the underlying economic model. Although the model we estimate is a static one, the fact that we have observations over twenty five years allows us to arrive at a better estimate of the true impact of devolution in Argentina.

III. The Argentine Decentralization Debate

Argentina represents a good case for evaluating the effects of fiscal decentralization on human development. It encompasses nearly three million square kilometers of territory and has a population of over thirty-two million fairly homogeneous and largely urban people.[14] As a federal state, it is composed of 23 provinces and an autonomous federal district. Argentine provinces are entitled to central government revenue derived from a revenue-sharing regime and are also the main locus of spending decisions, making them the appropriate units of analysis when evaluating the impact of fiscal decentralization.[15] Approximately 50 percent of Argentina's public spending is at the sub-national level, making it the most decentralized country in Latin America today in terms of public spending (IADB 1997).

Argentina also qualifies as an upper middle-income country, with its per capita GDP of 8,937 PPP$ in 1994 (UNDP 1997:146). Moreover, the UNDP Human Development Reports consistently classify it as one of the top 40 countries in terms of human development.[16] In fact, Argentina's consolidated social spending as a percentage of GDP has reached levels comparable to those of Western Europe (Flood 1994). Consequently, most current discussion focuses on enhancing efficiency rather than enlarging the size of existing social programs, and in this context, the degree and type of decentralization have become central issues.

Argentina's provinces differ substantially in their economic performance. Argentina's major industrial and urban areas are highly concentrated in the center of the country, mainly in the provinces of Buenos Aires, Cordoba and Santa Fe, which have long enjoyed relatively high

levels of socio-economic development.[17] In contrast, peripheral provinces, such as La Rioja, Catamarca or Jujuy, in the Northwestern region, have remained at levels of development only marginally different from those of the poorest countries of Latin America (Sawers 1996). As a result, the provinces also differ in their capacity to finance provincial spending with local revenues and federal co-participation funds, and the federal government has often resorted to additional transfers to cover residual fiscal gaps. Moreover, policy outcomes, as captured by available human development indicators, are highly differentiated from province to province, as well as *within* provinces. These differences make Argentina a good place to explore how decentralization affects human development.

The origin of differences between regions in levels of socio-economic development resides in the history of this federal country. Two factors had a particularly strong influence. First, there is a legacy of forty years of internal struggles among *de facto* autonomous provinces which followed independence from Spain in 1816, until the acceptance of a national constitution by all provinces in 1860. Second, there were significant differences in resource endowments as well as differential access to the port of Buenos Aires (and thus international markets) between provinces in the center and the periphery. Many analysts (see in particular Rofman and Romero 1997), looking mainly at economic data, argue that these regional differences have, in fact, increased over time, almost irrespective of the political regime at the center. However, our data on the evolution of social indicators show a tendency toward convergence rather than the usually proclaimed "growing regional disparity".[18] Thus, while we do not deny the existence of inter-provincial disparities, convergence casts doubt on the assumption that Argentine federalism is only a "constitutional fiction."

There have, moreover, been significant variations in the decentralization strategy pursued over time and across regimes, which is especially important for our purposes. If the arguments we present are correct, as different schemes of decentralization have moved back and forth from a more "delegative" to a more "devolutionary" emphasis, human development indicators should also have moved with them, a point our data set will allow us to test.

The Evolution of Argentine Revenue-Sharing Regimes

Revenue-sharing in Argentina began in the 1930s. The 1853 constitution granted the collection of all direct taxes to provincial governments and provided for the federal government to subsidize provinces in financial need via National Treasury Contributions (ATNs).[19] An incipient revenue-sharing regime emerged during the Great Depression when Congress centralized tax collection. Although this regime retained the provincial right to revenue, it lacked cohesion and a redistributive component (Macon 1963).[20] Provinces did not perceive revenue-sharing arrangements as a transfer of resources from the center, but as a return of these funds to the entities that were entitled to them but unable to levy them effectively.

Despite the centralization of tax collection, for the most part the provinces did not lose resources in absolute terms, although their relative share became smaller in the 1930s and 1940s, as shown in Graph 1. By the 1950s the provincial share of revenue was growing in both absolute and relative terms. However, in 1967, a military government decreed a reduction in the provincial share, thus opening the door to the widespread use of discretionary transfers, in particular ATNs, by subsequent authoritarian governments (Cetrangolo and Jimenez 1995:17).[21]

A 1973 reform introduced criteria for the revenue sharing regime for the first time. [22] However, discretionary transfers continued to play an important role, in particular during the subsequent military rule. In addition, although military rulers had transferred the provision of primary education to the provinces without granting them tax powers, they reduced provincial co-participation funds by funneling them to the national social security system in 1980 (Graph 2).[23]

With the return of democracy in 1984, provincial governments asked not just for a return to the revenue-sharing formula existing before its *de facto* reform in 1980, but also demanded compensation for the transfer of responsibility to them for social services. Since the governing party did not control the Senate and could not reach an agreement on revenue sharing, during the 1984-87 period the provincial shares of centrally collected taxes were channeled as ATNs (Schwartz and Liuksila 1997). Part of this distribution was regularized by the "Transitory Agreement for the Distribution of Federal Resources to the Provinces" in March 1986, thus making the provincial share more predictable, via a combination of the 1980 distribution with compensation for the decentralization of social services (SAREP, 1996). Yet, provincial administrations continued to receive federal "compensations," negotiated on a case-by-case basis, given a disorganized federal government (Carciofi 1990).

Amidst severe fiscal imbalances, a new revenue-sharing agreement between the federal and provincial administrations was finally reached in 1988, basically validating the 'transitory' share obtained by each province in the 1985-87 period by fixing a coefficient that has remained unexplained, legally or analytically (Porto 1990, Saiegh and Tommassi 1998).[24] As such, the new legislation represented a "victory" for the provinces, which is explained by the fact that the

opposition party controlled both Congress and the majority of provincial governors (Sanguinetti 1994, Eaton 1998). Yet, this 'resolution' of the chaotic situation of the 1984-1987 period came too late to solve the mounting fiscal crisis that characterized the end of the Alfonsín administration and contributed to hyperinflation by further weakening an already weak federal administration's grip on most basic macroeconomic variables.

The second democratic administration, elected in 1989, by contrast, enjoyed a unified government and controlled most provincial administrations. As a result, between 1992 and 1994 the federal government managed to reduce the overall provincial share of co-participation payments, by fifteen percent —with the *agreement* of all provinces except Córdoba, which decided, appealing to its constitutional right, to retain the existing terms. The fifteen percent reduction was used to finance the social security deficit (Porto 1997).[25] Nevertheless, as shown in Graph 3, there was an actual increase in the share of resources controlled by provincial governments, both from co-participation and local tax sources.[26] This odd outcome owes much to an economic boom that benefited both the provinces and the federal tax collection agency, as well as to a notable improvement in federal and provincial access to credit markets (Eaton 1998, Dillinger and Webb 1999). Discretionary compensations from the executive, the transfer to provincial control of important earmarked funds, as well as a guaranteed minimum revenue for each province, facilitated the acceptance by provincial governors of the fifteen percent reduction (Eaton 1998:8-9). In particular, the guaranteed revenue increased fiscal predictability and facilitated provincial borrowing. In sum, for all its problems, the decentralization of services, accompanied by a reduction of the provincial co-participation share, was made up by the absolute growth of fiscal revenues collected by national and provincial governments.[27]

What these data tell us is that the Argentine decentralization regime today is *more devolutionary in nature* than it has ever been since at least 1935. Against claims suggesting that Argentine federalism has grown more centralized, democratic administrations, in general, and those of the 1983-1994 period, in particular, actually increased the provincial share of resources, while also increasing the accountability of elected rather than appointed officials. Admittedly, co-participation still presents some problems, the "common pool" effect it generates being just one of them (Sanguinetti 1994; Jones, Sanguinetti, and Tommasi 1997). We also admit that in many cases provincial taxation uses inefficient mechanisms that may in part deter private investment (FIEL 1998). Furthermore, we agree with most political analysts that, while reduced in size, the federal government still commands too many discretionary resources, further compounding the lack of clarity surrounding the current decentralization regime (Faletti and Lozano 1996). Argentina's decentralization regime still implies some short-term macro-economic inefficiency associated with a soft budget constraint (Saiegh and Tommasi 1998), plus political inefficiencies impeding needed structural transformations (Calvo and Gibson 1997).

One additional argument that has been advanced against the type of decentralization adopted in Argentina is the "fiscal illusion" hypothesis. It is argued that the combination of the decentralization of expenditures to the provincial level and the centralization of tax collection at the federal level implicit in the revenue-sharing system means that local governments have an unclear perception of hard budget constraints, which leads them to overspending and inefficiency.[28] While economies of scale and access to new fiscal technologies favor the centralized collection of revenue, this process nevertheless provides the "wrong" spending incentives for local administrators. Analyzing the 1985-1995 period, for instance, Saiegh and

Tommassi (1998:14) show that an average of only 35 percent of provincial expenditures was financed by local taxes, and that ten provinces in fact financed less than 15 percent of what they spent. This local free-riding by individual provinces undoubtedly helps to explain national fiscal disasters such as the ones experienced in 1974-1976 (Schenone 1989) and 1987-1989 (Sanguinetti 1994).

We recognize the problems created by this 'fiscal illusion.' However, we consider that it is necessary to differentiate revenue sharing—to which provinces are entitled by law—and the more discretionary ATNs and other conditional transfers—that are controlled by the National Executive. ATNs are transfers from the central government to the provinces to cover provincial fiscal emergencies and often come with fairly stringent policy or political strings attached. Conditional transfers are earmarked resources coming from the national administration and are centrally defined and controlled (Isuani 1989). Provincial governments have no control over these resources and cannot count on them in their budgetary and administrative planning. Especially problematic is the fact that ATNs are often used to bail out troubled administrations, although provincial administrators do not know their actual magnitude and even their policy strings *ex ante*. ATNs, thus, are the main culprits in creating the oft-denounced "fiscal illusion" that leads provincial administrations to over-spend and borrow or get bailed out (Saiegh and Tommassi 1998).[29]

Co-participation or revenue sharing funds are quite different and should not be lumped together, as they generally are, with ATN's or other conditional transfers.[30] The revenue-sharing proceeds generated by the Argentine co-participation system are unconditional block grants pre-defined according to a formula, and automatically distributed via a purely administrative

process that precedes even the formulation of the national budget (Porto 1990). Like royalties paid by national enterprises for provincial resources utilized in their activities (themselves extra-budgetary), co-participation funds are thus predictable sources of revenue derived from legal arrangements that cannot be modified without provincial agreement, although most revenue collection is centralized in the national administration. Therefore, in a constitution consistent setting, these funds are independent of central government discretion, as their allocation is decided strictly by the provincial legislature. Provincial administrators can count on these resources for their budgetary planning, and, although there may be some marginal uncertainty about their actual size, their rough magnitude *can* be predicted. Unless they are totally unaware of how much the central government collects in co-participated taxes, or how many natural resources it extracts from their territory, local administrators do not suffer from "fiscal illusion" when they incorporate in their budget planning expected revenues that belong to them by federal right.

