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Fiscal Decentralization and Economic Growth in Iran

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Abstract: Economists and policy-makers believe that the Fiscal Decentralization is an effective strategy to promote economic growth. Thereby Economic Growth is seen as an objective of Fiscal Decentralization and efficiency in the allocation of resources in the public sector. This study analyzed the relationship between fiscal decentralization and economic growth in Iran for the period 2001-2007 .We used data for 28 provinces of the country estimated the model using a panel data regression with Fixed Effect. We find that fiscal decentralization has a positive effect on Iran's economic growth.

Key words: Fiscal Decentralization (FD), Economic Growth, Iran

INTRODUCTION

The relationship between Fiscal Decentralization and economic growth has been analyzed by a number of economists. This Linking has mainly three reasons: firstly, growth is seen as an objective of Fiscal Decentralization and efficiency in the allocation of resources in the public sector; secondly, it is an explicit intention of governments to adopt policies that lead to a sustained increase in per capita income and thirdly, per capita growth is easier to measure and to interpret than other economic performance indicators. Several economists have made the case for fiscal decentralization as a means of promoting long-run economic growth based on the view that it leads to better resource allocation and a more productive.

As Oates (1993) explained, "the basic economic case for fiscal decentralization is the enhancement of economic efficiency: the provision of local outputs that are differentiated according to local tastes and circumstances results in higher levels of social welfare than centrally determined and more uniform levels of outputs across all jurisdictions.", or Fiscal Decentralization provides incentives for local governments to innovate in the production and supply of public goods and services, or that competition among different levels revenue constraints.

In contrast, others have stressed the problems that fiscal decentralization can create for macroeconomic policy coordination generally, and for implementing stabilization policies in particular. According to Davoodi and Zou(1998) and Zhang and Zou(1998), the negative association between Fiscal Decentralization and Economic Growth may indicate that in practice local governments may not be responsive to local citizens' preferences and needs. This can occur when local officials are not elected by local citizens and when local citizens may be too poor to "vote with their feet."

2 - Literature Review:

Most empirical studies have focused on the share of sub-national government revenue or expenditure in consolidated (national and sub-national) government revenue or expenditure as the measure of fiscal decentralization. A number of recent studies have explored the impact of Fiscal Decentralization in various countries. In the Table 1, we have surmised these studies.

3. Methodology and Model:

The first effort to formalize the relationship between Economic Growth and Fiscal Decentralization is Davoodi and Zou(1998) which is the most commonly used analytical framework in the literature. Following Barro(1990) & Davoodi and Zou (1998),we will setup a theoretical model of Fiscal Decentralization and Economic Growth in order to frame our empirical investigation for Iran. While Barro's model introduced government expenditure in the production function of an endogenous growth model, Davoodi and Zou (1998)

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Table 1: Empirical studies summary Dependent Variable: GRP_{REG} is the annual growth rate of real per capita Gross Region (state or province) Product

