Decentralization and Human Development in Argentina

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Abstract   The human development impact of decentralization is the central focus of this paper, which addresses evolving patterns of fiscal decentralization in Argentina based on health and education indicators. The authors use previously unavailable data to look at decentralization in Argentina over time, and to document the positive impact of devolutionary decentralization on health and education, and the empirical relationship between fiscal decentralization and human development. The aim is to shift the focus of the general debate on decentralization away from purely budgetary issues.

Key words: Decentralization, Fiscal Decentralization, Argentina, Human Development, Health, Education, Budgets, Macro-Economics

Introduction

Decentralization has formed an important component of recent institutional innovation, being widely adopted in Latin America, as well as in many other countries of the developing world.[1] As a result, a large body of scholarly literature has emerged analyzing different aspects of decentralization. The decentralization of authority to lower levels of government includes both the responsibility for determining and implementing developmental policies and the collection of revenue. In both cases, the aim is to improve performance by increasing responsibility and participation of local citizens.[2] At the core of the second dimension is fiscal decentralization.[3] Most studies of fiscal decentralization in Latin America have focused on its budgetary effects because of the implications of budget deficits for macro-economic stability.

Attention has consequently focused on the 'softening' effect that fiscal decentralization may have on overall budget constraints and the resulting macro-economic fiscal instability it could generate.

Such studies of fiscal decentralization have, however, generally over-looked its effects on the level of human development, or have given it only secondary consideration.[4] 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.[5] The human development impact of decentralization forms the central focus of this paper. To address this issue, we focus on the effect of evolving patterns of fiscal decentralization in Argentina based on some health and education performance indicators in its provinces between 1970 and 1994.

This study aims to make two contributions to the decentralization literature. First, our analysis illuminates the empirical relationship between fiscal decentralization and human development by documenting the positive impact of *devolutionary* decentralization on health and education indicators. Second, our study provides a long-term historical perspective on decentralization in Argentina over time, using previously unavailable data, which are disaggregated to the provincial level over a period of 25 years. This allows an evaluation of the dynamic characteristics of fiscal decentralization across all Argentine provinces, for the first time.[6] Our panel data set (with time-series and cross-sectional observations) corrects for the deficiencies of previous studies on Argentina that rely on scattered empirical evidence or suffer from sample selection bias.[7] By examining the impact of different levels of fiscal decentralization on the enhancement of human development, we aim to contribute to the general debate on decentralization, shifting its focus away from purely budgetary issues.

The paper is organized into four sections. We present a brief overview of the theoretical considerations underlying our study, then advance the reasons that make Argentina an interesting case for testing these ideas, while analyzing the origins and recent development of the Argentine decentralization regime. We then present the empirical test of our central hypothesis, namely that devolutionary decentralization has a positive impact on human development, followed by a summary of our findings and some conclusions.

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.[8] For the purpose of this study, we follow a three-stage definition based on the degree of discretion and responsibility given to local authorities.[9]

- *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 re-allocating 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 transfer of decision-making on taxes and expenditures) is thus captured by the concept of devolution. Automatic, conditionality-free transfers, such as the Argentine revenue sharing regime, also constitute a sort of 'soft' devolution.[10] This type of decentralization is qualitatively different from the previous two because local authorities gain virtually complete control over resource allocation and generally become accountable to local constituencies which should increase decision-making responsiveness to local needs.

This paper explores decentralization in the Argentine context, assessing the effect of different degrees of devolution, as measured by different fiscal 'mixes', on health and education outcomes. We aim to test the proposition that devolutionary decentralization produces an increase in the accountability and responsibility of policy-makers, and consequently has a 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 they have a direct impact on the well-being of the population and are therefore most likely to be subject to local demands and pressures.

There are many *ex ante* reasons for expecting devolution to have such positive effects. More than other forms of decentralization, devolution enhances the ability of public administrators to take local preferences and information into account, minimizing costs, and increasing efficiency (by internalizing and reducing transactions costs).[11] It may also improve equity within the region as a result of enhanced visibility and accountability. 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.[12] Furthermore, when local authorities provide 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.

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 re-distributive powers. Indeed, decentralization without some type of central government re-distributive formula would probably exacerbate existing regional inequalities, a point that nineteenth-century Argentina makes painfully clear (Sawers, 1996). From an efficiency point of view, moreover, decentralization risks limiting the gains obtained from economies of scale in technology and information, while the lack of local expertise could reduce efficiency gains; excessive trial-and-error experimentation and duplication might also result. Equally important, while there may be greater transparency at the local level, we cannot be certain that corruption is not also likely to be greater, given the frequently substantial power of local elites.[13]

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 since it fails to incorporate the large part of the impact that happens only over time; moreover, a single period cross-section is biased in the presence of yearly idiosyncratic developmental shocks. By examining the impact of different levels of 'devolutionary' decentralization on health and education indicators in Argentina between 1970 and 1994, we hope, therefore, to gain better estimates of the underlying reality. Since panel data estimates by construction only consider the average impact of decentralization over the year, we also include time dummies.