Following this logic, we argue that co-participation and royalty funds resemble more our definition of "devolution" rather than that of "delegation," although admittedly less so than local resources based on local taxation. However, this differentiation between "devolution" and "delegation" becomes blurred when the constitutional letter of the law is not followed. Such occurrence, while not absent in recent history, is exogenous to the existing *de jure* decentralization scheme, and should not be confused with it. In fact, the appearance of such authoritarian practices not only helped shift the Argentine co-participation regime back from a devolutionary to a more delegative regime, but also, by preventing competitive politics at the national *and* local levels, helped derail the accountability mechanisms that make decentralization

an efficiency enhancing policy device. As we show below, it also negatively affected the progress of human development.

IV. Empirical Analysis

In this section, we investigate empirically the evolution of provincial health and education indicators and their association with changes in the level and type of decentralization regimes. We use a panel data set consisting of socio-economic and fiscal indicators for the 23 provinces of Argentina over a 25-year period (1970-94) and employ a fixed effects model. The sources of data used for this project are discussed in Appendix A. As in any study of this nature, measurement biases and the unavailability of certain crucial data potentially bias the results, and our conclusions should therefore be taken with caution.

Building on our previous analysis, we hypothesized that shifts to more devolutionary configurations would be accompanied by improvements in human development indicators as local authorities responded more to the needs and demands of the local population. To investigate this we selected two indicators of devolution, to use as our independent variables - the ratio of revenue derived from co-participation, royalties and provincial taxes to total resources (LOCALRAT) and the ratio of locally generated resources to locally *controlled* resources (OWNLOCAL). These indicators reflect the circumstances of Argentinean decentralization. Detailed justification for the choice of these indicators, which differ slightly from those used in previous exercises (e.g., FIEL 1993, Porto and Sanguinetti 1993, and Ranis and Stewart 1994)[31], is put forward in the next section of the paper. As for the dependent variables, we are constrained by data limitations to the consideration of just two human development

indicators. For education, we use the ratio of students enrolled in secondary school per one thousand primary students (EDUC). Although raw enrollment data in primary and secondary schools present problems, especially because they show repeating a grade as an increase in enrollment, we expect EDUC to be a rough indicator of educational output. Other things being equal, higher EDUC will show an educational system more capable of retaining students and therefore more likely to provide higher levels of human development.[32] During our sample period, primary education was free and compulsory, with enrollments very close to one hundred percent and so that variations in the ratio of secondary to primary enrolments gives a good indication of variations in educational output, particularly in the context of rising population[33]. This reduces the bias from demographic factors for our estimates. For the other dependent variable, we use the infant mortality rate (IMR), defined as the number of deaths of children under one year for every one thousand births, as an indicator of health conditions.

IV-a) Measures of Decentralization and Other Exogenous Variables

True devolution implies expenditure side decentralization accompanied by revenue side decentralization, i.e. the federal government passes on new responsibilities to the provinces, along with the fiscal means to achieve these ends. For example, the federal government may transfer the responsibility for primary education to the provinces, and also allow it to collect and keep certain taxes which were previously collected and expended by the federal government. Alternatively, there may be limited devolution, with expenditure decentralization but no revenue

decentralization. In this case, the federal government transfers the responsibility for primary education without any new tax revenue going to the provinces - neither is the fiscal jurisdiction (tax base) of the provinces increased, which would allow them to impose new taxes, nor are they given a larger share of co-participated taxes (shared revenue from certain taxes collected by the federal government). Instead, the federal government uses transfers which are highly unpredictable to fill the budget deficit of the provinces.

There is some evidence to suggest that the use of such transfers is what happened in Argentina most of the time under scrutiny. With the provinces not allowed to raise their own resources to meet the new goals, the efficiency gains from devolution are clearly reduced. Since the provinces seek to meet their additional expenditure responsibilities but do not have the funds to do so, increased expenditures on health and education must be accompanied by borrowing or ATN transfer or spending cuts elsewhere, for example in public housing and infrastructure. Increasing revenue decentralization in such a situation would allow the provinces to raise additional resources, undertake additional human development oriented activities, and internalize the gains from decentralization. Partial devolution, i.e. expenditure decentralization, may generate additional gains from further revenue decentralization.

The most widely used and intuitively appealing measure of decentralization is the ratio of provincial expenditures to federal expenditures, in a given province at a particular time. It would, of course, be preferable to have the breakdown of such expenditures by sector, across provinces and time. Unfortunately, we do not have data on the federal government's expenditure disaggregated by sector and province.[34] This makes it impossible for us to measure

expenditure decentralization. However, we may still observe the gains from revenue decentralization.

We therefore construct our measures of decentralization from the revenue side. The provinces have no say in the allocation of transfers. Therefore, they only have some control over the three categories of revenue mentioned above which we have pooled as controlled resources. Since there are explicit revenue sharing agreements for co-participated taxes periodically agreed upon, the provinces have some idea how much money to expect on this account. Similarly, royalties are to a certain extent in the provinces' own control; they observe and monitor the extraction of natural resources in their territory and can therefore easily estimate how much revenue in the form of royalties they should, at least *de jure*, receive. And as with co-participation funds, provincial administrators are free to determine how to spend these royalties. However, the greatest degree of control and accountability is over provincial taxes since they raise them directly. Therefore, we will measure decentralization primarily in terms of two ratios:

1. Controlled resources / Total resources
2. Provincial taxes / Controlled resources

We call these variables LOCALRAT and OWNLOCAL, respectively. The higher these ratios are, the higher the degree of fiscal autonomy for the provinces and therefore the higher is the level of fiscal decentralization and, according to our hypothesis, the higher should be the level of human development

There are other variables, besides the extent of decentralisation, that are likely to affect levels of human development and therefore need to be included in the empirical investigation. These include the level of per capita income in the province; the total level of expenditure by the provinces, whether locally controlled or raised or not, and the total num,ber of public employees, which provides a measure of total public expenditure. All these would be expected to be positively related to levels of human development.

The set of exogenous variables we will therefore use is as follows:

1. PGBCAP - Provincial per capita GDP
2. EXPCAP - Total per capita expenditure of the province
3. PUBEPOP - Number of public employees per every thousand of population
4. OWNLOCAL - Provincial taxes over controlled resources
5. LOCALRAT - Controlled resources over total resources
6. ROYRAT - Royalties over controlled resources
7. CONDRAT - Conditional transfers over uncontrolled resources (i.e. ATN and Conditional transfers)

Thus, by definition:

Controlled Resources + Non-controlled Resources = Total Resources -------- (1)

Provincial Taxes + Co-participated Taxes + Royalties = Controlled Resources ---------(2) and

Conditional Transfers + Discretionary Transfers (ATN) = Uncontrolled Resources --(3)

Dividing equation (1) by Total Resources, equation (2) by Controlled Resources, and equation (3) by Uncontrolled Resources yields:

LOCALRAT + (Non-Controlled Resources / Total Resources) = 1 ----------(4)

OWNLOCAL + (Co-participated Taxes / Controlled Resources) + ROYRAT = 1 ----- (5)

CONDRAT + (ATN / Uncontrolled Resources) = 1 ---------- (6)

For reasons of multicollinearity, we do not use the three ratios in parentheses above; they are, moreover, unnecessary, since the identities above imply that the variables 4-7 are sufficient to summarize any changes in the revenue side fiscal structure.[35] We may use an example to clarify this point. If property tax were initially collected and kept by the provinces but is now transferred to the federal government, which collects and keeps it and does not share the receipts with the provinces, the resulting shortfall in the provincial budget is partly met by discretionary federal transfers (ATNs) and partly by some expenditure cutbacks by the provinces. This is an instance of centralization and our measures of decentralization capture it. The share of controlled resources out of total resources falls and the share of non-controlled resources (transfers) increases. This implies that the variable LOCALRAT falls. Similarly the share of own taxes out of controlled resources falls, and this is captured by a fall in OWNLOCAL.

Argentina has gone through some tumultuous times during the sample period (1970-1994), with periods of hyperinflation and negative income growth, for example, during the debt crisis of the 1980s. In such situations it is extremely difficult to construct price deflators. Our

measures avoid this issue, since we use ratios of revenue variables; the deflator enters as a multiplicative term in both the numerator and the denominator and therefore cancels out. Also, it is widely believed that in developing countries, expenditure figures are generally extremely unreliable for a variety of reasons, such as corruption etc. Revenue variables are more reliable; by using revenue variables for our regressors, we can reduce, if not eliminate, this bias.