Authors (Years)	Study Region & Time	Variable of FD*	Analytical Framework	Empirical Methodology	Relation Between FD & Economic Growth
Zhang and Zou (1998)	28 provinces of China (1980-92)	FD-EXP, FD-EXPEB, FD-XPB+EB	Barro (1990), Levine and Renelt (1992)and Davoodi and Zou (1998)	Fixed Effect Models. GLS estimation	Negative and significant
Jin, Quian & Weingast (1999)	29 provinces of China (1982-92)	FD-EXP, FD-EXPEB, FD-XPB+EB	Zhang and Zou (1998)	variable dummy that grasps the effects of the national macroeconomic fluctuations	Positive and significant
Xie, Zou, Davoodi (1999)	50 states of USA(1948-94)	FD-EXP	Davoodi and Zou (1998)	Time series analysis. OLS estimation.	Negative but not significant
Lin & Liu (2000)	28 provinces of China (1970-93)	MRR-REV	Mankiw, Romer and Weil (1992) and Solow (1956)	Fixed Effect Models Province and Time Dummies	Positive and significant
Zhang & Zou (2001)	29 provinces of China(1987-93) & 16 major states of India (1970-94)	FD-EXP FD-REV	Barro (1990) and Zhang and Zou (1998)	Fixed Effect Models in China. Application to India: Estimations with a five year forward-moving average of real per capita income growth.	Negative and significant in China and Positive and significant in India
Akai & Sakata (2002)	50 states of USA (1992-96)	FD-EXP FD-REV	Xie, Zou, Davoodi (1999)	OLS and Fixed Effects Model, Time Dummies	Positive and significant
Akai,Nishimura, Sakata (2004)	50 states of USA (1992-97)	FD-EXP FD-REV	Barro (1990) & Xie, Zou, Davoodi (1999)	Fixed Effect Models with Province and Time Dummies Ml estimation.	A"hump-shaped" relationship between FD & Economic Growth
Wingender (2005)	10 provinces of Canada (1965-2004)	FD-EXP FD-REV	Davoodi and Zou (1998)	Fixed Effect Models with Time Dummies	Positive and significant in some provinces, but aggregated data do not present clear evidence of a significant impact.
Malik, hassan and Hussain (2006)	4 provinces of Pakistan (1971-2005)	FD-EXP FD-REV	Zhang and Zou (1998)	Time series analysis. OLS estimation.	Positive and significant & A"hump-shaped" relationship between FD & Economic Growth

Variable of FD*:
FD-EXP: ratio of local government expenditure to combined state and local government expenditure.
$FD\text{-}EXP_{EB}$: ratio of provincial extra budgetary to central extra-budgetary spending (per capita terms).
$FD\text{-}EXP_{B+EB}$: ratio of consolidated (budgetary + extra budgetary) provincial spending to consolidated central spending (per capita terms).
FD-REV: ratio of local government revenue to combined state and local government revenue
MRR-REV: the marginal retention rate of national budget revenues collected at the provincial level

improved it by detailing three levels of government. We will do the same here by defining these levels as the federal and provincial levels. Decentralization will therefore be represented as a higher share of sub national (provincial) government spending on total government spending. The production function is Cobb-Douglas, where k represents the level of private capital stock, which can be considered as a measure of both human and physical capital. Total government spending is divided in the two components federal (f) and provincial (p) government spending on goods and services respectively. The variables are all measured on a per capita basis.

$$y = k^{\alpha} f^{\beta} p^{\gamma} \ , \ \alpha + \beta + \gamma = 1 \tag{1}$$

Total government spending (g) is allocated as follows: $g = f + p$ and $f = \theta_f . g, p = \theta_p . g$ .When federal government's share of total expenditure is θ_f and provincial government's share is θ_p .

Consolidated government spending is financed by a flat income tax at a rate τ, which we will assume constant and Petroleum Revenue (*PRev*). We also make the further assumption of a balanced growth path, i.e. the government will not run any deficits or surpluses. To determine the long-run growth rate of the economy, we need to analyze the consumption and investment decisions made by the individuals.

We consider one representative agent facing an infinite planning horizon who maximizes his discounted utility subject to his dynamic budget constraint:

$$k^{\bullet} = dk / dt = (1-\tau) y - c = (1-\tau) k^{\alpha} f^{\beta} p^{\gamma} - c \tag{2}$$

And the government's budget allocation:

$$g = \tau y + p \,\mathrm{Re}\, v \tag{3}$$

He takes as given the government's announcement of the fix tax rate and the spending by the different levels of governments. The representative agent's preferences have the following form:

$$U(c) = \int_0^{\infty} \frac{c^{1-\sigma}}{1-\sigma} e^{-\rho t}; \sigma > 0, \sigma \neq 1 \tag{4}$$