The Argentine decentralization debate

As a middle-income federal country that experienced a process of devolution in the distribution of fiscal resources during the second part of the twentieth century, Argentina represents a good case for evaluating the effects of fiscal decentralization on human development. It encompasses nearly 3 million square kilometers of territory and has a fairly homogeneous and largely urban population of over 32 million people, with a per capita Gross Domestic Product (GDP) of more than PPP$12 000 in 1999 (United Nations Development Programme, 2001, p. 141). The United Nations Development Programme's Human Development Reports have consistently classified Argentina as one of the top 40 countries in terms of human development.[14] In fact, Argentina's consolidated social spending as a percentage of GDP has reached levels comparable with 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 is a federal state composed of 23 provinces and an autonomous federal district. Its 1853 constitution established the provinces' right to centrally collected revenues and made the provinces the main locus of spending decisions, thus rendering them the appropriate units of analysis when evaluating the impact of fiscal decentralization. Approximately 50% of Argentina's public spending is at the sub-national level, making it the most decentralized country in Latin America in terms of public spending (Inter-American Development Bank, 1997). However, provinces differ in their capacity to finance provincial spending out of local revenues and federally collected funds, while the extent and distribution of the federal government's additional transfers to cover residual fiscal gaps has varied over time.

There are substantial differences in the economic performance of Argentina's provinces. The central region contains the major industrial and urban areas, in the provinces of Buenos Aires, Cordoba and Santa Fe, which have long enjoyed relatively high levels of socio-economic development.[15] In contrast, peripheral provinces, such as La Rioja, Catamarca or Jujuy in the Northwestern region, have lagged considerably in their development (Sawers, 1996). Policy outcomes, as captured by available human development indicators, are also highly differentiated from province to province. The origin of such differences between regions can be traced to the history of this federal country; in particular, to the effects of different resource endowments and differential access to the port of Buenos Aires (and thus international markets). Many analysts (see, in particular, Rofman and Romero, 1997), looking mainly at economic data, argue that these regional differences have 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.[16]

Differences in regional performance, together with significant variations in the decentralization strategy pursued over time and across regimes, make Argentina a particularly good place to explore how decentralization affects human development. According to our hypothesis about the impact of devolution, as different schemes of decentralization have moved back and forth from a more 'delegative' to a more 'devolutionary' emphasis, human development indicators should have moved with them.

The evolution of Argentine revenue-sharing regimes

Revenue-sharing or *'co-participation'* refers to an arrangement by which the federal government collects taxes constitutionally assigned to the provinces and then transfers a portion of them back to the provinces according to a negotiated formula. There are other taxes for earmarked expenditures transferred to the provinces, while the federal government can also make discretionary transfers in the form of National Treasury Contributions (ATNs) to cover the residual financial needs of the provinces.[17] The shares assigned to

the provincial and federal governments have changed over time since the inception of this system in the 1930s and, more importantly from our perspective, they also varied during the period of study (1974–1994), allowing us to test their effect on human development.

The Argentine revenue sharing system originated during the Great Depression when Congress centralized tax collection while maintaining the provincial right to revenue. In consequence, provinces did not perceive revenue-sharing arrangements as a transfer of resources from the center, but as a return of funds to which they were entitled but which they were unable to levy effectively. However, this revenue sharing system lacked cohesion and a re-distributive component (Macon, 1963).[18] Although the provinces did not lose resources in absolute terms, for the most part their relative share was small in the 1930s and 1940s (see Table 1). By the 1960s the provincial share of revenue was growing in both absolute and relative terms, but in 1967 a military government decreed a reduction in the provincial share. This started a widespread use of discretionary transfers, in particular ATNs, by subsequent authoritarian governments (Cetrángolo and Jiménez, 1995, p. 17).[19]

In 1973, shortly before the transition to democracy, a new revenue-sharing regime favorable to the provinces was passed.[20] The following year health expenditures in the poorest provinces experienced a substantial increase, as shown in Appendix Table B2. This democratic experiment was short-lived, however. A new military government took over in 1976 and

TABLE 1. Evolution of primary revenue distribution for the provincial and federal governments according to different revenue-sharing regimes

		% of total revenue	
Law	Period	Federal	Provinces and City of Buenos Aires
12,143 and 12,147	1935–1946*	83	18
12,956	1947–1958	79	21
14,788	1959	66	34
	1960	64	36
	1961	62	38
	1962	60	40
	1963	58	42
	1964–1967	54	46
	1967	59	41
	1968–1972	70	38
20,221	1973–1980	47	53[a]
	1981–1984*[d]	49	52[b]
23,548	1988	42	58[c]

Notes: *Does not add to 100 because of rounding. [a]Includes 1.8% to the federal city of Buenos Aires and other funds. [b]Includes other earmarked funds. [c]Includes ATNs. [d]Reduction in revenue sharing to finance social security.
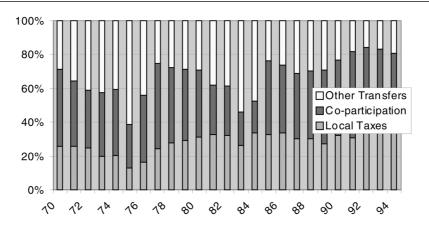*Source:* Cetrángolo and Jiménez (1995, p. 21).