IV-b) Econometric Specification

Model: The model that we estimate is a simple linear model as follows:

$$y_{it} = a + x_{it} b + u_{it}\ ; \qquad \text{for i = 1,2,……,N and t = 1,2, …..,T ----------(7)}$$

Where, a is a scalar and b is a K X 1 vector of coefficients to be estimated. Provinces are indexed by *i* and time periods by *t*; we have data on all twenty-three provinces of Argentina over the period 1970-1994, a period of twenty-five years. Therefore, for our sample N=23 and T=25. Note that we assume that the coefficients are fixed and constant, here y_{it} is IMR or EDUC for province *i* in period *t*. Similarly, x_{it} is a vector of exogenous variables for province *i* in period *t*. Specifically:

$$x_{it} = \{PGBCAP_{it}, PUBEPOP_{it}, EXPCAP_{it}, OWNLOCAL_{it}, LOCALRAT_{it}, ROYRAT_{it}, CONDRAT_{it}, AUTOC_{it}\}$$

(For definitions, see above). AUTOC is a dummy for time periods when Argentina had an autocratic government. For this model the ordinary least squares estimates will be consistent and efficient if $E(x_{it}'u_{it}) = 0$. To take into consideration the possibility of heteroskedasticity and autocorrelation, we also report the Generalized Least Squares estimates with a heteroskedastic

error structure correlated across panels. Also autocorrelation is allowed for, with panel specific AR(1) coefficients estimated in the GLS estimates. However, given the diversity among provinces in every sense of the word (as discussed in the next section), a more realistic setup is one with fixed effects. Specifically, we postulate that;

$$u_{it} = m_i + n_{it} \text{ ------(8);} \qquad \text{for i = 1,…..,N and t = 1,2,….,T}$$

Where m_i is the province specific unobserved fixed effect. Some provinces are naturally more efficient, and have better access to administrative and technical knowledge etc. [36]

We first estimate equation (7) above, using OLS with robust standard errors, GLS with heteroskedastic and autocorrelated errors and, also the fixed-effects estimator. Note that the variation in decentralization and human development across provinces and over time is what identifies the model.

IV-c) Preliminary Data Analysis

Appendix B reports additional information concerning the data. Tables B1 and B2 allow us to compare the decentralization trends and patterns of human development across low, medium, and high income provinces. [37] Several important conclusions with respect to regional disparities and time trends can be drawn from these tables. We observe that both the share of local resources in total government expenditures (LOCALRAT), and the percent of total resources that is raised locally (OWNLOCAL), are larger in high income provinces. However,

this gap diminishes over time. During the (1970-94) period, the gaps for LOCALRAT and OWNLOCAL have declined by 36 percent and 43 percent, respectively.

The per capita education and health expenditures, on the other hand, seem to be negatively correlated with provincial per capita income. Since households in high income provinces rely more on the private sector for education and health services, the per capita fiscal expenditure on education and health in high income provinces appear to be less than in low income ones. The lower income provinces receive larger amounts of per capita federal assistance, intended to reduce regional disparities in human development. The inter-provincial disparities in educational achievement and IMR have also declined significantly, as shown in Table B1.

Figures B2-B5 in appendix B plot the distribution of these variables across provinces for all years in the sample. This helps us determine, among other things, if there is convergence over time across provinces. We also plot a cubic spline[38] of the mean value of the variable across provinces, for each year in the sample. This helps us examine if there is a time trend across provinces.

Several facts need to be mentioned here: first, the infant mortality rate falls dramatically over the years, from an average of 72 infant deaths for every thousand population in 1970 to 22.5 in 1994, which implies a 70% decline in the course of twenty-five years. Also striking is the convergence across provinces in IMR, as can be seen from the fact that the standard deviation declines from 22 in 1970 to 5 in 1994. Health services were improving in Argentina and improving faster for the less developed provinces, allowing them to catch up. Figure B4 in appendix B illustrates this phenomenon.

Second, we find that secondary enrollment per thousand primary students, EDUC, steadily increases over the sample period. Overall, it increases by more than one hundred percent in twenty-five years. However, there is no convergence across provinces, as can be seen from the standard deviations (table B1) or from figure B5. Figure B5 illustrates the upward trend in EDUC over the years and, the consistent dispersion in EDUC across provinces, over the years. The latter shows up, as the width of the band around the mean value which does not shrink over time.

Third, from table B1 and figures B2 and B3 for our decentralization variables, we find that OWNLOCAL, our measure of the share of provincial taxes in the provincial budget, was steady throughout the early and mid-seventies, increased from 1978 until 1984, declined and then started increasing again in the early nineties. Also, we note the wide variation in OWNLOCAL across provinces and see no sign of convergence over the sample period. We find that LOCALRAT has taken a cyclical path over time, i.e. it declined between 1970 and 1975, increased until 1980, and declined again until 1984. From 1985 until 1988 it rose again and then emerged mostly steady until 1994. Also, the peaks got higher over time, implying a positive time trend. Throughout the early nineties we find that the role of transfers declined to less than 20% of the provincial budget, i.e. LOCALRAT had increased to 80% or more, and also that there is less variation across provinces. This roughly corresponds to different revenue sharing schemes undertaken by the federal government over the years. Based on this, we claim that there is considerable variation across provinces and over time in the exogenous decentralization variables to identify our model.

Finally, figures B6 through B9 in appendix B plot our dependent variables, IMR and EDUC, against our primary exogenous variables measuring decentralization, i.e. OWNLOCAL and LOCALRAT. Figures are scatter plots, with cubic splines fitted to the entire data. We find that there is weak evidence that IMR declines with OWNLOCAL (figure B6), and LOCALRAT (figure B7); the relationship seems approximately linear. For our second human development indicator, EDUC, we find a clear positive relationship with OWNLOCAL (figure B8). The decline in EDUC at high levels of OWNLOCAL may or may not imply diminishing returns, since a few outliers in the data largely cause this. There is a similar positive relationship with LOCALRAT (figure B9), indicating a decline in EDUC when LOCALRAT increases, at low levels of LOCALRAT.

It should be noted that the non-parametric plots discussed above implicitly assume a static model. For example, a negative relationship between IMR and OWNLOCAL can arise if the former declines and the latter increases over time. We will take this into consideration in the next section.

IV-d) Econometric Results

Model I: Table 1 reports the results for our first human development indicator, infant mortality rate, IMR. We find that OWNLOCAL is always significant and negative, i.e. allowing provinces to raise more of their own resources helps to reduce infant mortality. Similarly, for our other decentralization variable, LOCALRAT we find it is always negative and significant. Together, these estimates imply that decentralization is associated with better health services.

Moreover, infant mortality rates are shown to be higher during periods of autocracy, i.e. military governments, with the coefficient on AUTOC always significant and positive. Bigger government is better, in the sense that infant mortality is lower, as can be seen by the negative and significant coefficient on the number of public employees for every thousand population. Does that mean a larger public sector corresponds to more doctors, nurses etc.? We cannot provide a satisfactory explanation for the large coefficients on the number of public employees. We also find that the coefficient for per capita income is negative when significant, i.e. richer provinces have lower IMR on average. Surprisingly, however the coefficient for total provincial expenditure related to IMR are never significant. It should be noted that the OLS regression results are highly significant, with the exogenous variables explaining fifty-five percent of the variation in IMR.

Table 2 summarizes the results for EDUC, our second human development indicator. OWNLOCAL is always positive, and significant. Similarly, our second variable for decentralization LOCALRAT is always positive and significant. We can therefore conclude that decentralization is good for education as well. Allowing provinces to raise more of their own resources is conducive to improving the educational output, as measured by our indicator EDUC.

Again EDUC is lower under autocracy and increases with the number of public employees, perhaps because teachers are counted as public employees. EDUC is higher for provinces with higher per capita income on average; the coefficients are positive and significant at the 10% level, except for the fixed effects estimates. Total expenditures improve educational output, the coefficients are always positive, but significant only for the GLS estimates. The

regressions are highly significant (F-values), with the exogenous variables in the OLS estimates accounting for sixty five percent of the variation in EDUC.

In the models estimated above, we assumed implicitly that only the current values of the exogenous variables affected human development in that period. In reality, one could expect the provision of public goods to have a lagged impact on human development. Therefore, the impact of decentralization on human development is likely to be spread out over several years. We therefore experimented with several alternative specifications to take this explicitly into account. We found that lags of more than one period were seldom significant, and that the results were not significantly different from those reported above.

V. Summary and Conclusions

In this article we have made two contributions to the study of decentralization. First, we examined the origins and evolution of revenue-sharing arrangements in Argentina, involving the devolution of resources to provinces that were constitutionally entitled to them, but had relinquished their collection. Our study found that, while the provincial share of funds was curtailed by military rulers who also made increasing use of discretionary resources (ATN), with the return to democratic rule this trend was reversed and the share of provincial governments reached an all-time high in 1991. Moreover, the effect of democratic accountability for progress in human development was shown by the significantly negative effect of the dummy for autocracy with respect to both measures. Overall, during this entire period (1970-94) several long term trends, including fiscal decentralization and ultimate democratization which

empowered provincial administrations in a federal system, have led to a significant reduction in regional disparities and a sizeable increase in the levels of human development across all regions.

Second, we provided an empirical evaluation of the impact of decentralization on the generation of human development using previously unavailable data for the Argentine case. Our empirical analysis relied on a large panel data set to evaluate the possible relationships between decentralization and human development at the provincial level. Comparing decentralization patterns across low and high income provinces, we observed that both the ratio of locally controlled resources to total resources and the percent of controlled resources that is raised locally are larger in high income provinces. The gap, however, has diminished over time as locally controlled resources have grown faster in the less developed provinces. We also observed that the disparity in educational output and in the infant mortality rate between low and high income provinces has declined significantly over the 1970-94 period. This is partly due to the faster rise of per capita health and education expenditures in the low income provinces.

In order to gain additional insight into the interactions between decentralization and human development, we regressed two indicators of human development (infant mortality rate and the retention from primary to secondary education) on two decentralization indicators (OWNLOCAL and LOCALRAT) as well as several other control variables. Our estimates show that infant mortality has a significant and negative association with the percent of revenue that is raised locally (OWNLOCAL) and with the degree of local control over provincial fiscal resources (LOCALRAT). Our regression results for educational output also show that both indicators of decentralization were positively and significantly associated with the dependent variable.

We agree that fiscal and political considerations led to an imperfect implementation of fiscal decentralization in Argentina. However, our empirical findings indicate the positive effects of decentralization on human development and the importance of democratic accountability for the success of decentralization. Insofar as we have observed an evolution toward devolutionary forms of decentralization, these disadvantages should be analyzed in a dynamic setting and weighed against other beneficial short and long term effects of Argentina's decentralization regime. Our data show that the Argentine fiscal decentralization regime, dominated increasingly by devolutionary components, has been associated with continued improvements in human development at the provincial level. This fact cannot be easily dismissed. Insofar as the goal of public administration is to increase social welfare, the efficiency of a given government strategy should take into account its fiscal feasibility and simplicity. Yet, it should also take into account the policy outcomes such a strategy is likely to generate. In particular, knowledge of the effects that different decentralization schemes have had on the level oGf human development should be of central concern in evaluating the new Argentine co-participation regime currently under negotiation. As expected, our positive findings of the effects of decentralization on human development tend to be stronger for 'OWNLOCAL' than for 'LOCALRAT'.

