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Estimating the Income Elasticity of Local Government Revenues and Expenditures under Decentralization

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Abstract

A common feature of the different policy initiatives currently undertaken or considered to improve the decentralization program is a proposal to amend the current formula used in allocating the national government's internal revenues. This formula is known as the Internal Revenue Allotment (IRA) formula, which determines the principal revenue share of local governments in the country's total fiscal resources and as well as the allocation of the total share among the different levels and types of local governments. As an input to policy discussions, this paper seeks to measure the responsiveness of the revenues and expenditures of local government units to changes in the IRA. To measure local fiscal response to IRA changes, the income elasticity of the revenues from local sources and total expenditures of provinces and cities are econometrically estimated using local fiscal data covering the period 1990-96. The results show that revenues from local sources and total expenditures of either the provinces or cities are generally income elastic. That is, the increments in the IRA under decentralization do not seem to substitute for local revenues and have likewise stimulated greater local public spending. The results then suggest that local governments, despite initial apprehensions instigated by their seemingly increased dependence on central transfers, have nonetheless learned to adjust positively to their new roles and responsibilities under the program. However, the results also indicate that current policy reforms must also focus on improving fiscal imbalances, since local governments respond differently, albeit all positively, to the changes in their IRA shares under the decentralization program.

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1. Introduction

Presently, a number of proposals are considered or are already acted on to improve the country's decentralization program. In Congress, HB 7845 and SB 2064, among other similar bills filed, seek to amend the Local Government Code (LGC) of 1991, the law that contained wide-ranging implications for local fiscal autonomy. As stated in the current *Medium Term Philippine Development Plan 1999-2004*, the national government also emphasizes the need to review existing intergovernmental fiscal transfers to promote greater fiscal balance, equity and efficiency. In tandem with other stakeholders, local governments on the other hand are vigilant in their opposition to any policy that undermines local fiscal autonomy even as they proactively support moves that secure and propagate the gains under the decentralization program.

A common feature of the various initiatives is a proposal to upgrade the formula used in allocating the national government's internal revenues, which determine the principal revenue share of local governments in the country's total fiscal resources. Proposals to amend the formula used to determine the size and distribution of the internal revenue allotment (or IRA, the local governments' total share in the national government's internal revenues) are meant to achieve several policy objectives. First, a more adequate local fiscal revenues is intended to enable local governments fulfill their additional functions and expanded responsibilities under the decentralization program. Second, an improvement in the overall fiscal balance is targeted given the apparent bias of the current IRA formula for cities. Lastly, an enhancement in the efficiency, equity and effectiveness in local service delivery is desired given the differences in fiscal capacities and capabilities of local government units, not to mention the varied opportunities and incentives facing them.

With the IRA formula being central to the current policy debate, an assessment of the effect of the IRA on local fiscal behavior will help policymakers and other stakeholders make more informed discussions and decisions regarding the proposed reforms to the decentralization program. Toward such an assessment, the present paper seeks to measure the responsiveness of the revenues and expenditures of local government units to changes in the IRA, an analysis of which then should help identify possible broad policy guidelines for the revisions of the IRA formula.

To measure local fiscal response to IRA changes, the income elasticity of the revenues from local sources and total expenditures of provinces and cities are econometrically estimated using local fiscal data covering the period 1990-96. The results show that revenues from local sources and total expenditures of either the provinces or cities are generally income elastic. That is, the increments in the IRA under decentralization do not seem to substitute for local revenues, contrary to the initial apprehension arising from the seemingly increased dependence of local governments on central transfers, and the increments have likewise stimulated greater local expenditures.

The rest of the paper is organized as follows: a brief review of local literature is presented in Section 2. In Section 3, overall fiscal performances of provinces and cities during the period 1990-96 are discussed in the light of the implementation of two of the main features of the LGC. The empirical framework of the paper is then taken up in Section 4, followed by a discussion of the data and estimation issues in Section 5. Then in Section 6, the results are analyzed. Finally, the conclusions and policy implications are summarized in the last section.

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2. Review of past studies

There seems to be greater interest on the impact of central transfers on local fiscal behavior under decentralization than before, as the list of existing literature on the topic suggest (Appendix Table 1). This despite the widely known dependence of local governments on central transfers, especially on the internal revenue shares, even before the 1991 [Lamberte *et al.*, 1993]. Recent studies however, except possibly Alonzo [1997], do not measure the elasticity of local revenues or expenditures with respect to the IRA per se, but instead examine the effect of the IRA on the *level* of local revenues or expenditures. Nevertheless, the partial list of past studies reviewed here suggests the directions, if not the magnitudes, of the possible elasticity.

While other pre-decentralization studies on local governments are bigger in scope (including Lamberte *et al.* 1993)[1], Bahl and Miller, eds., [1983] focuses exclusively on local government finance in the Philippines before decentralization. A study included in the edited volume, Bahl and Schroeder [1983] reports some of the earliest statistical attempts at measuring the impact of BIR allotments (as the IRA is known then) on local revenue mobilization and capital spending. The study finds that no strong evidence exist that BIR allotments and specific tax allotments, both central transfers to local governments, stimulate overall expenditures or capital spending. However, a simulation of alternative BIR allotment formula indicates that it would favor local governments with high tax collection effort. Their results however maybe highly biased given the limitations of the samples used in the study.

Some of the earliest evaluations of the impact of the decentralization program on local government fiscal performance are Manasan [1992], Quitazol [1994], World Bank [1994] and Diokno [1994]. The first two studies contain empirical assessment of the likely or actual effects of the IRA on local revenue mobilization. Manasan [1992] reports that, at best, all LGUs will have higher local revenues as a result of the enabling features of the Code; and, at worst, only selected LGUs will be able take advantage of the provisions of the Code to improve their local revenue mobilization. Quitazol [1994] on the other hand finds that the IRA has substitutive effect on other types of local revenues. It should be pointed out however that the two studies rely on 1990, 1991 and 1993 data, which might capture transitory as LGUs adjust to the decentralization program.

World Bank [1994] and Diokno [1994] investigate the effect of the IRA on local health expenditures and locally-sourced revenues and have found basically the same results. Both studies report that the IRA has a positive but statistically insignificant effect on local health expenditures or locally-sourced revenues of either provinces or cities. However, the IRA is found to have has a small positive effect on both the health care expenditures and locally-sourced revenues of municipalities. Although these studies rely on a bigger sample of LGUs than Quitazol [1994], fiscal data for 1991, a year before the actual implementation of the decentralization program, are used.

Later empirical studies include Manasan [1995, 1997, 1998], Capuno and Solon [1996] and Alonzo [1997]. In a series of papers, Manasan investigated the effect of the IRA on different types of local revenues and expenditures. On the whole, she finds that the IRA has stimulative effect on both the total amount of locally-sourced revenues and on total expenditures, but may have varying or no significant effects on the different types of local revenues or expenditures. In particular, the IRA is reported to have substitutive effect on local tax revenues, especially on the real property taxes of cities during the early years of the decentralization. Also, she reports a positive correlation between per capita IRA and different types of local social service expenditures (except for education) [Manasan 1997]. In the same vein, Capuno and Solon [1996] also examines the effect of the IRA on social services, in particular on health expenditures. In this paper, the IRA is found to have negative effect on local health expenditures of provinces but a positive effect in the case of cities or municipalities. Manasan [1997] and between IRA and locally-sourced revenues.

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[1] Central transfer programs are reviewed here in the broader context of mobilizing all resources for regional growth.

Unlike the previous studies which measures the level-effect of IRA on local revenues or fiscal outlay, Alonzo [1997] on the other hand reports the elasticity of different types of local government expenditures (personal expenditures, maintenance and other operating expenses, capital outlay) with respect to income (IRA?), which is found to be close unitary in all cases.

Most of the studies reviewed here however rely on 1991-94 data, which might reflect transitory rather than permanent adjustments to the decentralization program. In addition to the limitation of using pre-decentralization or early-decentralization data, previous studies suffer other data and estimation problems. It is not clear from some of the studies, for example, what the sampling scheme used in selecting their sample LGUs. Furthermore, longitudinal or panel data sets and estimation techniques (rather than simply OLS) are ideal to this kind of exercise which involved cross-section and time-series observations.

3. The LGC and local fiscal performance

Although various attempts at fiscal decentralization were made before, the decentralization program adopted in the 1990s is unprecedented in the country in terms of scale and scope [Manasan 1992; Tapales 1993; Brillantes 1987; Loehr and Manasan 1999]. As the blueprint of the decentralization program, the Local Government Code of 1991 is contains several features that have wide-ranging implications on local fiscal behavior. Two among these deeply affect the expenditures and revenues of local governments.[2]

First, the Code expands the list of basic functions, services and facilities assigned to or under the direct administration, control and supervision of the local government units (Book I, Chapter 1, Section 17). Among these functions are central government functions now devolved to local government units since 1993. The devolved functions include agricultural extension services, community-based forestry projects, health services (including primary, secondary and tertiary hospitals), social welfare services, solid waste disposal system, and some local infrastructure facilities and tourism services.

Second, the Code also augments the shares of LGUs in the proceeds of national taxes (Book II, Title 3, Chapters 1 and 2). The most significant augmentation is in the share of the local governments in the internal revenues of the national government (which is known as the Internal Revenue Allotment or IRA). Additionally, local governments partake in the proceeds from sale or exploitation of local natural resources by the national government. Relative to the IRA however the share in national wealth (as the share in the latter form of national revenues is known) is small. Also, unlike the IRA which benefits all LGUs and other special regional bodies (such as the MMDA and ARMM regional government), shares in national wealth depend on the distribution of natural resources across areas.

The actual implementation of the LGC started a year after it was signed into law. In 1992, the new IRA formula was adopted. The shift to a new IRA formula[3] led to a significant increase in the revenue shares of local governments [Lamberte *et al.* 1993]. Nominally, the annual incremental IRA since 1991 until 1993 is estimated to be at least 12 billion pesos [Diokno 1994; DOH 1996]. It was not until 1993 however that the devolution of central government functions to local governments took place. According to estimates, taking as basis the 1992 budget of concerned agencies on the devolved functions, the amount of additional expenditure obligations assigned to LGUs as a consequence of the transfer of services, personnel and facilities to LGU is about 7.2 billion pesos [Loehr and Manasan 1999]. Although this total amount, which is referred to as the Cost of Devolved Functions (CODEF), is significantly less that the total incremental IRA, the CODEF however reported to be inequitably distributed. Unlike the IRA formula, which equally

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[2] Arguably, the two other major provisions of the Code has significant effect on local fiscal behavior: expanded resource generation/utilization authorities, and greater civil society participation in various aspects of local governance.

[3] The IRA formula has two components. The first component is called the *base* formula which essentially determines the relative shares of the national government and local governments in the total internal revenues of the national government. The second component is called the *distribution* formula which determines the relative shares of the different local government levels (provinces, cities, municipalities, barangays) and the individual LGU share within each level.

favors provinces and cities (23 percent), the distribution of the CODEF, especially of the cost of devolved health functions, is found to unduly burden the provinces more than any other level of local government units. Estimate show that, for example, provinces absorbed 45.6 percent of the total CODEF [Loehr and Manasan 1999], or about 59 percent of the devolved health functions, which account for more than 60 percent of the total CODEF [DOH 1996].

Although the LGC is yet to be amended, the *de facto* IRA formula however is different from the one specified in the LGC. Since 1994, the codal IRA formula has been amended through the General Appropriations Act passed each year to compensate each LGU for their share in the actual (or historical) CODEF and the cost of city-funded hospitals existing as of December 31, 1992. In 1994 and 1996, the compensation is set to 50 percent of the actual CODEF and the cost of city-funded hospitals. In 1995 and 1997, a 100 percent compensation is granted to LGUs.