FIGURE 1. Origin of provincial resources (1991 pesos), 1970–1994.

increased the use of discretionary transfers. It also transferred responsibility for the provision of primary education to the provinces in 1978 without, however, granting them tax powers or increasing their share of revenues. This explains the large jump in provincial education expenditures shown in Appendix Table B2 in that year. Moreover, the government reduced provincial co-participation funds by funneling a portion of these funds to the national social security system in 1980 (Fig. 1).[21]

With the return to democracy in 1984, provincial governments asked not only for a return to the revenue-sharing formula existing before its *de facto* reform in 1980, but also demanded compensation for the transfer of social sector responsibility without accompanying financial flows during the military regime. Since the governing party did not control the Senate and could not reach an agreement on revenue sharing, during the 1984–1987 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 (Secretaria de Aisitencia para le Reforma Economia Provincial (SAREP), 1996). Yet, provincial administrations continued to receive federal 'compensations', negotiated on a case-by-case basis, given a relatively disorganized federal government (Carciofi, 1990).[22]

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 1985–1987 period by fixing a coefficient that has remained unexplained, either legally or analytically. The 1988 revenue sharing law limited ATNs to 1% of the budget, thus dramatically reducing the discretion of the national government (Porto, 1990; Saiegh and Tommassi, 1998).[23] The new legislation, which favored the provinces by increasing the predictability of funding,

resulted from opposition party control of both Congress and the majority of provincial governors (Sanguinetti, 1994; Eaton, 1998).

The second democratic administration, elected in 1989, by contrast enjoyed a unified government that 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 15% in order to finance the social security deficit (Porto, 1996). Moreover, with their agreement, the federal government transferred secondary education and health administration (and expenditures) to the provinces. The acceptance of the 15% reduction by the provincial governors was facilitated by discretionary compensations from the executive, the transfer to provincial control of important earmarked funds, as well as a guaranteed minimum revenue for each province (Eaton, 1998, pp. 8-9). The guaranteed revenue floor was based on the 1991 collection level, which was at an historic peak, thus increasing fiscal predictability and facilitating provincial borrowing. Also, as shown in Figure 1, there was an actual increase in the share of resources controlled by provincial governments, both from co-participation and local tax sources, due to an economic boom that benefited both provincial and federal tax collection, as well as due to a notable improvement in federal and provincial access to credit markets (Eaton, 1998; Dillinger and Webb, 1999). In summary, the extra fiscal burden on the provinces due to the decentralization of services, accompanied by a reduction in the provincial co-participation share, was offset by the absolute growth of fiscal revenues collected by national and provincial governments during this period.[24]

What these data tell us is that the Argentine decentralization regime became *more devolutionary* in the 1990s than it had been since at least 1935. Democratic administrations, in general, and those of the 1983–1994 period, in particular, increased the provincial share of resources, while also increasing the accountability of elected rather than appointed officials. Moreover, the reduction of ATNs to 1% of the budget after 1988 reduced the federal government's discretion.

From the perspective of analyzing the impact of different types of decentralization on human development, it is clearly necessary to differentiate revenue sharing — to which provinces are entitled by law — from 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 for centrally defined purposes. Provincial governments have no control over these resources (Isuani, 1989). ATNs are often used to bail out fiscally troubled local administrations, but provincial administrators do not know their actual magnitude and even the policy strings attached. ATNs, thus, are the main culprits in creating the oft-denounced 'fiscal illusion' that leads provincial administrations to overspending, borrowing and central bail-outs (Saiegh and Tommassi, 1998).[25]

Hence in assessing the extent of devolution, co-participation funds

should not be lumped together, as they generally are, with ATNs or other conditional transfers.[26] The revenue-sharing proceeds generated by the Argentine co-participation system are unconditional block grants pre-defined according to a formula and distributed automatically via a purely administrative process that even precedes the formulation of the national budget (Porto, 1990). Like royalties paid by national enterprises for provincial resources used in their activities, co-participation funds are 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, these funds are independent of central government discretion and their allocation is decided strictly by the provincial legislature. Following this logic, we argue that co-participation and royalty funds more nearly resemble our definition of 'devolution' rather than that of 'delegation', although admittedly less so than local resources based on local taxation.

Empirical analysis

In this section we investigate 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 socioeconomic and fiscal indicators for the 23 provinces of Argentina over a 25-year period (1970–1994) 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 affect the results, and our conclusions should therefore be treated with caution.

As stated earlier, we hypothesize that more devolutionary options are accompanied by improvements in human development indicators as local authorities respond more to the needs and demands of the local population. To investigate this we selected two indicators of devolution, as our independent variables: the ratio of revenue derived from co-participation, royalties and provincial taxes to total resources; and the ratio of locally generated resources to locally *controlled* resources. These indicators reflect the circumstances of Argentinean decentralization. Detailed justification for the choice of these indicators is put forward later.[27] As for the dependent variables, we were constrained by data limitations to the consideration of two human development indicators. For education, we used the ratio of students enrolled in secondary school per 1000 primary students (EDUC). Although raw enrolment data in primary and secondary schools present problems, particularly because they show repeating a grade as an increase in enrolment, we accepted EDUC as a rough indicator of educational output. During our sample period, primary education was free and compulsory, with enrolments very close to 100%, so that variations in the ratio of secondary to primary enrolments give a good indication of variations in educational output. Other things equal, higher EDUC will show an educational system more capable of retaining students and therefore more likely to provide higher levels of

human development.[28] For the other dependent variable we used the infant mortality rate (IMR), defined as the number of deaths of children less than 1 year old for every 1000 births, as an indicator of health output.

Measures of decentralization and other exogenous variables

True devolution implies both expenditure and revenue decentralization; that is, 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 retain certain taxes that were previously collected and spent 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; the fiscal jurisdiction (tax base) of the provinces is not increased, which would allow them to impose new taxes, nor are they given a larger share of co-participated taxes. Instead, the federal government uses discretionary transfers that are generally highly unpredictable to meet the resulting budget deficit of the provinces.

The latter case appears to have occurred much of the time in Argentina. Since the provinces sought to meet their additional expenditure responsibilities but did not have the funds to do so, increased expenditures on health and education had to be accompanied by borrowing or ATN transfers or spending cuts elsewhere (e.g. in public housing and infrastructure).