We have attempted to present a broader view of provincial financing that includes revenue from 'co-participation' and royalties as part of locally generated resources, even if they are collected at the national level due to presumed economies of scale and greater fiscal capacity. The provinces clearly have a right to these resources, in addition to the revenues generated by provincial taxes, implying a certain amount of stability which facilitates budgetary planning. For that reason, we may consider them as devolutionary. However, we also found

that tax revenues collected at the provincial level tend to have a stronger effect on accountability and, thus, on the performance of our human development indicators. These findings are particularly important at a time when the provincial delegation of health and education expenditures to the provinces is moving faster than that of revenue collection which may have a negative effect on provincial performance. In this, as in other dimensions, the above should be viewed as work in progress, pointing researcher and policy maker in new directions of analysis and action.

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FOOTNOTES

[1] According to Peter Evans (1997), decentralization results from the failure of developmental states. A recent World Bank study finds that "out of 75 developing and transitional countries with populations greater than 5 million, all but 12 claim to be embarked on some form of transfer of political power to local units of government" (W. Dillinger, *Decentralization and its Implications for Urban Service Delivery*, Urban Managements Program Discussion Paper 16, World Bank, 1994, cited by Agrawal and Ribot 1999). Shahid et al. (1999:chapter 1) show that all fourteen Latin American countries with a population of more than 5 million implemented some decentralization measures.

[2] Fiscal decentralization is argued to improve resource allocation through better knowledge of local preferences and tastes and because of the example set by competition among jurisdictions (Oates, 1972 and 1977, Bennett, 1990). The positive effect of decentralization for the delivery of services in the region is emphasized by Fox and Aranda (1996), Tendler (1997), De La Cruz (1998), and Savedoff ed. (1998). The political dimensions of fiscal decentralization in the region are analyzed by Porto (1990), Eaton (1996, 1998 and 1999), Gibson et al. (1998), and Willis et al. (1999). Weingast (1997) and Rose-Ackerman and Rodden (1997) relate decentralization in the form of federalism to economic growth.

[3] Human development measures were only included to measure the *determinants* of decentralization (Porto 1996, Porto and Sanguinetti 1993), or linked to the decentralized provision of services (IADB 1996: chapter 3; Puryear 1997; Savedoff ed. 1998; De la Cruz 1995; Tendler 1997).

[4] On the positive impact of health and education on economic growth, see Birdsall and Sabot (1994) and Birsdall et al (1995). Ranis and Stewart (1999) provide an overview of the comparative Latin American experience and a justification for the use of health and education measures as indicators of human development.

[5] Our data set has been partially complemented by information collected independently by Diego Miranda with support from the David Rockefeller Center for Latin American Studies and the Program on Constitutional Government at Harvard University, as well as the National Science Foundation.

[6] Provincial studies include Bertranou (1993), Sawers (1996), Porto (1997), Nunez Minana and Porto (1984), Cavallo and Zapata (1986), and the World Bank (1989).

[7] Agrawal et al. (1999: chapter 2) provide a complete review of different definitions and their relation with diverse dimensions involved in the decentralization process.

[8] Gustav Ranis and Frances Stewart (1999), J.Klugman (nd), Rondinelli et al.(1989), Ostrom et al. (1993) and Samoff (1990) discuss the implications and characteristics of these forms of decentralization.

[9] The Argentine revenue sharing system is referred to also as 'co-participation' and we use both terms interchangeably in this article.

[10] For a thoughtful discussion of the effect of decentralization on the internalization and reduction of costs as well as its effects on governance, see Agrawal and Ribot (1999). For a powerful argument for the importance of local knowledge and resources for policy implementation, see Scott (1998).

[11] While local collection is not always possible for technical reasons, the link between 'effort' and 'reward' at the local level can be reinforced even for centrally collected resources in the absence of central bail- outs of local administrations, so as to 'harden' budget constraints (Dillinger and Webb 1999).

[12] Susan Rose Ackerman (1999:149) argues that "states and local governments may be under the control of local elites who use the state apparatus for their personal gain. Although competition between jurisdictions for investment resources limits corrupt possibilities, it does not eliminate them. The very smallness and intimacy of local jurisdictions may make corrupt relations possible." On the other hand, the so-called "gold-fish bowl effect" of imposed natural transparency at the local level works in the opposite direction.

[13] In this situation, as long as the impact of devolution converges fast to the true model, a static model but one with enough observations over time will be able to identify the true model . As a simple example consider the case where a level of decentralization x implies a level of human development y. However, provinces take time to adapt to this new level and therefore in the first year that decentralization is x the level of human development is actually y_1 which is lower than y. From the second year onwards it converges to the true level y. A static model with T=1 is biased; however, as T increases the estimated coefficient converges to the true coefficient (since in any linear estimation all observations are weighted equally).

[14] About 78 percent of the national population lives in tows of more than 50,000 inhabitants and around 91 percent of it lives in towns of more than 10,000 inhabitants (Indec 1998:69).

[15] Due to a process of decentralization of social services, elementary education was transferred to provincial jurisdiction in the late 1970s, while secondary education and health were transferred in the 1990s. The 1994 constitutional reform reinforced political decentralization by establishing direct elections for provincial Senators and the authorities of the city of Buenos Aires.

[16] According to the World Development Report (WB 1996:199-201), the national illiteracy rate was 4 percent in 1995 and the infant mortality rate was 23/1000 in 1994.

[17] While the city of Buenos Aires and its surroundings above account for eleven million people, adding the provinces of Buenos Aires, Santa Fe, and Córdoba, the central or 'littoral' region accounts for 63 percent of the national population and 73 percent of total industrial production (INDEC 1991 and 1994).

[18] Social data generally (across countries as well as within) tend to converge more than economic data.

[19] According to the constitutional text in force between 1853 and 1994, this fiscal "division of labor" was defined by articles 4, 9, 17, 67(1,2,9,18), 104 and 108. The constitutional origins of ATNs can be traced back to article 67(2).

[20] This "emergency" system included three laws: Law 12.143 of 1934, mandating the creation of a national sales tax; Law 12,147 of 1935, establishing a national income tax (Pirez 1984:14-20); and Law 12,139 of 1935, instituting the unification of "internal taxes" under national control (FIEL 1991:122). Following the addition of newly created taxes on capital gains in 1946 and an inheritance tax in 1951 (FIEL 1993: 140), as well as the partial reform of internal tax administration by law 14,390 in 1954 (Cetrangolo and Jimenez, 1995: 11), this first "emergency" revenue-sharing scheme remained basically intact until 1958. In 1959, Law 14,788 integrated income, sales, capital gains, and inheritance taxes into one revenue-sharing system. This law defined a common distribution pattern for all taxes, i.e. to allocate by 1963, 36 percent of all collected funds to the center, 6 percent to the MCBA, and 58 percent to the provinces (Cetrangolo, Jimenez, and Delfino 1996:12).

[21] According to FIEL, ATN transfers to the provinces were equivalent to 7.5 percent of total co-participation funds in 1970, 56.8 percent in 1971, and 60.6 percent in 1972 (1993:142).

[22] Defined by national 'law" 20221, the new regime divided co-participation tax proceeds equally between the provinces and the federal government (48.5 percent each), with the remaining 3 percent funding a "delegative" Regional Development Fund. To a significant degree, the allocation of funds among provinces was calculated according to the estimated development gap among provinces, and not exclusively in terms of decentralization, as had been the case in the past (Lopez Murphy and Moscovitch 1997:9)

[23] This in part explains the extensive attention subsequent democratic administrations *had* to pay to education policy. The relative success of this emphasis on education to compensate for the fiscal squeeze of the military period can be seen in the rise of primary school enrollments. INDEC (1994:79) reports that while 10.5 percent of 6-7 year-old children did not attend school in 1980, the percentage dropped to 3.6 percent by 1991.

[24] By Law 23,548, the new co-participation regime required that the federal government retain 42.34 percent of nationally collected taxes, while increasing the share of the provinces to 56.66 percent. The remaining 1 percent consisted of ATN resources, seriously constraining–at least on paper–the discretion of the federal government.

[25] During this period health and secondary education were also transferred to the provinces, increasing their financial burden.

[26] In the graph, we calculate the share of 'co-participation' in the period 1984-1988, following the methodology utilized by the Argentine Ministry of Interior (SAREP, 1996). Due to the partially "defined" characteristics of these transfers–see text above–although not technically co-participation, we prefer to characterize them as such, to differentiate them from more ad-hoc transfers. Other studies have often preferred to consider all transfers in this period as ATNs (e.g., Cetrángolo, Jiménez and Delfino 1996).

[27] For example, it has been noted that the *absolute* increase in revenue sharing represented more than double the expenses of transferred services between 1992 and 1994 (Sawers 1996: 226).

[28] This argument has been most clearly presented in FIEL (1993). Sanguinetti (1994), Saiegh and Tommassi (1998) and Gibson and Calvo (forthcoming) share a pessimistic view on the effects of fiscal decentralization. Dillinger and Webb (1999), on the other hand, present a more optimistic perspective for the post-1991 period

when a national currency board curtailed the ability of the central government to bail out provincial governments, thus imposing a harder budget constraint.

[29] As an example of the relation between dependence on ATN and provincial overspending, eleven of the twelve provinces deriving more than 1 percent of their current expenditures from ATN in 1996 have spent more than 20 percent over their revenues in the 1991-1996 period (the national average of over-spending was 16.4 percent), according to Presman and Lucioni (1997: 23 and 43).

[30] Implicitly or explicitly, the criticized "fiscal illusion" is understood in the literature as encompassing the purely conditional transfers by the federal government to the provinces, as well as the revenue-sharing proceeds of the Argentine co-participation regime whose origins and development are described here. See in particular Saiegh and Tommassi (1998) and Jones, Sanguinetti, and Tommasi (1997), Presman and Lucioni (1997), and FIEL (1993).

[31] The common measure of decentralization used in these studies is the ratio of local receipts to total resources.