Where c is per capita private consumption and ρ is a positive time discount rate. The individual chooses his optimal consumption path {c (t): t ≥ 0} and his investment path to determine the level of capital stock {k (t): t ≥ 0}.To find this optimal allocation of resources by the individual, we write down the Hamiltonian:

$$H_i = \frac{c^{1-\sigma}}{1-\sigma} e^{-\rho t} + \lambda \{(1-\tau)(k^{\alpha} f^{\beta} p^{\gamma}) - c\} \tag{5}$$

Where λ is a dynamic Lagrange multiplier.
By differencing on c and k we find the first order conditions *F.O.C.*

$$H_{ci} = \frac{\partial H}{\partial c} = 0 \Rightarrow c^{-\sigma} e^{-\rho t} = \lambda \tag{6}$$

$$H_{ki} = \frac{\partial H}{\partial k} = -\lambda^{\cdot} \Rightarrow \lambda (1-\tau) \frac{1}{\phi} \alpha k^{\alpha-1} f^{\beta} p^{\gamma} = -\lambda^{\cdot} \tag{7}$$

$$H_{\lambda i} = k^{\cdot}{}_i \Rightarrow k^{\bullet} = (1-\tau)(k^{\alpha} f^{\beta} p^{\gamma}) - c \tag{8}$$

Using the transversality condition $\lim_{t \to \infty} k \lambda e^{-\rho t} = 0$, the budget constraint 4 and by fixing the initial capital stock to k (0) = 1, we can find the growth rate of the economy.

$$\frac{y^{\bullet}}{y} = \frac{\alpha}{\sigma} [(1-\tau) \tau^{\frac{1-\alpha}{\alpha}} \theta_f^{\frac{\beta}{\alpha}} \theta_p^{\frac{\gamma}{\alpha}} - \rho] \tag{9}$$

Equation (9) shows that the long-run growth rate of per capita output is a function of the tax rate and the spending shares of the different levels of government. Thus, we see that the government can influence the growth rate of the economy by choosing among different spending shares for the federal and provincial levels. The model explicitly introduces the trade-off between provincial and federal government expenditure which is an important result of fiscal decentralization. This solution gives us an equation for empirical implementation where decentralization is measured as the share of local governments in total public spending. Also Equation (9), have some drawbacks for empirical estimation. First, the equation is nonlinear and can not be estimated using the traditional linear estimators for panel data usually employed. Second, there are some collinearity problems which may affect the significance and sign of the coefficient of the regression. The first case is the variables τ and (1-τ), which are perfectly collinear.

More important, if there are only two government levels, their shares on the public sector expenditure are perfectly collinear (i.e. $\theta_f = 1 - \theta_p$). Since equation (9) includes some transformation of these variables, the collinearity is not perfect. What the previous studies have done to avoid these two issues is to present a linear regression equation which attempt to be a linear approximation to the nonlinear specification. The estimated equation takes the form:

$$\gamma_{it} = C_0 + C_1\theta_{Pit} + C_2\tau_{it} + C_3X_{it} + C_4D_i + C_5N_t + u_{it}$$

where(i =1,...,I) and (t =1,...,N) refer to province i at time t; C_0, C_1, C_2 are scalar parameters while C_3, C_4, C_5 are vectors. The detailed specification of variables in Equation (10) is as follows:

γ_{it}(PerrealGrowth): the growth rate of real per capita Gross Domestic Product(GDP) in province i at time t.

θ_p :Proxy for Fiscal Decentralization (FD) i.e.: Ratio province of expenditure to consolidated government expenditure. Our primary concern in this empirical analysis is the sign and significance of the coefficient C_1 of the fiscal decentralization.

τ_{it} : Tax rate, percentage of province tax on province GDP i at time t.

D_i is a vector of *i*-1 province fixed- effects (i.e. province dummies); N_t is a vector of *t*-1 time fixed-effects(i.e. intercept time dummies).

Finally, in our empirical estimation, we also include: The vector *X* includes other exogenous variables that were not introduced in the model but generally introduced in growth regressions in an ad hoc fashion. These are: (i) the inflation rate of province; (ii) investment share of GDP (invtrate); (iii) Population Growth rate province *i* at *t*. (PopGrowth), u_{it} is the disturbance term that is assumed to be serially uncorrelated to the explanatory variables.