While a widely accepted measure of decentralization is the ratio of provincial expenditures to federal expenditures, it is not possible to measure expenditure decentralization in Argentina because of a lack of reliable data. Moreover, expenditure figures in developing countries are generally believed to be extremely unreliable for a variety of reasons, including corruption. We therefore construct our measures of decentralization from the revenue side, for which the data are more reliable;[29] that is, we measure the extent of devolution by the quantity of funds controlled by the province, in relation to total funds.

The provinces have no control over the allocation of ATN transfers. They have some control, however, over the three other categories of revenue (i.e. co-participation funds, royalties, and provincial taxes), which we have pooled as 'controlled resources'. Since there are explicit revenue-sharing agreements for co-participated taxes, the provinces have some idea how much money to expect on this account. Similarly, royalties are, to a certain extent, under 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 largest degree of control and accountability is, of course, over provincial taxes since they are raised locally.

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We therefore measure decentralization by two ratios:

1. Provincially controlled resources/total provincial resources (LOCALRAT)
2. Provincial taxes/total provincially controlled resources (OWNLOCAL)

The higher these ratios are, especially the second, the higher the degree of fiscal autonomy for the provinces and therefore the higher the level of fiscal decentralization and, according to our hypothesis, the higher the level of human development.

Other variables relating to the revenue side of the provinces are:

3. The ratio of royalties to controlled resources (ROYRAT)
4. The ratio of conditional transfers from the center (including ATN) to controlled resources (CONDRAT)

Reviewing:

(1) Controlled resources + non-controlled resources = total resources
(2) Provincial taxes + co-participated taxes + royalties = controlled resources, and
(3) Conditional transfers + discretionary transfers (ATN) = uncontrolled resources

These variables are sufficient to summarize any changes in the revenue side fiscal structure. We may use an example to clarify this point. If property tax was initially collected and kept by the provinces but is now transferred to the federal government, which collects and keeps it, 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.

There are other variables, besides the extent of decentralization, that are likely to affect levels of human development and therefore need to be included in the empirical investigation. These include the level of provincial per capita income, the level of total provincial public expenditure (whether locally controlled or not), and the total number of public employees (which provides some indication of total public expenditure). We expect each of these exogenous variables to be positively related to the levels of human development:

1. PGBCAP   Provincial per capita GDP
2. EXPCAP   Total per capita expenditure of the province
3. PUBEPOP   Number of public employees per 1000 provincial population

Argentina went through some tumultuous times during the sample period (1970–1994), with periods of hyper-inflation and negative income growth (e.g. during the debt crisis of the 1980s). In such situations it is extremely difficult to construct reliable price deflators. Our measures avoid this issue,

since we use ratios of revenue variables; the deflator enters in both the numerator and the denominator, and therefore cancels out.

Econometric specification

The model that we estimate is a simple linear model:

$$y_{it} = \alpha + x_{it}\beta + u_{it} \quad \text{for } i = 1, 2, \ldots, N \text{ and } t = 1, 2, \ldots, T \qquad (1)$$

where α is a scalar and β is a $K \times 1$ vector of coefficients to be estimated. Provinces are indexed by i and time periods by t; we have data on all 23 provinces of Argentina over the period 1970–1994, a period of 25 years. Therefore, for our sample, $N = 23$ and $T = 25$. Note that we assume that the coefficients are fixed and constant; 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:

$$x_{it} = \{\text{PGBCAP}_{it}, \text{PUBEPOP}_{it}, \text{EXPCAP}_{it}, \text{OWNLOCAL}_{it}, \text{LOCALRAT}_{it}, \quad (2)$$
$$\text{ROYRAT}_{it}, \text{CONDRAT}_{it}\}$$

To take into consideration the possibility of heteroskedasticity and autocorrelation, we also report the Generalized Least-Squares (GLS) estimates with a heteroskedastic error structure correlated across panels. Autocorrelation is also allowed for, with panel-specific AR(1) coefficients estimated in the GLS estimates. However, given the diversity among provinces (as discussed in the next section), a more realistic set-up is one with fixed effects. Specifically, we postulate that

$$u_{it} = \mu_i + v_{it} \quad \text{for } i = 1, 2, \ldots, N \text{ and } t = 1, 2, \ldots, T \qquad (3)$$

where μ_i are the province-specific unobserved fixed effects. Some provinces are naturally more efficient and have better access to administrative and technical knowledge.

We first estimate equation (1) using Ordinary Least-Squares (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. Both of our human development indicators exhibit a secular time trend; therefore, we will be including time dummies in all equations estimated in the following. Adding time dummies has the added benefit (compared with a simple time variable being added to the regression) of being able to capture any secular changes in *unobservables* that similarly affect all provinces in a given time period; for example, a new nationwide health or education program launched by the federal government.

Preliminary data analysis

Comparisons of the decentralization trends and patterns of human development in Argentina across high-income, medium-income, and low-income

provinces[30] can be drawn from the data presented in Appendix B. First, 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 1970–1994 period, the gaps for LOCALRAT and OWNLOCAL declined by 36% and 43%, respectively.

The per capita education and health expenditures, on the other hand, seem to be negatively correlated with provincial per capita income. This may be due to the fact that households in high-income provinces rely more on the private sector for education and health services. 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 have also declined significantly, as shown in Appendix Table B1.