[32] We would prefer a more accurate indicator of efficiency in education expenditures, but unfortunately none is available in time series format. Grade repetition rates are unknown for most years and provinces, standardized tests have not been conducted in a systematic way before 1993, and we have been unable to find public or other documents reporting literacy rates for the 1970-1994 period.

[33] Where school age population is declining, a rising ratio might pick this up, rather than any impovement in absolute levels of human development.

[34] Our enquiries at the Ministry of the Economy, which collects and distributes such data in Argentina, met with no success.

[35] If we have three equations, as follows (in our case identities from national income accounting):

$x_1+x_2=x$-----(1) ; $x_{11}+x_{12}+ x_{13}= x_1$ -----(2) and; $x_{21}+x_{22}= x_2$ ----(3)

One needs four ratios to capture any changes in this system, conditional on x (total expenditure) being fixed. They are $r_1= x_1/x$; $r_2= x_{11}/ x_1$; $r_3= x_{12}/ x_1$; and $r_4= x_{21}/ x_2$.

These ratios are LOCALRAT, OWNLOCAL, ROYRAT and CONDRAT, respectively. Note that a change in any of the variables above will be reflected by a change in one of these ratios; in that sense, these ratios are sufficient for summarizing the revenue side fiscal structure.

[36] To avoid the dummy variable trap it is customary to assume: $\sum_{i=1}^{N} m_i = 0$

The other standard assumptions are; (i) $n_{it} \sim IID(0, s_n^2)$ and;

(ii) x_{it} is independent of n_{it} for all i and t.

To estimate this model we use the within estimator;

$$\tilde{b} = (X'QX)^{-1} X'Qy$$

Where Q is a transformation, that subtracts the time mean for all provinces from each observation. For example Qy has the typical element (y_{it}-$y_{i.}$), where $y_{i.}$ refers to the mean of y for province i over all time periods.

[37] For "advanced" (Buenos Aires, Santa Fe, Cordoba, Mendoza and the City of Buenos Aires), "intermediate" (San Juan, San Luis, Entre Rios, Tucuman and Salta) and "poor" provinces (La Rioja, Catamarca, Corrientes, Jujuy, Misiones, Chaco, Santiago and Formosa).

[38] Cubic splines divide the range of the exogenous variable (in this case year) into bins (smaller intervals). Then for each interval it fits a cubic polynomial using the points in that interval. The number of bins affect the degree of smoothing achieved.

Appendix A

To examine the impact of decentralization on human development we needed a consistent data set on provincial revenue sources and expenditures, as well as human development indicators disaggregated across provinces, over the years. Unfortunately no such data set existed in the literature and we set out to build one, using data primarily from two sources of provincial public finance: SAREP (1996), covering the 1983-94 period and the Federal Council of Investments of Argentina (henceforth, CFI), covering the 1970-1990 period. The former is widely considered as more reliable and we used it as an anchor, using the growth rates from the second data set to extrapolate backwards, with the aim of generating a consistent data set for the years 1970-1994.

The two data sets present a number of inconsistencies making any direct comparisons problematic. First, the categories used for classifying revenue and expenditure are not always consistent with each other. Second, the two series use different price deflators, sometimes giving different values for the same variable. CFI consistently yields higher values for spending and resources than SAREP. This may be due to different imputation methods for bonds issued by the provinces and quasi-fiscal support from the Central Bank to the provinces through re-discounts. The two series are, however, highly correlated over the period when they overlap (1983-1990), yielding correlation coefficients uniformly over 0.95 for most categories.

Given the high degree of correlation between the two series, we assumed that the differences between the two series were proportional and used the entire overlapping period 1983-1990 to calculate the scaling factor, to obtain a higher degree of accuracy. For example, let $SAREP(x)_{83\text{-}90}$ denote the average value of the variable x in SAREP over the period 1983-1990. Similarly, let us define $CFI(x)_{83\text{-}90}$ as the average value of x in the CFI series over the period 1983-1990. We then calculate the value of x for 1982 (the first year for which we use the CFI data), in the following way:

$$x_{82} = CFI(x)_{82} * \{SAREP(x)_{83\text{-}90} / CFI(x)_{83\text{-}90}\} \quad \text{-----(1)}$$

We then use the growth rates from the CFI series to extrapolate backwards, for example:

$$x_{81} = x_{82} * \{ CFI(x)_{81} / CFI(x)_{82} \} \qquad \text{------(2)}$$

An additional problem with the CFI data is that co-participation funds are lumped together with 'road system' co-participation funds. We used separate data from the Argentine Ministry of Economy (henceforth, MECON, 1982) to decompose them by taking the ratio of road system funds to co-participation funds in the MECON series to calculate total road system funds in the CFI data.

Similarly, CFI also lumps together all other transfers as 'non-co-participation' transfers. We used disaggregated data on ATNs from Cetrangolo and Gimenez (1997) for the period 1972-1982, disaggregated data on all transfers from MECON for the period 1972-1981, and aggregate totals from FIEL (1993) to decompose it into its components. We considered the FIEL data to be the most reliable and therefore used the other sources only to obtain the ratios which were then applied to the FIEL data. This process involved two steps; first, we used the ratio of provincial ATN to aggregate ATN (from Cetrangolo and Giemenez) to calculate preliminary values of ATN from the FIEL series, for a particular province in that time period. Correspondingly, for conditional transfers and royalties we took the figures from MECON and the aggregate level from Cetrangolo and Giemenez, to calculate this ratio (since, Cetrangolo and Giemenez do not have disaggregated data on other transfers), and, as before applied it to the FIEL data to get the disaggregated values. Specifically, we proceed as follows:

$$\text{Preliminary } ATN_{i,t} = FIEL_{ATN,t} * \{CG_{ATN,i,t} / CG_{ATN,t} \} \qquad \text{-------(3)}$$

$$\text{Preliminary Conditional}_{i,t} = FIEL_{COND,t} * \{MEC_{COND,i,t} / CG_{COND,t}\} \qquad \text{-----(4)}$$

Royalties were calculated similarly. Where CG refers to Cetrangolo and Giemenez data and MEC refers to MECON, subscripts index province by *i* and time by *t*, an index of only *t* naturally indicates the aggregate value.

As our second step, to maintain consistency, we calibrated these figures using the data on non-co-participation funds from the CFI data. In other words we rescaled these data using the ratio

of the total of preliminary ATN, conditional transfers and royalties calculated above to the corresponding CFI figure on non-coparticipated funds, for that province in that time period.

Finally for the years 1970-71 and 1982 no such data were available rendering the construction of ratios impossible. We instead used the average of the ratios calculated earlier for the period 1972-1981, constrained by the aggregate levels of ATN and royalties from Murphy and Moscovitch (1997).

Appendix B

Figure B1: Diagram of the Fiscal Structure of Argentina

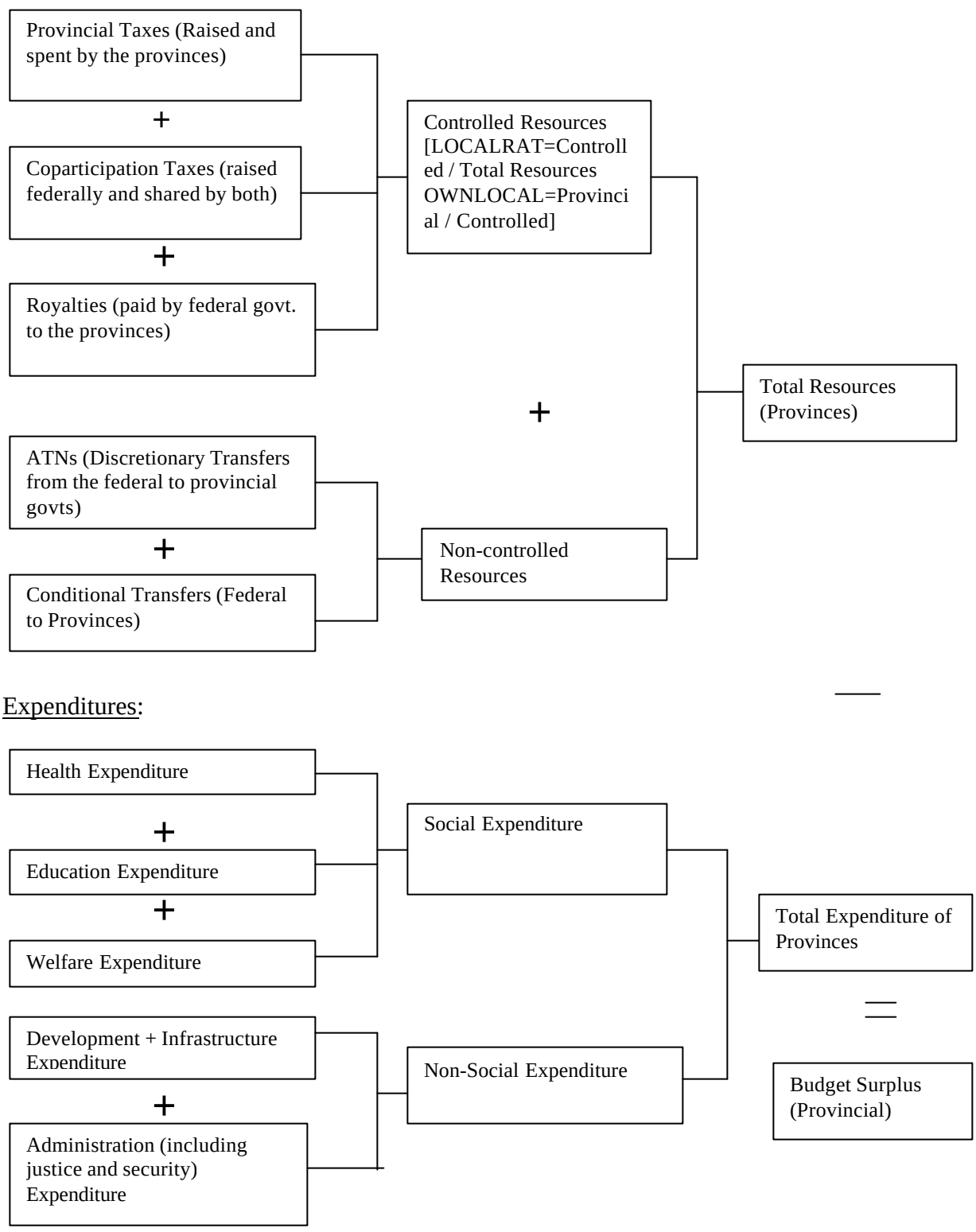


Table B1

Annual Averages of Key Variables for Low, Medium, and High Income Provinces (in 1991 Argentine pesos)