The fiscal effects of the LGC on provinces and cities may be discerned from Figure 1 and Figure 2, respectively. The figures track the annual averages in the IRA, revenues from local sources (LOCREV) and total expenditures (TOTEXP) of the two local government levels over a seven-year period beginning in 1990. Revenues from local sources (or simply *local revenues*) comprises income from real property taxes, proceeds from operation of public enterprises (such as public markets), local business taxes, mayor's permits, sand and gravel tax and other incomes. Local revenues do not include incomes from external sources such as transfers from the national government (e.g., IRA). Hence, local revenues are essentially the amount of resources that LGU has if the IRA is taken out of its budget.

The figures suggest two broad trends. First, the IRA accounts for the bulk of local financing in the case of provinces. Cities, in contrast, are less dependent on the IRA to support their expenditures. Second, there is generally a positive correlation between the IRA on the one hand and either local revenues or total expenditures on the other, especially under decentralization (1992-96). The positive correlation between the IRA and total expenditures is expected since the IRA, which is a major source of income, has been increasing since the implementation of the LGC. Also, the big jump in total expenditures between 1992 and 1993 may be explained by the devolution of functions, which essentially expanded the expenditure responsibilities of local governments.

Fig. 1. The IRA, Revenues from Local Sources and Total Expenditures of Provinces

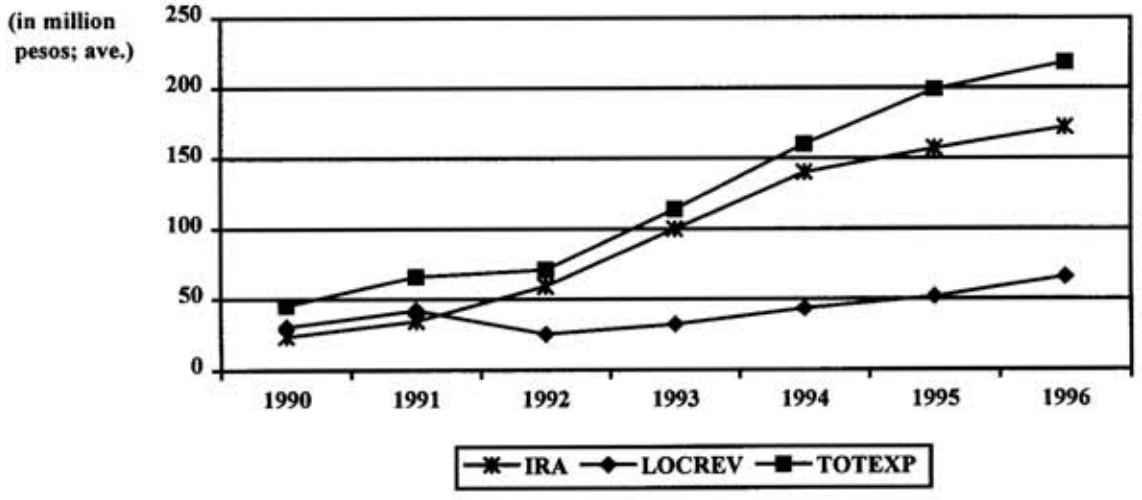
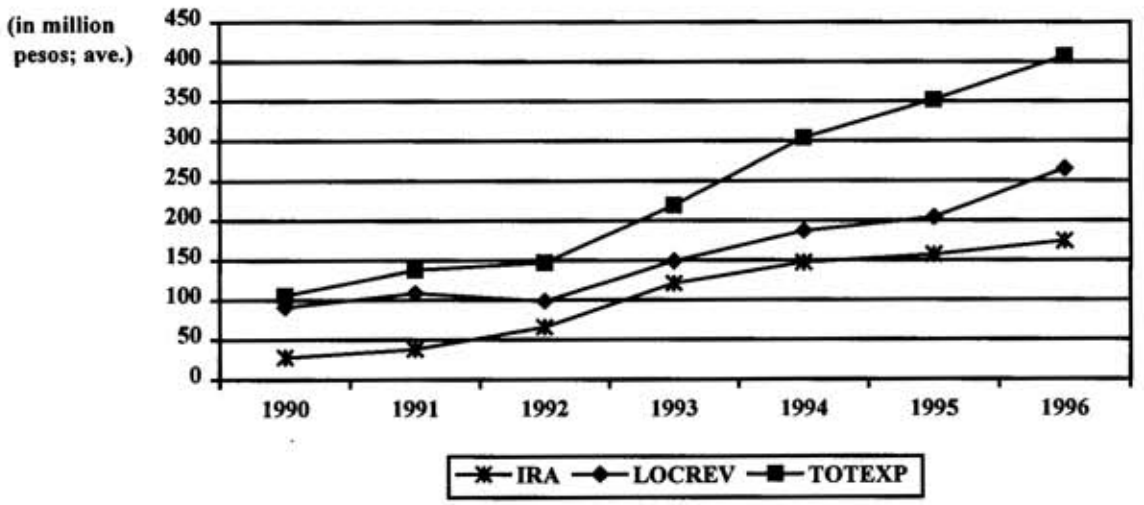


Fig. 2. The IRA, Revenues from Local Sources and Total Expenditures of Cities



The positive correlation between the IRA and local revenues on the other hand is surprising to say the least, especially when earlier studies report that the IRA has a substitutive (hence negative) effect on other types of local revenues. Previous reports however find partial support in the case of provinces where a negative correlation is observed between the IRA and local revenues or total expenditures between 1991 and 1993. The same relatively weak (but positive) relationship between the IRA and local revenues or total expenditures of cities is observed during the transition or implementation phase of the decentralization program (1991-93). But from 1993 onwards however the IRA seems to stimulate not only total expenditures but local revenues as well, both in the case of provinces and cities.

Clearly, the observed positive correlations between IRA and local revenues or total expenditures suggest a positive assessment of the effect of the IRA on local fiscal behavior. But for purposes of refining current central transfer programs, estimates of the magnitudes, rather than just the direction, of local fiscal response to the IRA however may be required.

4. Empirical framework

To measure the local fiscal responses to the changes in the IRA, especially under the decentralization program, the elasticity of the local revenues (LOCREV) or total expenditures (TOTEXP) with respect to the IRA (I) is estimated. Essentially, a functional relationship between LOCREV or TOTEXP, on the one hand, and I , on the other is assumed, i.e.,

$$X = f(I, \mathbf{W}), \quad X = \text{LOCREV}, \text{TOTEXP}; \quad I = \text{IRA}.$$

Here a vector of other variables **W** is introduced to control for the effects of other factors such as the staggered implementation of the LGC and region-specific differences. The income elasticity of local revenues or total expenditures with respect to IRA (since the IRA is an exogenuously determined income of LGUs), denoted as η_{XI} , may then be calculated as:

$$\eta_{XI} = (dX/dI)(I/X) = d\ln X/d\ln I.$$

With the availability of local government fiscal data, the income elasticity of local revenues and expenditures may be estimated econometrically. Econometric estimation is relatively better than year-on-year estimations when other factors tend to bias results. As suggested above, the natural logarithm of local revenues or the natural logarithm of total expenditures are regressed against the natural logarithm of IRA and other factors in this paper.

The expected signs of the estimated income elasticity are as follows. The income elasticity of total expenditures is expected to be positive, since a welfare-maximizing local government will presumably exhaust all of its available income to provide more or better local public services.[4] On the other hand, the income elasticity of total revenue may be positive or negative. If the estimated elasticity is positive, an additional IRA is said to stimulate greater revenue-raising efforts. Since with the additional exogenous income, a local government would need only a little bit more of local revenues to meet target expenditures. If, on the other hand, the estimated elasticity is negative, an additional IRA is said to substitute for local revenue-raising efforts. Since with the additional IRA, a local government may not need to collect as much local taxes to meet its expenditure obligations. Clearly, the directions and magnitudes of the estimated income elasticity, especially of local revenues, are important policy parameters.

5. Data and estimation issues

The period covered in the study is from 1990 to 1996. The first two years cover the years before the Code was actually implemented. The five-year period under decentralization (1992-96) may be considered long enough to account for both temporary and permanent adjustments to the new system. For each of the year covered, relevant fiscal data of all 74 provinces and 73 cities are used. Note however that the number of LGUs covered varies across the years since several municipalities were converted to cities and that new provinces were created since 1992.

As mentioned above, only the income elasticity of local revenues and total expenditures will be estimated. Hence, at best, the estimates will only provide a broad sketch of the overall responsiveness of local government units to changes in their exogenous income.[5] The fiscal data used in the estimates are culled from the Budget Operations Statements compiled by the Bureau of Local Government Finance of the Department of Finance and from the annual reports of the Commission on Audit. Other socioeconomic variables are collected from the Department of the Budget and Management, Department of Health and National Statistics Office.

A number of estimation issues are also addressed. The first issue is controlling for the staggered implementation of the LGC, i.e., the adoption of the new IRA formula in 1992 followed by the devolution of central government functions in 1993. To account for the sequential implementation of the two of the main features of LGC, year-dummy variables are introduced in estimation of income elasticity. In addition, the possible effects of region-specific factors (such as climate, topography, and culture) and the presence of regional hospitals retained and operated by the Department of Health under the decentralization are also accounted for in the estimation with the use of dummy variables also. All the dummy variables introduced are interacted with the natural logarithm of IRA (lnIRA), whose estimated coefficient is a measure of income elasticity.

For comparison, both OLS and panel (or longitudinal) data procedures are used to estimate the income elasticity. Since most previous studies rely on OLS technique, the comparison will help identify the possible bias in previous estimates. Panel data procedure however are more appropriate for longitudinal

[4] But this is not to say that the different types of local expenditures will all also vary positively with IRA

[5] A more detailed examination of income elasticity of different types of local revenues (such as real property taxes and income from economic enterprises) and different types of expenditures (such as social services, economic development, capital outlays), including the case of municipalities, will be the subject of another study.

analysis than OLS since the latter suffers a number of problems [Greene, 1997, Chapter 14].[6] In the panel data estimation, for both year-fixed effects and region-fixed effects, which are essentially dummy variables that test for differences in the estimated regression intercepts, are used. The year-fixed effects are especially useful to account for the *de facto* adjustments in the IRA formula to compensate LGUs for their shares in the actual CODEF and city-funded hospitals. While it possible to test simultaneously the year-fixed effects and region-fixed effects with the introduction of interaction variables (i.e., year dummies interacted with region dummies), this however will potentially pose a problem with the degrees of freedom.

6. Analysis of results

Overall guide

Description of the data used and the detailed results of the different econometric specifications tried are presented in the appendix tables. Appendix Table 2 presents the variable definitions. The descriptive statistics for the province-level data and city-level data are contained in Appendix Tables 3 and4, respectively. The various estimates of the income elasticity of the local revenues of provinces are contained in Appendix Tables 5 and 6; while the 3 succeeding tables (Appendix Tables 7-9) report the income elasticity of the total expenditures of provinces. On the other hand, the income elasticity estimates for the cities are presented in Appendix Tables 10 and 11 for local revenues and Appendix Tables 12-14 for total expenditures.

Note that several specifications are estimated using both OLS and Panel data estimation procedures, as additional dummy variables tested. Also, the control region for the province-level regressions is Region IV (Southern Tagalog Region), while that for the city-level regressions is the National Capital Region (NCR). The control year is 1990 for both the cities and provinces.

Effects of IRA formula changes and other factors

Several dummy variables are used to account for the change in the IRA formula, devolution of central government functions, presence of DOH-retained hospitals in the area, regional differences, and other year-fixed effects (e.g., 1995 being an election year). Generally, the effects of these factors on the income elasticity of local revenues and total expenditures appear to be significant in the case of provinces. Specifically, the estimated income elasticity is higher after the new IRA formula was adopted (in 1992). The positive effect of lnIRA on total expenditures however seems diminished with the devolution of central government functions to LGUs in 1993. This is understandable since the provinces absorbed the bulk of the devolved functions. The presence of DOH-retained hospitals on the other hand does not seem to affect the estimated income elasticity of provinces.