Second, it should be noted (again see Appendix Table B1) that the infant mortality rate fell dramatically over the years, from an average of 72 infant deaths for every 1000 population in 1970 to 22.5 per 1000 in 1994, which implies a 70% decline in the course of 25 years. Also striking is the convergence across provinces in IMR, as can be seen from the fact that the standard deviation declined 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.

Third, the decline in infant mortality accelerated markedly after the beginning of democracy in 1984. This achievement is especially noteworthy since reducing the percentage gap between the best IMR in the world and Argentina's becomes more difficult over time as the Argentinian rate improves.

Fourth, secondary enrolment per 1000 primary students (EDUC) increased steadily over the sample period. Overall, it increased by more than 100% in 25 years. Appendix Table B1 illustrates the upward trend in EDUC over the years, plus convergence across provinces at different income levels, but no convergence across provinces of levels of similar income.

Fifth, there is considerable variation across provinces and over time in the exogenous decentralization variables that identify our model (Appendix Table B1). Note that the time trend in both the decentralization variables is weak; therefore, the likelihood of a positive time trend in decentralization, coupled with a negative time trend in our dependent variable, infant mortality, or a positive time trend in the other dependent variable (EDUC), leading to a spurious correlation between them, is low.[31]

Finally, Appendix Figures B1 and B2 plot our dependent variables, IMR and EDUC, against our primary exogenous variables measuring decentralization (i.e. OWNLOCAL and LOCALRAT). The figures are scatter plots, with cubic splines fitted to the entire data. We find that there is weak evidence that IMR declines with OWNLOCAL (Appendix Fig. B1) and LOCALRAT (Appendix Fig. B2); the relationship seems approximately linear. For our second human development indicator, EDUC, we find a clear positive relationship with OWNLOCAL (Appendix Fig. B3). 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 (Appendix Fig. B4), indicating a decline in EDUC when LOCALRAT increases, at low levels of LOCALRAT. For a full definition of all our variables and their relation see Appendix B Diagram B1.

Econometric results

Table 2 reports the results for our first human development indicator, IMR. The first column reports the results for the standard OLS estimates, the second column reports the GLS estimates, and the third column presents the fixed effects estimates. We find that OWNLOCAL is always significant and negative (i.e. allowing provinces to raise more of their own resources helps reduce infant mortality). Similarly, for our other devolution variable, LOCALRAT, we find that it is always negative and significant, except for the fixed effects estimates where it is not significant. We attribute this to the loss of degrees of freedom associated with this procedure; note that the magnitude of the estimate stays the same as the GLS estimates. Together, these estimates imply that decentralization is associated with better health services. A larger civil service 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 1000 population. This may be because a larger public sector corresponds to more doctors, nurses, etc. We also find that the coefficient for per capita income is negative when significant (i.e. richer provinces have a lower IMR, on average). Surprisingly, however, the coefficient for total provincial expenditure related to IMR is positive when significant. It should be noted that the OLS regression results are highly significant, with the exogenous variables explaining 70% of the variation in

TABLE 2. Infant mortality rates

IMR	OLS robust SE	GLS	Fixed effects
Per capita income (constant 1991 pesos)	−0.0001 (0.550)	−0.0002 (0.000)	0.0001 (0.777)
Public employees per 1000 population	−0.082 (0.027)	−0.029 (0.003)	−0.112 (0.019)
Per capita total provincial expenditure	−0.0001 (0.928)	0.001 (0.003)	0.0002 (0.904)
Provincial taxes/controlled resources (OWNLOCAL)	−0.281 (0.000)	−0.169 (0.000)	−0.122 (0.025)
Controlled resources/total resources (LOCALRAT)	−0.111 (0.012)	−0.024 (0.000)	−0.025 (0.490)
Royalties/controlled resources	−0.037 (0.227)	−0.076 (0.000)	−0.007 (0.866)
Conditional transfers/total transfers	−0.041 (0.161)	−0.007 (0.095)	0.003 (0.912)
Time dummies	Yes*	Yes*	Yes*
Constant	93.352 (0.000)	79.824 (0.000)	79.252 (0.000)
R^2	0.7		0.663
F/χ^2	43.56 (0.000)	1265704 (0.000)	74.00 (0.000)
N	575	575	575

P values in parentheses (i.e. Prob > |*t*|). SE, standard error.
* All time dummies significant at 1% level of significance

TABLE 3. Educational output

Secondary enrollment per 1000 primary students	OLS robust SE	GLS	Fixed effects
Per capita income (constant 1991 pesos)	0.004 (0.000)	0.001 (0.000)	−0.004 (0.000)
Public Employees per 1000 population	2.079 (0.000)	0.242 (0.000)	1.458 (0.000)
Per capita total provincial expenditure	−0.033 (0.000)	0.004 (0.000)	0.008 (0.220)
Provincial taxes/controlled resources (OWNLOCAL)	3.167 (0.000)	0.599 (0.000)	0.758 (0.000)
Controlled resources/total resources (LOCALRAT)	0.421 (0.059)	0.045 (0.013)	0.015 (0.907)
Royalties/controlled resources	0.304 (0.114)	0.322 (0.000)	0.547 (0.000)
Conditional transfers/total transfers	−0.247 (0.057)	−0.061 (0.555)	−0.056 (0.505)
Time dummies	Yes	Yes*	Yes**
Constant	46.217 (0.019)	153.91 (0.000)	149.04 (0.000)
R^2	0.759		0.529
F/χ^2	63.68 (0.000)	1629689 (0.000)	144.67 (0.000)
N	575	575	575

P values in parentheses (i.e. Prob > |*t*|). SE, standard error.
*All time dummies significant at 1% level of significance.
**All time dummies significant at 1% level of significance except 1970 and 1971.