	Educational Efficiency			**Infant mortality rate**			**OWNLOCAL**			**LOCALRAT**			**Fiscal exp. per capita as % of total resources**		
	Low	med	high	low	med	High	low	med	high	low	med	high	low	med	high
1970	152	195	302	77	74	54	13	22	43	55	71	77	13.7	9.5	5.7
1971	162	207	315	68	58	47	14	23	42	47	56	75	14.5	10.2	5.2
1972	175	221	322	66	60	45	16	25	44	42	47	72	13.6	11.3	5.0
1973	183	233	336	62	51	47	10	20	40	42	45	60	15.5	13.0	5.6
1974	203	254	351	60	51	45	12	20	40	46	52	62	20.6	15.4	6.8
1975	215	278	362	58	51	44	14	25	38	35	30	38	18.9	15.4	6.9
1976	223	296	368	55	51	41	10	18	35	38	51	52	18.0	11.4	5.0
1977	226	282	363	54	48	40	10	17	35	60	72	81	16.4	12.9	5.6
1978	232	292	353	48	46	33	13	21	40	63	66	84	18.1	13.0	6.8
1979	233	283	350	42	34	31	14	23	39	61	72	85	17.0	12.7	6.6
1980	248	316	339	41	35	30	18	28	44	62	73	91	18.9	15.2	7.3
1981	259	301	330	40	36	39	25	35	55	56	65	83	21.2	14.8	8.3
1982	263	301	338	35	30	28	25	32	57	51	61	74	15.4	10.6	6.7
1983	265	292	347	36	32	27	30	38	55	45	39	57	19.3	12.8	6.5
1984	274	310	357	36	30	28	30	44	62	46	41	66	19.7	15.5	7.0
1985	289	324	362	30	26	25	18	27	48	76	82	89	20.8	14.0	7.7
1986	311	331	377	30	28	26	21	30	50	74	77	86	24.7	16.1	9.2
1987	314	338	370	30	27	25	24	30	47	69	70	78	24.7	17.5	9.3
1988	333	354	387	29	27	25	22	26	49	75	69	82	20.2	14.0	9.0
1989	360	380	409	28	28	24	20	22	44	72	69	79	20.4	13.4	7.8
1990	387	405	431	28	28	24	20	25	48	74	78	89	20.2	12.6	7.6
1991	398	426	457	26	25	23	21	24	46	76	82	92	22.5	13.9	8.6
1992	395	424	452	26	23	22	23	25	48	79	86	91	23.5	15.3	10.0
1993	391	421	448	25	23	19	37	32	55	79	82	90	26.6	16.2	11.0
1994	390	419	444	23	23	20	27	31	55	75	82	89	25.3	17.1	11.3

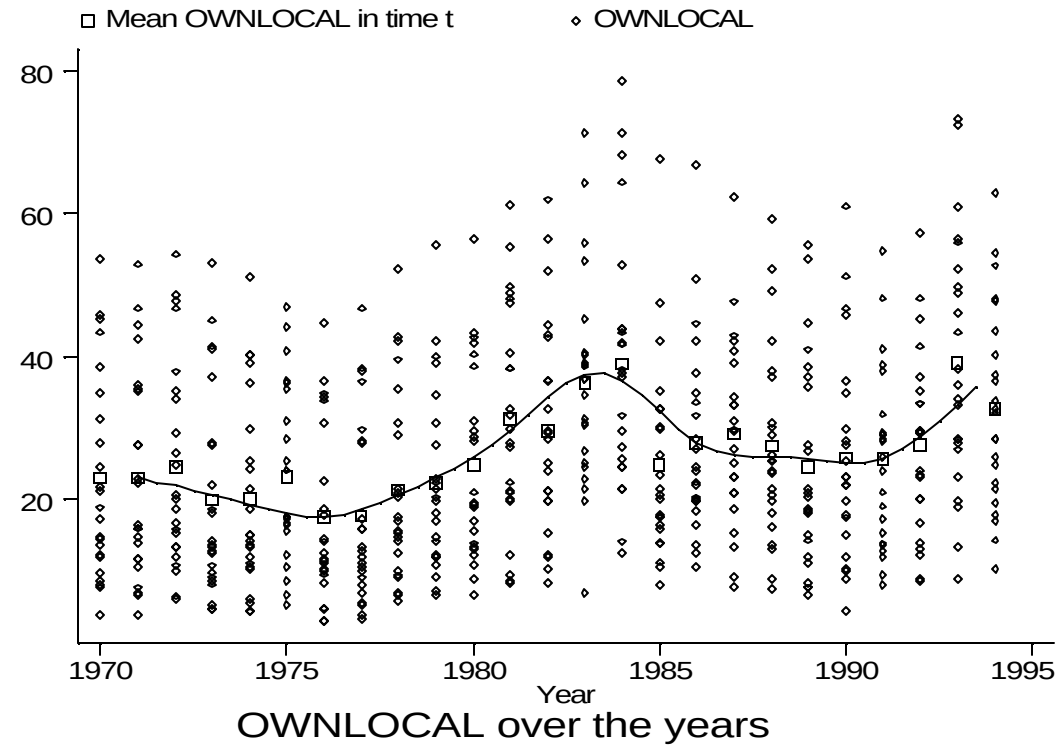
Source: Own data set as described in Appendix A

Table B2

Annual Averages of Fiscal Variables for Low, Medium, and High Income Provinces (in 1991 Argentine pesos)

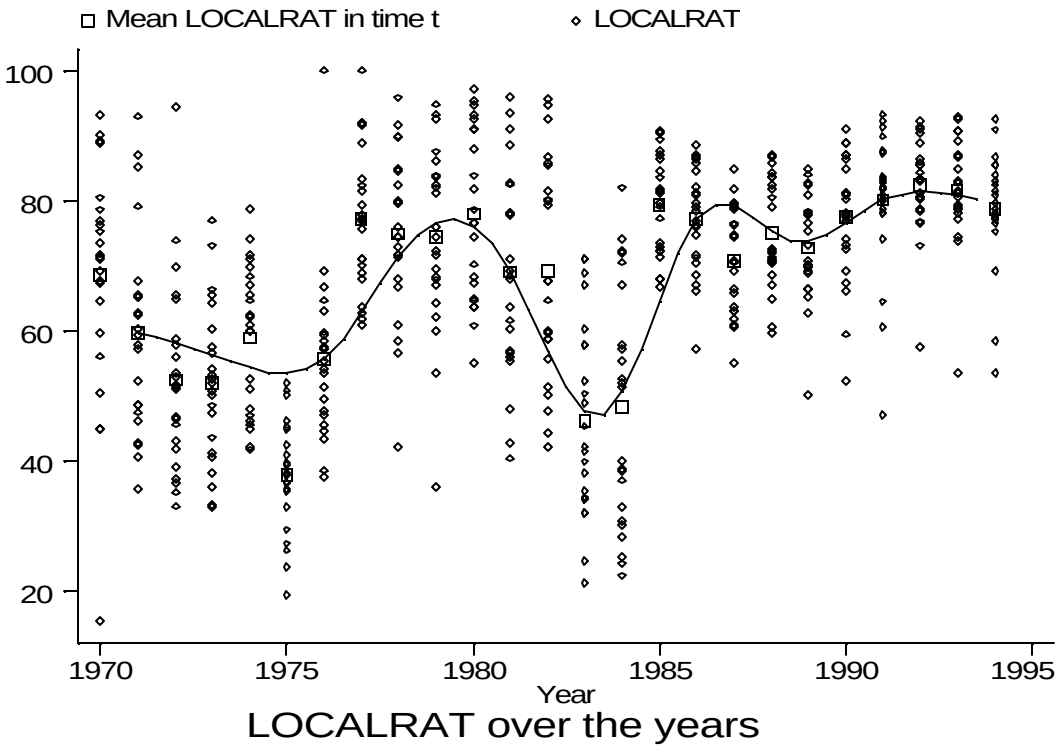
	Educational exp. Per capita			Health exp. Per capita			Social exp. As % of total exp.			Welfare exp. As % of total exp.		
	Low	med	high	low	med	High	Low	Med	high	low	Med	high
1970	66	58	59	58	39	32	31	41	40	7.1	8.5	6.7
1971	61	66	56	59	43	32	27	39	43	6.5	7.5	8.2
1972	57	60	54	60	44	32	30	36	43	8.6	8.1	7.0
1973	87	82	71	77	61	38	33	37	44	8.5	7.0	6.1
1974	109	98	92	121	83	53	34	36	43	10.8	8.0	7.4
1975	105	108	91	106	79	54	37	39	42	16.0	10.0	6.6
1976	82	60	47	84	62	32	36	36	38	17.0	10.6	8.3
1977	81	62	51	86	62	36	33	34	37	12.4	10.9	7.7
1978	137	97	79	92	66	38	41	45	47	14.8	13.2	11.0
1979	140	116	83	89	66	37	50	48	46	19.7	13.5	11.4
1980	170	136	99	127	81	56	54	48	49	22.4	14.6	9.7
1981	158	111	85	115	63	48	50	46	42	21.5	15.3	9.9
1982	125	78	61	92	47	34	50	47	44	19.8	16.3	12.0
1983	179	110	72	125	61	37	49	50	41	18.4	18.0	10.5
1984	226	143	119	138	88	58	51	49	50	18.9	18.3	8.1
1985	220	113	93	142	73	51	50	51	48	17.4	18.9	10.5
1986	235	134	105	158	84	66	49	48	46	19.2	18.8	11.5
1987	243	140	106	151	102	58	52	47	47	22.2	21.0	14.4
1988	226	120	92	133	82	58	50	44	45	18.9	17.3	13.7
1989	196	97	72	124	64	42	52	49	43	17.9	18.3	10.3
1990	194	103	73	110	81	45	48	50	46	17.2	17.1	12.1
1991	218	117	108	134	80	51	47	49	49	15.1	17.1	10.3
1992	270	155	144	148	94	57	49	51	51	13.0	14.0	9.0
1993	304	187	162	155	91	69	45	53	52	10.9	15.0	10.4
1994	321	207	172	154	101	71	45	51	51	11.0	13.8	10.8

Source: Own data set as described in Appendix A.