Unlike provinces', the local revenues of cities appear to be less sensitive to the same set of other factors. This is perhaps due to the fact that cities' are less dependent on the IRA than provinces. But city-level expenditures however seem positively affected by the devolution of function and negatively by the presence of DOH-retained hospitals. Although the cities' share in the Cost of Devolved Functions is less than provinces', the devolved functions still led to increases in total fiscal outlay since devolved functions are mostly fixed or recurrent expenditures (e.g., personnel services and facilities).

The importance of the other factors in explaining the variations in estimated income elasticity of total expenditures is also evident in the case of cities. The higher income elasticity after 1993, which appears to

[6] Specifically, if only cross-section data are used, the estimated income elasticity will be sensitive to the choice of the year since the decentralization is best characterized as a sequence of reforms. If on the other hand, the behavior of only one LGU is tracked for a number of years, the estimated elasticity obviously has limited information content regarding other LGUs. Even if OLS is procedure is applied on panel data, the procedure is also unable to distinguish one component of the variance of the residual that is due to time variation from another component that is due to cross-section differences. The biases however are minimized to a certain extent if dummy variables are also introduced in the OLS estimations.

be due to the devolution of function, may be due to the fact that they receive extra IRA for their share in the CODEF as well for any hospitals they were operating before the decentralization. It also interesting to note that the presence of retained hospital in the city tend to reduce the income elasticity of total expenditures, indicating that these in effect subsidize local health expenditures since many of the DOH-retained hospitals are located in cities or regional centers.

Also, the results show that the OLS estimates are generally different from the panel data estimates, both in the case of province-level and city-level regressions. Thus the findings indicate the potential bias in the previous estimates of income elasticity (or even in the effect of IRA on the *level* of local revenues or total expenditures). The income elasticity estimates also generally vary between year-fixed effects and random-fixed effects panel data models. Based on the results of the full-blown province-level regressions, the fixed-effect panel data model is a more appropriate to account for variations across years, while random-effects model is more suitable for controlling regional differences, both in the case of local revenues and total expenditures. In the case of cities, on the other hand, regional variations seem also to exert independent effect on total revenues, while year-fixed effects do not. However, both year-fixed effects and region-fixed effects do not seem to influence total expenditures. Hence, the differences in the fiscal behavior of provinces, and of the cities partly, may also be due to the sociocultural or geographical differences across regions.

Estimated average income elasticity

The estimated average elasticity for provinces and cities are summarized in Tables 1 and 2, respectively. Again the OLS estimates generally differ from the panel data estimates, showing significant bias when the proper estimation procedure is not used. The differences however narrow down when the full-blown model is estimated. This is not surprising since the introduction of the dummy variables in the OLS regressions essentially replicates the panel data procedure (which is also called *the least squares dummy variable* method).

In the case of provinces, the panel data estimates of the income elasticity of local revenues is between 1.242 to 1.374, after accounting for all the other above-mentioned factors. The income elasticity of total expenditures on the other hand is between 0. 956 and 0.987. This indicates that the increase in the IRA of provinces exerts a greater positive pressure on local revenue generation effort than on local expenditures. This is perhaps due to the effect of the devolved services, personnel and facilities are collectively found to diminish the partial effect of IRA on local fiscal outlay.[7] Furthermore, it is likely that the provinces are forced to optimize their provision of health services, which comprises the bulk of devolved functions, under decentralization.

In contrast however the estimated income elasticity of local revenues of cities, using the full-blown model, is between 1.065 and 0.929. Since the cities are less dependent on IRA than provinces, their relatively smaller income elasticity indicates that cities have already exploited much of their potential sources of local income. On the other hand, the cities exhibit higher income elasticity of expenditures, estimated to be nearly unitary, less than provinces. In this case, the cost of devolved functions to cities, which is comparatively small, presumably did not constrain the cities to spend on other local public services.

In sum, a doubling of the IRA of provinces will likely generate more than twice the amount of their local revenues, but will lead to less than 100 percent increase in their expenditures. A doubling of the IRA of cities on the other hand will likely double both their local revenues and total expenditures.[8]

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[7] This is consistent with earlier findings that a number of provinces received additional IRAs less than the amount it would need to finance the devolved functions during the during the early years of the decentralization program [Capuno 2001, forthcoming].

[8] Furthermore, the positive effect of the IRA also suggests that LGUs may have taken advantage of the enabling provisions of the Code by improving their tax collection and administration systems.

Table 1. Estimates of Average Elasticity for Provinces

Model	Average Elasticity		
	OLS Estimates	Panel Data Estimates	
		Year	Region
A. Income Elasticity of Revenues from Local Sources			
Base (M1)	0.75	1.296	0.683
Controlling for the devolved functions (M2)	1.154	1.431	0.984
Controlling for the devolved functions and the change in the IRA formula (M3)	1.562	1.465	1.416
Controlling for the devolved functions, the change in the IRA formula and regional differences (M4)	1.330	1.374	1.242
B. Income Elasticity of Total Expenditures			
Base (P1)	0.901	1.021	0.886
Controlling for the devolved functions (P2)	0.882	1.041	0.932
Controlling for the devolved functions and the change in the IRA formula (P3)	1.053	1.048	1.013
Controlling for the devolved functions, the change in the IRA formula and presence of DOH-retained hospitals (P4)	1.034	1.026	0.989
Controlling for the devolved functions, the change in the IRA formula, presence of DOH-retained hospitals and regional differences (P5)	0.954	0.956	0.987

Simulations

From the detailed results contained in the appendices, the estimates of income elasticity of both provinces and cities appear to be especially sensitive to regional variations. As an illustration of how such results can be used for counterfactual analysis, the impact of a 10-million peso increase in the IRA on local revenues and total expenditures is simulated. The results for provinces and cities are presented in Tables 3 and 4 respectively. The simulations are useful in measuring the differential impact of central transfer policies across LGU levels and regions.

In the case of provinces, the 10-million peso incremental IRA is projected to generate an average of at least a 5.5 million-peso increase in local revenues and a minimum of 12.6 million-peso rise in total expenditures. Significant variations however are observed across regions. The incremental grant to provinces in Region VII, which include Cebu, appears to stimulate greater amount in local incomes than any other provinces elsewhere. Provinces in the Cordillera Autonomous Region however are likely to be the least stimulated by the increase in central transfers, perhaps owing to their relatively poor resource base. In terms of changes in total expenditures of provinces, largely similar pattern is observed across regions.

In the case of the cities on the other hand, the incremental IRA is projected to lead to and average of at least 14 million-peso increase in local revenues and a minimum of 24.3 million-peso rise in total expenditures. The policy change will likely to have its maximum impact both in terms of increasing local revenues and total expenditures on Metro Manila Cities, and to some noticeable extent also to cities in Region III, Region VII and CAR.

Table 3. Estimates of Average Elasticity for Cities

Model	Average Elasticity		
	OLS Estimates	Panel Data Estimates	
		Year	Region
A. Income Elasticity of Revenues from Local Sources			
Base (D1)	0.600	0.668	0.718
Controlling for the devolved functions (D2)	0.612	0.777	0.950
Controlling for the devolved functions and the change in the IRA formula (D3)	0.828	0.837	0.985
Controlling for the devolved functions, the change in the IRA formula and regional differences (D4)	1.043	1.065	0.929
B. Income Elasticity of Total Expenditures			
Base (C1)	0.766	0.769	0.843
Controlling for the devolved functions (C2)	0.754	0.760	0.970
Controlling for the devolved functions and the change in the IRA formula (C3)	0.785	0.772	1.065
Controlling for the devolved functions, the change in the IRA formula and presence of DOH-retained hospitals (C4)	0.709	1.065	0.668
Controlling for the devolved functions, the change in the IRA formula, presence of DOH-retained hospitals and regional differences (C5)	1.065	1.067	1.065

Table 4. Simulating the Effect of a Ten-Million Peso Increase in the IRA of Provinces
(Figures in million pesos)

Regions	Period average (1990-96)			Change in Local Revenues		Change in Total Expenditures	
	IRA	Local Revenues	Total Expendi-tures	Year*	Region*	Year*	Region*
National	94.9	41.7	125.0	6.04	5.46	12.59	13.00
Region I	125.0	44.8	152.0	4.92	4.48	11.62	11.99
Region II	97.2	23.6	112.0	3.34	2.99	11.02	11.33
Region III	121.0	65.6	175.0	7.45	6.73	12.35	14.27
Region IV	102.0	69.7	153.0	9.39	8.49	14.34	14.81
Region V	91.0	28.4	107.0	4.61	3.89	11.24	11.58
Region VI	118.0	43.5	148.0	5.07	4.60	11.99	12.37
Region VII	124.0	123.0	234.0	13.63	12.32	18.04	18.66
Region VIII	85.5	17.2	97.9	2.76	2.45	10.95	11.26
Region IX	102.0	25.2	122.0	3.39	3.04	11.43	11.78
Region X	82.7	35.8	107.0	5.95	5.38	12.37	12.78
Region XI	98.3	38.0	124.0	3.55	4.80	9.44	12.48
Region XII	97.7	19.7	10.0	2.77	2.49	0.98	1.00
CAR	57.3	8.169	44.4	1.42	1.71	5.93	7.59
ARMM	105.0	5.80	76.3	0.76	0.63	6.95	7.13
CARAGA	87.0	30.0	112.0	4.74	4.32	12.31	12.73

*Controlling for year-fixed effects or region-fixed effects.

Table 5. Simulating the Effect of a Ten-Million Peso Increase in the IRA of Cities
(Figures in million pesos)

Regions	Period average (1990-96)			Change in Local Revenues		Change in Total Expenditures	
	IRA	Local Revenues	Total Expendi-tures	Year*	Region*	Year*	Region*
National	105.0	158.0	239.0	16.03	13.98	24.29	24.24
NCR	114.0	460.0	545.0	42.97	37.49	51.01	50.91
Region I	68.9	35.9	96.2	5.55	4.72	14.90	14.87
Region II	90.8	32.2	50.6	3.78	3.23	3.40	5.93
Region III	81.3	79.7	154.0	12.66	8.86	20.21	20.17
Region IV	97.0	56.7	146.0	6.23	5.33	16.06	16.03
Region V	68.5	41.5	103.0	6.45	5.52	16.04	16.01
Region VI	96.4	59.5	120.0	6.57	5.57	13.28	13.26
Region VII	82.8	85.6	159.0	12.68	9.41	22.43	22.33
Region VIII	118.0	41.5	136.0	3.75	3.12	12.30	12.27
Region IX	137.0	52.8	146.0	5.28	3.31	11.37	11.35
Region X	88.1	48.0	121.0	7.70	4.81	16.37	16.36
Region XI	321.0	231.0	501.0	7.66	6.64	16.65	16.62
Region XII	121.0	99.2	202.0	8.73	7.56	17.81	17.78
CAR	83.2	115.0	184.0	14.72	13.37	23.60	23.55
ARMM	55.3	3.61	58.9	0.70	0.52	11.36	11.34
CARAGA	124.0	57.8	161.0	4.96	4.20	13.85	13.83

*Controlling for year-fixed effects or region-fixed effects.

7. Conclusions and policy implications

Generally consistent with previous results, the results of the present study show that, on the whole, local revenues and total expenditures of either provinces or cities vary positively with the changes in the IRA. This dispels the initial apprehension about the possible substitutive effect of the IRA, especially on local revenue mobilization. Certainly, this should be taken as one clear gain of the decentralization program.

Any change in the IRA is likely to have differential impact across LGU levels or regions. The local revenues of provinces show greater sensitivity to changes in central transfers than cities'. Furthermore, LGUs in the most economically advanced regions are also found to be more susceptible to IRA reforms than others.

The presence of DOH-retained hospitals has no significant effect on the provinces; but they do have a negative effect on the total expenditures of cities, where most of these hospitals are located.