4. Empirical Results:

We estimate the growth regression equation (10) using the panel data technique, With and without the set of "other variables", *X*. Our basic regression includes the 5 first repressors in (10): a constant, percentage of province tax on province GDP (tax rate), degree of fiscal decentralization, as defined, region fixed-effects and time fixed-effects. We then look at the sign and significance of the coefficient of the fiscal decentralization variable as we add the "other variables".

Table 2: Summary Statistics

	PerrealGrowth	FD	Taxrate	Inflation	Invtrate	Popgrowth
Mean	8.650244	0.010185	0.019496	14.01521	0.031546	1.38549
Medain	7.308	0.007755	0.017955	14.2295	0.02562	1.29305
Maximum	164.798	0.05031	0.04805	25.441	0.13316	4.15006
Minimum	-24.922	0.00294	0.00153	6.199	0.00178	-2.39397
Std.Dev	15.10246	0.00741	0.009051	3.242528	0.021141	0.803414
Observation	168	168	168	168	168	168
Cross sections	28	28	28	28	28	28

To sum up, regression results in table (3) shows that over the period 2001-2007 there is a positive and nearly significant relationship between Fiscal Decentralization and economic growth in Iran, in the presence and absence of the control variables. It implies that higher fiscal decentralization associated with higher economic growth.

With respect to other variables, table (3) shows that the estimated coefficients are not always

Consistent with general theoretical and empirical studies on economic growth:(i) higher growth is associated with lower inflation. (ii) Growth is higher with lower investment rate over GDP

The explanatory power of the regressions is relatively high (adjusted R^2 between 0,42 and 0,78) and the critical F values would lead us to accept the general fixed-effect model of the Explanatory variables on growth.

Table 3: Regression Results Dep. Var: Provincial real Per Capita GDP Growth rate Method: Pooled EGLS (Cross-section weights) Total Pooled (balanced) observations: 168 Linear estimation after one-step weighting matrix White period or Cross-section standard errors & covariance (d.f.corrected)

Indep. var	1	2	3	4	5	6
Constant	20.3 (13.7)	20.1(10.2)	41.8(9.3)	43.7(7.6)	33 (5.01)	17.3(5.3)
tax rate	-699.4(-9.6)	-637.8(-8.2)	-831.9(-5.5)	-825.3(-5.1)	-795.5(-3.2)	-508.5(-2.96)
F D	198.5(2.5)	199.1 (3.7)	57.5 (1.52)	57.1 (1.51)	107.2(4.9)	127.2(6.03)
Invest rate	-	-8.6(-0.2)	17.7 (0.6)	18.1 (0.5)	29.7(0.97)	-
Inflation rate	-	-	-1.3(-6.5)	-1.29(-6.4)	-0.63(-2.95)	-
Popgrowth rate	-	-	-	1.51(-5.6)	-1.49(-5.9)	-
Adjusted R-square	0.61	0.64	0.76	0.78	0.42	0.52
Obs	168	168	168	168	168	168
No. of province	28	28	28	28	28	28
F value	8.7	9.4	15.8	15.8	4.8	7.3
Fixed effect(Cross)	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effect(period)	Yes	Yes	Yes	Yes	No	No

Note: t-statistics in parentheses.

5. Conclusions:

The main focus of this paper was to provide evidence on the relationship between fiscal decentralization and economic growth for Iran. First, we set up a simple analytical model to give a basic result of fiscal decentralization and economic growth. We used a cross-province fixed-effect panel data regression model over the 2001-2007 periods to investigate whether fiscal decentralization has any growth impact. The positive association between fiscal decentralization and provincial economic growth has been found to be consistently significant and nearly robust in Iran. This finding consistence with light of the conventional wisdom that fiscal decentralization usually makes a positive contribution to local economic growth.

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