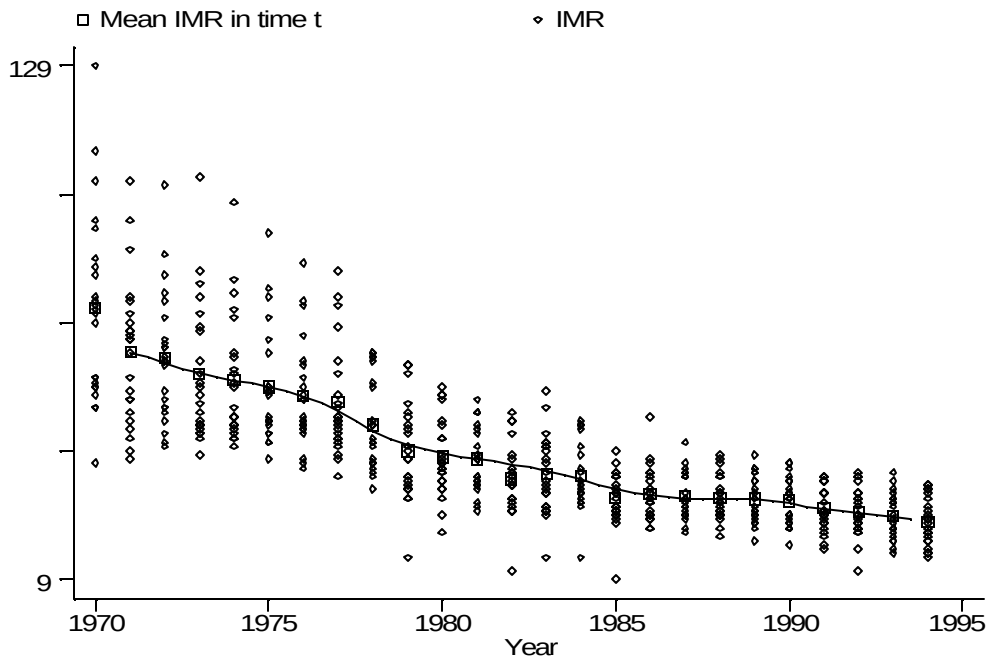
OWNLOCAL over the years

Figure B2



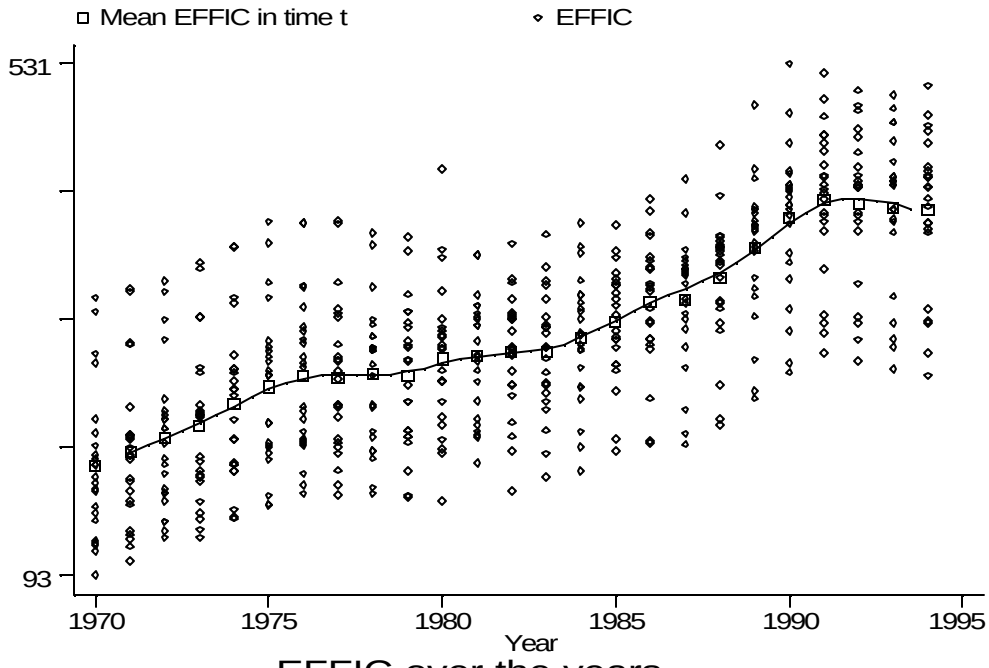
LOCALRAT over the years

Figure B3



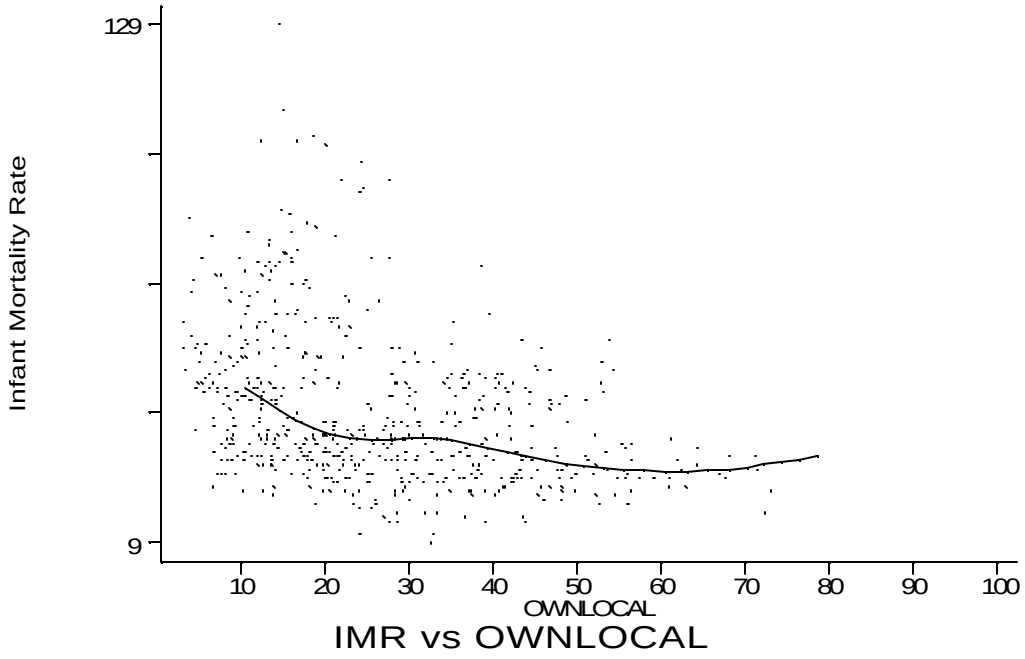
IMR over the years

Figure B4



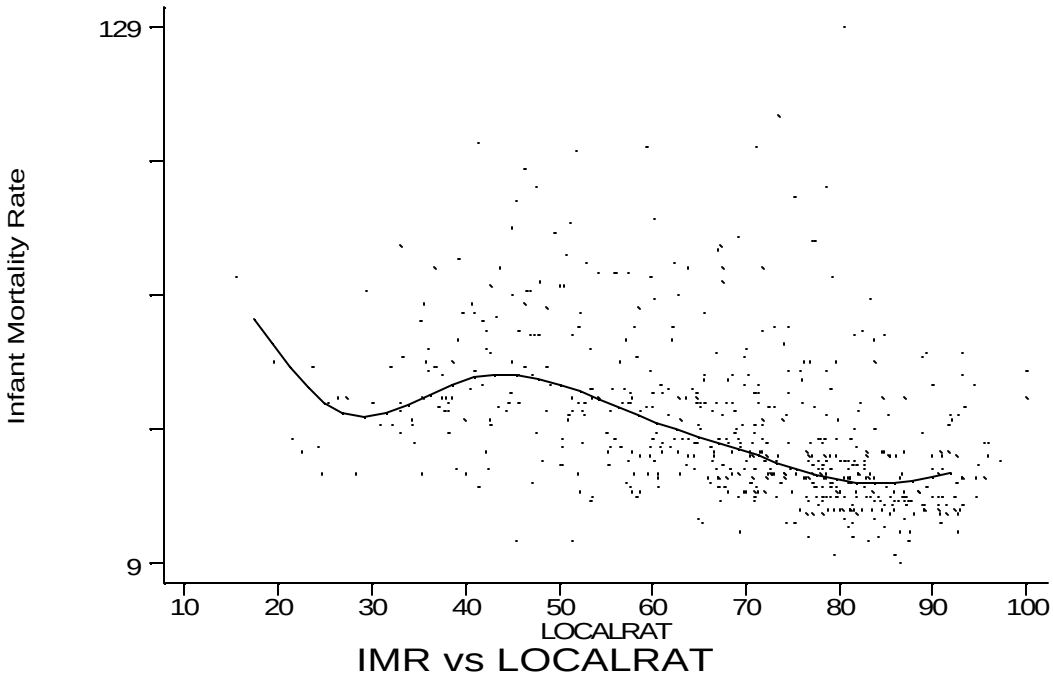
EFFIC over the years

Figure B5



IMR vs OWNLOCAL

Figure B6



IMR vs LOCALRAT

Figure B7

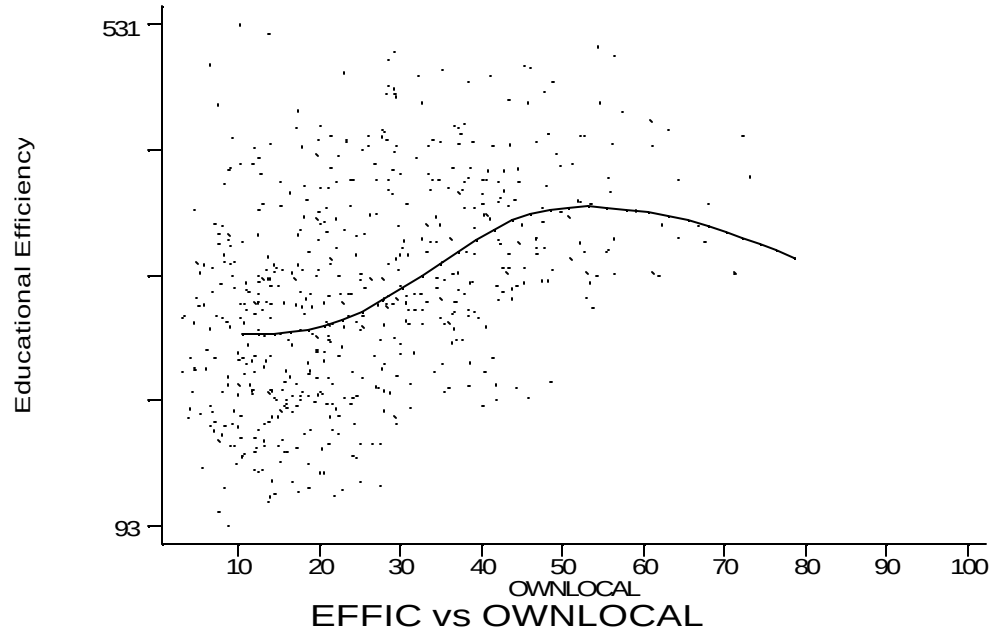


Figure B8

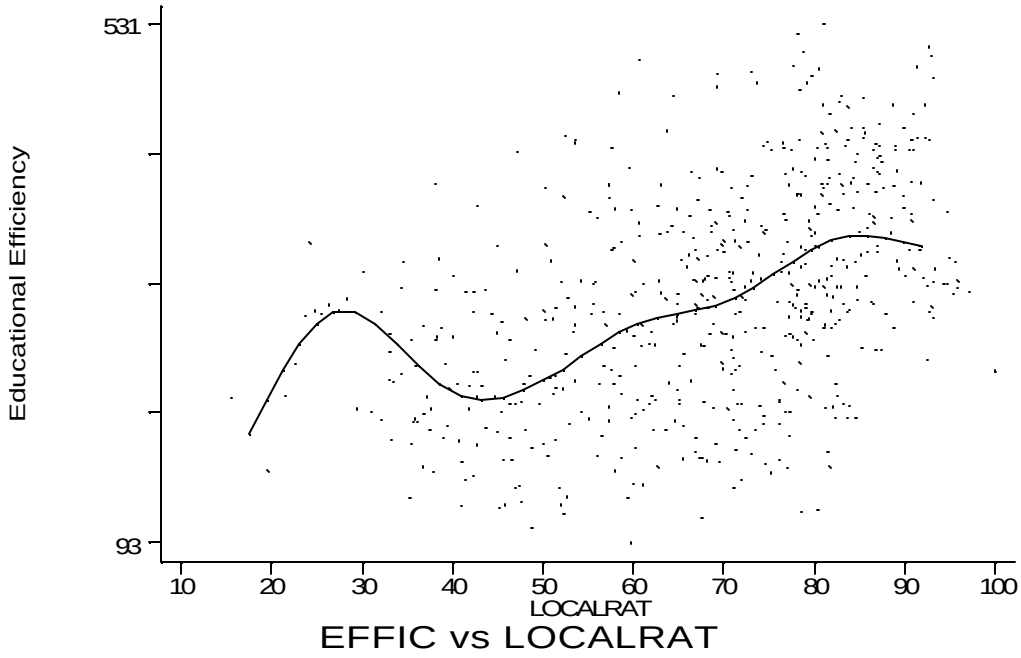
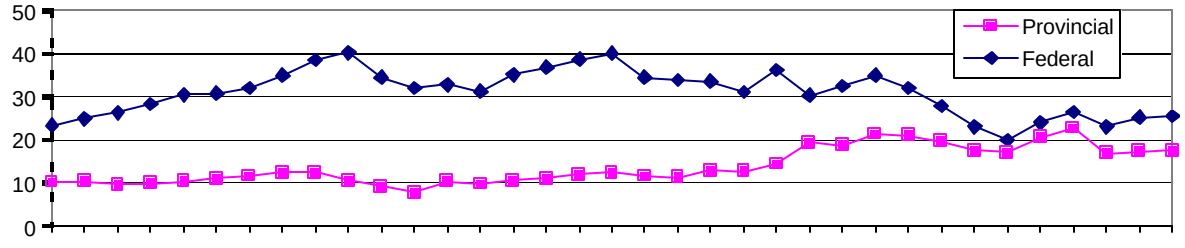


Figure B9

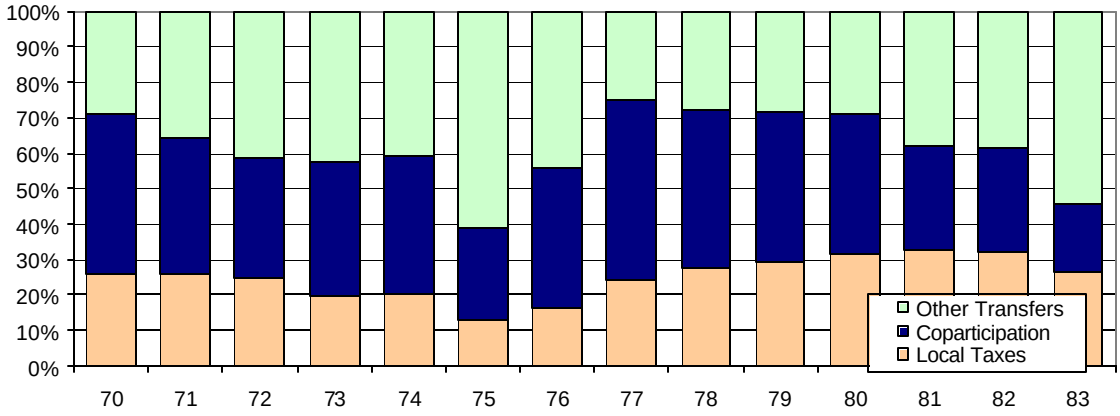
Graphs, Tables and Figures for the Text

Graph 1: Primary Revenue Distribution for the Provincial and Federal Governments as a Share of National Taxation (net of local tax) 1935-1969



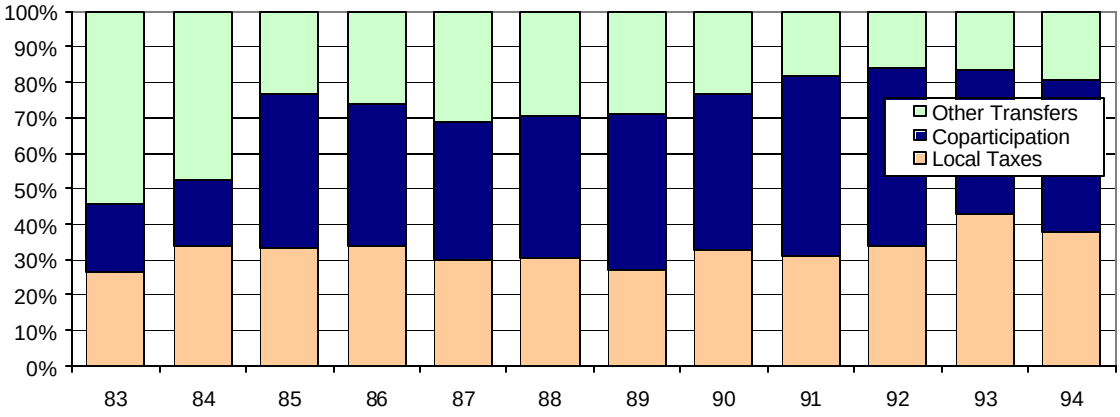
Source: Cetrangolo, Jimenez, and Delfino 1996

Graph 2: Origin of Provincial Resources (1991 pesos), 1970-1983



Source: Own data set as described in Appendix

Graph 3: Origin of Provincial Resources (1991 pesos), 1983-94



Source: Own data set as described in Appendix

Table 1

Infant Mortality Rates

IMR	OLS Robust SE	GLS	Fixed Effects
Per Capita Income (Constant 1991 pesos)	.00003 (0.534)	-.0003 (0.000)	-.002 (0.000)
Public Employees per thousand population	-.309 (0.000)	-.237 (0.000)	-.496 (0.000)
Per capita total provincial expenditure	.001 (0.625)	.00001 (0.939)	-.003 (0.180)
Provincial Taxes/Controlled Resources (OWNLOCAL)	-.48 (0.000)	-.138 (0.000)	-.316 (0.000)