Three broad policy guidelines can be drawn from the results. First, policies that tend to reduce the IRA will have a double negative effect on local finances. The reduction will lead to a decrease in total income and in local revenues. This clearly has grave implications on the ability of local governments to provide basic services.

Second, the IRA formula may have to factor in the sensitivity of local revenues and total expenditures to increments in the IRA to achieve overall fiscal balance. This is an important policy consideration since the IRA is the biggest single form of block transfers to LGUs and that it accounts for a big portion of total revenues of LGUs. But tinkering with the IRA formula may prove to be politically difficult as recent events indicate.

Finally, perhaps as an alternative to a revised IRA formula, a fiscal equalization grant scheme must but adopted to improve overall fiscal balance. Such a grant scheme seems more appropriate than the IRA because by design it will specifically adjust for the differences in local fiscal needs and capabilities. In addition, the grant can be designed to factor in possible adverse strategic responses of LGUs to any policy reform. Such flexibility may not be so easily achieved with the IRA, which is basically a block transfer.

However, aside from the additional funds required to finance a fiscal equalization grant, finer and more complete estimates of income elasticity will have to be done for specific policy purposes. More disaggregated estimates of the income elasticity of different types of local revenues and expenditures are obviously needed to determine various local fiscal needs and capabilities. In addition, similar estimations for municipalities must also be undertaken. Furthermore, inter-LGU interactions – arising from spillovers, mandated tax revenue-sharing arrangements, other inter-local transfers and strategic interactions – will have to be analyzed to maximize the effectiveness of central transfer programs. The effect of other major macroeconomic developments such as the 1997 financial crisis and the temporary withholding of part of the IRA in 1998 should also be investigated. These will be the subjects of future studies.

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Appendix Table 1. Summary of Past Studies

Studies	Research Objectives	Unit of Analysis	Period Coverage	Methodology	Main/Relevant Results
Bahl and Schroeder [1983]	To evaluate the effect of (central) grant system on local revenue mobilization and capital spending	96 municipalities (in 4 provinces)	1977	- Regress local gov't expenditures against BIR allotment and specific tax allotment and regress BIR allotment against on local tax effort (OLS)	- No strong evidence exists that BIR and specific tax allotments stimulate overall expenditures or capital spending - BIR allotment seems to favor local governments with high tax effort
Manasan [1992]	To analyze some of the provisions of the 1991 LGC as these impact on the financial position of LGUs	Provinces, cities, municipalities (Rural/urban/ industrial)	1992	- Simulate the effect the new IRA formula and other provisions of the LGC on local revenues (by sources)	- Incremental IRA for some LGUs may be insufficient to finance devolved functions - At best, the LGC will have lead higher local revenues; at worst, only urban municipalities will have higher local revenues
Quitazol, M. J. [1994]	To analyze the incentive effects of IRA on local taxation	12 provinces	1991 and 1993	- Measure LGU dependence on the IRA, fiscal gap, effect of IRA on fiscal effort and revenue-adequacy performance	- LGUs heavily depend on the IRA, which is also found to have substitutive effect on other types of local revenues
World Bank [1994] [Also in Diokno, 1994]*	To assess the risks and opportunities in the health sector under devolution (To find the determinants of per capita health expenditures and per capita locally-sourced revenues)	71 provinces, 60 cities, 515 municipalities	1991	-Regress per capita health expenditures or locally-sourced revenues against IRA and other socioeconomic variables (OLS)	-IRA has positive but statistically insignificant effect on the health care expenditures of either provinces or cities; although it has small positive effect in the case of municipalities -IRA shows negative but also statistically insignificant effect on the local revenues of provinces or cities; although it also has small positive effect in the case of municipalities
Manasan [1995]	To review and analyze the revenue performance of local government units between 1981 and 1993	All provinces, cities and municipalities (?)	1985, 1990, 1992 and 1993	-Regress per capita locally-sourced revenues and RPT collection on per capita IRA , among others (OLS)	- IRA has positive effect on total locally-sourced revenues, but negative effect on local tax revenues before and after decentralization
Capuno and Solon [1996]	To evaluate the effect of the IRA, spillovers and cost of devolved functions, presence of DOH-retained hospitals on local health expenditures	36 provinces, 20 cities, 117 municipalities	1991 and 1993	- Regress per capita health expenditures against IRA and other factors (OLS)	IRA has negative and statistically significant effect on local health expenditures of provinces; but positive and statistically significant effect on the local health expenditures of cities or municipalities
Alonzo [1997]	To develop guidelines for national gov't support to devolved functions and identify mechanisms for central transfers to LGUs for project cost-sharing	28 provinces	1993	- Estimate expenditure elasticity with respect to LGU income (IRA?)	Estimates are 0.995 for personal services, 0.928 for maintenance and other operating expenses, and 1.054 for capital outlay

Appendix Table 1. Summary of Past Studies (cont.)

Studies	Research Objectives	Unit of Analysis	Period Coverage	Methodology	Main/Relevant Results
Manasan [1997]	To analyze the expenditure patterns of provinces before and after devolution, and the effect of IRA and local revenues on social and human development expenditures	All provinces	1991/1993	- Regress social service expenditure indicators against per capita IRA, per capital local source revenues and HDI (or its components) (OLS)	Social sector expenditures are generally positively related with per capita IRA but have statistically significant relation with locally-source revenues. Education expenditures fall with per capita IRA and rises with locally-source revenues
Manasan [1998]	To address the question on how to finance and deliver adequate public services in urban areas	All cities and regional growth centers (i.e., urban areas)	1991, 1993, 1994, 1995	-Regress per capita business tax revenues, real property tax revenues and total income against per capita IRA, among others (OLS). -Regress different types of social service expenditures and total expenditures per capita against per capita IRA, among others (OLS)	-IRA seems to have have stimulative effect on total income, but substitute effect on business tax revenues and no statistically significant effects on real property tax revenues under decentralization. - A strong, positive and significant link is found between total expenditures and IRA; IRA has no apparent effect on social service expenditures, except in the case of LGUs who have above average net resource transfers (i.e., more than adequate incremental IRAs).

Appendix Table 2. Variable Definitions

Variable name	Definition
LNIRA	- Natural logarithm of the Internal Revenue Allotment (IRA)
LNLOCREV	- Natural logarithm of the total revenues from local sources
LNTOTEXP	- Natural logarithm of the total expenditures
DEV93	- 1 if year is 1993 or later; 0 otherwise
LNIRA *x* DEV93	- Natural logarithm of IRA *x* DEV93
YR92	- 1 if year is 1992 or later; 0 otherwise
LNIRA *x* YR92	- Natural logarithm of IRA *x* YR92
DOHOSP	- 1 if there is DOH-retained hospital within the political boundary; 0 otherwise
LNIRA *x* DOHOSP	- Natural logarithm of IRA *x* DOHOSP
RGN1	- 1 if Region I (Ilocos); 0 otherwise
RGN2	- 1 if Region II (Cagayan Valley); 0 otherwise
RGN3	- 1 if Region III (Central Luzon); 0 otherwise
RGN4	- 1 if Region IV (S. Tagalog); 0 otherwise
RGN5	- 1 if Region V (Bicol); 0 otherwise
RGN6	- 1 if Region VI (W. Visayas); 0 otherwise
RGN7	- 1 if Region VII (C. Visayas); 0 otherwise
RGN8	- 1 if Region VIII (E. Visayas); 0 otherwise
RGN9	- 1 if Region IX (W. Mindanao); 0 otherwise
RGN10	- 1 if Region X (N. Mindanao); 0 otherwise
RGN11	- 1 if Region XI (S. Mindanao); 0 otherwise
RGN12	- 1 if Region XII (C. Mindanao); 0 otherwise
CAR	- 1 if Cordillera Autonomous Region (CAR); 0 otherwise
ARMM	- 1 if Autonomous Region of Muslim Mindanao (ARMM); 0 otherwise
CARAGA	- 1 if CARAGA; 0 otherwise
NCR	- 1 if National Capital Region; 0 otherwise
LNIRA *x* RGN1	- Natural logarithm of IRA *x* Region I
LNIRA *x* RGN2	- Natural logarithm of IRA *x* Region II
LNIRA *x* RGN3	- Natural logarithm of IRA *x* Region III
LNIRA *x* RGN4	- Natural logarithm of IRA *x* Region IV
LNIRA *x* RGN5	- Natural logarithm of IRA *x* Region V
LNIRA *x* RGN6	- Natural logarithm of IRA *x* Region VI
LNIRA *x* RGN7	- Natural logarithm of IRA *x* Region VII
LNIRA *x* RGN8	- Natural logarithm of IRA *x* Region VIII
LNIRA *x* RGN9	- Natural logarithm of IRA *x* Region IX
LNIRA *x* RGN10	- Natural logarithm of IRA *x* Region X
LNIRA *x* RGN11	- Natural logarithm of IRA *x* Region XI
LNIRA *x* RGN12	- Natural logarithm of IRA *x* Region XII
LNIRA *x* CAR	- Natural logarithm of IRA *x* CAR
LNIRA *x* ARMM	- Natural logarithm of IRA *x* ARMM
LNIRA *x* CARAGA	- Natural logarithm of IRA *x* CARAGA
LNIRA *x* NCR	- Natural logarithm of IRA *x* NCR

Appendix Table 3. Descriptive Statistics: Provinces
(1990-1996)

Variables	Obs	Mean	Std. Dev.	Minimum	Maximum
LNIRA	521	18.067	0.932	14.246	19.785
LNLOCREV	521	16.743	1.349	11.411	20.754
LNTOTEXP	518	18.318	0.918	15.366	20.800
LNIRA *x* DEV93	521	10.937	9.188	0	19.785
DEV93	624	0.500	0.500	0	1
LNIRA *x* YR92	521	13.433	8.250	0	19.785
YR92	624	0.625	0.485	0	1
LNIRA *x* DOHOSP	521	5.885	8.590	0	19.785
DOHOSP	624	0.308	0.462	0	1
LNIRA *x* RGN1	521	0.982	4.129	0	19.785
LNIRA *x* RGN2	521	1.202	4.495	0	19.563
LNIRA *x* RGN3	521	1.477	4.999	0	19.480
LNIRA *x* RGN4	521	2.678	6.446	0	19.443
LNIRA *x* RGN5	521	1.420	4.868	0	19.375
LNIRA *x* RGN6	521	1.463	4.953	0	19.767
LNIRA *x* RGN7	521	0.978	4.117	0	19.692
LNIRA *x* RGN8	521	1.446	4.894	0	19.489
LNIRA *x* RGN9	521	0.694	3.483	0	19.440
LNIRA *x* RGN10	521	0.925	3.966	0	19.337
LNIRA *x* RGN11	521	1.155	4.451	0	19.367
LNIRA *x* RGN12	521	0.731	3.573	0	19.266
LNIRA *x* CAR	521	1.244	4.512	0	18.708
LNIRA *x* ARMM	521	0.704	3.530	0	19.100
LNIRA *x* CARAGA	521	0.967	4.067	0	19.041
RGN1	624	0.051	0.221	0	1
RGN2	624	0.064	0.245	0	1
RGN3	624	0.077	0.267	0	1
RGN4	624	0.141	0.348	0	1
RGN5	624	0.077	0.267	0	1
RGN6	624	0.077	0.267	0	1
RGN7	624	0.051	0.221	0	1
RGN8	624	0.077	0.267	0	1
RGN9	624	0.038	0.192	0	1
RGN10	624	0.051	0.221	0	1
RGN11	624	0.064	0.245	0	1
RGN12	624	0.038	0.192	0	1
CAR	624	0.090	0.286	0	1
ARMM	624	0.051	0.221	0	1
CARAGA	624	0.051	0.221	0	1

Sources of raw data: DOF-BLGF, COA, DOH, DBM, NSO.