IMR. Note that in these sets of regressions all time dummy variables were significant at the 1% level, suggesting either a clear time trend, as we would expect and as noted earlier, or the substantial influence of unobserved variables.

Table 3 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. The GLS and OLS estimates are significant at the 5% and 10% levels, and the fixed effects estimates are not significant even at the 10% level. We can therefore conclude that decentralization is good for education as well (i.e. allowing provinces to raise more of their own resources is conducive to improving the educational output).

EDUC again rises with the number of public employees, perhaps because teachers make up a large share of public employees. EDUC is higher for provinces with higher per capita income on average; the coefficients are positive and always significant at the 1% level, except for the fixed effects estimates where the coefficient is negative. Total expenditures may or may not improve educational output. The more reliable GLS estimate suggests they do. The OLS model suggests they do not, and the fixed effects estimate is not significant. The regressions are highly significant (*F* values), with the exogenous variables in the OLS estimates accounting for 76% of the variation in EDUC.

In the models estimated we assumed implicitly that only the current values of the exogenous variables affect human development in that period. In reality, one would expect the provision of such public goods to have a lagged impact on human development. We therefore experimented with several alternative specifications, including several year lags as well as

variables averaged out over 5 years, in order to take this explicitly into account. However, we found that the results were not markedly different from those already reported.[32]

Summary and conclusions

In this article we have attempted to make 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 which they no longer collected. 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. In addition, a sizeable increase in health and education expenditures occurred following the democratic transitions in 1974 and 1984. Overall, during this entire period (1970–1994), several long-term trends, including fiscal decentralization and ultimate democratization that empowered provincial administrations in a federal system, have led to a significant reduction in regional disparities and to a sizeable increase in the levels of human development across all regions.

Second, we provided an empirical evaluation of the impact of devolution 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 devolution and human development at the provincial level. Comparing decentralization patterns across low-income 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-income and high-income provinces has declined significantly over the 1970–1994 period, partly due to the faster rise of per capita health and education expenditures in the low-income provinces.

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 our two devolution 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 devolution were positively and significantly associated with the dependent variable.

Fiscal and political considerations led to imperfect implementation of

fiscal decentralization in Argentina. Argentina evidently fits the category of a border-line case between the 'devolution' and 'delegation' types of decentralization. Nonetheless, our empirical findings indicate the positive effects of devolution on human development and the importance of democratic accountability for the success of decentralization. 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. As expected, our positive findings of the effects of decentralization on human development tend to be stronger for 'OWNLOCAL' (i.e. the share of provincially controlled resources consisting of local taxes) than for 'LOCALRAT' (i.e. the share of total provincial resources controlled locally) because tax revenues collected at the provincial level induce greater local accountability.

These findings are particularly important at a time when the provincial delegation of health and education expenditures to the provinces is severely threatened as a result of macro-economic imbalances. If such actions could be accompanied by increased revenue collection at the provincial level this might have a positive effect on human development performance, but in its absence reduced devolution will compound the effects of current macro cutbacks on human development in Argentina.

Acknowledgements

Notes

1 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 14 Latin American countries with a population of more than 5 million implemented some decentralization measures.

2 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 (1995), and Savedoff (1998). For a discussion of decentralization and local accountability, see Agrawal and Ribot (1999). 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, 1977; Bennett, 1990).

3 The political dimensions of fiscal decentralization in the region are analyzed by Willis

et al. (1999), Porto (1990), Eaton (1996, 1998, 1999), and Gibson *et al.* (1998). Parikh and Weingast (1997) and Rodden and Rose-Ackerman (1997) relate decentralization in the form of federalism to economic growth.

4 Human development measures were mainly included to measure the *determinants* of decentralization (Porto, 1996; Porto and Sanguinetti, 1993), or were linked to the decentralized provision of services (De La Cruz, 1995; Inter-American Development Bank, 1996, chapter 3; Puryear, 1997; Tendler, 1997; Savedoff, 1998).

5 On the positive impact of health and education on economic growth, see Birdsall and Sabot (1998) and Birdsall *et al.* (1995). Ranis and Stewart (2001) 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.

6 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.

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

8 Agrawal *et al.* (1999, chapter 2) provide a complete review of different definitions and their relation to diverse dimensions involved in the decentralization process.

9 Ranis *et al.* (2000), Klugman (1994), Rondinelli *et al.* (1989), Ostrom *et al.* (1993) and Samoff (1990) discuss the implications and characteristics of these forms of decentralization.

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

11 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 on the importance of local knowledge and resources for policy implementation, see Scott (1998).

12 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).

13 Susan Rose Ackerman (1999, p. 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.

14 According to the World Development Report (World Bank, 1996, pp. 199–201), the national illiteracy rate was 4% in 1995 and the infant mortality rate was 23 per 1000 in 1994.

15 While the city of Buenos Aires and its surroundings account for 11 million people, adding the provinces of Buenos Aires, Santa Fe, and Córdoba, the central or 'littoral' region accounts for 63% of the national population and 73% of total industrial production (Instituto Nacional De Estadistica y Censos (INDEC), 1991, 1994).

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

17 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. ATNs were discretionary funds of the federal government to be distributed to provinces and munici-palities under exceptional circumstances to cover financial shortages. The constitutional origin of ATNs can be traced back to article 67(2). Their use, however, has been discretionary and related largely to political influence.