Controlled Resources/Total Resources (LOCALRAT)	-.152 (0.000)	-.084 (0.000)	-.116 (0.004)
Royalties/Controlled Resources	-.018 (0.621)	-.036 (0.000)	.057 (0.259)
Conditional Transfers/ Total Transfers	-.063 (0.013)	-.02 (0.000)	-.033 (0.161)
AUTOC	9.995 (0.000)	8.107 (0.000)	7.042 (0.000)
CONSTANT	73.698 (0.000)	58.157 (0.000)	86.236 (0.000)
R^2	0.547		0.284
F/Chi^2	101.76 (0.000)	4343.81 (0.000)	125.55 (0.000)
N	575	575	575

P-values in parentheses i.e. Prob>|t|

Table 2

Educational Efficiency

Secondary enrollment per thousand primary students	OLS Robust SE	GLS	Fixed Effects
Per Capita Income (Constant 1991 pesos)	.001 (0.008)	.003 (0.000)	.002 (0.159)
Public Employees per thousand population	2.155 (0.000)	1.953 (0.000)	2.687 (0.000)
Per capita total provincial expenditure	.006 (0.337)	.011 (0.000)	.008 (0.318)
Provincial Taxes /Controlled Resources (OWNLOCAL)	2.673 (0.000)	.489 (0.000)	.698 (0.002)
Controlled Resources/Total Resources (LOCALRAT)	1.176 (0.000)	.327 (0.000)	.448 (0.005)
Royalties/Controlled Resources	-.246 (0.198)	-.197 (0.000)	-.747 (0.000)
Conditional Transfers/ Total Transfers	-.132 (0.280)	-.005 (0.555)	.085 (0.365)
AUTOC	-51.237 (0.000)	-31.283 (0.000)	-55.406 (0.000)
CONSTANT	89.278 (0.000)	175.08 (0.000)	150.739 (0.000)
R^2	0.645		0.529
F/Chi^2	116.42 (0.000)	6636.32 (0.000)	194.01 (0.000)
N	575	575	575

P-values in parentheses i.e. Prob>|t|