Appendix Table 4. Descriptive Statistics: Cities
(1990-1996)

Variables	Obs	Mean	Std. Dev.	Minimum	Maximum
LNIRA	512	17.970	1.050	14.290	20.512
LNLOCREV	515	17.808	1.435	13.756	22.024
LNTOTEXP	487	18.422	1.029	15.467	21.885
LNIRA *x* DEV93	512	10.654	9.200	0	20.512
DEV93	600	0.500	0.500	0	1
LNIRA *x* YR92	512	13.180	8.320	0	20.512
YR92	600	0.625	0.485	0	1
LNIRA *x* DOHOSP	512	6.449	8.755	0	20.512
DOHOSP	600	0.347	0.476	0	1
LNIRA *x* RGN1	512	0.730	3.536	0	18.686
LNIRA *x* RGN2	512	0.106	1.381	0	18.682
LNIRA *x* RGN3	512	1.224	4.528	0	18.964
LNIRA *x* RGN4	512	1.960	5.609	0	19.899
LNIRA *x* RGN5	512	0.730	3.534	0	18.651
LNIRA *x* RGN6	512	1.984	5.673	0	19.251
LNIRA *x* RGN7	512	2.166	5.849	0	19.741
LNIRA *x* RGN8	512	0.752	3.644	0	19.334
LNIRA *x* RGN9	512	1.003	4.178	0	19.985
LNIRA *x* RGN10	512	1.231	4.553	0	19.401
LNIRA *x* RGN11	512	0.526	3.142	0	20.498
LNIRA *x* RGN12	512	0.502	2.999	0	19.461
LNIRA *x* CAR	512	0.246	2.095	0	18.717
LNIRA *x* ARMM	512	0.241	2.049	0	18.305
LNIRA *x* CARAGA	512	0.502	3.000	0	19.469
LNIRA *x* NCR	512	4.069	7.470	0	20.512
NCR	600	0.227	0.419	0	1
RGN1	600	0.040	0.196	0	1
RGN2	600	0.013	0.115	0	1
RGN3	600	0.067	0.250	0	1
RGN4	600	0.107	0.309	0	1
RGN5	600	0.040	0.196	0	1
RGN6	600	0.120	0.325	0	1
RGN7	600	0.120	0.325	0	1
RGN8	600	0.040	0.196	0	1
RGN9	600	0.053	0.225	0	1
RGN10	600	0.067	0.250	0	1
RGN11	600	0.027	0.161	0	1
RGN12	600	0.027	0.161	0	1
CAR	600	0.013	0.115	0	1
ARMM	600	0.013	0.115	0	1
CARAGA	600	0.027	0.161	0	1

Sources of raw data: DOF-BLGF, COA, DOH, DBM, NSO.

Appendix Table 5. Income Elasticity of the Local Revenues of Provinces
(Dep. var.: **LNLOCREV**)

Explanatory Variables	Model M1					Model M2				
	OLS Estimates (a)	Panel Data Estimates				OLS Estimates (a)	Panel Data Estimates			
		Fixed Effects		Random Effects			Fixed-Effects		Random Effects	
		Year (b)	Region (c)	Year (d)	Region (e)		Year (b)	Region (c)	Year (d)	Region (e)
LNIRA	0.750 (13.776)*	1.491 (19.971)*	0.683 (14.770)*	1.296 (18.233)*	0.685 (14.834)*	0.753 (7.596)*	1.366 (12.270)*	0.662 (7.714)*	1.469 (18.851)*	0.677 (7.597)*
LNIRA *x* DEV93						0.802 (5.613)*	0.228 (1.518)	0.644 (5.285)*	-0.077 (-5.107)*	0.693 (5.460)*
DEV93						-15.460 (-6.009)*		-12.316 (-5.608)*		-13.277 (-5.805)*
CONSTANT	3.202 (3.253)*	-10.196 (-7.555)*	4.401 (5.260)*	-6.645 (-5.155)*	4.272 (4.979)*	3.436 (2.003)*	-10.419 (-7.684)*	4.962 (3.341)*	-8.947 (-6.648)*	4.650 (3.012)*
No. of obs.	521	521	521	521	521	521	521	521	521	521
R-squared	0.268					0.377				
Within		0.437	0.302	0.437	0.302		0.440	0.383	0.435	0.382
Between		0.348	0.146	0.348	0.146		0.463	0.412	0.071	0.428
Overall		0.268	0.268	0.267	0.268		0.120	0.373	0.333	0.375
Adj. R-squared	0.266					0.3735				
F-stat	189.78	389.83	218.15			104.31	201.08	103.96		
(Prob>F)	(0.00)	(0.00)	(0.00)			(0.00)	(0.00)	(0.00)		
Wald chi-sq				332.44	220.06				371.24	309.06
(Prob>chi-sq)				(0.00)	(0.00)				(0.00)	(0.00)
Hausman Test				72.76	0.46				560.20	0.00
(Prob>ch-sq)				(0.00)	(0.50)				(0.00)	1.00

Note: "*" and "**" mean significant at the 5 and 10 percent levels, respectively. For the panel data models, the control year is 1990 and the control region is Region IV (S. Tagalog).

Appendix Table 6. Income Elasticity of the Local Revenues of Provinces
(Dep. var.: **LNLOCREV**)

Explanatory Variables	Model M3					Model M4				
	OLS Estimates (a)	Panel Data Estimates				OLS Estimates (a)	Panel Data Estimates			
		Fixed Effects		Random Effects			Fixed Effects		Random Effects	
		Year (b)	Region (c)	Year (d)	Region (e)		Year (b)	Region (c)	Year (d)	Region (e)
LNIRA	1.139	1.234	0.982	1.526	1.012	1.062	1.157	1.062	1.378	1.016
	(9.427)*	(9.784)*	(9.447)*	(19.688)*	(9.430)*	(7.131)*	(7.531)*	(7.131)*	(11.301)*	(9.816)*
LNIRA *x* DEV93	-0.260	-0.222	-0.347	-0.017	-0.314	-0.241	-0.234	-0.241	-0.008	-0.356
	(-1.028)	(-0.876)	(-1.625)	(-1.596)	(-1.421)	(-1.137)	(-1.097)	(-1.137)	(-1.231)	(-1.670)**
DEV93	4.204		5.940		5.321	4.048		4.048		6.112
	(0.929)		(1.553)		(1.342)	(1.064)		(1.064)		(1.598)
LNIRA *x* YR92	0.676	0.581	0.695	-0.097	0.681	0.595	0.512	0.595	-0.079	0.691
	(2.568)*	(2.196)*	(3.133)*	(-7.970)*	(2.961)*	(2.680)*	(2.286)*	(2.680)*	(-10.458)*	(3.116)*
YR92	-13.490		-13.588		-13.40	-11.773		-11.773		-13.531
	(-2.902)*		(-3.470)*		(-3.299)*	(-3.004)*		(-3.004)*		(-3.455)*
LNIRA *x* RGN1						-0.135	-0.132	-0.135	-0.106	-0.020
						(-0.677)	(-0.663)	(-0.677)	(-0.525)	(-1.998)*
LNIRA *x* RGN2						-0.142	-0.166	-0.142	-0.200	-0.037
						(-0.877)	(-1.022)	(-0.877)	(-1.221)	(-3.915)*
LNIRA *x* RGN3						-0.335	-0.319	-0.335	-0.302	0.010
						(-1.816)**	(-1.730)**	(-1.816)**	(-1.621)	(1.140)
LNIRA *x* RGN5						-0.166	-0.157	-0.166	-0.168	-0.024
						(-0.904)	(-0.859)	(-0.904)	(-0.904)	(-2.734)*
LNIRA *x* RGN6						0.077	0.074	0.077	-0.092	-0.023
						(0.466)	(0.447)	(0.466)	(0.550)	(-2.677)*
LNIRA *x* RGN7						0.107	0.093	0.107	0.102	0.005
						(0.597)	(0.518)	(0.597)	(0.562)	(0.510)
LNIRA *x* RGN8						0.146	0.140	0.146	0.122	-0.054
						(0.815)	(0.783)	(0.815)	(0.673)	(-6.078)*
LNIRA *x* RGN9						-0.194	-0.199	-0.194	-0.154	-0.039
						(-0.916)	(-0.943)	(-0.916)	(-0.722)	(-3.415)*
LNIRA *x* RGN10						0.106	0.086	0.106	0.038	-0.017
						(0.581)	(0.469)	(0.581)	(0.205)	(-1.617)
LNIRA *x* RGN11						-0.584	-0.559	-0.584	-0.501	-0.013
						(-2.605)*	(-2.494)*	(-2.605)*	(-2.229)*	(-1.381)
LNIRA *x* RGN12						-0.373	-0.362	-0.373	-0.373	-0.037
						(-1.513)	(-1.473)	(-1.513)	(-1.495)	(-3.296)*
LNIRA *x* CAR						-0.456	-0.478	-0.456	-0.587	-0.071
						(-2.577)*	(-2.704)*	(-2.577)*	(-3.343)*	(-7.439)*
LNIRA *x* ARMM						0.542	0.538	0.542	0.695	-0.134
						(1.431)	(1.423)	(1.431)	(1.825)**	(-11.738)*
LNIRA *x* CARAGA						0.220	0.224	0.220	0.198	-0.017
						(1.027)	(1.049)	(1.027)	(0.914)	(-1.685)**
RGN1						2.100	2.033		1.565	
						(0.576)	(0.561)		(0.426)	
RGN2						1.902	2.333		2.937	
						(0.650)	(0.798)		(0.997)	

Table 6. Income Elasticity of the Local Revenues of Provinces (cont.)
(Dep. var.: **LNLOCREV**)

Explanatory Variables	Model M3					Model M4				
	OLS Estimates (a)	Panel Data Estimates				OLS Estimates (a)	Panel Data Estimates			
		Fixed Effects		Random Effects			Fixed Effects		Random Effects	
		Year (b)	Region (c)	Year (d)	Region (e)		Year (b)	Region (c)	Year (d)	Region (e)
RGN3						6.330	6.015		5.717	
						(1.875)**	(1.786)**		(1.679)**	
RGN5						2.561	-2.408		2.580	
						(0.772)	(0.728)		(0.769)	
RGN6						-1.836	-1.775		-2.113	
						(-0.610)	(-0.592)		(-0.695)	
RGN7						-1.876	-1.615		-1.784	
						(-0.573)	(-0.495)		(-0.583)	
RGN8						-3.580	-3.464		-3.164	
						(-1.110)	(-1.077)		(-0.970)	
RGN9						2.815	2.908		2.073	
						(0.733)	(0.759)		(0.537)	
RGN10						-2.195	-1.812		-0.960	
						(-0.667)	(-0.551)		(-0.290)	
RGN11						10.432	9.967		8.885	
						(2.550)*	(2.438)*		(2.169)*	
RGN12						6.098	5.900		6.093	
						(1.364)	(1.323)		(1.347)	
CAR						6.792	7.204		9.077	
						(2.159)*	(2.292)*		(2.908)*	
ARMM						-12.436	-12.356		-15.271	
						(-1.789)**	(-1.781)**		(-2.185)*	
CARAGA						-4.278	-4.348		-3.887	
						(-1.105)	(-1.126)		(-0.992)	
CONSTANT	-2.738	-10.930	-0.150	-9.340	-0.715	-1.141	-8.009	-0.499	-6.531	-0.279
	(-1.331)	(-7.974)*	(-0.085)	(-7.092)*	(-0.391)	(-0.437)	(-3.671)*	(-0.026)	(-3.013)*	(-0.158)
No. of Observations	521	521	521	521	521	521	521	521	521	521
R-squared	0.474					0.661				
Within		0.445	0.484	0.433	0.483		0.642	0.516	0.634	0.484
Between		0.002	0.515	0.848	0.527		0.000	0.092	0.893	1.000
Overall		0.021	0.470	0.458	0.472		0.048	0.000	0.651	0.638
Adj. R-squared	0.468					0.638				
F-statistic	92.64	136.66	93.86			28.72	27.89	27.35		
(Prob>F)	(0.00)	(0.00)	(0.00)			(0.00)	(0.00)	(0.00)		
Wald chi-sq				414.41	465.55				910.90	882.28
(Prob>chi-sq)				(0.00)	(0.00)				(0.00)	(0.00)
Hausman Test				17.27	0.00				26.36	32.64
(Prob>chi-sq)				(0.00)	(1.00)				(0.70)	(0.03)

Note: "*" and "**" mean significant at the 5 and 10 percent levels, respectively. For the panel data models, the control year is 1990 and the control region is Region IV (S. Tagalog).