18 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, 1986, pp. 14–20); and Law 12,139 of 1935, instituting the unification of 'internal taxes'

under national control (Fundacion de Investigaciones Economicas Latinoamericanas [FIEL], 1993, p. 122). Following the addition of newly created taxes on capital gains in 1946 and an inheritance tax in 1951 (FIEL, 1993, p. 140), as well as the partial reform of internal tax administration by law 14,390 in 1954 (Cetrángolo and Jiménez, 1995, p. 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; that is, to allocate, by 1963, 36% of all collected funds to the center, 6% to the MCBA, and 58% to the provinces (Cetrángolo *et al.*, 1996, p. 12).

19 According to FIEL, ATN transfers to the provinces were equivalent to 7.5% of total co-participation funds in 1970, 56.8% in 1971, and 60.6% in 1972 (1993, p. 142).

20 Defined by 'national law' 20,221, the new regime divided co-participation tax proceeds equally between the provinces and the federal government (48.5% each), with the remaining 3% 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, p. 9).

21 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, p. 79) reports that, while 10.5% of 6- to 7-year-old children did not attend school in 1980, the percentage dropped to 3.6% by 1991.

22 We calculated 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 earlier), 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 (for example, Cetrángolo *et al.*, 1996).

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

24 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, p. 226).

25 As an example of the relation between dependence on ATN and provincial overspending, 11 of the 12 provinces deriving more than 1% of their current expenditures from ATN in 1996 have spent more than 20% over their revenues in the 1991–1996 period (the national average of over-spending was 16.4%), according to Presman and Lucioni (1997, pp. 23, 43). ATNs thus induce 'soft budget' constraints that lead to provincial mismanagement.

26 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 *et al.* (1997), Presman and Lucioni (1997), and FIEL (1993).

27 The indicators differ slightly from those used in previous exercises (for example, FIEL, 1993; Porto and Sanguinetti, 1993; Ranis and Stewart, 1994).

28 This indicator measures the number of students who successfully finish primary school and enroll into secondary school as a proxy for retention. We would prefer a more accurate indicator of the output yielded by 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. Admittedly our measure may bias the estimates of the impact of decentralization downwards to the extent population was growing over the period.

29 Note that these measures do a good job of measuring devolution but not delegation; when

increased responsibilities are handed over to the provinces without additional funding, this will be seen as an instance of centralization in our measures.

30 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).

31 Time dummies help avoid spurious correlation. Moreover, the independent variables OWN LOCAL and LOCALRAT show no clear time trend.

32 As expected, the standard error went up as we lost observations. Moreover, applying the Hausman test to the fixed effects, our specifications passed at the 1% level.

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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 and we set out to build one, using data primarily from two sources of provincial public finance: SAREP (1996), covering the 1983–1994 period, and the Federal Council of Investments of Argentina (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 in order to obtain a higher degree of accuracy. For example, let $SAREP(x)_{83-90}$ denote the average value of the variable x in SAREP over the period 1983–1990. Similarly, let us define $CFI(x)_{83-90}$ as the average value of x in the CFI series over the period 1983–1990. We then calculated the value of x for 1982 (the first year for which we use the CFI data), in the following way:

$$x_{82} = CFI(x)_{82} \times \{SAREP(x)_{83-90}/CFI(x)_{83-90}\} \tag{1}$$

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

$$x_{81} = x_{82} \times \{CFI(x)_{81}/CFI(x)_{82}\} \tag{2}$$

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 (MECON) (Ministry of Economy, 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 Cetrángolo and Jiménez (1995) 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 that were then applied to the FIEL data. This process involved two steps; first, we used the ratio of provincial ATN to aggregate ATN (from Cetrángolo and Jiménez) to calculate preliminary values of ATN from the FIEL series, for a particular province in a particular time period. Correspondingly, for conditional transfers and royalties, we took the figures from MECON and the aggregate level from Cetrángolo and Jiménez to calculate this ratio (since Cetrángolo and Jiménez do not have disaggregated data on other transfers), and, as before, applied it to the FIEL data to obtain the disaggregated values. Specifically, we proceeded as follows:

$$\text{Preliminary ATN}_{i,t} = FIEL_{ATN, t} * \{CG_{ATN, i,t}/CG_{ATN, t}\} \tag{3}$$

$$\text{Preliminary conditional}_{i,t} = FIEL_{COND, t} * \{MEC_{COND, i,t}/CG_{COND, t}\} \tag{4}$$

Royalties were calculated similarly. CG refers to Cetrángolo and Jiménez data and MEC refers to MECON, subscripts index province by i and time by t; an index of only t 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 re-scaled these data using the ratio of the total of preliminary

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

Finally, for the years 1970–1971 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 (1997).

Appendix B

DIAGRAM B1: The fiscal structure of Argentina

Resources:

Provincial Taxes (Raised and spent by the provinces)

+

Coparticipation Taxes (raised federally and shared by both)

+

Royalties (paid by federal govt. to the provinces)

Controlled Resources [LOCALRAT=Controlled / Total Resources OWNLOCAL=Provincial / Controlled]

ATNs (Discretionary Transfers from the federal to provincial govts)

+

Conditional Transfers (Federal to Provinces)

Non-controlled Resources

+

Total Resources (Provinces)

Expenditures

Health Expenditure

+

Education Expenditure

+

Welfare Expenditure

Social Expenditure

Development + Infrastructure Expenditure

+

Administration (including justice and security) Expenditure

Non-Social Expenditure

Total Expenditure of Provinces

—

Budget Surplus (Provincial)