Appendix Table 7. Income Elasticity of the Total Expenditures of Provinces
(Dep. var.: **LNTOTEXP**)

Explanatory Variables	Model P1					Model P2				
	OLS Estimates (a)	Panel Data Estimates				OLS Estimates (a)	Panel Data Estimates			
		Fixed Effects		Random Effects			Fixed-Effects		Random Effects	
		Year (b)	Region (c)	Year (d)	Region (e)		Year (b)	Region (c)	Year (d)	Region (e)
LNIRA	0.901 (51.731)*	1.050 (41.106)*	0.884 (53.121)*	1.021 (42.187)*	0.886 (53.418)*	0.882 (26.217)*	1.084 (28.342)*	0.854 (26.332)*	1.048 (39.510)*	0.859 (26.541)*
LNIRA *x* DEV93						0.161 (3.318)*	-0.061 (-1.184)	0.139 (3.030)*	-0.015 (-2.594)*	0.145 (3.146)*
DEV93						-3.049 (-3.494)*		-2.599 (-3.137)*		-2.712 (-3.270)*
CONSTANT	2.038 (6.469)*	-0.651 (-1.410)	2.352 (7.815)*	-0.117 (-0.267)	2.294 (7.591)*	2.407 (4.135)*	-0.593 (-1.278)	2.896 (5.165)*	-0.443 (-0.968)	2.790 (4.977)*
No. of obs.	518	518	518	518	518	518	518	518	518	518
R-squared	0.838					0.845				
Within		0.768	0.849	0.768	0.849		0.769	0.853	0.768	0.853
Between		0.964	0.749	0.964	0.749		0.492	0.778	0.939	0.780
Overall		0.838	0.838	0.838	0.838		0.647	0.845	0.840	0.845
Adj. R-squared	0.838					0.844				
F-stat	2676.11	1689.71	2821.88			935.48	846.22	966.69		
(Prob>F)	(0.00)	(0.00)	(0.00)			(0.00)	(0.00)	(0.00)		
Wald chi-sq				1779.74	2853.52				1813.68	2930.56
(Prob>chi-sq)				(0.00)	(0.00)				(0.00)	(0.00)
Hausman Test				12.78	3.39				12.93	8.66
(Prob>ch-sq)				(0.00)	(0.07)				(0.00)	0.034

Note: "*" and "**" mean significant at the 5 and 10 percent levels, respectively. For the panel data models, the control year is 1990 and the control region is Region IV (S. Tagalog).

Appendix Table 8. Income Elasticity of the Total Expenditures of Provinces
(Dep. var.: **LNTOTEXP**)

Explanatory Variables	Model P3					Model P4				
	OLS Estimates (a)	Panel Data Estimates				OLS Estimates (a)	Panel Data Estimates			
		Fixed Effects		Random Effects			Fixed-Effects		Random Effects	
		Year (b)	Region (c)	Year (d)	Region (e)		Year (b)	Region (c)	Year (d)	Region (e)
LNIRA	0.991 (23.889)*	1.029 (23.821)*	0.957 (23.947)*	1.065 (39.719)*	0.962 (24.186)*	0.976 (23.041)*	1.013 (22.900)*	0.931 (22.623)*	1.042 (34.608)*	0.936 (22.928)*
LNIRA *x* DEV93	-0.228 (-2.625)*	-0.249 (-2.862)*	-0.230 (-2.795)*	0.002 (0.382)	-0.228 (-2.775)*	-0.231 (-2.639)*	-0.258 (-2.948)*	-0.223 (-2.702)*	0.002 (0.189)	-0.223 (-2.714)*
DEV93	4.124 (2.641)*		4.185 (2.837)*		4.145 (2.814)*	4.189 (2.664)*		4.087 (2.760)*		4.084 (2.768)*
LNIRA *x* YR92	0.281 (3.095)*	0.243 (2.672)*	0.274 (3.203)*	-0.027 (-4.308)*	0.274 (3.202)*	0.277 (3.045)*	0.237 (2.609)*	0.271 (3.174)*	-0.025 (-2.726)*	0.270 (3.177)*
YR92	-5.450 (-3.400)*		-5.292 (-3.502)*		-5.294 (-3.506)*	-5.363 (-3.343)*		-5.215 (-3.459)*		-5.209 (-3.467)*
LNIRA *x* DOHOSP						0.013 (0.344)	0.027 (0.709)	-0.009 (-0.236)	0.021 (0.600)	-0.005 (-0.133)
DOHOSP						-0.178 (-0.258)	-0.427 (-0.621)	0.246 (0.367)	-0.333 (-0.508)	0.175 (0.263)
CONSTANT	0.683 (0.969)	-0.806 (-1.721)**	1.252 (1.842)**	-0.583 (-1.283)	1.148 (1.695)**	0.923 (1.285)	-0.365 (-0.688)	1.667 (2.394)*	-0.206 (-0.403)	1.567 (2.265)*
No. of obs.	518	518	518	518	518	518	518	518	518	518
R-squared	0.867					0.868				
Within		0.772	0.873	0.768	0.873		0.774	0.875	0.769	0.875
Between		0.032	0.803	0.991	0.804		0.011	0.810	0.990	0.811
Overall		0.117	0.866	0.864	0.866		0.089	0.867	0.864	0.867
Adj. R-squared	0.865					0.866				
F-stat	665.92	573.33	686.17			477.21	345.83	495.46		
(Prob>F)	(0.00)	(0.00)	(0.00)			(0.00)	(0.00)	(0.00)		
Wald chi-sq				2011.71	3481.60				1851.05	3528.24
(Prob>chi-sq)				(0.00)	(0.00)				(0.00)	(0.00)
Hausman Test**				9.88	4.27				9.80	2.29
(Prob>chi-sq)				(0.02)	(0.511)				(0.08)	(0.94)

Note: "*" and "**" mean significant at the 5 and 10 percent levels, respectively. For the panel data models, the control year is 1990 and the control region is Region IV (S. Tagalog).

Appendix Table 9. Income Elasticity of the Total Expenditures of Provinces
(Dep. Var.: **LNTOTEXP**)

Explanatory Variables	Model P5				
	OLS Estimates (a)	Panel Data Estimates			
		Fixed Effects Model		Random Effects Model	
		Year (b)	Region (c)	Year (d)	Region (e)
LNIRA	0.956	1.00	0.956	1.014	0.940
	(16.339)*	(16.454)*	(16.339)*	(21.655)*	(23.034)*
LNIRA *x* DEV93	-0.199	-0.236	-0.199	0.006	-0.225
	(-2.460)*	(-2.918)*	(-2.460)*	(2.280)*	(-2.724)*
DEV93	3.662		3.662		4.121
	(2.518)*		(2.518)*		(2.783)*
LNIRA *x* YR92	0.235	0.198	0.235	-0.024	0.269
	(2.772)*	(2.324)*	(2.772)*	(-8.262)*	(3.150)*
YR92	-4.574		-4.574		-5.181
	(-3.059)*		(-3.059)*		(-3.435)*
LNIRA *x* DOHOSP	0.013	0.028	0.013	0.022	-0.008
	(0.339)	(0.745)	(0.339)	(0.601)	(-0.226)
DOHOSP	-0.155	-0.433	-0.155	-0.314	0.239
	(-0.224)	(-0.625)	(-0.224)	(-0.477)	(0.357)
LNIRA *x* RGN1	-0.012	-0.021	-0.012	-0.019	-0.010
	(-0.152)	(-0.269)	(-0.152)	(-0.241)	(-2.471)*
LNIRA *x* RGN2	0.009	-0.005	0.009	-0.004	-0.013
	(0.137)	(-0.080)	(0.137)	(-0.065)	(-3.364)*
LNIRA *x* RGN3	-0.155	-0.152	-0.155	-0.159	0.005
	(-2.214)*	(-2.199)*	(-2.214)*	(-2.253)*	(1.388)
LNIRA *x* RGN5	-0.003	-0.012	-0.003	-0.009	-0.011
	(-0.040)	(-0.169)	(-0.040)	(-0.130)	(-3.241)*
LNIRA *x* RGN6	0.082	0.077	0.082	0.078	-0.010
	(1.297)	(1.241)	(1.297)	(1.229)	(-2.989)*
LNIRA *x* RGN7	0.015	0.009	0.015	0.009	0.007
	(0.221)	(0.126)	(0.221)	(0.128)	(1.897)**
LNIRA *x* RGN8	0.070	0.060	0.070	0.065	-0.013
	(1.040)	(0.895)	(1.040)	(0.957)	(-3.705)*
LNIRA *x* RGN9	-0.012	-0.020	-0.020	-0.028	-0.011
	(-0.246)	(-0.260)	(-0.246)	(-0.349)	(-2.401)*
LNIRA *x* RGN10	0.018	0.002	0.018	0.005	-0.008
	(0.256)	(0.026)	(0.256)	(0.071)	(-1.842)**
LNIRA *x* RGN11	-0.274	-0.258	-0.274	-0.274	-0.007
	(-3.217)*	(-3.063)*	(-3.217)*	(-3.215)*	(-1.843)**
LNIRA *x* RGN12	-0.019	-0.025	-0.020	-0.025	-0.020
	(-0.204)	(-0.276)	(-0.204)	(-0.265)	(-4.579)*
LNIRA *x* CAR	-0.226	-0.241	-0.226	-0.252	-0.016
	(-3.296)*	(-3.546)*	(-3.296)*	(-3.788)*	(-4.244)*
LNIRA *x* ARMM	0.033	0.0155	0.033	0.084	-0.015
	(0.233)	(0.110)	(0.233)	(0.586)	(3.455)*
LNIRA *x* CARAGA	0.118	0.107	0.118	0.112	-0.007
	(1.457)	(0.080)	(1.457)	(1.373)	(-1.812)**

Appendix Table 9. Income Elasticity of the Total Expenditures of Provinces (cont.)
(Dep. Var.: **LNTOTEXP**)

Explanatory Variables	Model P5				
	OLS Estimates (a)	Panel Data Estimates			
		Fixed Effects Model		Random Effects Model	
		Year (b)	Region (c)	Year (d)	Region (e)
RGN1	0.042	0.207		0.168	
	(0.029)	(0.146)		(0.116)	
RGN2	-0.374	-0.128		-0.146	
	(-0.334)	(-0.116)		(-0.131)	
RGN3	2.929	2.880		2.994	
	(2.290)*	(2.278)*		(2.327)*	
RGN5	-0.150	0.008		-0.041	
	(-0.119)	(0.006)		(-0.033)	
RGN6	-1.677	-1.598		-1.616	
	(-1.465)	(-1.412)		(-1.402)	
RGN7	-0.142	-0.024		-0.034	
	(-0.114)	(-0.020)		(-0.027)	
RGN8	-1.487	-1.301		-1.400	
	(-1.223)	(-1.082)		(-1.144)	
RGN9	0.166	0.175		0.317	
	(0.114)	(0.122)		(0.218)	
RGN10	-0.446	-0.154		-0.215	
	(-0.354)	(-0.123)		(-0.171)	
RGN11	4.878	4.585		4.884	
	(3.146)*	(2.986)*		(3.143)*	
RGN12	-0.013	0.104		0.092	
	(-0.008)	(0.062)		(0.054)	
CAR	3.695	3.964		4.167	
	(3.031)*	(3.274)*		(3.510)*	
ARMM	-0.891	-0.567		-1.813	
	(-0.340)	(-0.219)		(-0.692)	
CARAGA	-2.253	-2.059		-2.146	
	(-1.540)	(-1.423)		(-1.457)	
CONSTANT	1.352	0.305	1.687	0.364	1.639
	(1.323)	(0.365)	(2.244)*	(0.423)	(2.367)*
No. of observations	518	518	518	518	518
R-squared	0.897				
Within		0.824	0.886	0.821	0.875
Between		0.001	0.007	0.992	1.000
Overall		0.091	0.138	0.895	0.887
Adjusted R-squared	0.889				
F-statistics	119.34	67.87	177.82		
(Prob>F)	(0.00)	(0.00)	(0.00)		
Wald chi-sq				4104.84	3881.22
(Prob>chi-sq)				(0.00)	(0.00)
Hausman Test				10.49	43.75
(Prob>chi-sq)				(0.99)	(0.00)

Note: "*" and "**" mean significant at the 5 and 10 percent levels, respectively. For the panel data models, the control year is 1990 and the control region is Region IV (S. Tagalog).

Appendix Table 10. Income Elasticity of the Local Revenues of Cities
(Dep. var.: **LNLOCREV**)

Explanatory Variables	Model D1					Model D2				
	OLS Estimates (a)	Panel Data Estimates				OLS Estimates (a)	Panel Data Estimates			
		Fixed Effects		Random Effects			Fixed Effects		Random Effects	
		Year (b)	Region (c)	Year (d)	Region (e)		Year (b)	Region (c)	Year (d)	Region (e)
LNIRA	0.600 (11.044)*	0.781 (10.404)*	0.718 (18.544)*	0.668 (10.623)*	0.719 (18.627)*	0.612 (6.278)*	0.777 (7.165)*	0.790 (12.038)*	0.757 (9.965)*	0.790 (12.093)*
LNIRA *x* DEV93						0.204 (1.438)	0.008 (0.056)	0.320 (3.445)*	-0.022 (-1.974)*	0.319 (3.454)*
DEV93						-4.009 (-1.575)		-6.387 (-3.831)*		-6.382 (-3.841)*
CONSTANT	7.016 (7.171)*	3.761 (2.785)*	4.901 (7.034)*	5.801 (5.121)*	4.513 (6.153)*	6.935 (4.136)*	3.750 (2.744)*	3.873 (3.432)*	4.443 (3.404)*	3.487 (3.027)*
No. of Observations	512	512	512	512	512	512	512	512	512	512
R-squared	0.193					0.205				
Within		0.177	0.410	0.177	0.410		0.177	0.468	0.177	0.468
Between		0.728	0.178	0.728	0.178		0.741	0.181	0.632	0.181
Overall		0.193	0.193	0.193	0.193		0.187	0.203	0.201	0.203
Adj. R-squared	0.191					0.200				
F-stat	121.96	108.25	343.86			43.64	54.02	144.27		
(Prob>F)	(0.00)	(0.00)	(0.00)			(0.00)	(0.00)	(0.00)		
Wald chi-sq				112.85	346.98				116.92	437.85
(Prob>chi-sq)				(0.00)	(0.00)				(0.00)	(0.00)
Hausman Test				7.63	0.14				3.88	0.00
(Prob> chi-sq)				(0.06)	(0.71)				(0.14)	(1.00)

Note: "*" and "**" mean significant at the 5 and 10 percent levels, respectively. For the panel data models, the control year is 1990 and the control region is NCR.

Appendix Table 11. Income Elasticity of the Local Revenues of Cities
(Dep. var.: **LNLOCREV**)

Explanatory Variables	Model D3					Model D4				
	OLS Estimates (a)	Panel Data Estimates				OLS Estimates (a)	Panel Data Estimates			
		Fixed Effects		Random Effects			Fixed Effects		Random Effects	
		Year (b)	Region (c)	Year (d)	Region (e)		Year (b)	Region (c)	Year (d)	Region (e)
LNIRA	0.828	0.837	0.985	0.821	0.985	0.938	0.958	0.938	1.048	1.025
	(6.620)*	(6.529)*	(12.213)*	(10.574)*	(12.257)*	(10.875)*	(10.920)*	(10.875)*	(17.448)*	(12.585)*
LNIRA x DEV93	0.189	0.159	0.067	0.002	0.068	0.050	0.028	0.050	-0.013	0.087
	(0.832)	(0.694)	(0.469)	(0.179)	(0.474)	(0.348)	(0.196)	(0.348)	(-2.035)*	(0.604)
DEV93	-3.361		-1.446		-1.454	-1.184		-1.184		-1.769
	(-0.825)		(-0.564)		(-0.569)	(-0.462)		(-0.462)		(-0.683)
LNIRA x YR92	-0.201	-0.210	0.076	-0.043	0.075	0.073	0.051	0.073	-0.058	0.065
	(-0.842)	(-0.873)	(0.506)	(-3.895)*	(0.499)	(0.487)	(0.337)	(0.487)	(-8.108)*	(0.429)
YR92	2.804		-2.231		-2.209	-2.236		-2.236		-1.985
	(0.670)		(-0.845)		(-0.839)	(-0.851)		(-0.851)		(-0.745)
LNIRA x RGN1						-0.273	-0.269	-0.273	-0.300	-0.119
						(-1.217)	(-1.199)	(-1.217)	(-1.337)	(-11.108)*
LNIRA x RGN2						-0.714	-0.782	-0.714	-0.630	-0.114
						(-1.292)	(-1.408)	(-1.292)	(-1.144)	(-4.347)*
LNIRA x RGN3						0.331	0.333	0.331	0.315	-0.121
						(2.062)*	(2.072)*	(2.062)*	(1.965)*	(-13.902)*
LNIRA x RGN4						-0.004	0.000	-0.004	-0.012	-0.113
						(-0.036)	(0.003)	(-0.036)	(-0.103)	(-15.393)*
LNIRA x RGN5						0.025	0.028	0.025	-0.003	-0.114
						(0.112)	(0.126)	(0.112)	(-0.012)	(-10.616)*
LNIRA x RGN6						0.128	0.143	0.128	0.140	-0.123
						(0.866)	(0.969)	(0.866)	(0.952)	(-16.696)*
LNIRA x RGN7						0.264	0.269	0.264	0.254	-0.115
						(2.069)*	(2.104)*	(2.069)*	(1.990)*	(-16.159)*
LNIRA x RGN8						-0.225	-0.213	-0.225	-0.182	-0.138
						(-0.934)	(-0.884)	(-0.934)	(-0.761)	(-13.010)*
LNIRA x RGN9						0.402	0.412	0.402	0.429	-0.165
						(2.353)*	(2.408)*	(2.353)*	(2.519)*	(-17.411)*
LNIRA x RGN10						0.451	0.455	0.451	0.456	-0.143
						(2.548)*	(2.567)*	(2.548)*	(2.572)*	(-16.477)*
LNIRA x RGN11						0.136	0.162	0.136	0.231	-0.102
						(0.547)	(0.650)	(0.547)	(0.944)	(-8.100)*
LNIRA x RGN12						0.403	0.417	0.403	0.443	-0.103
						(1.432)	(1.480)	(1.432)	(1.574)	(-8.152)*
LNIRA x CAR						-0.251	-0.238	-0.251	-0.255	-0.058
						(-0.631)	(-0.598)	(-0.631)	(-0.641)	(-3.348)*
LNIRA x ARMM						0.158	0.155	0.158	0.116	-0.237
						(0.379)	(0.370)	(0.379)	(0.278)	(-13.315)*
LNIRA x CARAGA						0.253	0.265	0.253	0.295	-0.125
						(0.913)	(0.957)	(0.913)	(1.070)	(-9.928)*
RGN1						2.753	2.689		3.239	
						(0.688)	(0.672)		(0.811)	

Appendix Table 11. Income Elasticity of the Local Revenues of Cities (cont.)
(Dep. var.: **LNLOCREV**)

Explanatory Variables	Model D3					Model D4				
	OLS Estimates (a)	Panel Data Estimates				OLS Estimates (a)	Panel Data Estimates			
		Fixed Effects		Random Effects			Fixed Effects		Random Effects	
		Year (b)	Region (c)	Year (d)	Region (e)		Year (b)	Region (c)	Year (d)	Region (e)
RGN2						10.950	12.153		9.404	
						(1.097)	(1.211)		(0.945)	
RGN3						-8.088	-8.120		-7.794	
						(-2.815)*	(-2.824)*		(-2.715)*	
RGN4						-1.939	-2.014		-1.781	
						(-0.936)	(-0.972)		(-0.860)	
RGN5						-2.472	-2.526		-1.964	
						(-0.621)	(-0.634)		(-0.494)	
RGN6						-4.505	-4.791		-4.720	
						(-1.688)**	(-1.787)**		(-1.770)**	
RGN7						-6.785	-6.872		-6.593	
						(-2.969)*	(-3.002)*		(-2.885)*	
RGN8						1.653	1.442		0.889	
						(0.375)	(0.327)		(0.203)	
RGN9						-10.357	-10.525		-10.836	
						(-3.312)*	(-3.364)*		(-3.474)*	
RGN10						-10.686	-10.754		-10.764	
						(-3.355)*	(-3.372)*		(-3.375)*	
RGN11						-4.447	-4.933		-6.228	
						(-0.929)	(-1.030)		(-1.330)	
RGN12						-9.241	-9.488		-9.945	
						(-1.787)**	(-1.834)**		(-1.926)**	
CAR						3.501	3.273		3.593	
						(0.489)	(0.457)		(0.501)	
ARMM						-6.986	-6.920		-6.239	
						(-0.948)	(-0.939)		(-0.847)	
CARAGA						-6.880	-7.100		-7.647	
						(-1.354)	(-1.397)		(-1.509)	
CONSTANT						3.443	1.327		1.568	
	3.483	3.845	0.815	3.587	0.422	(2.334)*	(1.246)	-0.400	(1.522)	1.7611
	(1.645)	(2.804)*	(0.597)	(2.732)*	(0.305)			(-0.261)		(1.282)
No. of Observations	512	512	512	512	512	512	512	512	512	512
R-squared	0.225					0.719				
Within		0.178	0.517	0.177	0.517		0.703	0.542	0.702	0.507
Between		0.389	0.181	0.939	0.181		0.646	0.006	0.943	1.000
Overall		0.103	0.221	0.224	0.221		0.448	0.010	0.717	0.697
Adj. R-squared	0.218					0.698				
F-statistic	29.42	36.25	104.92			34.71	33.82	28.15		
(Prob>F)	(0.00)	(0.00)	(0.00)			(0.00)	(0.00)	(0.00)		
Wald chi-sq				146.81	529.95				1208.14	1127.83
(Prob>chi-sq)				(0.00)	(0.00)				(0.00)	(0.00)
Hausman Test				1.23	0.03				7.90	36.88
(Prob>chi-sq)				(0.746)	(1.00)				(1.00)	(0.01)

Note: "*" and "**" mean significant at the 5 and 10 percent levels, respectively. For the panel data models, the control year is 1990 and the control region is NCR.