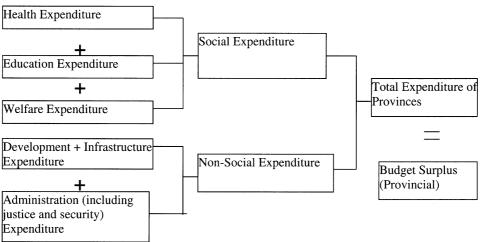TABLE B1. Annual averages of key variables for low-income, medium-income, and high-income provinces (in 1991 Argentine pesos)

Year	Educational output			Infant mortality rate			OWNLOCAL			LOCALRAT		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
1970	152	195	302	77	74	54	13	22	43	55	71	77
1971	162	207	315	68	58	47	14	23	42	47	56	75
1972	175	221	322	66	60	45	16	25	44	42	47	72
1973	183	233	336	62	51	47	10	20	40	42	45	60
1974	203	254	351	60	51	45	12	20	40	46	52	62
1975	215	278	362	58	51	44	14	25	38	35	30	38
1976	223	296	368	55	51	41	10	18	35	38	51	52
1977	226	282	363	54	48	40	10	17	35	60	72	81
1978	232	292	353	48	46	33	13	21	40	63	66	84
1979	233	283	350	42	34	31	14	23	39	61	72	85
1980	248	316	339	41	35	30	18	28	44	62	73	91
1981	259	301	330	40	36	39	25	35	55	56	65	83
1982	263	301	338	35	30	28	25	32	57	51	61	74
1983	265	292	347	36	32	27	30	38	55	45	39	57
1984	274	310	357	36	30	28	30	44	62	46	41	66
1985	289	324	362	30	26	25	18	27	48	76	82	89
1986	311	331	377	30	28	26	21	30	50	74	77	86
1987	314	338	370	30	27	25	24	30	47	69	70	78
1988	333	354	387	29	27	25	22	26	49	75	69	82
1989	360	380	409	28	28	24	20	22	44	72	69	79
1990	387	405	431	28	28	24	20	25	48	74	78	89
1991	398	426	457	26	25	23	21	24	46	76	82	92
1992	395	424	452	26	23	22	23	25	48	79	86	91
1993	391	421	448	25	23	19	37	32	55	79	82	90
1994	390	419	444	23	23	20	27	31	55	75	82	89

Source: Own data set as described in Appendix A.

TABLE B2. Annual averages of fiscal variables for low-income, medium-income, and high-income provinces (in 1991 Argentine pesos)

Year	Educational expenditure per capita			Health expenditure per capita			Social expenditure as % of total expenditure			Welfare expenditure as % of total expenditure		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	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.

TABLE B3. Correlation coefficients between growth rates of ATN and human development indicators

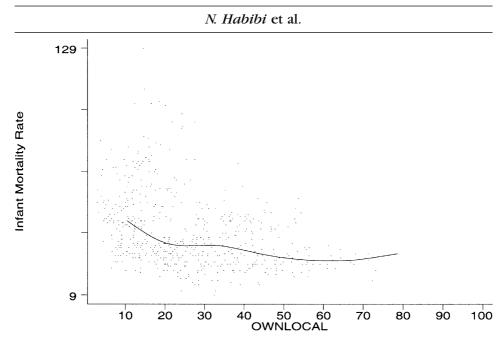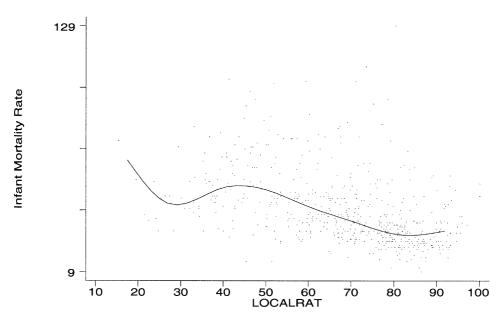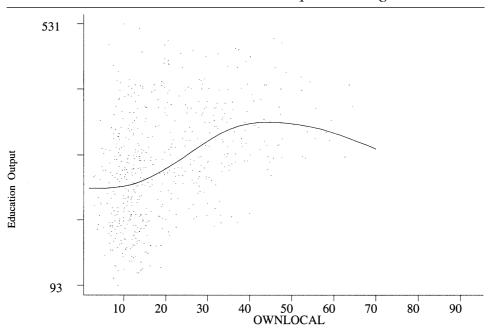|	Growth rate of ATNs
IMR growth (one period lag)	0.04
IMR growth (two period lag)	−0.03
IMR growth (three period lag)	−0.05
EDUC growth (one period lag)	−0.03
EDUC growth (two period lag)	−0.04
EDUC growth (three period lag)	0.02

FIGURE B1. Relationship between IMR and OWNLOCAL.

FIGURE B2. Relationship between IMR and LOCALRAT.
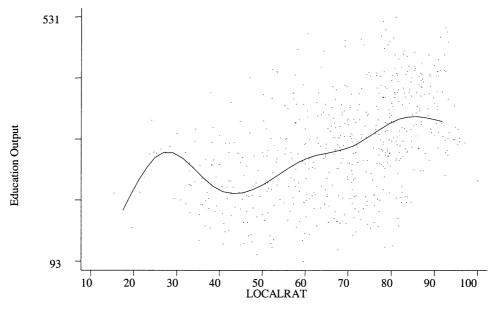
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FIGURE B3. Relationship between EDUC and OWNLOCAL.

FIGURE B4. Relationship between EDUC and LOCALRAT.

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