Appendix Table 12. Income Elasticity of the Total Expenditures of Cities
(Dep. var.: **LNTOTEXP**)

Explanatory Variables	Model C1					Model C2				
	OLS Estimates (a)	Panel Data Estimates				OLS Estimates (a)	Panel Data Estimates			
		Fixed Effects		Random Effects			Fixed-Effects		Random Effects	
		Year (b)	Region (c)	Year (d)	Region (e)		Year (b)	Region (c)	Year (d)	Region (e)
LNIRA	0.766 (25.674)*	0.769 (18.088)*	0.843 (42.195)*	0.766 (21.442)*	0.842 (42.304)*	0.674 (11.232)*	0.717 (10.565)*	0.906 (23.412)*	0.763 (17.521)*	0.901 (23.245)*
LNIRA *x* DEV93						0.160 (1.984)*	0.085 (0.972)*	0.127 (2.596)*	0.001 (0.124)	0.129 (2.621)*
DEV93						-2.829 (-1.974)*		-2.636 (-3.022)*		-2.663 (-3.038)*
CONSTANT	4.638 (8.625)*	4.583 (5.987)*	3.243 (9.001)*	4.633 (7.196)*	3.068 (8.157)*	6.213 (6.032)*	4.557 (5.947)*	2.272 (3.419)*	4.671 (6.257)*	2.159 (3.204)*
No. of obs.	484	484	484	484	484	484	484	484	484	484
R-squared	0.58					0.58				
Within		0.407	0.792	0.407	0.792		0.409	0.814	0.407	0.814
Between		0.964	0.319	0.964	0.319		0.933	0.339	0.964	0.339
Overall		0.578	0.578	0.578	0.578		0.491	0.566	0.578	0.567
Adj. R-squared	0.58					0.58				
F-stat	659.13	327.18	1780.44			221.92	164.04	677.65		
(Prob>F)	(0.00)	(0.00)	(0.00)			(0.00)	(0.00)	(0.00)		
Wald chi-sq				459.78	1789.66				437.03	2017.11
(Prob>chi-sq)				(0.00)	(0.00)				(0.00)	(0.00)
Hausman Test				0.01	0.16				1.06	0.00
(Prob>ch-sq)				(0.907)	(0.690)				(0.588)	(1.00)

Note: "*" and "**" mean significant at the 5 and 10 percent levels, respectively. For the panel data models, the control year is 1990 and the control region is NCR.

Appendix Table 13. Income Elasticity of the Total Expenditures of Cities
(Dep. var.: **LNTOTEXP**)

Explanatory Variables	Model C3					Model C4				
	OLS Estimates (a)	Panel Data Estimates				OLS Estimates (a)	Panel Data Estimates			
		Fixed Effects		Random Effects			Fixed-Effects		Random Effects	
		Year (b)	Region (c)	Year (d)	Region (e)		Year (b)	Region (c)	Year (d)	Region (e)
LNIRA	0.839 (10.585)*	0.846 (10.432)*	1.065 (22.050)*	0.784 (17.523)*	1.056 (21.620)*	0.777 (9.817)*	0.778 (9.644)*	1.066 (21.557)*	0.705 (13.494)*	1.053 (20.926)*
LNIRA *x* DEV93	0.403 (3.040)*	0.372 (2.806)*	0.027 (0.345)	0.008 (1.165)	0.037 (0.470)	0.372 (2.895)*	0.333 (2.600)*	0.048 (0.627)	0.010 (1.928)**	0.059 (0.751)
DEV93	-7.040 (-2.981)*		-0.644 (-0.463)		-0.820 (-0.581)	-6.419 (-2.806)*		-1.003 (-0.731)		-1.186 (-0.845)
LNIRA *x* YR92	-0.409 (-2.819)*	-0.416 (-2.860)*	-0.042 (-0.491)	-0.013 (-1.742)	-0.049 (-0.571)	-0.406 (-2.909)*	-0.412 (-2.950)*	-0.050 (-0.600)	-0.009 (-1.599)	-0.060 (-0.703)
YR92	6.959 (2.751)*		0.244 (0.164)		0.387 (0.255)	6.959 (2.858)*		0.421 (0.288)		0.608 (0.406)
LNIRA *x* DOHOSP						0.038 (0.650)	0.051 (0.860)	-0.087 (-2.418)*	0.048 0.812)	-0.081 (-2.201)*
DOHOSP						-0.304 (-0.284)	-0.511 (-0.480)	1.727 (2.643)*	-0.467 (-0.439)	1.623 (2.435)*
CONSTANT	3.465 (2.585)*	4.703 (6.170)*	-0.267 (-0.328)	4.390 (5.815)*	-0.330 (-0.397)	4.375 (3.259)*	6.176 (6.806)*	-0.385 (-0.460)*	5.608 (6.309)*	-0.385 (-0.449)
No. of obs.	484	484	484	484	484	484	484	484	484	484
R-squared	0.590					0.621				
Within		0.412	0.833	0.408	0.833		0.467	0.840	0.457	0.840
Between		0.133	0.329	0.976	0.330		0.060	0.334	0.972	0.337
Overall		0.108	0.563	0.582	0.564		0.084	0.579	0.614	0.582
Adj. R-squared	0.590					0.616				
F-stat	137.42	113.74	461.99			111.61	82.73	344.98		
(Prob>F)	(0.00)	(0.00)	(0.00)			(0.00)	(0.00)	(0.00)		
Wald chi-sq				540.97	2244.39				760.86	2315.79
(Prob>chi-sq)				(0.00)	(0.00)				(0.00)	(0.00)
Hausman Test**				0.00	0.00					0.00
(Prob>chi-sq)				(1.00)	(1.00)					(1.00)

Note: "*" and "**" mean significant at the 5 and 10 percent levels, respectively. For the panel data models, the control year is 1990 and the control region is NCR.

Appendix Table 14. Income Elasticity of the Total Expenditures of Cities
(Dep. Var.: **LNTOTEXP**)

Explanatory Variables	Model C5				
	OLS Estimates (a)	Panel Data Estimates			
		Fixed Effects Model		Random Effects Model	
		Year (b)	Region (c)	Year (d)	Region (e)
LNIRA	1.073	1.079	1.073	1.084	1.100
	(18.892)*	(18.948)*	(18.892)*	(26.242)*	(22.043)*
LNIRA *x* DEV93	0.049	0.023	0.049	-0.009	0.063
	(0.630)	(0.300)	(0.630)	(-2.600)*	(0.814)
DEV93	-1.028		-1.028		-1.245
	(-0.744)		(-0.744)		(-0.903)
LNIRA *x* YR92	-0.058	-0.076	-0.058	-0.028	-0.063
	(-0.688)	(-0.905)	(-0.688)	(-7.547)*	(-0.748)
YR92	0.541		0.541		0.682
	(0.365)		(0.365)		(0.464)
LNIRA *x* DOHOSP	-0.096	-0.086	-0.096	-0.092	-0.098
	(-2.457)*	(-2.230)*	(-2.457)*	(-2.378)*	(-2.704)*
DOHOSP	1.886	1.713	1.886	1.810	1.935
	(2.658)*	(2.451)*	(2.658)*	(2.582)*	(2.940)*
LNIRA *x* RGN1	-0.173	-0.179	-0.173	-0.175	-0.071
	(-1.538)	(-1.619)	(-1.538)	(-1.574)	(-13.371)*
LNIRA *x* RGN2	-0.395	-0.438	-0.395	-0.379	-0.092
	(-1.491)	(-1.670)**	(-1.491)	(-1.437)	(-7.398)*
LNIRA *x* RGN3	0.023	0.018	0.023	0.024	-0.071
	(0.286)	(0.222)	(0.286)	(0.293)	(-16.027)*
LNIRA *x* RGN4	-0.036	-0.033	-0.036	-0.036	-0.068
	(-0.589)	(-0.542)	(-0.589)	(-0.593)	(-17.781)*
LNIRA *x* RGN5	0.004	-0.009	0.004	0.001	-0.071
	(0.041)	(-0.083)	(0.041)	(0.007)	(-13.739)*
LNIRA *x* RGN6	-0.045	-0.042	-0.045	-0.042	-0.075
	(-0.621)	(-0.589)	(-0.621)	(-0.577)	(-20.003)*
LNIRA *x* RGN7	0.123	0.119	0.123	0.122	-0.068
	(1.937)**	(1.897)**	(1.937)**	(1.933)**	(-18.660)*
LNIRA *x* RGN8	0.043	0.046	0.043	0.052	-0.086
	(0.373)	(0.400)	(0.373)	(0.466)	(-16.342)*
LNIRA *x* RGN9	0.014	0.013	0.014	0.017	-0.094
	(0.165)	(0.162)	(0.165)	(0.205)	(-19.753)*
LNIRA *x* RGN10	0.151	0.143	0.151	0.152	-0.078
	(1.750)**	(1.684)**	(1.750)**	(1.759)**	(-18.333)*
LNIRA *x* RGN11	0.049	0.060	0.049	0.062	-0.069
	(0.408)	(0.501)	(0.408)	(0.519)	(-11.054)*
LNIRA *x* RGN12	0.201	0.198	0.201	0.212	-0.071
	(1.237)	(1.241)	(1.237)	(1.314)	(-11.300)*
LNIRA *x* CAR	-0.169	-0.179	-0.169	-0.171	-0.047
	(-0.882)	(-0.951)	(-0.882)	(-0.892)	(-5.567)*
LNIRA *x* ARMM	0.133	0.109	0.133	0.125	-0.103
	(0.662)	(0.548)	(0.662)	(0.624)	(-11.993)*
LNIRA *x* CARAGA	0.115	0.118	0.115	0.123	-0.092
	(0.860)	(0.902)	(0.860)	(0.925)	(-15.066)*

Appendix Table 14. Income Elasticity of the Total Expenditures of Cities (cont.)
(Dep. Var.: **LNTOTEXP**)

Explanatory Variables	Model C5				
	OLS Estimates (a)	Panel Data Estimates			
		Fixed Effects Model		Random Effects Model	
		Year (b)	Region (c)	Year (d)	Region (e)
RGN1	1.811	1.933		1.857	
	(0.904)	(0.979)		(0.934)	
RGN2	5.514	6.624		5.207	
	(1.150)	(1.315)		(1.093)	
RGN3	-1.698	-1.589		-1.709	
	(-1.166)	(-1.108)		(-1.183)	
RGN4	-0.587	-0.636		-0.590	
	(-0.531)	(-0.585)		(-0.538)	
RGN5	-1.357	-1.114		-1.295	
	(-0.701)	(-0.584)		(-0.675)	
RGN6	-0.551	-0.591		-0.615	
	(-0.418)	(-0.453)		(-0.468)	
RGN7	-3.424	-3.338		-3.405	
	(-3.010)*	(-2.979)*		(-3.020)*	
RGN8	-2.376	-2.402		-2.529	
	(-1.112)	(-1.142)		(-1.193)	
RGN9	-1.970	-1.944		-2.035	
	(-1.288)	(-1.292)		(-1.335)	
RGN10	-4.146	-3.996		-4.159	
	(-2.661)*	(-2.604)*		(-2.676)*	
RGN11	-2.255	-2.430		-2.503	
	(-0.967)	(-1.058)		(-1.093)	
RGN12	-5.022	-4.952		-5.227	
	(-1.673)**	(-1.677)**		(-1.754)*	
CAR	2.214	2.406		2.238	
	(0.641)	(0.708)		(0.649)	
ARMM	-4.175	-3.738		-4.031	
	(-1.173)	(-1.067)		(-1.139)	
CARAGA	-3.804	-3.854		-3.954	
	(-1.551)	(-1.597)		(-1.621)	
CONSTANT	0.614	0.800	-0.872	0.435	0.054
	(0.633)	(1.129)	(-0.936)	(0.617)	(0.065)
No. of observations	484	484	484	484	484
R-squared	0.876				
Within		0.829	0.846	0.829	0.838
Between		0.782	0.048	0.985	0.999
Overall		0.815	0.113	0.876	0.869
Adjusted R-squared	0.866				
F-statistics	85.26	61.12	111.36		
(Prob>F)	(0.00)	(0.00)	(0.00)		
Wald chi-sq				3163.66	3070.01
(Prob>chi-sq)				(0.00)	(0.00)
Hausman Test				1.49	24.25
(Prob>chi-sq)				(1.00)	(0.334)

Note: "*" and "**" mean significant at the 5 and 10 percent levels, respectively. For the panel data models, the control year is 1990 and the control region is NCR.